

ZONE 1

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GN-502 84.10



ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT


PROJECT NO. 10E0541A01

DOCUMENT TITLE:

REFORMATE FEED TANK DATA SHEET

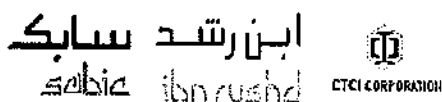
DOCUMENT NO:

DS-56-FA-501

| | | | | | | | | |
|-----------|--------------------|-----|------|-------|-----------|------------------------|--|---|
| | | | | | | ابن رشيد ibn.rashed | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA |  CTCI CORPORATION |
| CERTIFIED | | | | | | | | |
| 2 | Revised as Marked | LSH | SYL | YSL | 9-Aug-11 | PROJ. | | |
| 1 | Issued for Design | LSH | SYL | YSL | 22-Apr-11 | MGR | DATE | |
| 0 | Issue For Approval | LSH | SYL | YSL | 23-Mar-11 | CLIENT | DATE | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | XC32C-56-501 | |

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GN-504 84.10



**REFORMATE FEED TANK
DATA SHEET**

XC32C-56-501

2 OF 2

**DATE
09-Aug-2011**

**REV.
2**

CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 56-F-01 | 1 THRU 3 OF 3 | 2 | 09-Aug-2011 |

Attachment total 7 pages.

STORAGE TANK
DATASHEET

| | |
|----------------|----------------|
| Contract: | 10E0541A01 |
| Equip. No.: | 56-F-01 |
| Revision : | 2 |
| Unit : | 56 - Sulfolane |
| P.O. No.: | |
| Document No. : | DS-56-FA-501 |
| Sheet | 1 of 3 |

REV

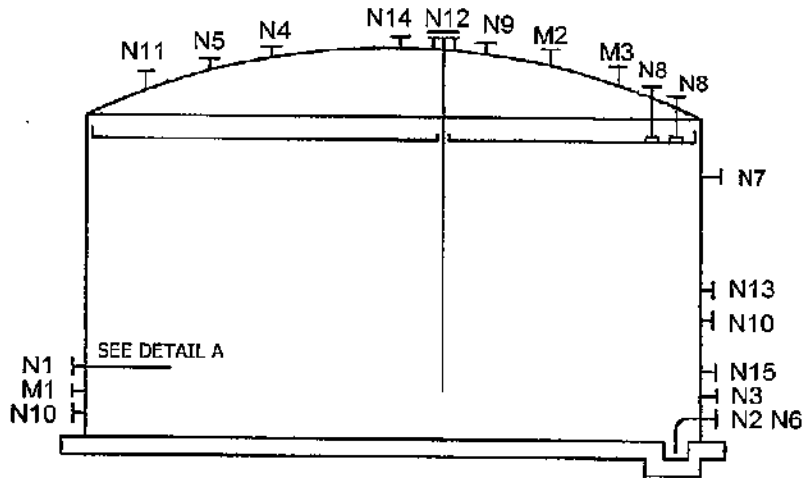
| | | | |
|----------|-----------------------------------|--------|--------------------------------|
| Client: | Arabian Industrial Fibers Company | Plant: | Sulfolane |
| Service: | Reformate Feed Tank | Site: | Yanbu, Kingdom of Saudi Arabia |

2

DESIGN SKETCH

VESSEL DIMENSIONS: ID: 34200 T/T: 18000 QTY: 1

1



1

| DESIGN CONDITIONS | | | CONSTRUCTION | | |
|-----------------------------|----------------------|----------|---------------------------------------|------------------------|---------------------|
| Pressure: | 254.0 | mmH2O(g) | MATERIALS | | CORROSION ALLOWANCE |
| Alt: | 85 | °C | Roof: | C.S. | NONE mm |
| Vacuum: | 100.0 | mmH2O(g) | Shell: | C.S. | 1.5 mm |
| Alt: | | °C | Internal: | | mm |
| Min. Design Metal Temp: | Existing (Note 10) | °C | | | |
| Alt: | | bar(g) | | | |
| Liquid Level: | | mm | | | |
| Specific Gravity of Liquid: | 0.762 | | | | |
| Alt: | 15 | °C | | | |
| OPERATING CONDITIONS | | | NOTES & SPECIAL CONDITIONS | | |
| Fluid: | Aromatic Hydrocarbon | | Roof Type: | Internal Floating Roof | |
| Pressure + : | 12.7 | mmH2O(g) | Stress Relieve (Process Reason Only): | - | |
| Alt: | 50 | °C | Earthquake Design: | - | |
| Vacuum - : | | mmH2O(g) | Roof Tie Rods: | - | |
| Alt: | | °C | Seismic Zone: | - | |
| Low Temperature: | | °C | Essential Facilities Factor: | - | |
| Alt: | | mmH2O(g) | Site Amplification Factor: | - | |
| Hydrogen Partial Pressure: | | mmH2O(g) | Zone Coefficient: | - | |
| Alt: | | °C | Roof Tie Rods: | - | |
| INSULATION | | | | | |
| Type: | | | | | |
| Req'd Thickness: | | | | | |
| Fireproofing: | | | | | |

1

STORAGE TANK
DATASHEET

Contract: 10E0541A01
Equip. No.: 56-F-01
Revision : 2 Date: 09-Aug-2011
Unit : 56 - Sulfolane
P.O. No.:
Document No. : DS-56-FA-501
Sheet 2 of 3

REV

NOZZLE SCHEDULE

| TAG | QTY | SIZE in | PRESSURE RATING | DESCRIPTION |
|-----|-----|------------|--------------------|--------------------------------------|
| M1 | 2 | 24 | 150#RF | Shell Manhole |
| M2 | 1 | 24 | 150#RF | Roof Manhole |
| M3 | 1 | 36 | 150#RF | Roof Manhole |
| N1 | 1 | 10 | 150#RF | Filling Nozzle |
| N2 | 1 | 4 | 150#RF | Spare Nozzle |
| N3 | 1 | 1 | 150#RF | Temperature Indicator Nozzle |
| N4 | 1 | 1 | 150#RF | Gas Blanketing Nozzle |
| N5 | 1 | 4 | 150#RF | Gas Blanketing Nozzle |
| N6 | 1 | 4 | 150#RF | Drain Nozzle W/ Sump |
| N7 | 9 | 2 1/2 | 150#RF | Foam Nozzle |
| N8 | 2 | 1 1/2 | 150#RF | Level Indicator |
| N9 | 1 | 8 | 150#RF | Pressure / Vacuum Vent (Note 6) |
| N10 | 1 | 4 | 150#RF | Filling Nozzle |
| N11 | 1 | 20 | 150#RF | Emergency Vent |
| N12 | 1 | 8 | 150#RF | Gauge Hatch W/6" Slot Dipping Device |
| N13 | 1 | 4 | 150#RF | Spare Nozzle |
| N14 | 1 | 2 | 150#RF | Gas Transfer Nozzle |
| N15 | 1 | 10 | 150#RF | Suction Nozzle |

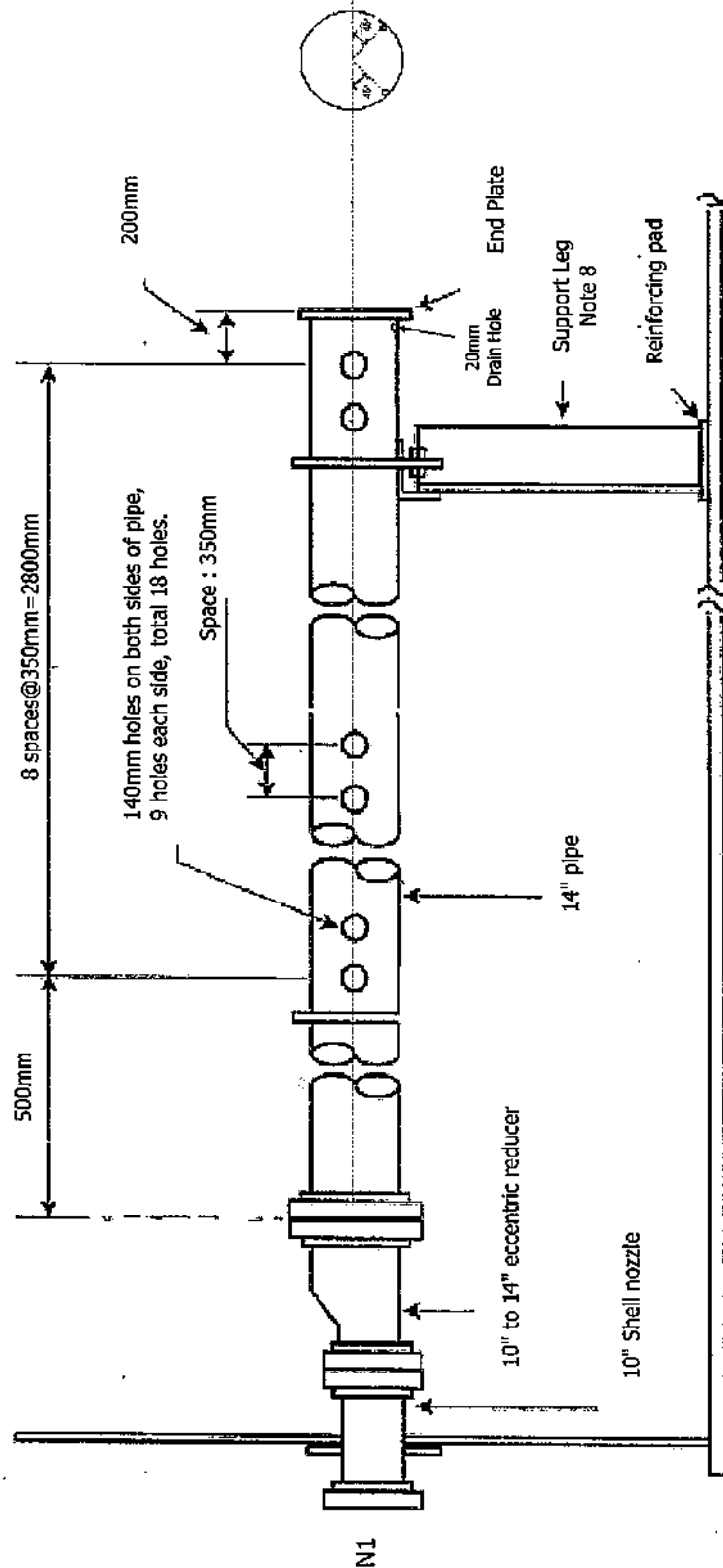
NOTES:

- Formerly Aromatics Storage Tank, 58-F-02.
- Locating filling and suction nozzles 180° apart to allow sufficient residence time for water settling and thermal equilibrium.
- Flash point = -17°C.
- Nominal Capacity = 16500 m³, Working Capacity = 14238 m³.
- Pump In Rate = 308.9 (m³/h) & Pump Out Rate = 255 (m³/h).
- CTCI shall confirm PSV nozzle size.
- Vapor Pressure : 0.496 bar(a) @ 38°C
- Support shall be confirmed by manufacturer.
- Liquid level: HHLL: 16500 mm HLL: 14400 mm, LLL: 3600mm, LLLL: 1000mm.
- The Min. Design Ambient Temperature should be 6 °C.
- Dimensions are in millimeter unless otherwise noted.
- Add 10" new nozzle N15 for pump suction.
- Limit the inlet velocity to 3 ft/s(1 m/s) until inlet pipe is submerged. Add new distributor at N1 nozzle as detail A.
- Add new one (1) N8 nozzle.
- Existing design pressure : 254 mmH₂O(g)@85°C, New design condition : same as existing.

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DETAIL A



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SPECIFICATION

FOR

**58-F-01 A, B
58-F-02**

FOR CONSTRUCTION

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| MARK | DESCRIPTION | BY | CHKD | APVD | DATE |
|------|----------------|-----------|-------|------|-----------|
| ◇ | | | | | |
| ◇ | | | | | |
| ◇ | | | | | |
| ◇ | As per ACL-185 | K. Hamada | M. Ma | | 1 Aug '91 |

REVISIONS

| | | | |
|----------------|---|------|------------------|
| CLIENT : | ARABIAN INDUSTRIAL FIBERS COMPANY (IBN RUSHD) | APVD | <i>M. Doyle</i> |
| PROJECT TITLE: | IBN RUSHD PTA & AROMATICS PROJECT - AROMATICS | CHKD | |
| JOB NO. : | 51046 | MADE | <i>K. Hamada</i> |
| DOC NO. : | SP-58-F-001 | DATE | 22 Apr. '96 |



UOP

CTCI CORPORATION

25 East Algonquin Road - PO Box 5017 - Des Plaines, Illinois 60017-5017 - USA

PROJECT SPECIFICATION

560696 - 306 - 1 SHEET 1

| REV | DATE | BY | APPD | REV | DATE | BY | APPD |
|-----|---------|-----|------|-----|------|----|------|
| 0 | 7/10/75 | SAW | | | | | |
| 1 | 5/15/75 | SAW | NK | | | | |

ATMOSPHERIC STORAGE TANKS

Benzene/Toluene Fractionation Unit

| Item Number | Service | Sheet |
|-----------------------------------|------------------------|-------|
| | References | 2 |
| | General Notes | 2 |
| | Specific Notes | 3 |
| F-5801A, B 58-F-01A, B | Benzene Day Tank | 4 |
| F-5802 58-F-02 | Aromatics Storage Tank | 5 |

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① This equipment shall be designed and constructed in accordance with the following UOP Standard Specifications: 3-16-3, 7-11-0, 9-11-1, 9-16-1



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CTCI CORPORATION

PROJECT SPECIFICATION

560696 - 306 - 1 SHEET 2

| REV | DATE | BY | APPD | REV | DATE | BY | APPD |
|-----|---------|-----|------|-----|------|----|------|
| 0 | 4/10/95 | | | | | | |
| 1 | 5/15/95 | SMW | NK | | | | |
| | | | | | | | |
| | | | | | | | |

ATMOSPHERIC STORAGE TANKS

I. References

- A. UOP Standard Specification 3-16 Storage Tanks Atmospheric
- B. UOP Standard Specification 7-11 Electrical (For Tank Grounding)
- C. UOP Standard Specification 9-11 External Thermal Insulation
- D. UOP Standard Specification 9-16 Painting
- E. UOP Standard Specification 9-21 Fire Protection
- F. API 650 Welded Steel for Oil Storage

◇ Tanks

II. General Notes

- A. Tanks shall be designed, fabricated and tested in accordance with the above references, except as modified in this specification. ◇ Deleted
- B. ~~Alternate tank sizing may be offered if a cost saving to the owner can be demonstrated. Nominal tank capacity must be maintained. Any alternate must be approved by the owner.~~
- C. ~~Alternate dome or umbrella roof may be offered in place of cone roof, where feasible, and where a cost saving to the owner can be demonstrated. Nominal tank capacity must be maintained. Any alternate must be approved by the owner.~~ ◇ Deleted
- D. All tanks shall be grounded.
- E. See Project Specification 614 included under same project number as this specification for level gauges that will be used and furnished by others.
- F. Where gas blanketing is used see Project Specification 617 included under same project number as this specification for gas blanketing control valves that will be used and furnished by others.
- G. Where propeller type tank mixers are required see Project Specification 316 included under same project number as this specification for the mixer that will be provided and furnished by others.
- H. Where tank heaters are required see Project Specification 318 included under same project number as this specification for the type of heater that will be used and furnished by others.
- I. All connections shall be flanged.
- J. Working capacity must be maintained.
- ① K. Fixed roof tank and internal floating roof tanks shall be provided with a subsurface or semi-fixed foam injection system, type II discharge outlet, suitable foam maker, and connecting piping. Piping terminates outside the tank dike walls.

◇ (For the Type II, refer to the attached Figure A-1-4 (P) of NFPA 11.)

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Rev. 1
2/85

509308

7-2



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PROJECT SPECIFICATION

560696 - 306 0 SHEET 3

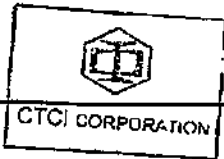
| REV | DATE | BY | APPD | REV | DATE | BY | APPD |
|-----|---------|----|------|-----|------|----|------|
| 0 | 4/10/75 | | | | | | |
| | | | | | | | |
| | | | | | | | |

ATMOSPHERIC STORAGE TANKS

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III. Specific Notes (See Specific Tank Sheets for Notes that Apply)

1. Filling and suction nozzles to be located 180 degrees apart to allow sufficient residence time for water settling and thermal equilibrium.
2. Provide one 4 inch gas tight gauging and sampling device including all necessary accessories, to permit gauging and sampling without venting gas to atmosphere.
3. Tank shall be designed with a frangible joint ^{per API-650,} and an emergency manhole ^{with} cover.
4. The tank shell thickness shall be calculated in accordance with the applicable requirements of API 650 using the minimum corrosion allowance as 1/16 inch (1.5 mm) for all rings. The minimum corrosion allowance used shall be 1/16 inch (1.5 mm) for the tank bottoms.
5. Inlet velocity shall be limited to three feet per second (one meter per second) until inlet pipe is submerged. Inlet distributors may have to be added to limit the inlet velocity.
6. The filling rate and the pumpout rate are based on maximum rates. The contractor shall design the venting system based on 1.5 times the filling/pumpout rates shown. The contractor shall adjust the pumpout rate to account for the flow rate that occurs when the tank is drained.
7. The tanks shall be furnished with an internal floating roof as per API Standard 650 "Welded Steel Tanks for Oil Storage" Appendix H. Each internal floating roof shall be equipped with a liquid mounted primary seal, a wiper type secondary seal made of a resilient material and gasketed fittings. The tank will be gas blanketed and equipped with pressure/vacuum vents on all openings in outer shell of roof.



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ATMOSPHERIC STORAGE TANKS

| PROJECT SPECIFICATION | | | | | | | |
|-----------------------|---------|-----|------|---------|--------|-----|------|
| 560696 - 306 - 4 | | | | SHEET 4 | | | |
| REV | DATE | BY | APVD | REV | DATE | BY | APVD |
| 0 | 4/10/85 | | | 4 | 1/5/96 | ASA | ASA |
| 1 | 4/12/85 | NK | NK | | | | |
| 2 | 5/15/85 | SMW | NK | | | | |
| 3 | 7/2/85 | SMW | NK | | | | |

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| | | |
|---|----------------------------------|--------------------------------|
| Tank Name | | Benzene Day Tank |
| Item Number | | 58-F01A, B 5801A, B |
| Number of Tanks | | 2 |
| Tank Size | Nominal Capacity, m ³ | 1830 |
| | Diameter, m ID | 13.4 |
| | Height, m | 13.0 |
| Working Capacity, m ³ | | 1418 |
| Material of Construction | | Carbon Steel |
| Design Pressure, mmH ₂ O(g) | | 254 |
| Design Vacuum, mmH ₂ O(g) | | 100 |
| Design Temperature, °C | | 85 |
| Roof Type: C = Cone F = Floating IF = Internal Floating | | ◇ C & IF |
| Tank Contents | Material Stored | Benzene |
| | Density kg/m ³ @ 15°C | 859 |
| Flash Point (above or below 38°C) | | Below |
| Storage Temperature, °C | | 40 max |
| Filling Nozzle | | 1 @ 6" |
| Suction Nozzle | | 1 @ 16" |
| Temperature Indicator Nozzle | | 1 @ 1" ◇ |
| Recirculation Nozzle | | 1 @ 6" |
| Gas Blanketing Nozzle (Roof) | | 1 @ 1" |
| Gas Blanketing Nozzle (Roof) | | ① 1 @ 2" |
| Drain Valve Nozzle | | 1 @ 4" |
| Foam Chambers | | Provide |
| Level Indicator Nozzle | | 1 @ 1-1/2" |
| Pressure/Vacuum Vent Nozzle | | Provide |
| Filling Rate, m ³ /h | | 50.9 |
| Pumpout Rate, m ³ /h | | 609.5 |
| Notes - See Sheet 3 | | 1,2,3,4,5,6,7 |

509310



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25 East Algonquin Road - PO Box 5017 - Des Plaines, Illinois 60017-5017 - USA

ATMOSPHERIC STORAGE TANKS

PROJECT SPECIFICATION

560896 - 306 - 4

SHEET 5

| REV | DATE | BY | APVD | REV | DATE | BY | APVD |
|-----|---------|-----|------|-----|--------|-----|------|
| 0 | 4/10/95 | | | 4 | 1/5/96 | ASA | ASA |
| 1 | 4/12/95 | NK | NK | | | | |
| 2 | 5/15/95 | SMW | NK | | | | |
| 3 | 7/2/95 | SMW | NK | | | | |

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| | | |
|--|----------------------------------|--------------------------|
| Tank Name | | Aromatics Storage Tank |
| Item Number | | 58-N-02 58002 |
| Number of Tanks | | 1 |
| Tank Size | Nominal Capacity, m ³ | 16500 |
| | Diameter, m ID | 34.2 |
| | Height, m | 18.0 |
| Working Capacity, m ³ | | 13800 |
| Material of Construction | | Carbon Steel |
| Design Pressure, mmH2O(g) | | 254 |
| Design Vacuum, mmH2O(g) | | 100 |
| Design Temperature, °C | | 85 |
| Roof Type: C = Cone F = Floating IF = Internal Floating | | ① Dome & IF |
| Tank Contents | Material Stored | Aromatics |
| | Density kg/m ³ @ 15°C | 854 |
| Flash Point (above or below 38°C) | | Below |
| Storage Temperature, °C | | 40 max |
| Filling Nozzle | | ① 1 @ 10" |
| Filling Nozzle (from desorbent surge drum at MX Sorbex Unit) | | ① 1 @ 4" |
| Suction Nozzle | | 1 @ 4" |
| Temperature Indicator Nozzle | | 1 @ 1" ① |
| Gas Blanketing Nozzle (Roof) | | 1 @ 1" |
| Gas Blanketing Nozzle (Roof) | | 1 @ 4" |
| Drain Valve Nozzle | | 1 @ 4" |
| Level Indicator Nozzle | | 1 @ 1-1/2" |
| Foam Chambers | | Provide |
| Pressure/Vacuum Vent Nozzle | | Provide |
| Filling Rate, m ³ /h | | ① 262 |
| Pumpout Rate, m ³ /h | | 14.4 |
| Notes - See Sheet 3 | | 1,2,3,4,5,6,7 |

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2-4



◇ New sheet added

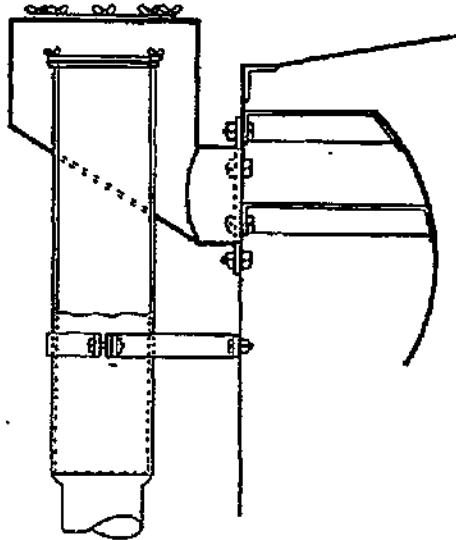


Figure A-1-4(p) Air foam chamber with Type II outlet.
NFPA

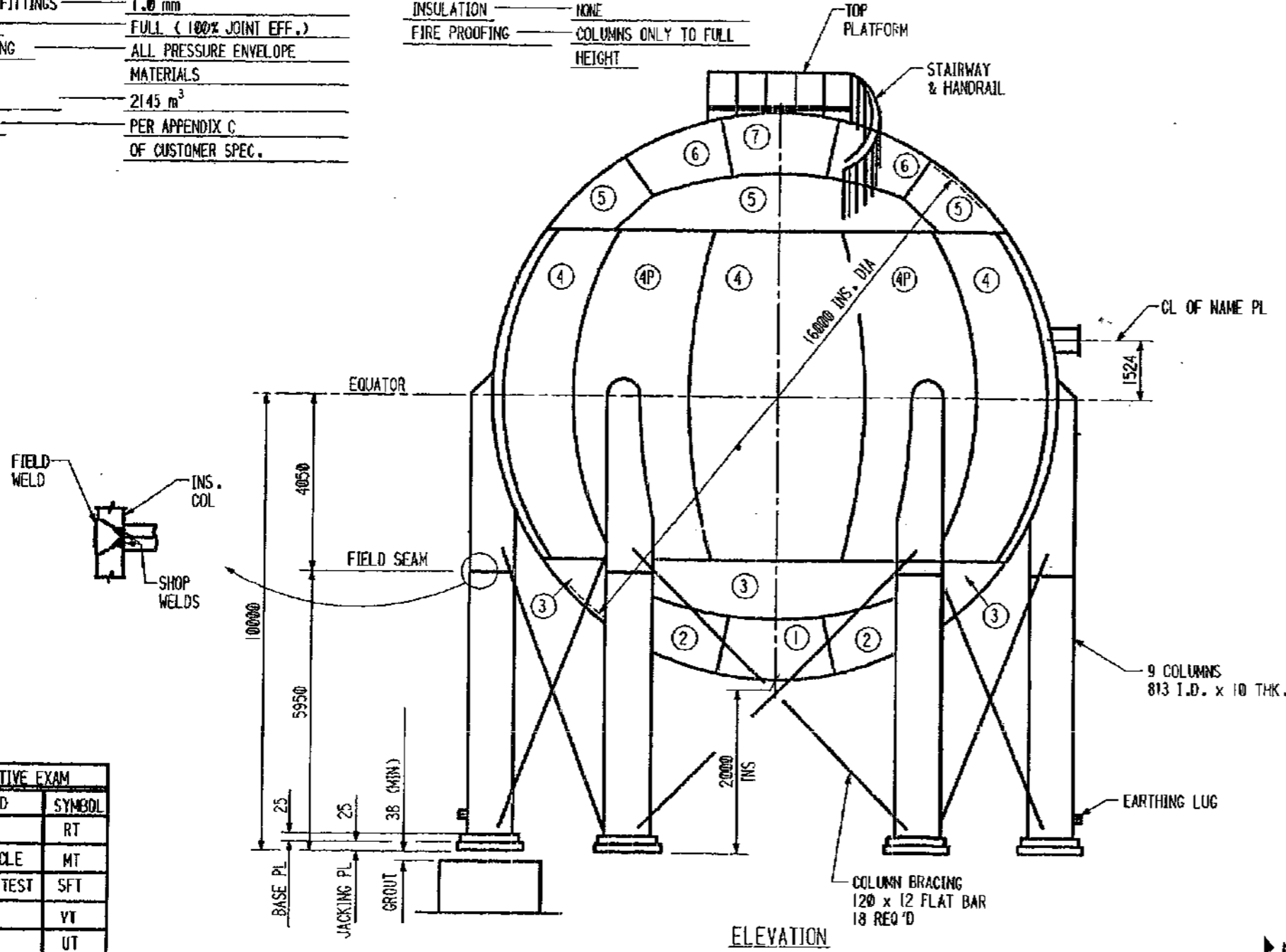
TECHNICAL & CONSTRUCTION INFORMATION

| | |
|------------------------|--------------------------------------|
| DESIGN CODE | ASME SEC VIII, DIV 2, 95 ED & 95 ADD |
| CUSTOMER SPEC. | 22854-SP-000-D-003 |
| SPECIFIC GRAVITY | 0.52 |
| SERVICE | PROPANE |
| MAX DESIGN METAL TEMP. | 85°C |
| MIN DESIGN METAL TEMP. | -46°C |
| DESIGN PRESSURE | 20 barg AT 85°C |
| TEST PRESSURE | 25 barg PER AT-301 |
| ALLOWABLE VACUUM | 1.034 barg |
| DESIGN WIND VELOCITY | 125 km/h (ASCE 7-88) |
| SEISMIC | ZONE I (ASCE 7-88) |
| FOUNDATION | BY OTHERS |
| CONSTRUCTION | BY ACBI |
| CORROSION ALLOWANCE | |
| SHELL | 1.0 mm |
| FITTINGS | 1.0 mm |
| RADIOGRAPHY | FULL (100% JOINT EFF.) |
| IMPACT TESTING | ALL PRESSURE ENVELOPE MATERIALS |
| CAPACITY | 2145 m ³ |
| TOLERANCES | PER APPENDIX C OF CUSTOMER SPEC. |

| | |
|----------------------|---|
| MATERIAL SPEC | |
| SHELL PLATES | SA537 - CLASS 2 |
| COLUMN STUBS | SA537 - CLASS 2 |
| LOWER COLUMNS | A36 |
| FORGINGS | SA350 - LF2 (IMPACTS AT -48°C) |
| INTERNAL PIPE | A333 GR6 |
| BRACING | A36 |
| BASE PLATES | A36 |
| GASKETS | 316 STN STL SPIRAL WOUND GRAPHITE FILLED (ASBESTOS FREE) |
| STUD BOLTS | SA320-L7 |
| NUTS | SA194-GR4 |
| FIELD PWHT | ENTIRE SPHERE |
| INSULATION | NONE |
| FIRE PROOFING | COLUMNS ONLY TO FULL HEIGHT |

| MARK | NO. | REQ'D | THK'S |
|------|-----|-------|-------|
| 1 | 1 | 1 | 46.37 |
| 2 | 2 | 2 | 46.37 |
| 3 | 4 | 4 | 46.31 |
| 4 | 9 | 9 | 46.21 |
| 4P | 9 | 9 | 46.21 |
| 5 | 4 | 4 | 45.06 |
| 6 | 2 | 2 | 44.89 |
| 7 | 1 | 1 | 44.89 |

| CUST. MARK | ACBI MARK | QUANT | SIZE | RATING | DESCRIPTION |
|------------|-----------|-------|---------|----------|---|
| J1 | 9-1 | 1 | 4" | 300# RF | TOP NOZZLE W/INTERNAL (LIC) |
| J2 | 6-1 | 1 | 8" | 300# RF | TOP NOZZLE W/INTERNAL (LI) |
| J3 | 8-1 | 1 | 4" | 300# RF | TOP NOZZLE W/INTERNAL (LALL) |
| J4 | 7-1 | 1 | 4" | 300# RF | TOP NOZZLE W/INTERNAL (LAHH) |
| J5 | 5-1 | 1 | 2" | 300# RF | TOP NOZZLE W/INTERNAL (TI) |
| M1 | 11-A | 1 | 24" | 300# RF | TOP MANHOLE W/DAVIT |
| N1 | 4-1 | 1 | 8" | 300# RF | TOP NOZZLE W/INTERNAL (LIQ. IN) |
| N2 | 10-A | 1 | 24"/12" | STUB END | BOTTOM NOZZLE W/VORTEX BREAKER (LIQ. OUT) |
| N3 | 3-1 | 1 | 8" | 300# RF | TOP NOZZLE (RELIEF) |
| | 14-A | 1 | | | NAMEPLATE |
| | 15-1 | 2 | | | EARTHING LUGS |
| | | 1 | | | FIREWATER SPRAY SYSTEM |



AS - BUILT

- NOTES:**
- SEE DWG #2 FOR NOZZLE ORIENTATION.
 - SEE DWG # 35 FOR STAIRWAY KEY PLAN.
 - SEE DWG # F1 FOR FOUNDATION LOADS AND COLUMN LOCATIONS.

| METHOD | SYMBOL |
|--------------------|--------|
| RADIOGRAPHIC | RT |
| MAGNETIC PARTICLE | MT |
| SOLUTION FILM TEST | SFT |
| VISUAL | VT |
| ULTRASONIC | UT |

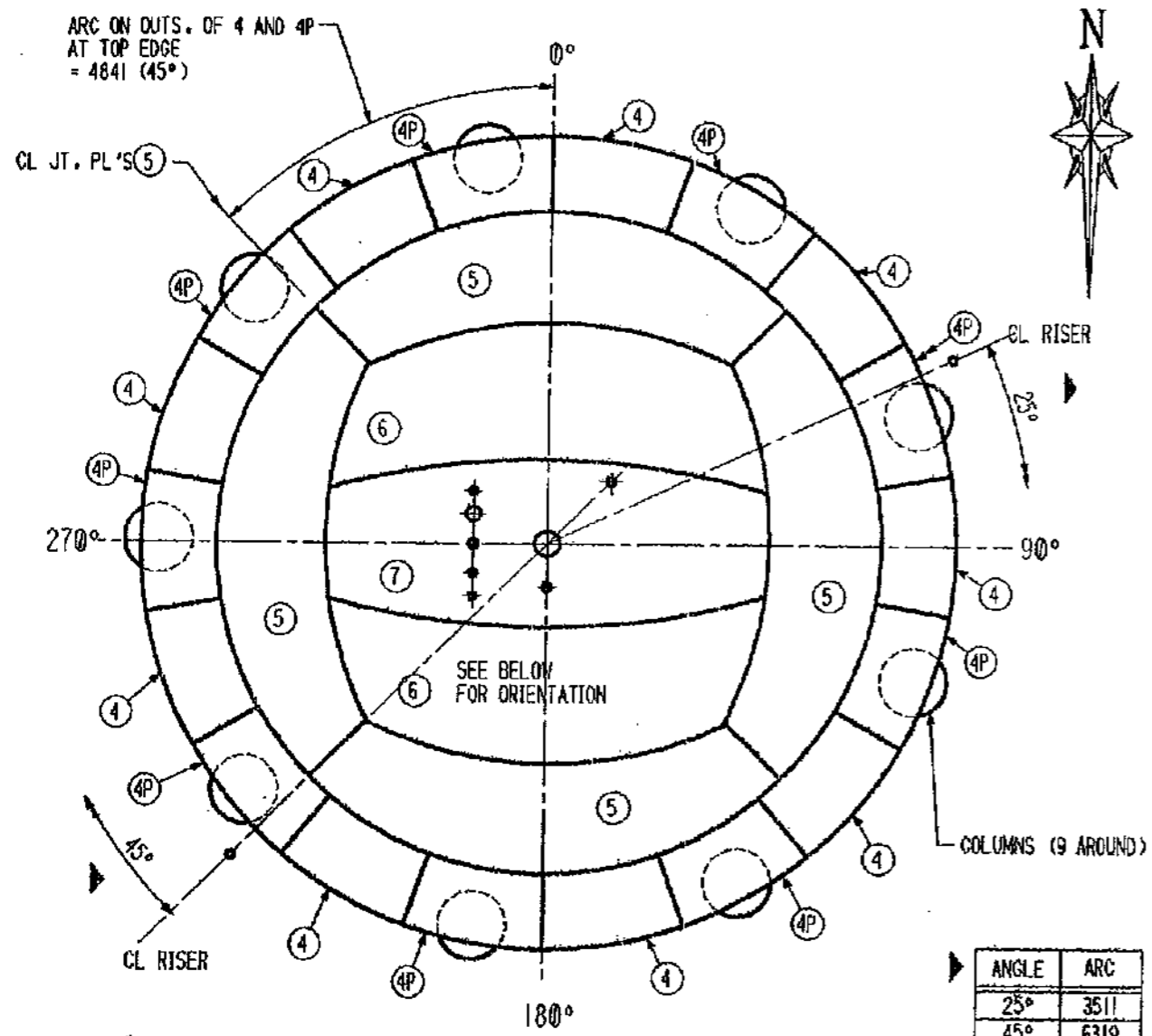
| | | | |
|---|--|---|--|
| | | ARABIAN CBI LTD. GENERAL ARRANGEMENT 16.0 M ID PROPANE SPHERE IGB RUSHID PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDIA ARABIA | |
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12-0301-65212001-2021

INDICATES CHANGE FROM PREVIOUS ISSUE

08:30:07 Oct. 9, 1996

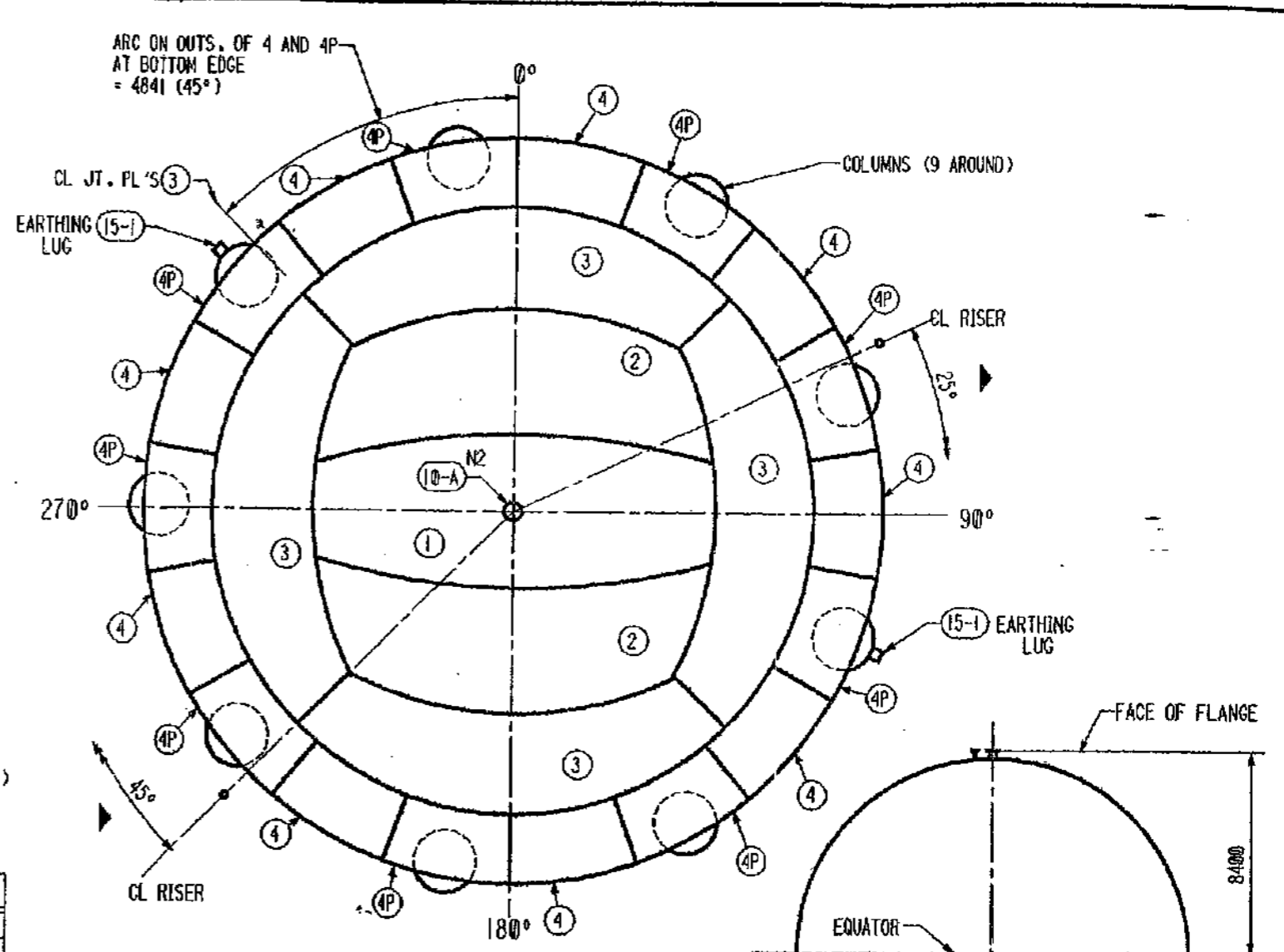
65212002.DGN



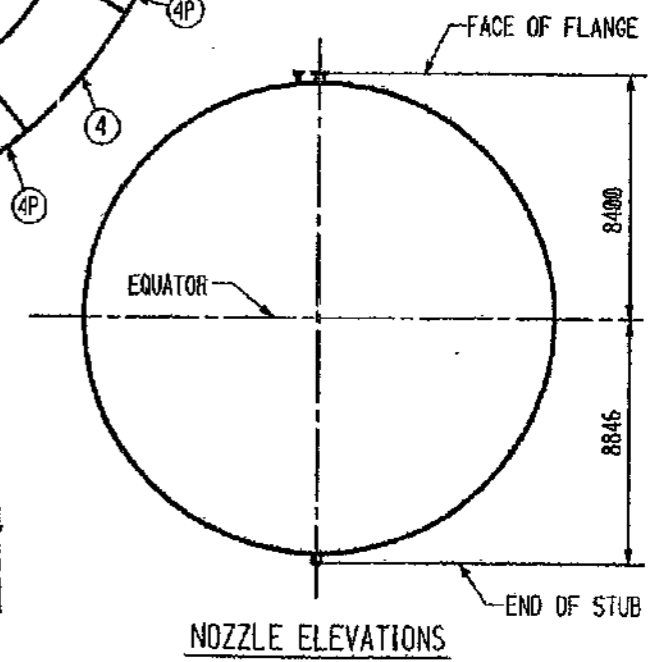
TOP PLAN

| ANGLE | ARC |
|-------|------|
| 25° | 3511 |
| 45° | 6319 |

ARCS ARE MEASURED ON OUTSIDE AT EQUATOR

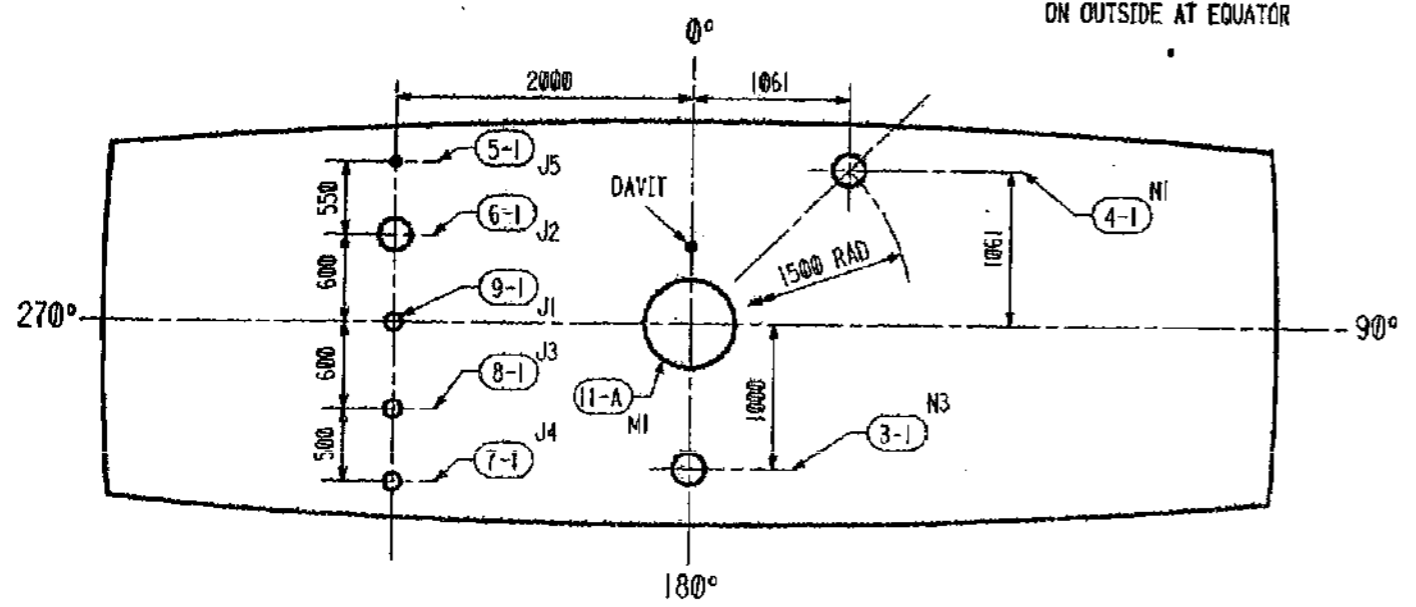


BOTTOM HEAD PLATES INSIDE VIEW



NOZZLE ELEVATIONS

AS - BUILT



FITTINGS IN TOP HEAD (OUTSIDE VIEW)

INDICATES CHANGE FROM PREVIOUS ISSUE

| | |
|---|------------------------|
| ARABIAN CBI LTD. | |
| ORIENTATION | |
| 16.0 M ID PROPANE SPHERE | |
| IBN RUSHD PTA AND AROMATICS PLANT PROJECT | |
| ARABIAN INDUSTRIAL FIBERS CO. LTD | |
| YANBU, SAUDIA ARABIA | |
| ITEM NO | 101-D-001 |
| CONTRACT NO | 965212 |
| BY DRW | CHKD R.H. DATE 11/5/96 |
| ENGINEERING SUPERVISOR | R.A. HERBERT |
| DATE | 2-18-97 |
| NO. OF SHEETS | 2 |
| SHEET NO. | 2 |

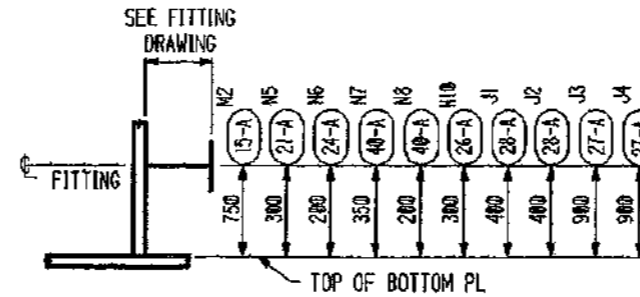
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TECHNICAL & CONSTRUCTION INFORMATION

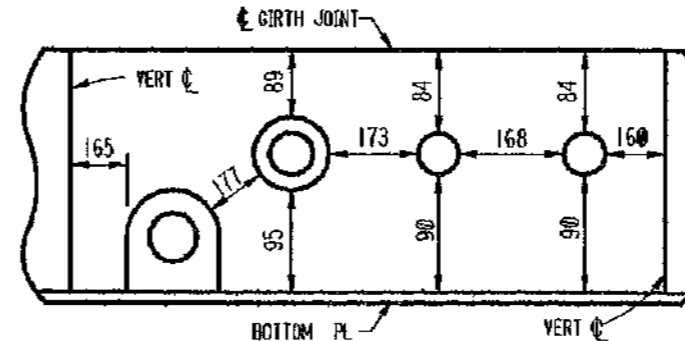
| | |
|-------------------------------|-------------------------------------|
| SPECIFICATIONS | API 650-9th ED. (1993/94 ADD.) |
| | APP. E, F, I.2, & S (NON CERTIFIED) |
| SPECIFIC GRAVITY | 1.050 |
| SERVICE | ACETIC ACID |
| MAX DESIGN METAL TEMP. | 85°C |
| MIN DESIGN METAL TEMP. | 17°C |
| DESIGN PRESSURE | 0.025 bar (g) |
| DESIGN VACUUM | 0.006 bar (g) |
| DESIGN LIQUID LEVEL | 15000 mm |
| DESIGN WIND VELOCITY | 140 km/h (PER API 650) |
| SEISMIC | ZONE I (I=1.0, S=1.2) |
| | PER API 650 |
| ROOF LIVE LOAD | 1.2 KPa PLUS VACUUM |
| NOMINAL CAPACITY | 4710 m ³ |
| PUMP IN RATE | 120 m ³ /hr |
| PUMP OUT RATE | 85 m ³ /hr |
| FOUNDATION | BY OTHERS |
| CONSTRUCTION | BY ARABIAN CBI |
| CORROSION ALLOWANCE | |
| BOTTOM | 1.0 mm |
| SHELL | 1.0 mm |
| ROOF | 1.0 mm |
| STRUCTURAL | 1.0 mm |

| | |
|----------------------------|--------------------|
| MATERIAL SPEC | |
| BOTTOM RECT. | A240-316L |
| BOTTOM SKETCHES | A240-316L |
| SHELL PLATES | A240-316L |
| ROOF PLATES | A240-316L |
| STRUCTURAL | A479-316L & A36 |
| FLANGES | A182-F316L |
| NOZZLE NECKS | A312-TP316L |
| INTERNAL PIPE | A312-TP316L |
| INSPECTION - MILL | CTR'S |
| SHOP | ACBI |
| FIELD | ACBI & CUSTOMER |
| SURFACE PREPARATION | YES |
| PAINTING | YES |
| PHWT | NONE |
| INSULATION | YES |
| MISC. | |
| GASKETS | REINZ-AMF34 |
| BOLTS & NUTS | A193-B8M & A194-8M |
| RADIOGRAPHY | PER CODE |
| JOINT EFFICIENCY | N/A |

| RING NO. | CORR. ALLOW. mm | DESIGN FOR PRODUCT SO-1.850 | | DESIGN FOR TEST SO-1.0 | | THK. USED mm | MATERIAL SPECIFICATION | API NAT'L GROUP NO. |
|----------|-----------------|-----------------------------|------------------|------------------------|------------------|--------------|------------------------|---------------------|
| | | ALLOWABLE STRESS MPa | REQUIRED THK. mm | ALLOWABLE STRESS MPa | REQUIRED THK. mm | | | |
| 1 | 1.0 | 131.1 | 12.54 | 155.1 | 9.29 | 12.54 | A240-316L | N/A |
| 2 | 1.0 | 131.1 | 10.14 | 155.1 | 7.38 | 10.14 | A240-316L | N/A |
| 3 | 1.0 | 131.1 | 7.84 | 155.1 | 5.53 | 8.00 | A240-316L | N/A |
| 4 | 1.0 | 131.1 | 5.54 | 155.1 | 3.67 | 6.00 | A240-316L | N/A |
| 5 | 1.0 | 131.1 | 3.26 | 155.1 | 1.83 | 6.00 | A240-316L | N/A |



SHELL FITTING ELEVATION



SKETCH 'A'
(BOTTOM RING ONLY)

GENERAL NOTES:

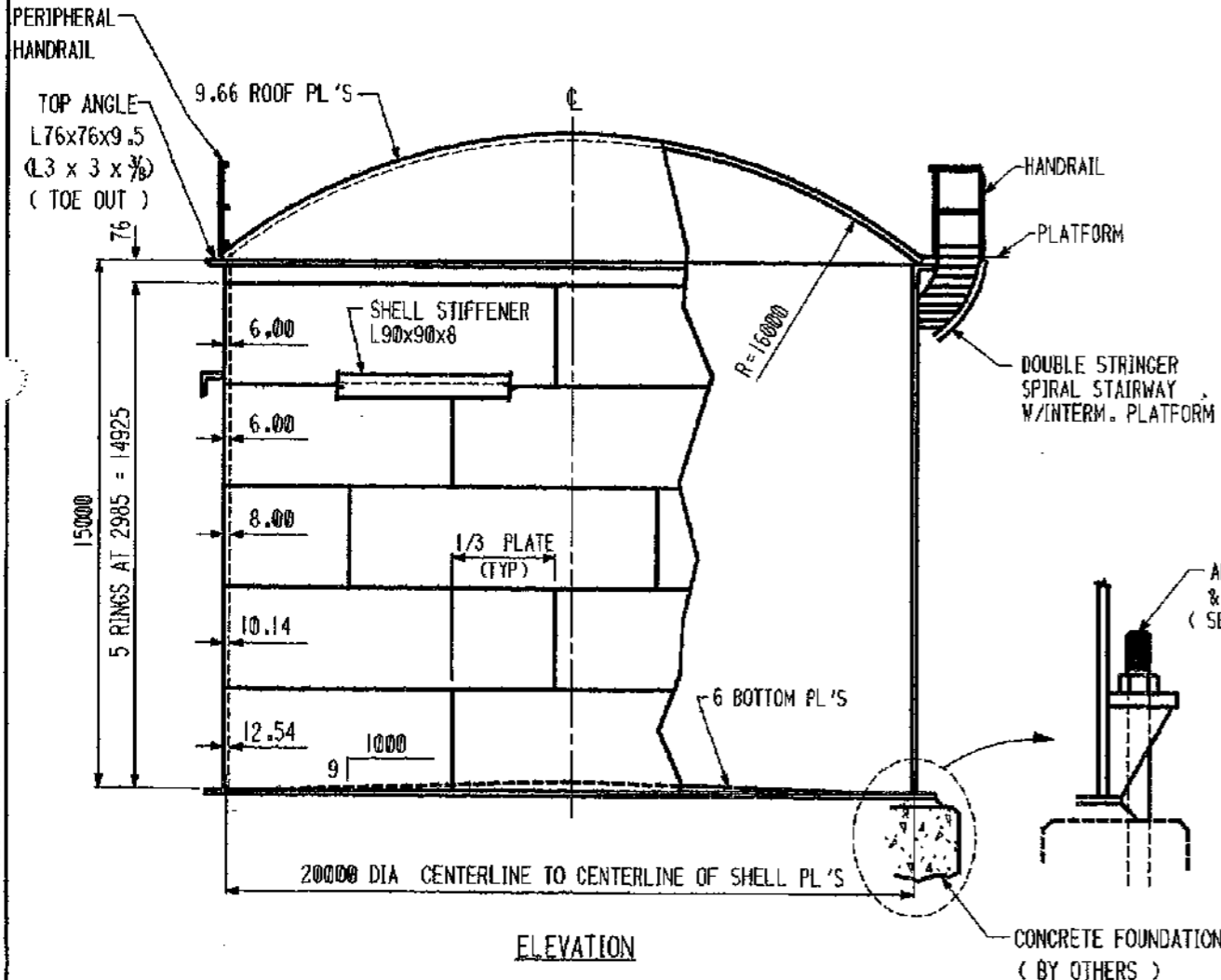
- FITTINGS TO BE LOCATED AS SHOWN ON ORIENTATION DRAWING(S). IF LOCATIONS ARE NOT GIVEN, LOCATE IN FIELD TO SUIT CUSTOMER MAINTAINING MINIMUM SPACING SHOWN IN SKETCH 'A'. DIMENSIONS GIVEN ARE FROM EDGE TO EDGE OF REINFORCING PL OR FROM CL OF BUTT WELD TO EDGE OF REINFORCING PL.
- FLANGE BOLT HOLES TO STRADDLE VERTICAL CENTERLINE FOR SHELL NOZZLES.
- FLANGE BOLT HOLES TO STRADDLE 0°-180° CENTERLINE FOR ROOF NOZZLES.
- SEE SHEETS 800 & 802 FOR MATERIAL MANAGEMENT.

STEVE COYLE
SABCO QA/QC
18 MAY 1999

AS-BUILT
KTT ACIB

LIST OF FITTINGS

| CUST. MARK | ACBI MARK | QUANT | SIZE | RATING | DESCRIPTION |
|------------|-----------|-------|------|---------|---------------------------------------|
| M1 | 30-A | 1 | 24" | API | ROOF MANWAY |
| M2 | 15-A | 1 | 24" | API | SHELL MANHOLE |
| N1 | 39-A | 1 | 8" | 150 RF | ROOF NOZZLE ACID FILL W/INT. |
| N2 | 36-A | 1 | 3" | 150 RF | ROOF NOZZ PUMP SPILLBACK W/INT. |
| N3 | 31-A | 1 | 6" | 150 RF | ROOF NOZZ VENT |
| N4 | 38-A | 1 | 3" | 150 RF | ROOF NOZZLE VAPOUR RETURN |
| N5 | 21-A | 1 | 6" | 150 RF | SHELL NOZZLE PUMP SUCTION |
| N6 | 24-A | 1 | 3" | 150 RF | SHELL NOZZLE DRAIN W/INT. |
| N7 | 40-A | 1 | 2" | 150 RF | SHELL NOZZLE STEAM IN |
| N8 | 40-A | 1 | 2" | 150 RF | SHELL NOZZLE STEAM OUT |
| N9 | 35-A | 1 | 8" | 150 RF | ROOF NOZZ LEVEL TEMP SERVO W/INT. |
| N10 | 26-A | 1 | 6" | 150 RF | SHELL NOZZLE SPARE |
| J8 | 42-A | 1 | 12" | 150 RF | ROOF NOZZLE (EMERGENCY VENT) |
| J1 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LT |
| J2 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LT |
| J3 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE TIC |
| J4 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE TI |
| J5 | 33-A | 1 | 2" | 150 RF | ROOF NOZZ (N ₂ BLANKETING) |
| J6A/B | 33-4 | 2 | 3/4" | 3000 CL | ROOF NOZZ (N ₂ BLANKETING) |
| J7 | 32-A | 1 | 3" | 150 RF | ROOF NOZZLE PSV |
| J7A | 43-A | 1 | 6" | 150 RF | ROOF NOZZLE VAC. VENT |
| DWG#18 | | 1 | | | NAMEPLATE |
| | | 1 | | | ROOF PLATFORM |
| | | 1 | | | PERIPHERAL HANDRAIL |
| DWG#50 | | 1 | | | SPIRAL STAIRWAY |
| DWG#29 | | 4 | | | GROUNDING LUG |
| DWG#41 | | | | | HEATER COIL |
| 17-A | | 1 | 36" | | SUMP |
| DWG#19 | | | | | ANCHOR CHAIRS |
| DWG#2/13 | | | | | INSULATION SUPPORTS |
| | | 1 | | | DRIP RING |
| | | 1 SET | | | CATHODIC PROTECTION (EXT.) |
| DWG#35 | | 1 | | | STILLING WELL |



ELEVATION

ACETIC ACID STORAGE TANK

BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

ARABIAN CBI LTD.

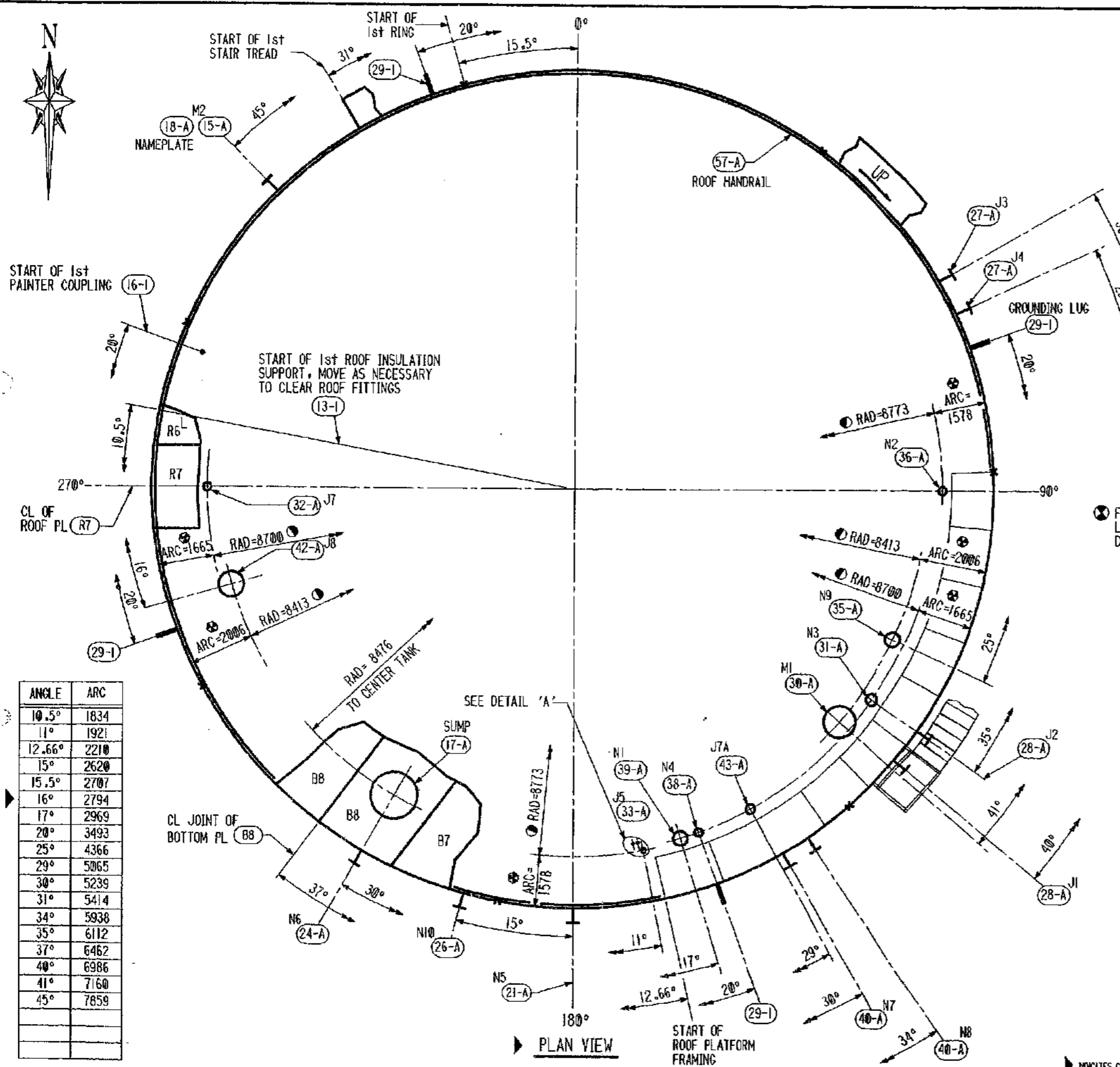
GENERAL ARRANGEMENT
20.0m DIA. x 15.0m HIGH SS DRT
IBN RUSHD PTA AND AROMATICS PLANT PROJECT
ARABIAN INDUSTRIAL FIBERS CO. LTD
YANBU, SAUDI ARABIA

| | | | |
|------------------------|----------------------------|-------------|-----------|
| ITEM NO | 102-F-001 | CONTRACT NO | ED 965205 |
| BY | Key CHCD MSIG DATE 3/15/96 | DWG | 1 |
| BY | R L HERBERT | REV | 8 |
| ENGINEERING SUPERVISOR | | SHT | 8 |

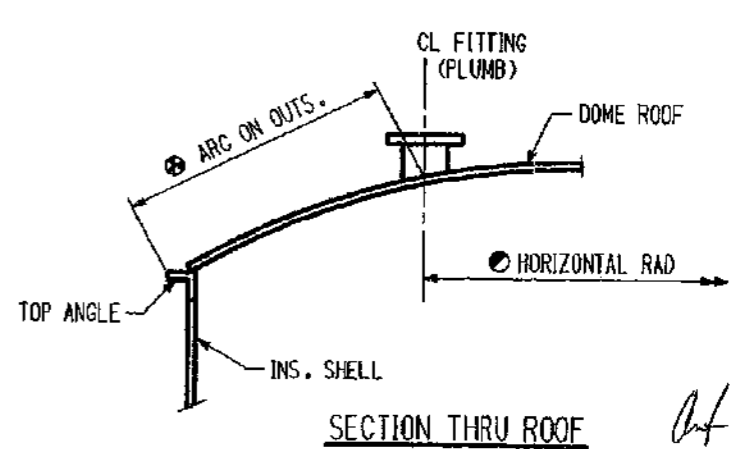
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▶ INDICATES CHANGE FROM PREVIOUS ISSUE

65205-001.DGN

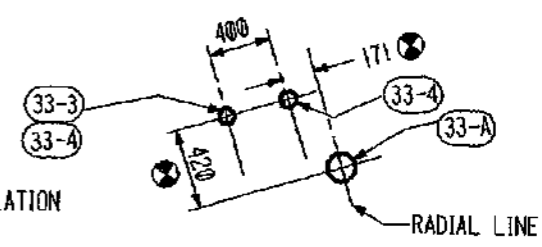


| ANGLE | ARC |
|--------|------|
| 10.5° | 1834 |
| 11° | 1921 |
| 12.66° | 2210 |
| 15° | 2620 |
| 15.5° | 2707 |
| 16° | 2794 |
| 17° | 2969 |
| 20° | 3493 |
| 25° | 4366 |
| 29° | 5065 |
| 30° | 5239 |
| 31° | 5414 |
| 34° | 5938 |
| 35° | 6112 |
| 37° | 6452 |
| 40° | 6986 |
| 41° | 7160 |
| 45° | 7859 |



AS-BUILT
KTF ACBLS

STEVE COYLE
SABCO DA/OC
16 MAY 1999



FIELD TO VERIFY CPLG LOCATION W/PIPING ON DWG #37 PRIOR TO INSTALLATION

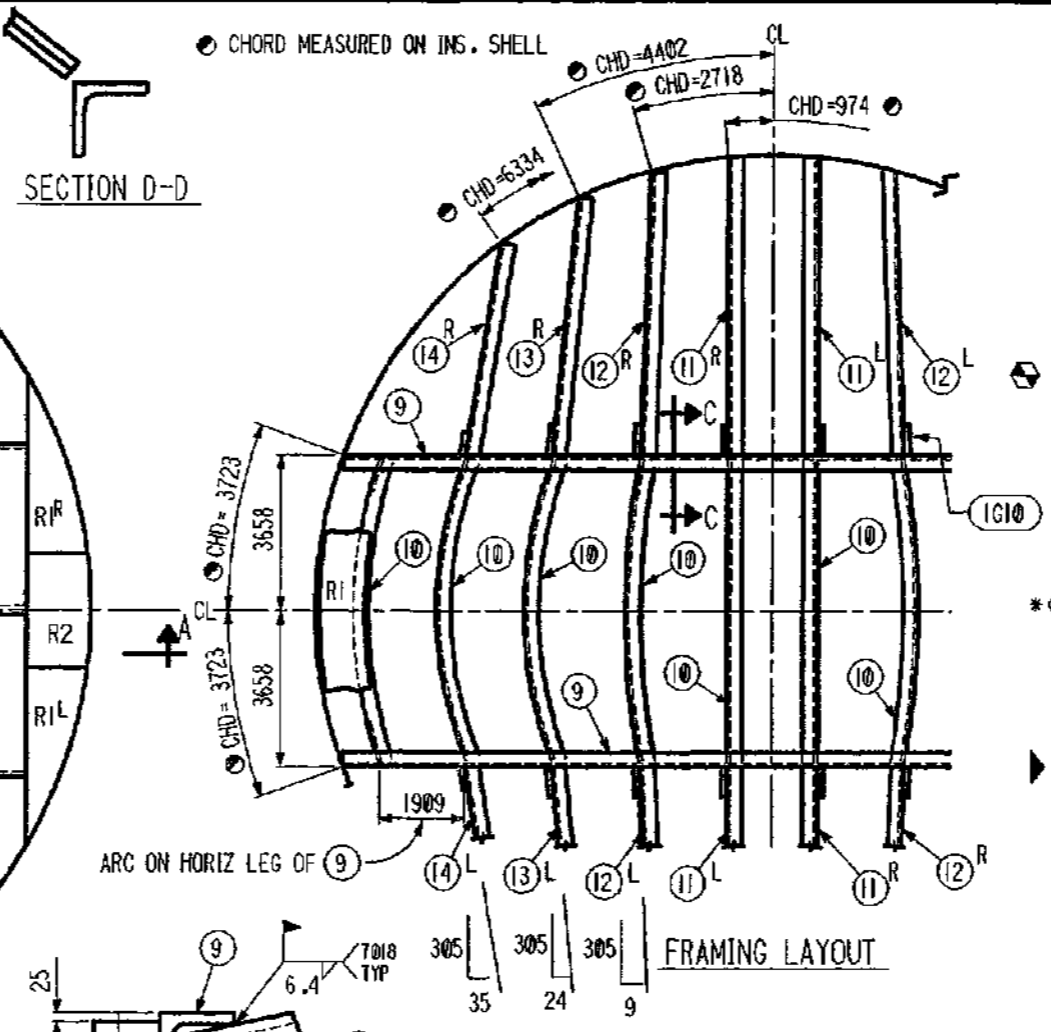
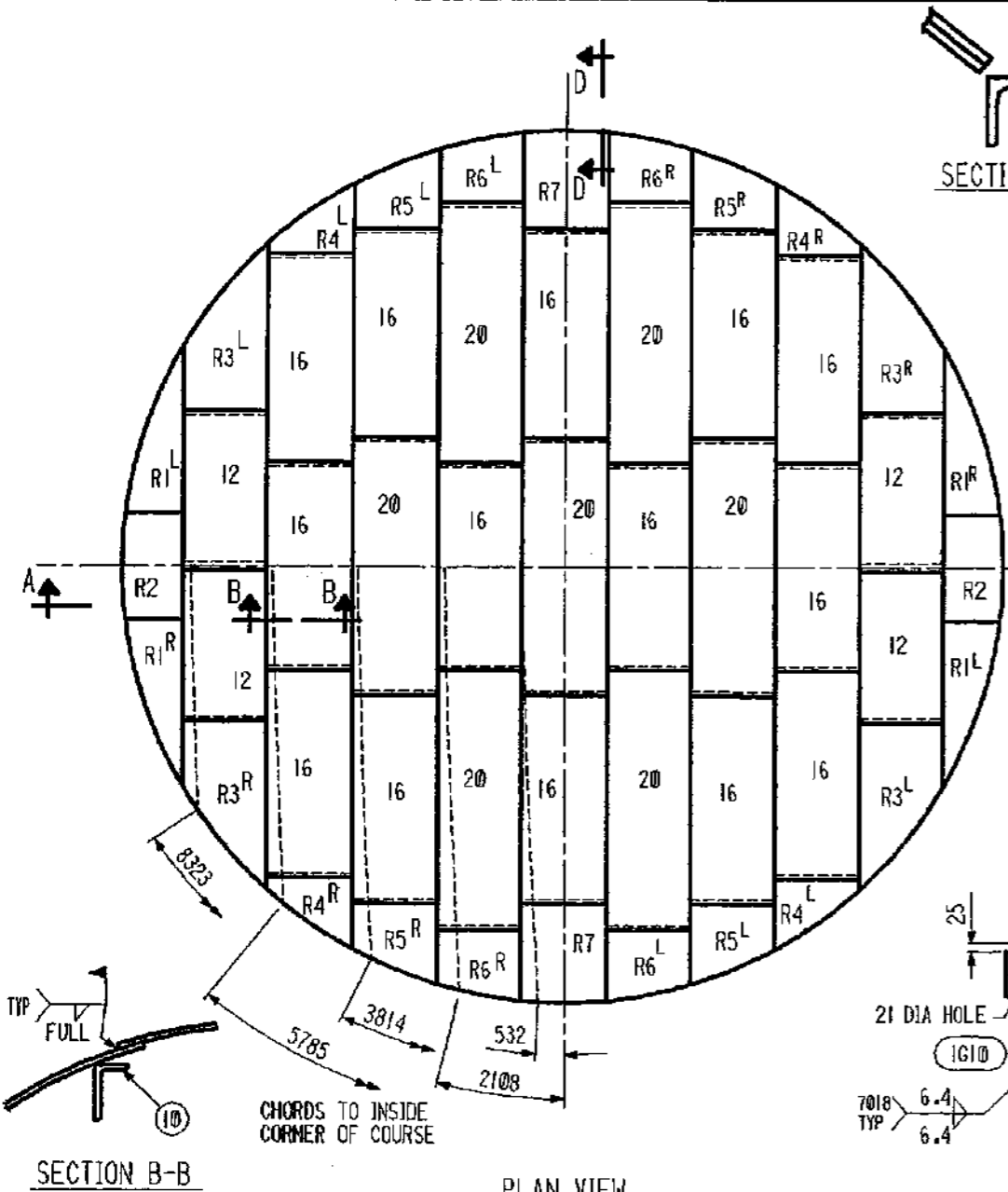
NOTES:

1. ALL ARC'S ARE MEASURED ON OUTSIDE OF FIRST SHELL RING UNLESS OTHERWISE NOTED.
2. ROOF NOZZLE BOLT HOLES TO STRADDLE 0°-180° CL
3. 'X' DENOTES FIRST SHELL RING JOINTS.
4. SEE DWG # F1 FOR ANCHOR CHAIRS LOCATION

ACETIC ACID STORAGE TANK
BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

| | |
|--|--------------------------|
| ARABIAN CBI LTD. | |
| ORIENTATION 20.0m DIA. x 15.0m HIGH SS DRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO 102-F-001 | CONTRACT NO ED 965205 |
| BY KT CHKD MSTG DATE 5-28-96 R L HERBERT ENGINEERING SUPERVISOR | DWG 2 REV 4 |
| <small>This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden.</small> | |

DATE PLOTTED: 06/07/99 10:45 AM



| SHOP PC | MARK | ASSN PC | DESCRIPTION | LENGTH MM | SPEC | D |
|---------------------------|----------|---------|----------------------------------|-----------|------------|----|
| DOME ROOF | | | | | | |
| 4 | R1 R/L | | PL SK x 9.66 (CF 2000 x 6096 C2) | | A240-316L | Bc |
| 2 | R2 | | PL SK x 9.66 (CF 2000 x 4877) | | A240-316L | Bc |
| 4 | R3 R/L | | PL SK x 9.66 (CF 2000 x 7315) | | A240-316L | Bc |
| 4 | R4 R/L | | PL SK x 9.66 (CF 2000 x 7315 C2) | | A240-316L | Bc |
| 4 | R5 R/L | | PL SK x 9.66 (CF 2000 x 4877 C2) | | A240-316L | Bc |
| 4 | R6 R/L | | PL SK x 9.66 (CF 2000 x 4877 C2) | | A240-316L | Bc |
| 2 | R7 | | PL SK x 9.66 (CF 2000 x 4877 C2) | | A240-316L | Bc |
| 7 | 20 | | PL 2000 x 9.66 | 6069 | A240-316L | Bc |
| 14 | 16 | | PL 2000 x 9.66 | 4877 | A240-316L | Bc |
| 4 | 12 | | PL 2000 x 9.66 | 3657 | A240-316L | Bc |
| 2 8-A MAIN ANGLE ASSEMBLY | | | | | | |
| | 8-9 | 4 | L200 x 100 x 15 x SK FIN | 10121 | A36 | C |
| | | | FIN ON RAD=15576 SHR | 11031 | | |
| | 1010 | 16 | BAR 65 x 10 | 89 | A36 | C |
| 10 | 8-10 | | L200 x 100 x 12 FIN | 7364 | A36 | C |
| | | | FIN ON RAD=16000 SHR | 8364 | | |
| 4 | 8-11 L/R | | L200 x 100 x 12 x SK FIN | 7172 | A36 | C |
| | | | FIN ON RAD=15970 SHR | 8135 | | |
| 4 | 8-12 L/R | | L150 x 75 x 12 x SK FIN | 6731 | A36 | C |
| | | | FIN ON RAD=15720 SHR | 7735 | | |
| 4 | 8-13 L/R | | L150 x 75 x 12 x SK FIN | 5983 | A36 | C |
| | | | FIN ON RAD=15201 SHR | 6989 | | |
| 4 | 8-14 L/R | | L150 x 75 x 12 x SK FIN | 4739 | A36 | C |
| | | | FIN ON RAD=14450 SHR | 5749 | | |
| 52 | 8-16 | | BAR 50 x 6 x SK | 280 | A36 | D |
| 18 | 8-17 | | BOLT 3/4" DIA HVY HEX | 38 | A307B | D |
| 18 | 8-18 | | NUT 3/4" DIA HVY HEX | | A563A | D |
| 20 | 8-19 | | PL 150 x 5 W/RAD CORNERS | 150 | A240-T304L | Bc |

MAYBE SHIPPED IN TWO PIECES
* = SEE NOTE #5

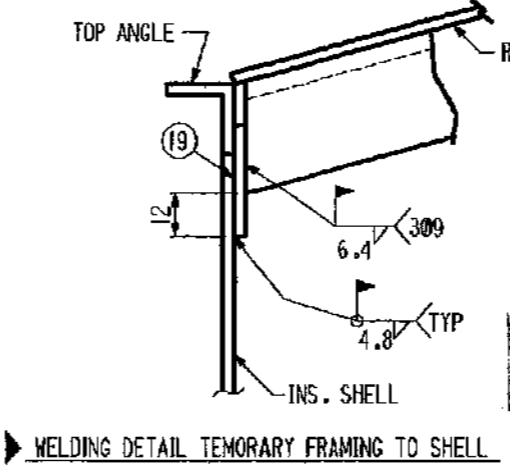
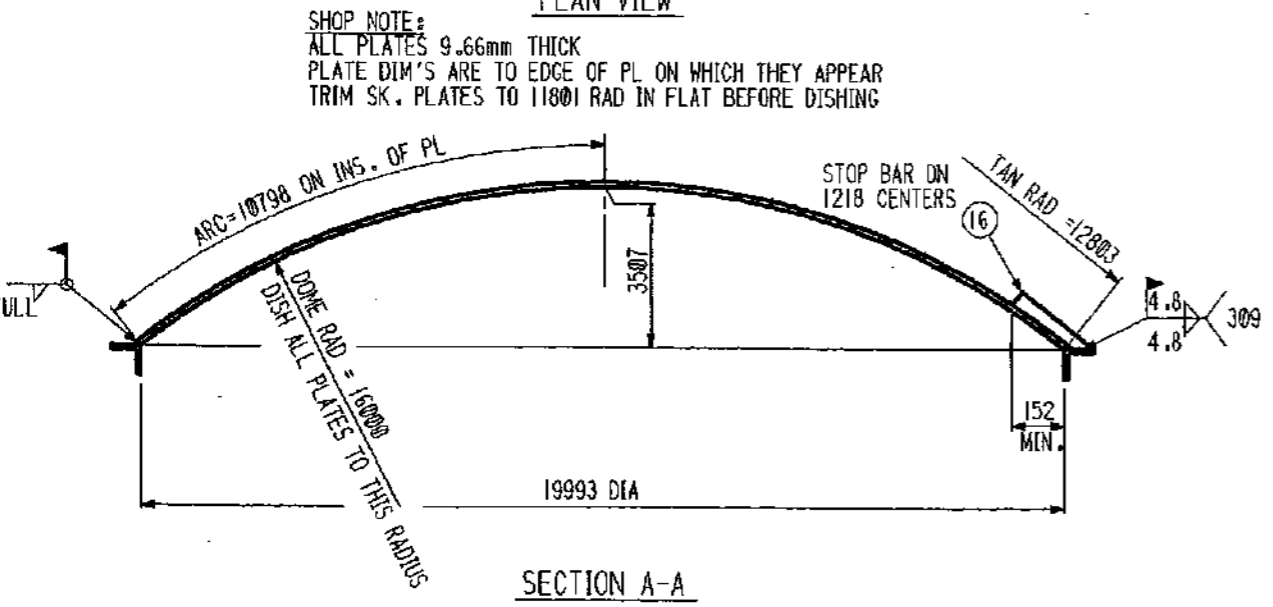
LENGTH OF 9.66 WELDS FOR ROOF PLATES (m)
ROOF TO TOP ANGLE = 62.8
LAP DOWN = 59.8
LAP SLOPING = 197.9
LAP OVERHEAD (IF REQ'D.) = 261.6

NOTE:
1. WORK THIS DWG WITH DWG # 9 & 10.
2. ALL WELDING TO BE DONE USING 316L ELECTRODE, UNLESS OTHERWISE NOTED.

STEVE COYLE
SABCO QA/QC
18 MAY 1998

IR
1 Jun 99

AS-BUILT
KTT ACBZ

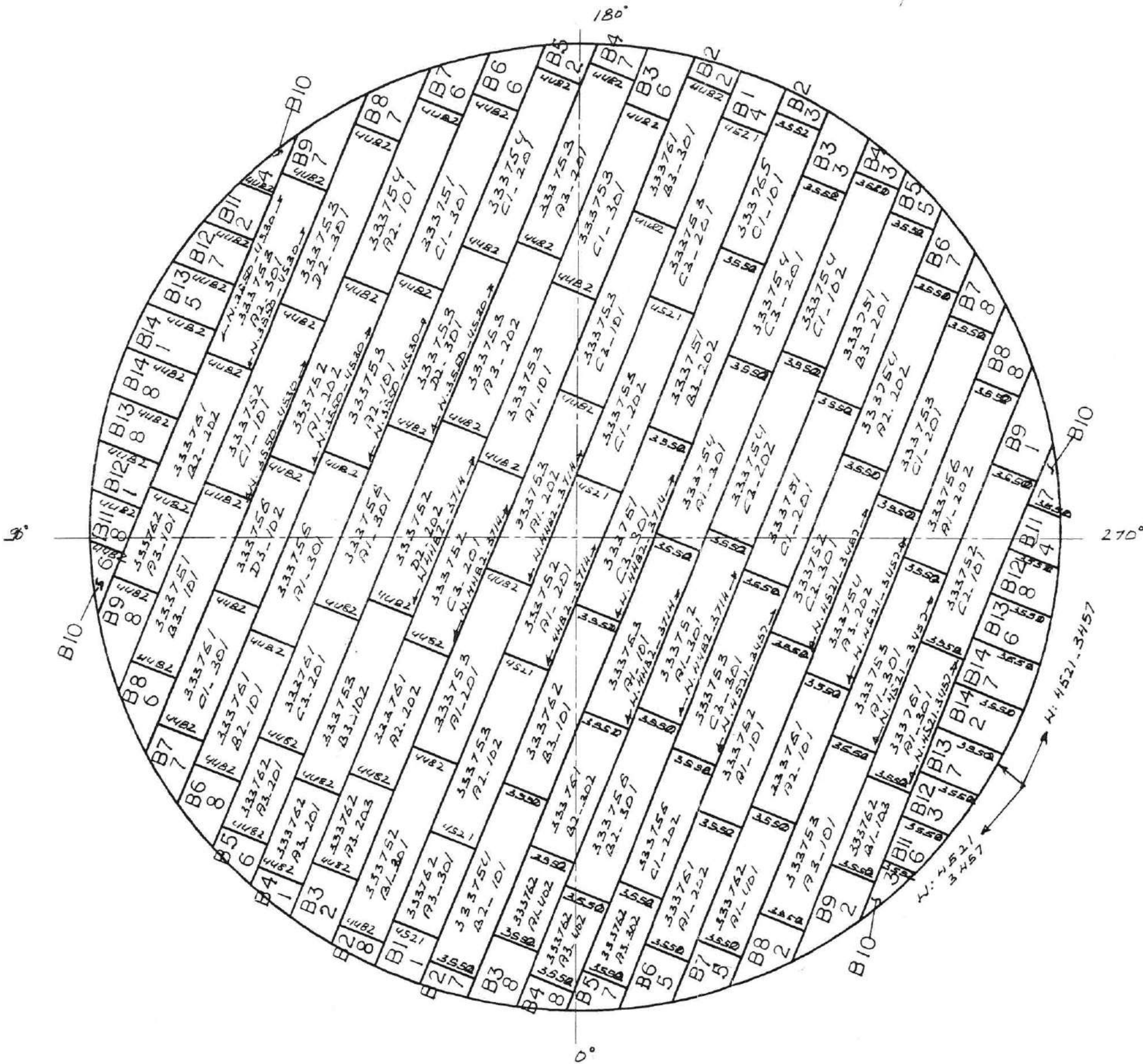
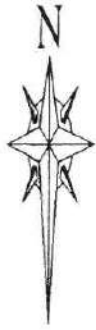


WELDING DETAIL TEMPORARY FRAMING TO SHELL

- FIELD NOTES:
- ROOF SKETCH PLATES NUMBERED IN ORDER OF ERECTION. USE THE CHORDS SHOWN FOR LOCATING CORNER OF SKETCH PLATE.
 - NOTE THAT PLATE COURSES ARE 90° TO THE LONG CONTINUOUS ANGLE.
 - MINIMUM LAP IS 26mm. LAP BETWEEN ADJACENT COURSES WILL INCREASE TO A MAXIMUM AT THE TOP ANGLE. SKETCH PLATE LOCATING CHORDS AND SKETCH PLATE SIZES ARE BASED ON 30mm LAP.
 - BEFORE COMPLETING ERECTION OF FRAMING, 161 kg TOTAL IS THE MAXIMUM PERMISSIBLE CONCENTRATED LOAD ON THE FRAMING.
 - FRAMING TO BE REMOVED AFTER ROOF IS COMPLETE.

INDICATES CHANGE FROM PREVIOUS ISSUE

| | | | |
|---|------------------------|-------------------------|-----------|
| | | ARABIAN CBI LTD. | |
| DOME ROOF | | | |
| 20.0m DIA. x 15.0m HIGH SS DRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | | | |
| ITEM NO | 102-F-001 | CONTRACT NO | ED 965205 |
| BY | Key MSTG DATE 5/1/96 | DWG | 8 |
| | R L HERBERT | REV | 3 |
| | ENGINEERING SUPERVISOR | SHT | |
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BOTTOM STRETCHOUT

| NAME OF WELDER | I.D. |
|----------------|------|
| M. KHAN | 3550 |
| Z. KHATTAK | 3457 |
| M.M. HARIZ | 3714 |
| S. KHAN | 4482 |
| M. SARFARAZ | 4521 |
| N. MIR | 4530 |
| | |
| | |
| | |

- FOREMAN:**
- RECORD WELDERS' I.D. ON EACH JOINT.
 - RECORD JOINT ID AND RT INTERVALS (FIRST & LAST FOR 100%) OR LOCATION FOR SPOT RADIOGRAPHS OR PLUGS.

WHEN COMPLETE

FOREMAN:

SEND CONSTRUCTION OFFICE ONE LEGIBLE COPY AND WORK COPIES IF ANY

FOR CONSTRUCTION

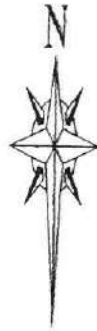
BENZENE STORAGE TANK
 BECHTEL LTD CONTRACT No. 22854-LCC-005

| | | | |
|---|--|---------------------------|--|
| ARABIAN CBI LTD. | | CONTRACT NO. ED 965202 | |
| | | ITEM NO. 103-F-001 | |
| BOTTOM STRETCHOUT 51.0m DIA. x 22.0m HIGH URT IEN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | | DWG R2A REV 0 | |
| BY: ZH CHPD RLH DATE 7/8/96 R L HERBERT ENGINEERING SUPERVISOR | | SMT | |

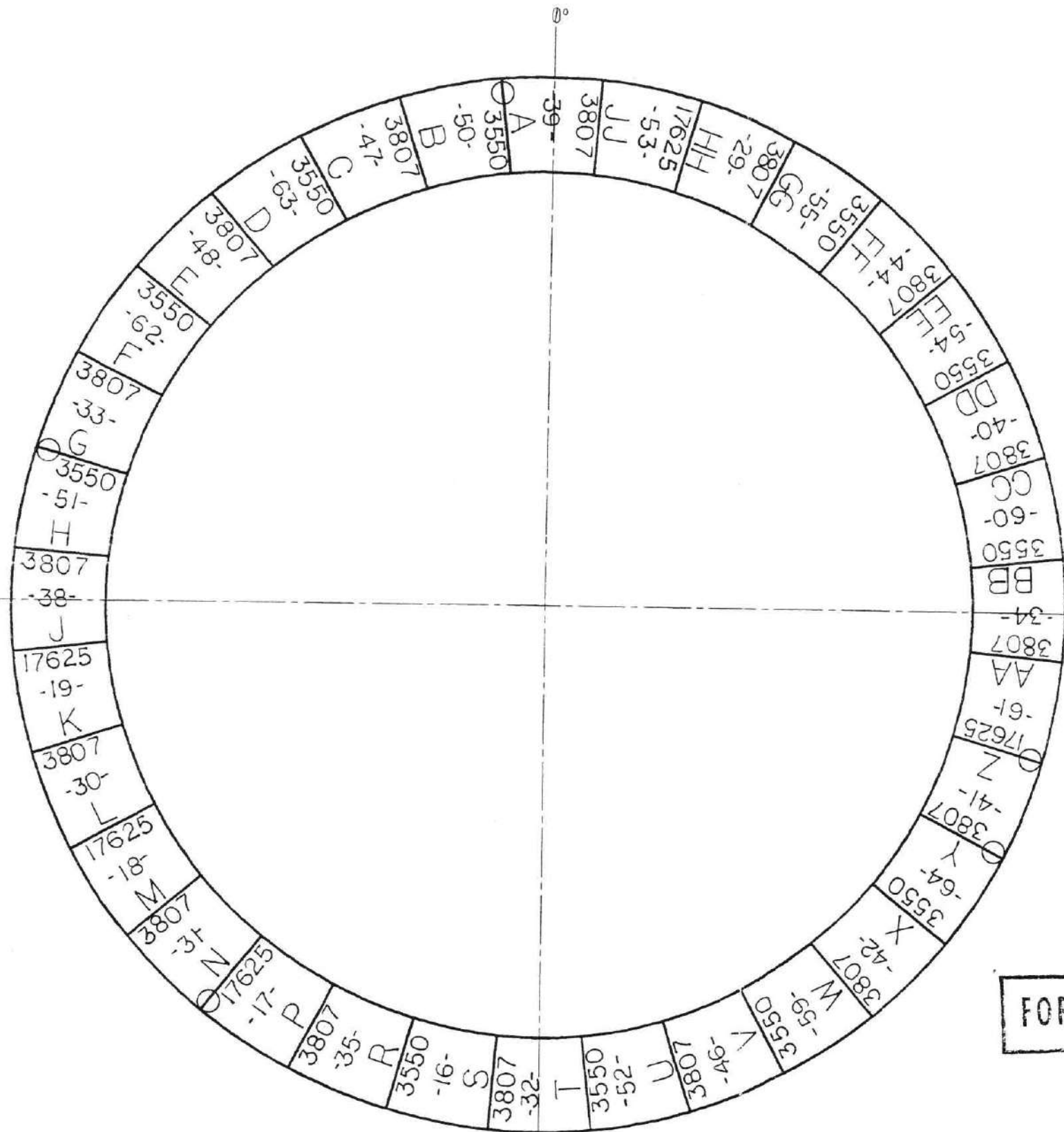
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R. Rame
 11-2-97

INDICATES CHANGE FROM PREVIOUS ISSUE



| NAME OF WELDER | I.D. |
|----------------|-------|
| C. K. PATHAN | 3807 |
| M. KHAN | 3550 |
| J. H. PATEL | 17625 |
| | |
| | |
| | |
| | |
| | |



- FOREMAN:**
- RECORD WELDERS' I.D. ON EACH JOINT.
 - RECORD JOINT ID AND RT INTERVALS (FIRST & LAST FOR 100%) OR LOCATION FOR SPOT RADIOGRAPHS OR PLUGS.

WHEN COMPLETE

FOREMAN:
SEND CONSTRUCTION OFFICE ONE LEGIBLE COPY AND WORK COPIES IF ANY

N.A. UMAMAN
JAWC

FOR CONSTRUCTION

BENZENE STORAGE TANK
BECHTEL LTD CONTRACT No. 22854-LCC-005

ANNULAR PLATE STRETCHOUT

| | |
|---|------------------------|
| A CBI ARABIAN CBI LTD. | |
| ANNULAR PLATE STRETCHOUT 51.0m DIA. x 22.0m HIGH URT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO. 103-F-001 | CONTRACT NO. ED 965202 |
| BY ZH CHKD RLH DATE 7/8/96 | DWG R3A REV |
| R L HERBERT ENGINEERING SUPERVISOR | SHT |
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INDICATES CHANGE FROM PREVIOUS ISSUE

13-08-58 Oct. 2, 1996

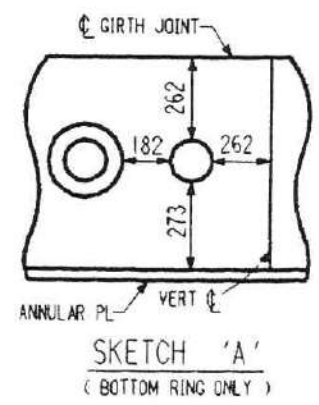
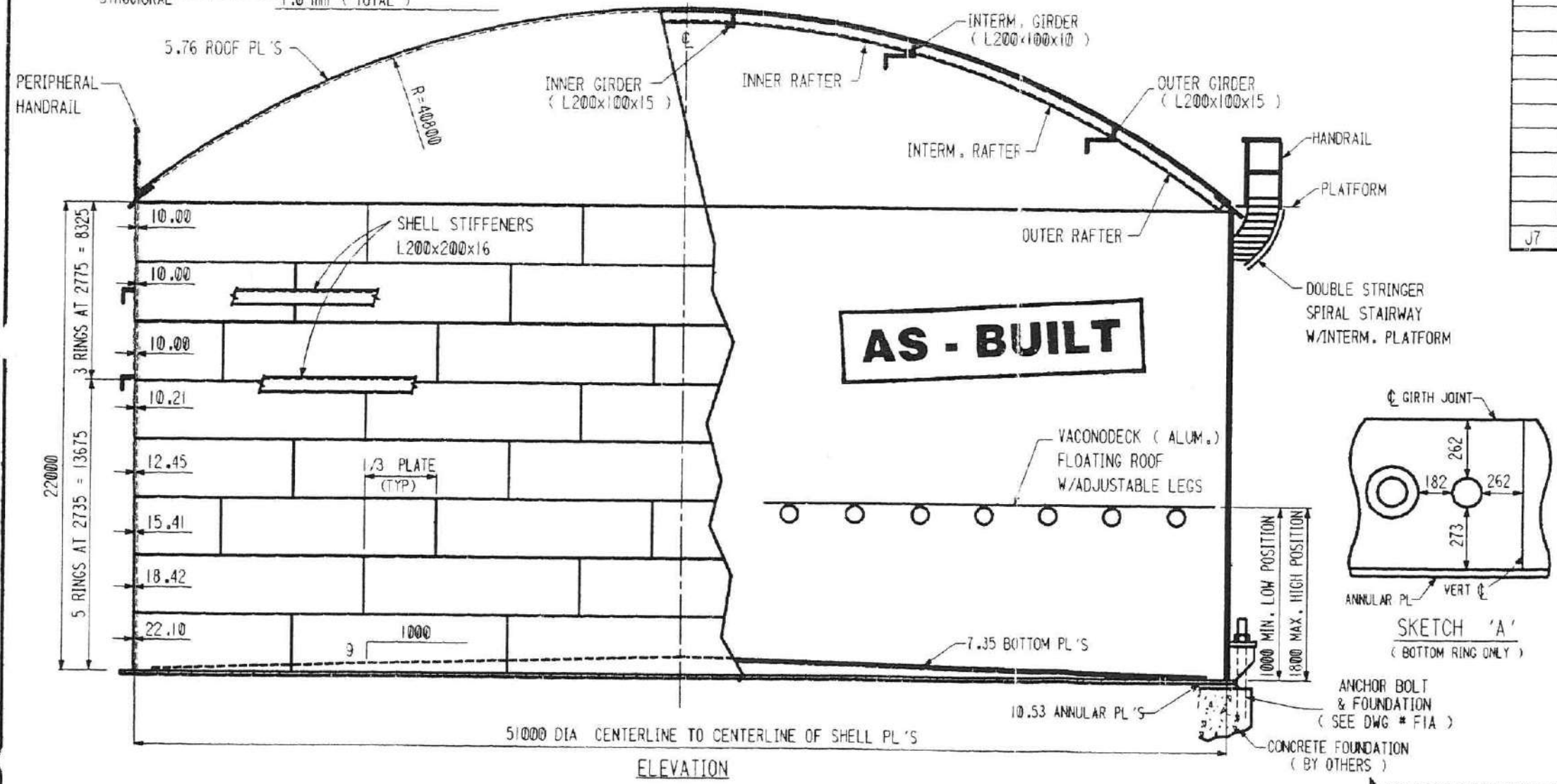
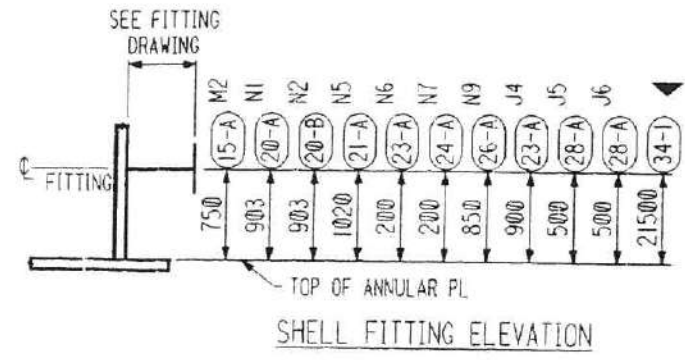
TECHNICAL & CONSTRUCTION INFORMATION

| SPECIFICATIONS | |
|------------------------|-------------------------|
| SPECIFIC GRAVITY | 0.857 |
| SERVICE | BENZENE |
| MAX DESIGN METAL TEMP. | 85°C |
| MIN DESIGN METAL TEMP. | 17°C |
| DESIGN PRESSURE | 0.025 bar (g) |
| DESIGN VACUUM | 0.006 bar (g) |
| DESIGN LIQUID LEVEL | 19600 mm |
| DESIGN WIND VELOCITY | 140 km/h (PER API 650) |
| SEISMIC | ZONE I (I=1.0, S=1.2) |
| PER API 650 | |
| ROOF LIVE LOAD | 1.2 KPa PLUS VACUUM |
| NOMINAL CAPACITY | 40030 m ³ |
| PUMP IN RATE | 51 m ³ /hr |
| PUMP OUT RATE | 1000 m ³ /hr |
| FOUNDATION | BY OTHERS |
| CONSTRUCTION | BY ARABIAN CBI |
| CORROSION ALLOWANCE | |
| BOTTOM | 1.0 mm |
| SHELL | 1.0 mm |
| ROOF | 1.0 mm |
| STRUCTURAL | 1.0 mm (TOTAL) |

| MATERIAL SPEC | |
|---------------------|------------------------------|
| BOTTOM RECT. | A36 |
| BOTTOM SKETCHES | A36 |
| ANNULAR PLATES | A36 |
| SHELL PLATES | ISO 630-FE510C & A36 |
| ROOF PLATES | A36 |
| STRUCTURAL | A36 |
| FLANGES | A105 |
| NOZZLE NECKS | A106B |
| INTERNAL PIPE | A106B |
| INSPECTION - MILL | CTR'S |
| SHOP | ACBI |
| FIELD | ACBI & CUSTOMER |
| SURFACE PREPARATION | |
| PAINTING | YES |
| PWHT | ALL REINF. NOZZ. IN 1st RING |
| INSULATION | NO |
| MISC. | |
| GASKETS | REINZ-AFM37 |
| BOLTS & NUTS | A193-B7 & A194-2H |
| RADIOGRAPHY | PER CODE |
| JOINT EFFICIENCY | N/A |

| RING NO. | CORR. ALLOW. mm | DESIGN FOR PRODUCT SG = 0.857 | | DESIGN FOR TEST SG = 1.0 | | THK. USED mm | MATERIAL SPECIFICATION | API MAT'L GROUP NO. |
|----------|-----------------|-------------------------------|------------------|--------------------------|------------------|--------------|------------------------|---------------------|
| | | ALLOWABLE STRESS MPa | REQUIRED THK. mm | ALLOWABLE STRESS MPa | REQUIRED THK. mm | | | |
| 1 | 1.0 | 206.8 | 21.30 | 221.6 | 22.10 | 22.10 | ISO 630-FE510C | IV |
| 2 | 1.0 | 206.8 | 17.95 | 221.6 | 18.42 | 18.42 | ISO 630-FE510C | IV |
| 3 | 1.0 | 206.8 | 15.19 | 221.6 | 15.41 | 15.41 | ISO 630-FE510C | IV |
| 4 | 1.0 | 206.8 | 12.43 | 221.6 | 12.42 | 12.45 | ISO 630-FE510C | IV |
| 5 | 1.0 | 206.8 | 9.69 | 221.6 | 9.43 | 10.21 | ISO 630-FE510C | IV |
| 6 | 1.0 | 160.0 | 8.97 | 171.7 | 8.68 | 10.00 | A36 | I |
| 7 | 1.0 | 160.0 | 5.09 | 171.7 | 4.43 | 10.00 | A36 | I |
| 8 | 1.0 | 160.0 | 1.69 | 171.7 | 0.74 | 10.00 | A36 | I |

| LIST OF FITTINGS | | | | | |
|------------------|-----------|-------|------|---------|---|
| CUST. MARK | ACBI MARK | QUANT | SIZE | RATING | DESCRIPTION |
| M1 | 30-A | 1 | 30" | API | ROOF MANWAY |
| M2 | 15-A | 1 | 24" | API | SHELL MANHOLE |
| N1 | 20-A | 1 | 10" | 150 RF | SHELL NOZZLE INLET |
| N2 | 20-B | 1 | 10" | 300 RF | SHELL NOZZLE PUMP SPILLBACK |
| N3 | 31-A | 1 | 6" | 150 RF | ROOF NOZZLE VENT |
| J3A | 39-A | 1 | 12" | 150 RF | VENT |
| N5 | 21-A | 1 | 20" | 150 RF | SHELL NOZZLE PUMP SUCTION W/INT. |
| N6 | 23-A | 1 | 2" | 150 RF | SHELL NOZZLE PURGE CONNECTION |
| N7 | 24-A | 1 | 6" | 150 RF | SHELL NOZZLE DRAIN W/INT. |
| N8 | 35-A | 1 | 8" | 150 RF | ROOF NOZZLE LEVEL SERVICE W/INT. |
| N9 | 26-A | 1 | 6" | 150 RF | SHELL NOZZLE SPARE |
| - | 34-1 | 5 | 8" | 150 RF | FOAM CHAMBER |
| J1 | 33-A | 1 | 2" | 150 RF | ROOF NOZZLE (N ₂ BLANKETING) |
| J2A/B | 33-4 | 2 | 3/4" | 3000 CL | ROOF NOZZLE (N ₂ BLANKETING) |
| J3 | 32-A | 1 | 10" | 150 RF | ROOF NOZZLE (PSV) |
| J4 | 23-A | 1 | 2" | 150 RF | SHELL NOZZLE TI |
| J5 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LI |
| J6 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LALL/LAHH |
| | 17-A | 1 | 60" | | SUMP |
| | DWG#18 | 1 | | | NAMEPLATE |
| | | | | | PERIPHERAL HANDRAIL |
| | DWG#50 | 1 | | | SPIRAL STAIRWAY |
| | | | | | VACNODECK |
| | DWG#19 | | | | ANCHOR CHAIRS |
| | | | | | CATHODIC PROTECTION (EXT.) |
| | DWG#45 | 1 | | | DELUGE SYSTEM |
| | DWG#29 | 4 | | | GROUNDING LUGS |
| | DWG#35 | 1 | | | STILLING WELL |
| J7 | 2-A | 1 | 12" | | ROOF NOZZLE (EMERGENCY VENT) |



GENERAL NOTES:

- FITTINGS TO BE LOCATED AS SHOWN ON ORIENTATION DRAWING(S). IF LOCATIONS ARE NOT GIVEN, LOCATE IN FIELD TO SUIT CUSTOMER MAINTAINING MINIMUM SPACING SHOWN IN SKETCH 'A'. DIMENSIONS GIVEN ARE FROM EDGE TO EDGE OF REINFORCING PL OR FROM CL OF BUTT WELD TO EDGE OF REINFORCING PL. THE LOCATION DIMENSION SHOWN IN SKETCH 'A' ARE ONLY FOR NOZZLES 2" DIA AND LESS
- FLANGE BOLT HOLES TO STRADDLE VERTICAL CENTERLINE FOR SHELL NOZZLES.
- FLANGE BOLT HOLES TO STRADDLE 0°-180° CENTERLINE FOR ROOF NOZZLES
- SEE SHEETS 800 & 802 FOR MATERIAL MANAGEMENT.

DETAILED FOR (1) TANK - (1) TANK REQUIRED
BENZENE STORAGE TANK

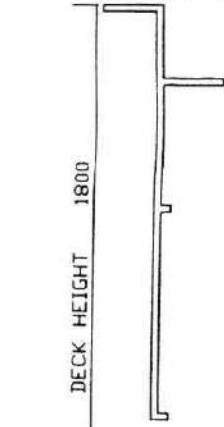
BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

| | |
|---|--|
| <p>ARABIAN CBI LTD.</p> <p>GENERAL ARRANGEMENT</p> <p>51.0m DIA. x 22.0m HIGH URT</p> <p>IGN RUSHD PTA AND AROMATICS PLANT PROJECT</p> <p>ARABIAN INDUSTRIAL FIBERS CO. LTD</p> <p>YANBU, SAUDI ARABIA</p> | |
| <p>ITEM NO: 103-F-001</p> <p>BY Key CHD MSTG DATE 3/15/96</p> <p>R L HERBERT</p> <p>ENGINEERING SUPERVISOR</p> | <p>CONTRACT NO: ED 965202</p> <p>DWG: JA</p> <p>REV: 5</p> |
| <p>This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden.</p> | |

65202010.DGN

2770 3000 3000 3000 3000 3000 3000 3000 1700

TANK DIAMETER 51000
 DR 190
 OUTER DIAMETER 50620
 INNER DIAMETER 50540



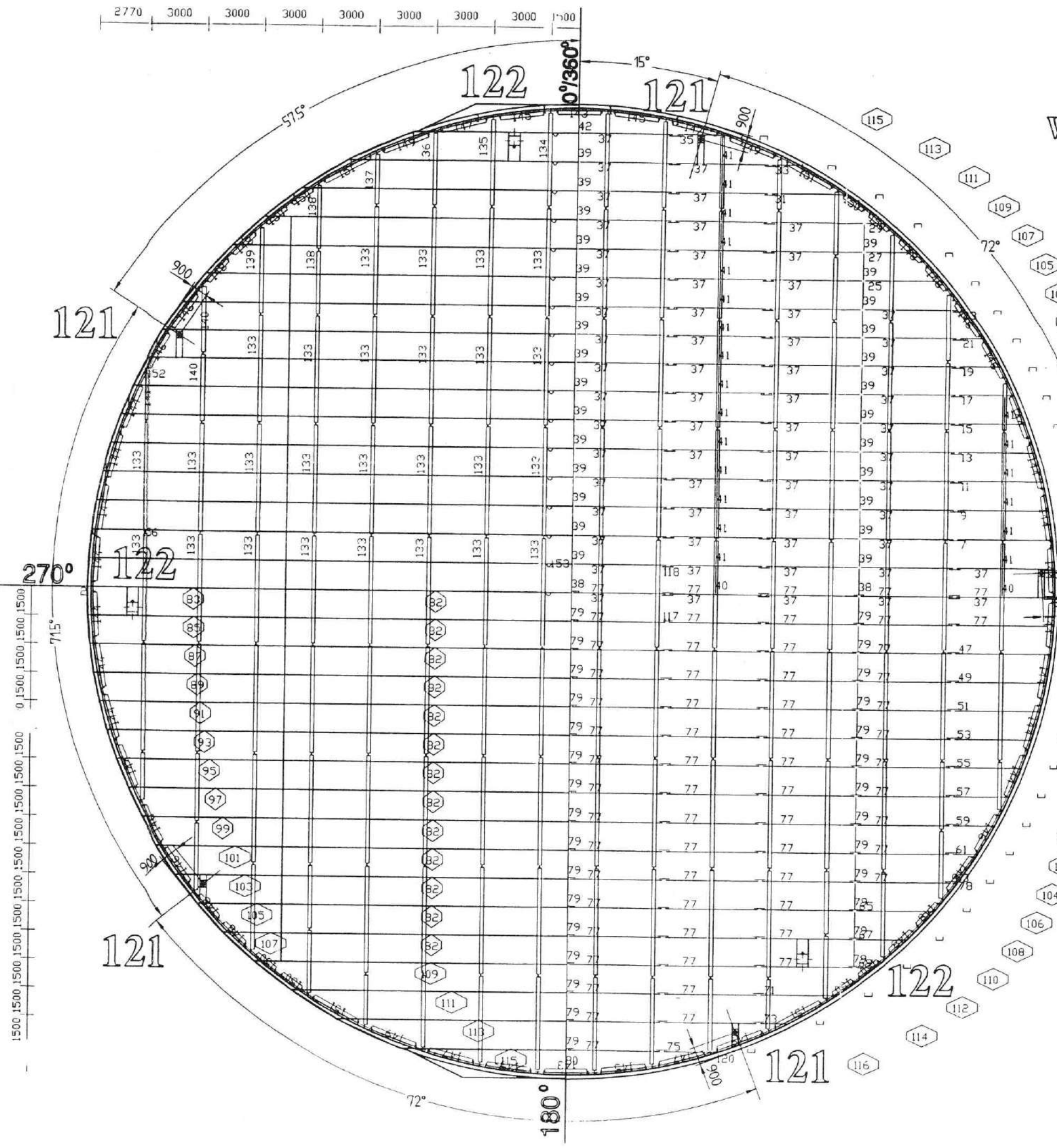
| POS | TYP TEXT |
|-----|----------------------|
| 1 | 1 PE ELEMENT |
| 3 | 3 R-CHANNEL |
| 4 | 4 R-CHANNEL |
| 37 | 2 S-CHANNEL |
| 38 | 6 FRAM SPAC +BOLTS |
| 40 | 5 FRAMING SPACER |
| 43 | 8 R-BUTT STRAP |
| 44 | 9 R-BUTT STRAP |
| 77 | 7 S-BUTT STRAP |
| 78 | 10 PE-BUTT STRAP |
| 79 | 11 T-BUTT STRAP |
| 80 | 12 R-T-BUTT STRAP |
| 81 | 13 SEALING BLOCK |
| 82 | 14 S-SHEET |
| 83 | 15 R-SHEET |
| 84 | 16 R-SHEET |
| 115 | 18 END-R-SHEET |
| 116 | 19 END-R-SHEET |
| 117 | 23 CON.BUTT STRAP |
| 118 | 24 CHANNEL CON |
| 119 | 25 CONNECTION F. PE |
| 120 | 48 VACONOSEAL PE Db |
| 121 | 64 CABLE GUIDE SS |
| 122 | 68 MANHOLE VII AL |
| 123 | 74 FUNNEL 8 AL |
| 125 | 1356 NEG.DEV.LADDER |
| 126 | 96 DRAIN PIPE |
| 127 | 130 SEALING PASTE |
| 133 | 21 FLOAT |
| 152 | 22 FLOAT ADAPTER |
| 153 | 26 FLOAT BRACKET |
| 155 | 57 P-ADJ.LEG+PLUG A |
| 156 | 61 F-ADJ.LEG+PLUG A |
| 157 | 31 BOLT M8*20 |
| 158 | 32 BOLT M8*35 |
| 159 | 33 BOLT M8*55 |
| 160 | 34 NUT M8 |
| 161 | 38 SPEC BOLT M8*35S |
| 162 | 36 BOLT M8*65 |
| 163 | 37 RIVET 4.8*14.3 |
| 167 | 129 ANTIROD.GASTIGHT |
| 168 | 66 CABLE 05 SS |
| 169 | 67 ANTISTATIC SYS |
| 170 | 113 INDICATING PLATE |

121
 CL DECK
 90°
 CL TANK

103-F-001

VACONO DECK® 006
 ASSEMBLY DRAWING
 TANK DIAMETER 51,0m

| | |
|-------------|----------------------|
| Revision: | |
| a) * | |
| b) * | |
| c) * | |
| SCALE | 1:100 |
| DRAWING NO. | 04998/77 |
| CUSTOMER | BR BECHTEL - HANBU |
| DRAWING NO. | 103-F-001 |
| Drawn | [Signature] 20.06.94 |
| Checked | [Signature] 20.06.94 |

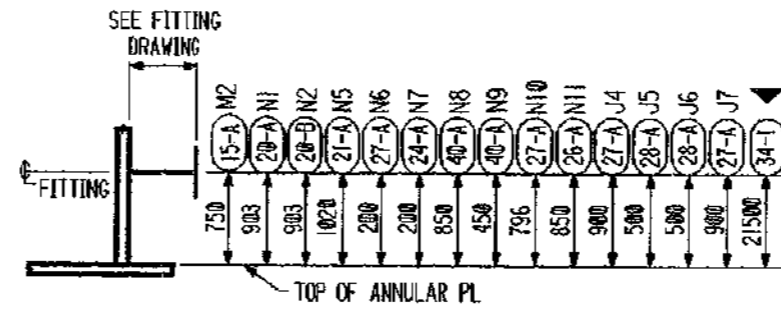


TECHNICAL & CONSTRUCTION INFORMATION

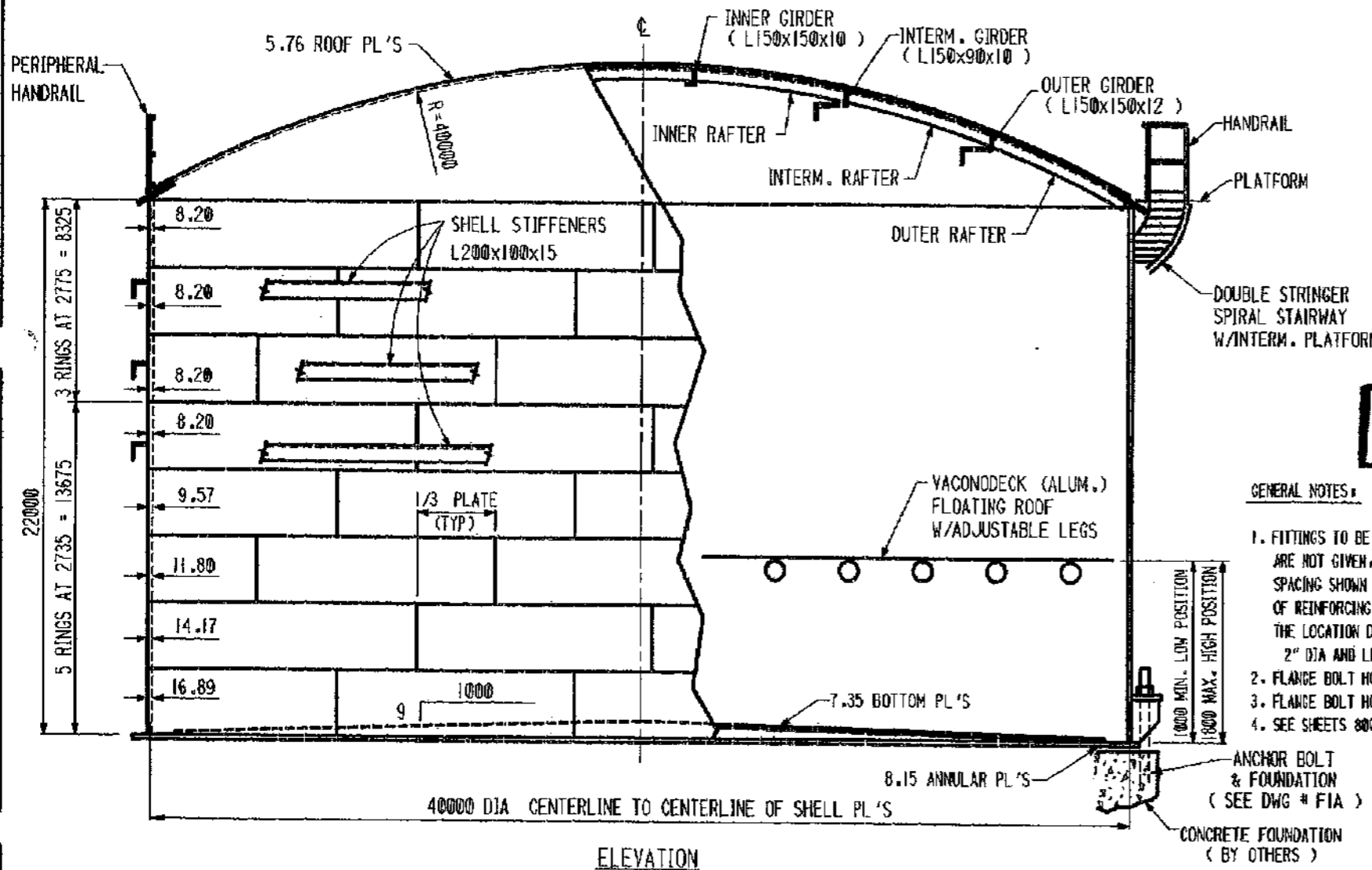
| | |
|------------------------|------------------------------|
| SPECIFICATIONS | API 650-9th ED.(1993/94 ADD) |
| SPECIFIC GRAVITY | 0.846 |
| SERVICE | PARA-XYLENE |
| MAX DESIGN METAL TEMP. | 85°C |
| MIN DESIGN METAL TEMP. | 17°C |
| DESIGN PRESSURE | 0.025 bar (g) |
| DESIGN VACUUM | 0.006 bar (g) |
| DESIGN LIQUID LEVEL | 19100 mm |
| DESIGN WIND VELOCITY | 140 km/h (PER API 650) |
| SEISMIC | ZONE I (I=1.0 , S=1.2) |
| ROOF LIVE LOAD | 1.2 KPa PLUS VACUUM |
| NOMINAL CAPACITY | 24000 m ³ |
| PUMP IN RATE | 55 m ³ /hr |
| PUMP OUT RATE | 1000 m ³ /hr |
| FOUNDATION | BY OTHERS |
| CONSTRUCTION | BY ARABIAN CBI |
| CORROSION ALLOWANCE | |
| BOTTOM | 1.0 mm |
| SHELL | 1.0 mm |
| ROOF | 1.0 mm |
| STRUCTURAL | 1.0 mm (TOTAL) |

| | |
|---------------------|------------------------------|
| MATERIAL SPEC | |
| BOTTOM RECT. | A36 |
| BOTTOM SKETCHES | A36 |
| ANNULAR PLATES | A36 |
| SHELL PLATES | ISO 630-FE510C & A36 |
| ROOF PLATES | A36 |
| STRUCTURAL | A36 |
| FLANGES | A105 |
| NOZZLE NECKS | A106B |
| INTERNAL PIPE | A106B |
| INSPECTION - MILL | CTR'S |
| SHOP | ACBI |
| FIELD | ACBI & CUSTOMER |
| SURFACE PREPARATION | YES |
| PAINTING | YES |
| PWHT | ALL REINF. NOZZ. IN 1st RING |
| INSULATION | YES |
| MISC. | |
| GASKETS | REINZ-AFM37 |
| BOLTS & NUTS | A193-B7 & A194-2H |
| RADIOGRAPHY | PER CODE |
| JOINT EFFICIENCY | N/A |

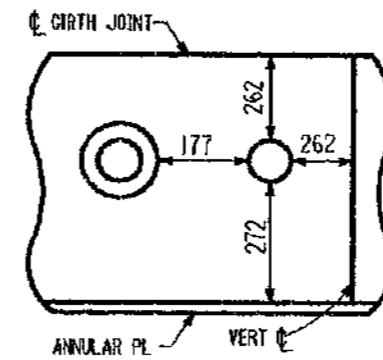
| RING NO. | CORR. ALLOW. mm | DESIGN FOR PRODUCT SG=0.846 | | DESIGN FOR TEST SG=1.0 | | THK. USED mm | MATERIAL SPECIFICATION | API MAT'L GROUP NO. |
|----------|-----------------|-----------------------------|------------------|------------------------|------------------|--------------|------------------------|---------------------|
| | | ALLOWABLE STRESS MPa | REQUIRED THK. mm | ALLOWABLE STRESS MPa | REQUIRED THK. mm | | | |
| 1 | 1.0 | 206.8 | 16.31 | 221.6 | 16.89 | 16.89 | ISO 630-FE510C | IV |
| 2 | 1.0 | 206.8 | 13.87 | 221.6 | 14.17 | 14.17 | ISO 630-FE510C | IV |
| 3 | 1.0 | 206.8 | 11.72 | 221.6 | 11.80 | 11.80 | ISO 630-FE510C | IV |
| 4 | 1.0 | 206.8 | 9.57 | 221.6 | 9.44 | 9.57 | ISO 630-FE510C | IV |
| 5 | 1.0 | 206.8 | 7.43 | 221.6 | 7.08 | 8.20 | ISO 630-FE510C | IV |
| 6 | 1.0 | 160.0 | 6.58 | 171.7 | 6.14 | 8.20 | A36 | I |
| 7 | 1.0 | 160.0 | 3.76 | 171.7 | 3.03 | 8.20 | A36 | I |
| 8 | 1.0 | 160.0 | 1.12 | 171.7 | 0.13 | 8.20 | A36 | I |



SHELL FITTING ELEVATION



ELEVATION



SKETCH 'A' (BOTTOM RING ONLY)

AS-BUILT
RTT ACB2

GENERAL NOTES:

- FITTINGS TO BE LOCATED AS SHOWN ON ORIENTATION DRAWING(S). IF LOCATIONS ARE NOT GIVEN, LOCATE IN FIELD TO SUIT CUSTOMER MAINTAINING MINIMUM SPACING SHOWN IN SKETCH 'A'. DIMENSIONS GIVEN ARE FROM EDGE TO EDGE OF REINFORCING PL OR FROM CL OF BUTT WELD TO EDGE OF REINFORCING PL. THE LOCATION DIMENSION SHOWN IN SKETCH 'A' ARE ONLY FOR NOZZLES 2" DIA AND LESS.
- FLANGE BOLT HOLES TO STRADDLE VERTICAL CENTERLINE FOR SHELL NOZZLES.
- FLANGE BOLT HOLES TO STRADDLE 0°-180° CENTERLINE FOR ROOF NOZZLES.
- SEE SHEETS 800 & 802 FOR MATERIAL MANAGEMENT.

STEVE COBLE
SABCO
3/15/96

DETAILED FOR (1) TANK - (1) TANK REQUIRED
PARA-XYLENE STORAGE TANK

BECHTEL LTD CONTRACT No. 22854-LCC-005 (22854-000-F-001)

| | |
|---|--------------------------|
| ARABIAN CBI LTD. | |
| GENERAL ARRANGEMENT 40.0m DIA. x 22.0m HIGH URT IBN RUSHD PTA & AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO 103-F-003 | CONTRACT NO ED 965201 |
| BY Rev. CHKD MSHG DATE 3/15/96 | DWG IA REV 5 |
| R L HERBERT ENGINEERING SUPERVISOR | |
| This drawing is the property of Arabian CBI and is to be used only in conjunction with the performance of work by Arabian CBI. Reproduction in whole or in part is expressly forbidden. | |

| LIST OF FITTINGS | | | | | |
|------------------|-----------|-------|------|---------|---|
| CUST. MARK | ACBI MARK | QUANT | SIZE | RATING | DESCRIPTION |
| M1 | 30-A | 1 | 30" | API | ROOF MANWAY |
| M2 | 15-A | 1 | 24" | API | SHELL MANHOLE |
| N1 | 20-A | 1 | 10" | 150 RF | SHELL NOZZLE INLET |
| N2 | 20-B | 1 | 10" | 300 RF | SHELL NOZZLE PUMP SPILLBACK |
| N3 | 31-A | 1 | 6" | 150 RF | ROOF NOZZLE VENT |
| J3A | 39-A | 1 | 6" | 150 RF | ROOF P/V VENT |
| N5 | 21-A | 1 | 20" | 150 RF | SHELL NOZZLE PUMP SUCTION W/INT. |
| N6 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE PURGE CONNECTION |
| N7 | 24-A | 1 | 6" | 150 RF | SHELL NOZZLE DRAIN W/INT. |
| N8 | 40-A | 1 | 2" | 150 RF | SHELL NOZZLE STEAM COIL INLET |
| N9 | 40-A | 1 | 2" | 150 RF | SHELL NOZZLE STEAM COIL OUTLET |
| N10 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE PUMP SPILLBACK |
| N11 | 26-A | 1 | 6" | 150 RF | SHELL NOZZLE SPARE |
| N12 | 35-A | 1 | 8" | 150 RF | ROOF NOZZLE LEVEL SERVO W/INT. |
| - | 34-1 | 3 | 8" | 150 RF | FOAM CHAMBER CONNECTION |
| J1 | 33-A | 1 | 2" | 150 RF | ROOF NOZZLE (N ₂ BLANKETING) |
| J2A/B | 33-4 | 2 | 3/4" | 3000 CL | ROOF NOZZLE (N ₂ BLANKETING) |
| J3 | 32-A | 1 | 12" | 150 RF | ROOF NOZZLE (PSV) |
| J4 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE TIC |
| J5 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LT |
| J6 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LALL/AAH |
| J7 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE TI |
| | DWG#29 | 4 | | | GROUNDING LUGS |
| | DWG#18 | 1 | | | NAMEPLATE |
| | DWG#57 | 1 | | | PERIPHERAL HANDRAIL |
| | DWG#50 | 1 | | | SPIRAL STAIRWAY |
| | | 1 | | | YACONODECK |
| | 17-A | 1 | 60" | | SUMP |
| | DWG#40-41 | | | | HEATER COIL |
| | DWG#45 | | | | DELUGE SYSTEM |
| | DWG#2-13 | | | | INSULATION SUPPORTS |
| | DWG#19 | | | | ANCHOR CHAIRS |
| | | 1 | | | ROOF PLATFORM |
| | | 1 SET | | | CATHODIC PROTECTION EXT. |
| | DWG#35 | 1 | | | STILLING WELL |
| J8 | 42-A | 1 | 12" | | ROOF NOZZLE (EMERGENCY VENT) |

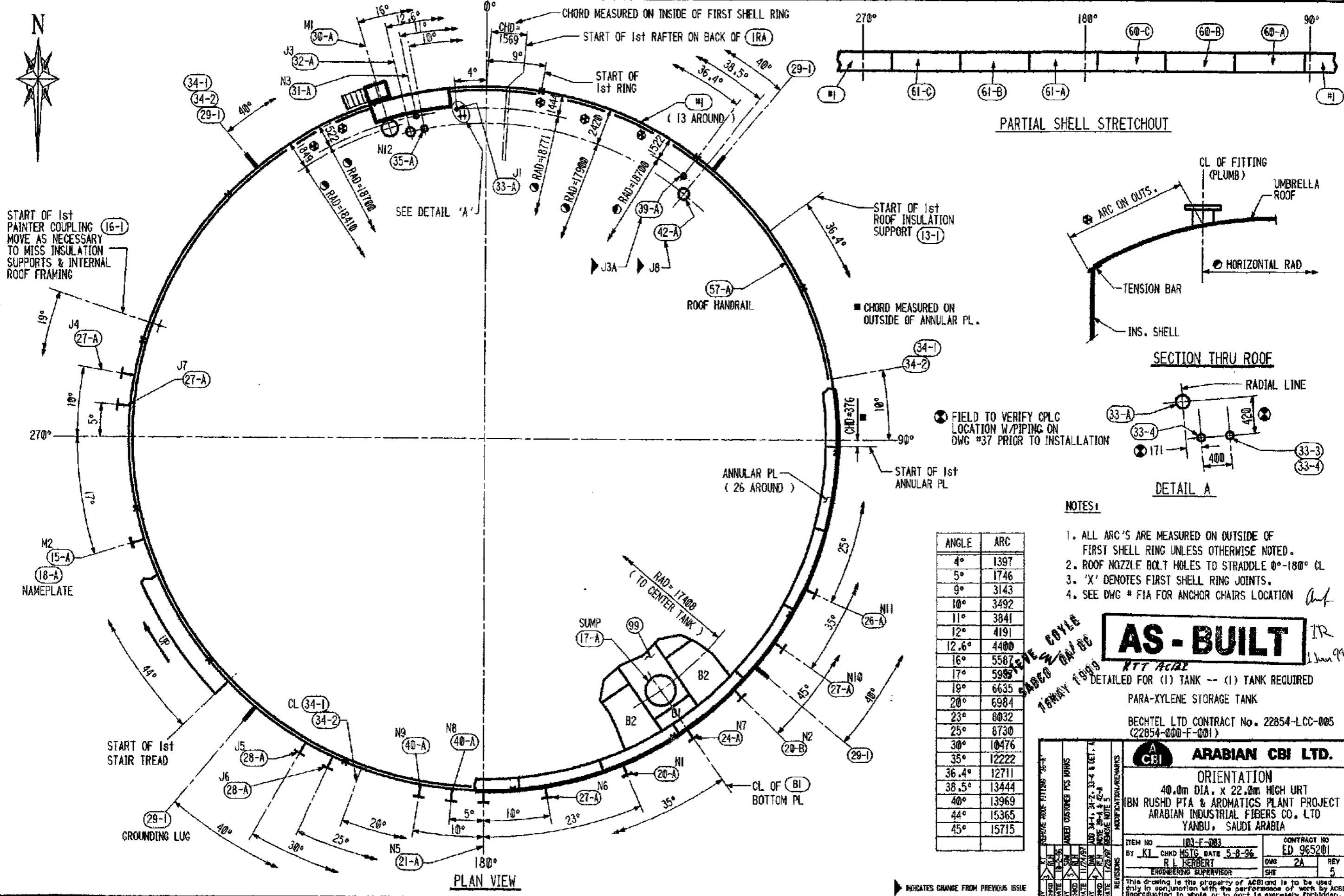
1045421 Oct. 2, 1996

632010.dgn

INDICATES CHANGE FROM PREVIOUS ISSUE

13x21x59 Oct. 2, 1996

520102A.DCN



| ANGLE | ARC |
|-------|-------|
| 4° | 1397 |
| 5° | 1746 |
| 9° | 3143 |
| 10° | 3492 |
| 11° | 3841 |
| 12° | 4191 |
| 12.6° | 4400 |
| 16° | 5587 |
| 17° | 5989 |
| 19° | 6635 |
| 20° | 6984 |
| 23° | 8032 |
| 25° | 8730 |
| 30° | 10476 |
| 35° | 12222 |
| 36.4° | 12711 |
| 38.5° | 13444 |
| 40° | 13969 |
| 44° | 15365 |
| 45° | 15715 |

NOTES:

1. ALL ARC'S ARE MEASURED ON OUTSIDE OF FIRST SHELL RING UNLESS OTHERWISE NOTED.
2. ROOF NOZZLE BOLT HOLES TO STRADDLE 0°-180° CL
3. 'X' DENOTES FIRST SHELL RING JOINTS.
4. SEE DWG # FIA FOR ANCHOR CHAIRS LOCATION

COYLE
SABO
TERRY 1999

AS-BUILT

DETAILED FOR (1) TANK -- (1) TANK REQUIRED
 PARA-XYLENE STORAGE TANK
 BECHTEL LTD CONTRACT No. 22854-LCC-005
 (22854-000-F-001)

| | |
|--|---|
| ARABIAN CBI LTD. ORIENTATION 40.0m DIA. x 22.0m HIGH URT IBN RUSHD PTA & AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO 103-F-003 BY KI CHKD MSTRG DATE 5-8-96 R L HERBERT ENGINEERING SUPERVISOR | CONTRACT NO ED 965201 DWG 2A REV 5 |
| This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden. | |

09#12#59 Oct. 21, 1996

6520801g.dgn

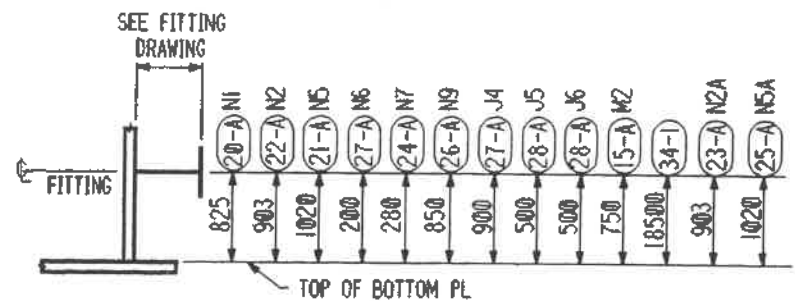
TECHNICAL & CONSTRUCTION INFORMATION

| SPECIFICATIONS | API 650-9th ED. (1993/94 ADD.) | MATERIAL SPEC |
|------------------------|--------------------------------|------------------------------------|
| SPECIFIC GRAVITY | 0.88 | BOTTOM RECT. — A36 |
| SERVICE | ORTHOXYLENE | BOTTOM SKETCHES — A36 |
| MAX DESIGN METAL TEMP. | 85°C | SHELL PLATES — A36 |
| MIN DESIGN METAL TEMP. | 17°C | ROOF PLATES — A36 |
| DESIGN PRESSURE | 0.025 bar (g) | STRUCTURAL — A36 |
| DESIGN VACUUM | 0.006 bar (g) | FLANGES — A105 |
| DESIGN LIQUID LEVEL | 16500 mm | NOZZLE NECKS — A53B SMLS OR A106B |
| DESIGN WIND VELOCITY | 140 km/h (PER API 650) | INTERNAL PIPE — A53B SMLS OR A106B |
| SEISMIC | ZONE I (I=1.0, S=1.2) | INSPECTION - MILL — CTR'S |
| ROOF LIVE LOAD | 1.2 kPa PLUS VACUUM | SHOP — ACBI |
| NOMINAL CAPACITY | 5180 m ³ | FIELD — ACBI & CUSTOMER |
| PUMP IN RATE | 37 m ³ /hr | SURFACE PREPARATION — YES |
| PUMP OUT RATE | 1000 m ³ /hr | PAINTING — YES |
| FOUNDATION | BY OTHERS | PWHT — NONE |
| CONSTRUCTION | BY ARABIAN CBI | INSULATION — NONE |
| CORROSION ALLOWANCE | | MISC. — |
| BOTTOM | 1.0 mm | GASKETS — REINZ-AFM37 |
| SHELL | 1.0 mm | BOLTS & NUTS — A193-B7 & A194-2H |
| ROOF | 1.0 mm | RADIOGRAPHY — PER CODE |
| STRUCTURAL | 1.0 mm | JOINT EFFICIENCY — N/A |

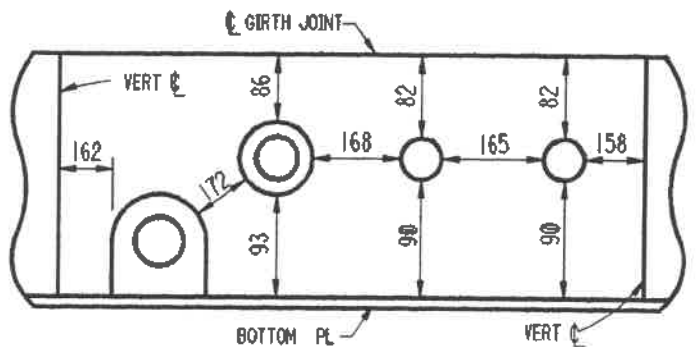
| SPECIFICATIONS | API 650-9th ED. (1993/94 ADD.) | MATERIAL SPEC |
|------------------------|--------------------------------|------------------------------------|
| SPECIFIC GRAVITY | 0.88 | BOTTOM RECT. — A36 |
| SERVICE | ORTHOXYLENE | BOTTOM SKETCHES — A36 |
| MAX DESIGN METAL TEMP. | 85°C | SHELL PLATES — A36 |
| MIN DESIGN METAL TEMP. | 17°C | ROOF PLATES — A36 |
| DESIGN PRESSURE | 0.025 bar (g) | STRUCTURAL — A36 |
| DESIGN VACUUM | 0.006 bar (g) | FLANGES — A105 |
| DESIGN LIQUID LEVEL | 16500 mm | NOZZLE NECKS — A53B SMLS OR A106B |
| DESIGN WIND VELOCITY | 140 km/h (PER API 650) | INTERNAL PIPE — A53B SMLS OR A106B |
| SEISMIC | ZONE I (I=1.0, S=1.2) | INSPECTION - MILL — CTR'S |
| ROOF LIVE LOAD | 1.2 kPa PLUS VACUUM | SHOP — ACBI |
| NOMINAL CAPACITY | 5180 m ³ | FIELD — ACBI & CUSTOMER |
| PUMP IN RATE | 37 m ³ /hr | SURFACE PREPARATION — YES |
| PUMP OUT RATE | 1000 m ³ /hr | PAINTING — YES |
| FOUNDATION | BY OTHERS | PWHT — NONE |
| CONSTRUCTION | BY ARABIAN CBI | INSULATION — NONE |
| CORROSION ALLOWANCE | | MISC. — |
| BOTTOM | 1.0 mm | GASKETS — REINZ-AFM37 |
| SHELL | 1.0 mm | BOLTS & NUTS — A193-B7 & A194-2H |
| ROOF | 1.0 mm | RADIOGRAPHY — PER CODE |
| STRUCTURAL | 1.0 mm | JOINT EFFICIENCY — N/A |

| RING NO. | CORR. ALLOW. mm | DESIGN FOR PRODUCT SG = 0.88 | | DESIGN FOR TEST SG = 1.0 | | THK. USED mm | MATERIAL SPECIFICATION | API INT'L GROUP NO. |
|----------|-----------------|------------------------------|------------------|--------------------------|------------------|--------------|------------------------|---------------------|
| | | ALLOWABLE STRESS MPa | REQUIRED THK. mm | ALLOWABLE STRESS MPa | REQUIRED THK. mm | | | |
| 1 | 1.0 | 160.0 | 9.89 | 171.7 | 9.41 | 9.89 | * A36 | I |
| 2 | 1.0 | 160.0 | 8.42 | 171.7 | 7.85 | 8.42 | * A36 | I |
| 3 | 1.0 | 160.0 | 6.98 | 171.7 | 6.32 | 8.42 | * A36 | I |
| 4 | 1.0 | 160.0 | 5.54 | 171.7 | 4.80 | 7.38 | * A36 | I |
| 5 | 1.0 | 160.0 | 4.11 | 171.7 | 3.29 | 7.38 | * A36 | I |
| 6 | 1.0 | 160.0 | 2.68 | 171.7 | 1.78 | 7.38 | * A36 | I |
| 7 | 1.0 | 160.0 | 1.27 | 171.7 | 0.29 | 7.38 | * A36 | I |

* KILLED OR SEMI KILLED



SHELL FITTING ELEVATION



SKETCH 'A' (BOTTOM RING ONLY)

GENERAL NOTES:

- FITTINGS TO BE LOCATED AS SHOWN ON ORIENTATION DRAWING(S). IF LOCATIONS ARE NOT GIVEN, LOCATE IN FIELD TO SUIT CUSTOMER MAINTAINING MINIMUM SPACING SHOWN IN SKETCH 'A'. DIMENSIONS GIVEN ARE FROM EDGE TO EDGE OF REINFORCING PL OR FROM CL OF BUTT WELD TO EDGE OF REINFORCING PL.
- FLANGE BOLT HOLES TO STRADDLE VERTICAL CENTERLINE FOR SHELL NOZZLES.
- FLANGE BOLT HOLES TO STRADDLE 0°-180° CENTERLINE FOR ROOF NOZZLES.
- SEE SHEETS 800 & 802 FOR MATERIAL MANAGEMENT

IR
1 Jun 99 DETAILED FOR (1) TANK - (1) TANK REQUIRED
 ORTHOXYLENE STORAGE TANK

BECHTEL LTD CONTRACT No. 22854-LCC-005 (22854-000-F-001)

| | | | | |
|--|------|------------------|------|-----------------------------|
| <p>ADD 34- TO FITTING ELEVATION REVISE LIST OF FITTINGS</p> | | <p>REVISIONS</p> | | <p>MODIFICATION/REMARKS</p> |
| BY | DATE | BY | DATE | |
| BY | DATE | BY | DATE | |
| BY | DATE | BY | DATE | |
| BY | DATE | BY | DATE | |
| BY | DATE | BY | DATE | |
| BY | DATE | BY | DATE | |
| BY | DATE | BY | DATE | |
| BY | DATE | BY | DATE | |
| BY | DATE | BY | DATE | |

STEVE COYLE
 SABCO QA/QC
 16 MAY 1999

AS-BUILT
 16 MAY 1999

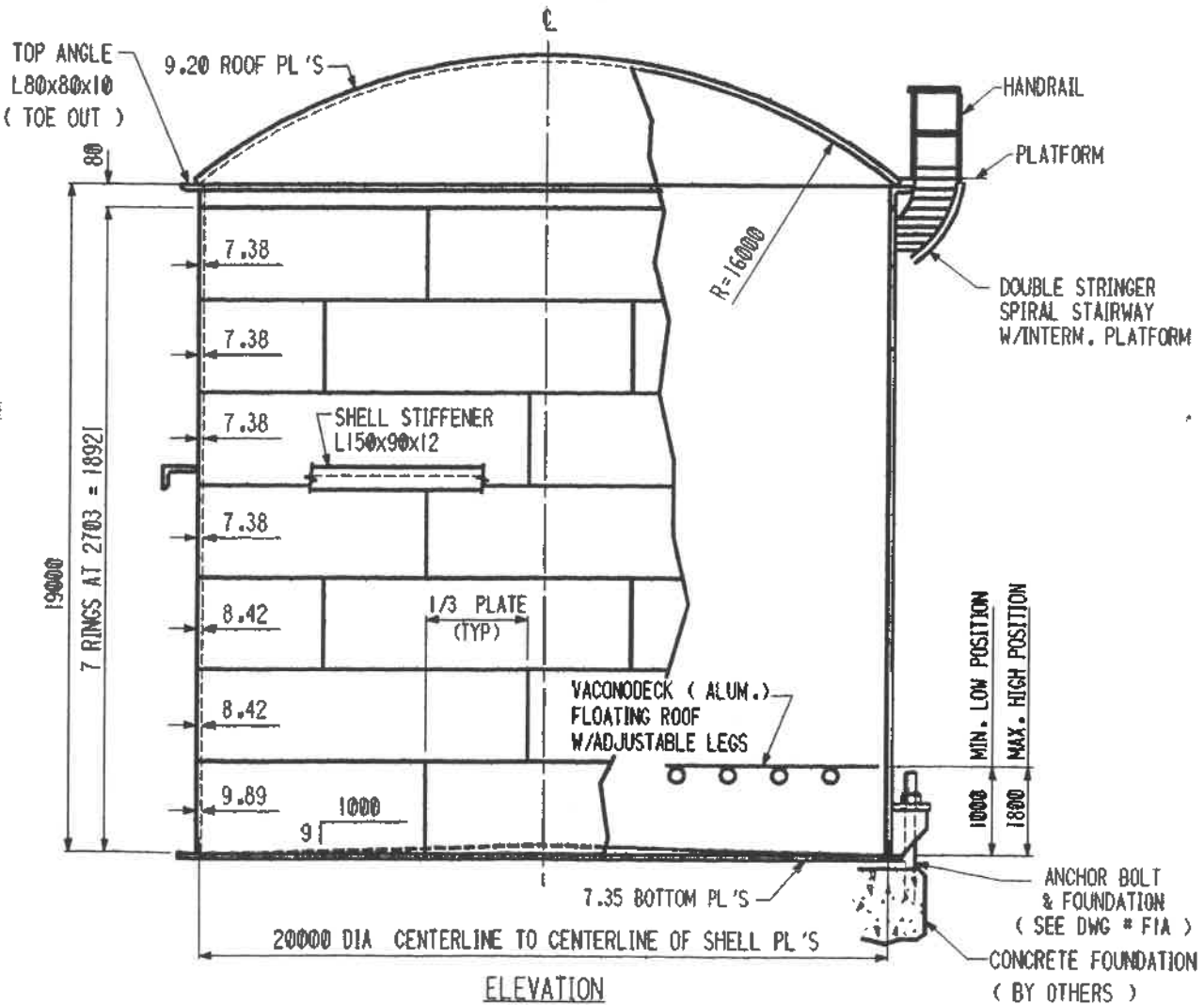
INDICATES CHANGE FROM PREVIOUS ISSUE

A ARABIAN CBI LTD.

GENERAL ARRANGEMENT
 20.0m DIA. x 19.0m HIGH SS DRT
 IBN RUSHD PTA AND AROMATICS PLANT PROJECT
 ARABIAN INDUSTRIAL FIBERS CO. LTD
 YANBU, SAUDI ARABIA

ITEM NO 103-F-005 CONTRACT NO ED 965208
 BY Key. CHKD MSG. DATE 3/19/96
 R L HERBERT DWG 1A REV 7
 ENGINEERING SUPERVISOR SHY

This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden.



ELEVATION

07-53-14 Oct. 8, 1996

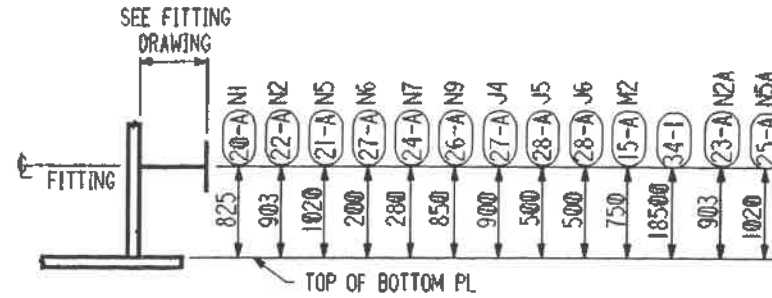
TECHNICAL & CONSTRUCTION INFORMATION

| | |
|------------------------|--------------------------------|
| SPECIFICATIONS | API 650-9th ED. (1993/94 ADD.) |
| | APP E, F, I, 2, H |
| SPECIFIC GRAVITY | 0.88 |
| SERVICE | ORTHOXYLENE |
| MAX DESIGN METAL TEMP. | 85°C |
| MIN DESIGN METAL TEMP. | 17°C |
| DESIGN PRESSURE | 0.025 bar (g) |
| DESIGN VACUUM | 0.006 bar (g) |
| DESIGN LIQUID LEVEL | 16500 mm |
| DESIGN WIND VELOCITY | 140 km/h (PER API 650) |
| SEISMIC | ZONE I (I=1.0, S=1.2) |
| | PER API 650 |
| ROOF LIVE LOAD | 1.2 KPa PLUS VACUUM |
| NOMINAL CAPACITY | 5180 m ³ |
| PUMP IN RATE | 37 m ³ /hr |
| PUMP OUT RATE | 1000 m ³ /hr |
| FOUNDATION | BY OTHERS |
| CONSTRUCTION | BY ARABIAN CBI |
| CORROSION ALLOWANCE | |
| BOTTOM | 1.0 mm |
| SHELL | 1.0 mm |
| ROOF | 1.0 mm |
| STRUCTURAL | 1.0 mm |

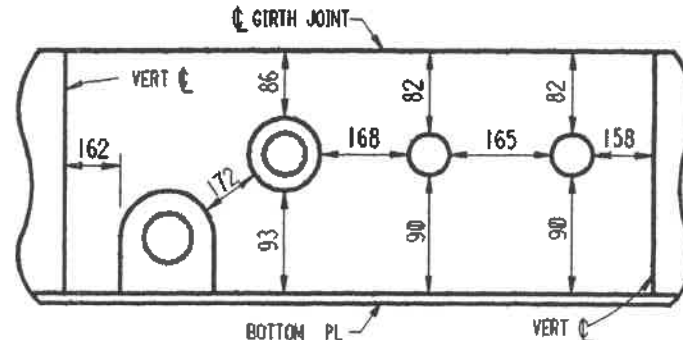
| | |
|----------------------|--------------------|
| MATERIAL SPEC | |
| BOTTOM RECT. | A36 |
| BOTTOM SKETCHES | A36 |
| SHELL PLATES | A36 |
| ROOF PLATES | A36 |
| STRUCTURAL | A36 |
| FLANGES | A105 |
| NOZZLE NECKS | A53B SMLS OR A106B |
| INTERNAL PIPE | A53B SMLS OR A106B |
| INSPECTION - MILL | CTR'S |
| SHOP | ACBI |
| FIELD | ACBI & CUSTOMER |
| SURFACE PREPARATION | YES |
| PAINTING | YES |
| PWHT | NONE |
| INSULATION | NONE |
| MISC. | |
| GASKETS | REINZ-AFM37 |
| BOLTS & NUTS | A193-B7 & A194-2H |
| RADIOGRAPHY | PER CODE |
| JOINT EFFICIENCY | N/A |

| RING NO. | CORR. ALLOW. mm | DESIGN FOR PRODUCT SG=0.88 | | DESIGN FOR TEST SG=1.0 | | THK. USED mm | MATERIAL SPECIFICATION | API NAT'L GROUP NO. |
|----------|-----------------|----------------------------|------------------|------------------------|------------------|--------------|------------------------|---------------------|
| | | ALLOWABLE STRESS MPa | REQUIRED THK. mm | ALLOWABLE STRESS MPa | REQUIRED THK. mm | | | |
| 1 | 1.0 | 160.0 | 9.89 | 171.7 | 9.41 | 9.89 | * A36 | I |
| 2 | 1.0 | 160.0 | 8.42 | 171.7 | 7.85 | 8.42 | * A36 | I |
| 3 | 1.0 | 160.0 | 6.98 | 171.7 | 6.32 | 8.42 | * A36 | I |
| 4 | 1.0 | 160.0 | 5.54 | 171.7 | 4.80 | 7.38 | * A36 | I |
| 5 | 1.0 | 160.0 | 4.11 | 171.7 | 3.29 | 7.38 | * A36 | I |
| 6 | 1.0 | 160.0 | 2.68 | 171.7 | 1.78 | 7.38 | * A36 | I |
| 7 | 1.0 | 160.0 | 1.27 | 171.7 | 0.29 | 7.38 | * A36 | I |

* KILLED OR SEMI KILLED



SHELL FITTING ELEVATION



SKETCH 'A' (BOTTOM RING ONLY)

GENERAL NOTES:

1. FITTINGS TO BE LOCATED AS SHOWN ON ORIENTATION DRAWING(S). IF LOCATIONS ARE NOT GIVEN, LOCATE IN FIELD TO SUIT CUSTOMER MAINTAINING MINIMUM SPACING SHOWN IN SKETCH 'A'. DIMENSIONS GIVEN ARE FROM EDGE TO EDGE OF REINFORCING PL OR FROM CL OF BUTT WELD TO EDGE OF REINFORCING PL.
2. FLANGE BOLT HOLES TO STRADDLE VERTICAL CENTERLINE FOR SHELL NOZZLES.
3. FLANGE BOLT HOLES TO STRADDLE 0°-180° CENTERLINE FOR ROOF NOZZLES.
4. SEE SHEETS 800 & 802 FOR MATERIAL MANAGEMENT.

IR 1 June 92

DETAILED FOR (1) TANK - (1) TANK REQUIRED
ORTHOXYLENE STORAGE TANK

BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

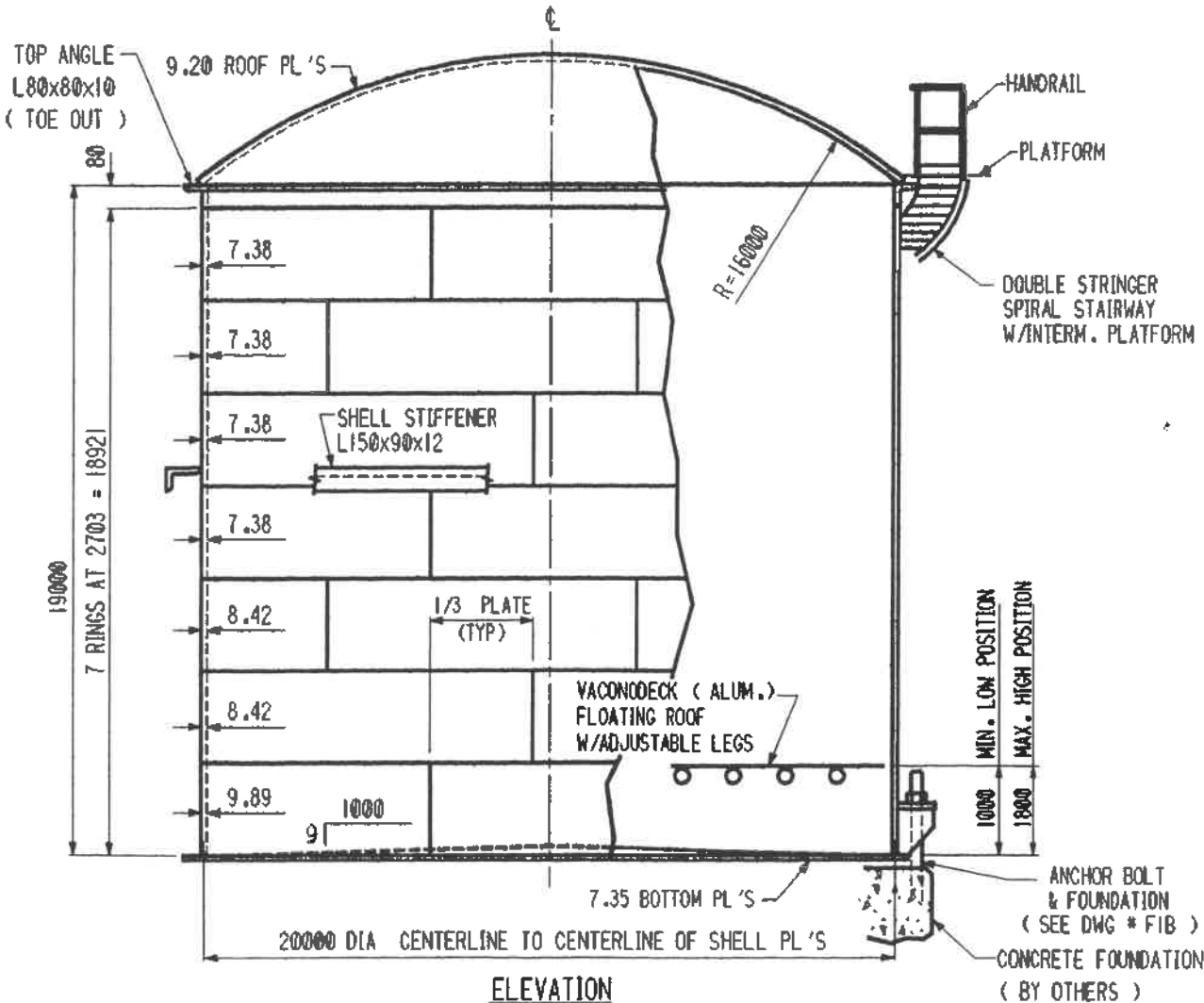
STEVE COYLE
SABCO QA/QC
16 MAY 1999

AS-BUILT

INDICATES CHANGE FROM PREVIOUS ISSUE

LIST OF FITTINGS

| CUST. MARK | ACBI MARK | QUANT | SIZE | RATING | DESCRIPTION |
|------------|-----------|-------|------|---------|---|
| M1 | 30-A | 1 | 30" | API | ROOF MANWAY |
| M2 | 15-A | 1 | 24" | API | SHELL MANHOLE |
| N1 | 20-A | 1 | 4" | 150 RF | SHELL NOZZLE INLET |
| N2 | 22-A | 1 | 10" | 300 RF | SHELL NOZZLE SPARE W/BLIND |
| N3 | 31-A | 1 | 6" | 150 RF | ROOF NOZZLE VENT |
| N5 | 21-A | 1 | 20" | 150 RF | SHELL NOZZ SPARE W/BLIND |
| N6 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE PURGE CONNECTION |
| N7 | 24-A | 1 | 6" | 150 RF | SHELL NOZZLE DRAIN W/INT. |
| N8 | 35-A | 1 | 8" | 150 RF | ROOF NOZZLE LEVEL SERVO W/INT. |
| N9 | 26-A | 1 | 6" | 150 RF | SHELL NOZZLE SPARE |
| | 34-1 | 1 | 8" | 150 RF | FOAM CHAMBER CONNECTION |
| J1 | 33-A | 1 | 2" | 150 RF | ROOF NOZZ (N ₂ BLANKETING) |
| J2A/B | 33-4 | 2 | 3/4" | 3000 CL | ROOF NOZZ (N ₂ BLANKETING) |
| J3 | 32-A | 1 | 4" | 150 RF | ROOF NOZZLE PSV |
| J4 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE TT |
| J5 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LT |
| J6 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LAMP/LALL |
| J3A | 39-A | 1 | 12" | 150 RF | VENT |
| J7 | 42-A | 1 | 12" | 150 RF | ROOF NOZZLE (EMERGENCY VENT) |
| DWG#18 | | 1 | | | NAMEPLATE |
| DWG#38 | | 1 | | | INTERNAL LADDER |
| | | 1 | | | PERIPHERAL HANDRAIL |
| DWG#50 | | 1 | | | SPIRAL STAIRWAY |
| DWG#29 | | 4 | | | GROUNDING LUG |
| | | 1 | | | VACONODECK |
| | 17-A | 1 | 60" | | SUMP |
| DWG#45 | | | | | DELUGE SYSTEM |
| DWG#19 | | | | | ANCHOR CHAIRS |
| DWG#35 | | 1 | | | STILLING WELL |
| | | 1 SET | | | CATHODIC PROTECTION (EXT.) |
| N2A | 23-A | 1 | 10" | 300 RF | SHELL NOZZLE PUMP SPILLBACK |
| N5A | 25-A | 1 | 20" | 150 RF | SHELL NOZZLE PUMP SUCTION W/INT. |

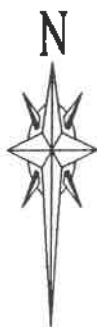


ELEVATION

| | |
|---|------------------------|
| ARABIAN CBI LTD. | |
| GENERAL ARRANGEMENT | |
| 20.0m DIA. x 19.0m HIGH SS DRT | |
| IBN RUSHD PTA AND AROMATICS PLANT PROJECT | |
| ARABIAN INDUSTRIAL FIBERS CO. LTD | |
| YANBU, SAUDI ARABIA | |
| ITEM NO 103-F-006 | CONTRACT NO ED 965208 |
| By Key, checked MSIG DATE 3/19/96 | DWG 18 REV 7 |
| R L HERBERT | ENGINEERING SUPERVISOR |
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6520001b.dcn

10-8421 Oct. 30, 1996

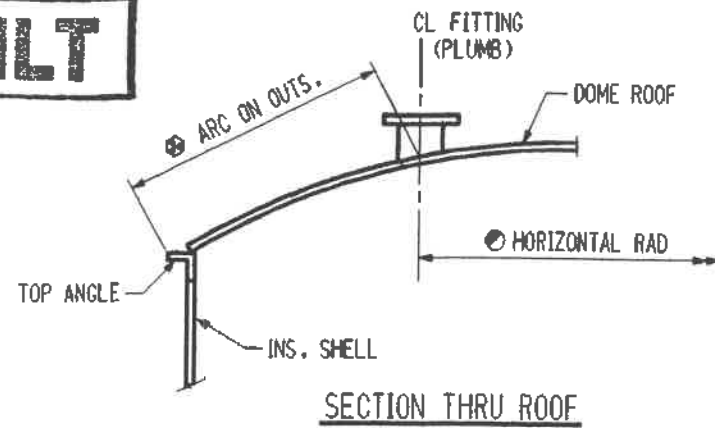


At
SR
13 Jun 99

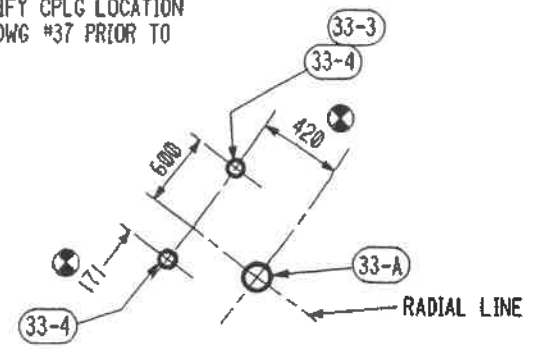
AS-BUILT

ACBI

STEVE COYLE
SABCO QA/QC
15 MAY 1999



FIELD TO VERIFY CPLG LOCATION
W/PIPING ON DWG #37 PRIOR TO
INSTALLATION



DETAIL A

NOTES:

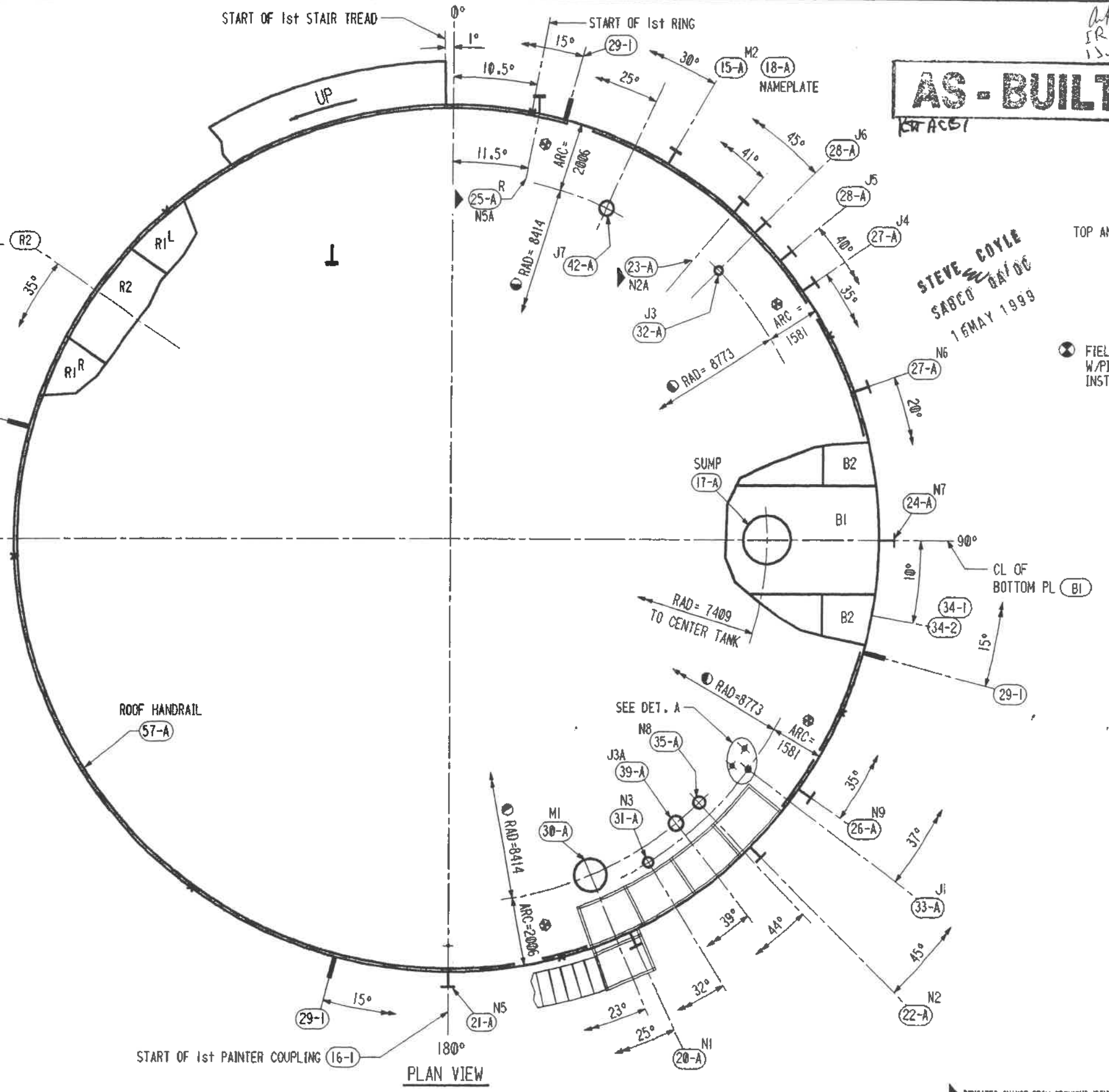
1. ALL ARC'S ARE MEASURED ON OUTSIDE OF FIRST SHELL RING UNLESS OTHERWISE NOTED.
2. ROOF NOZZLE BOLT HOLES TO STRADDLE 0°-180° CL
3. 'X' DENOTES FIRST SHELL RING JOINTS.
4. SEE DWG # FIA FOR ANCHOR CHAIRS LOCATION

DETAILED FOR (1) TANK -- (1) TANK REQUIRED
ORTHOXYLENE STORAGE TANK

BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

| | | | |
|---|--------------------------|-------------------------|-----|
| | | ARABIAN CBI LTD. | |
| ORIENTATION | | | |
| 20.0m DIA. x 19.0m HIGH SS DRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | | | |
| ITEM NO 183-F-005 | CONTRACT NO ED 965208 | DATE 5-28-96 | |
| BY R L HERBERT ENGINEERING SUPERVISOR | DWG 2A | REV 5 | SHT |
| This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden. | | | |

| ANGLE | ARC |
|-------|------|
| 1° | 175 |
| 10° | 1746 |
| 10.5° | 1834 |
| 11.5° | 2008 |
| 15° | 2619 |
| 20° | 3492 |
| 23° | 4016 |
| 25° | 4365 |
| 29° | 5064 |
| 30° | 5239 |
| 32° | 5588 |
| 35° | 6112 |
| 37° | 6461 |
| 39° | 6810 |
| 40° | 6985 |
| 41° | 7159 |
| 44° | 7683 |
| 45° | 7858 |



PLAN VIEW

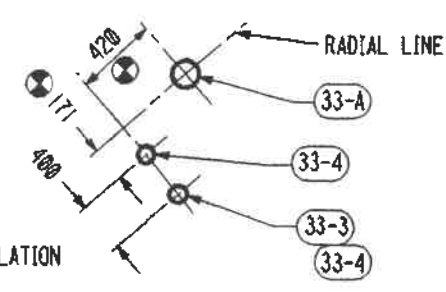
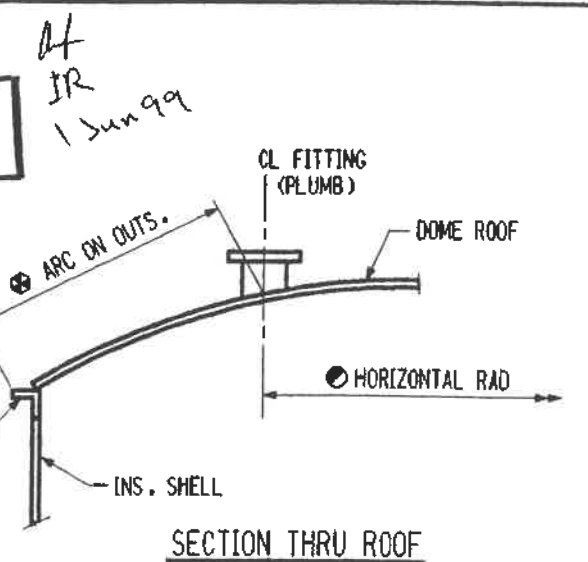
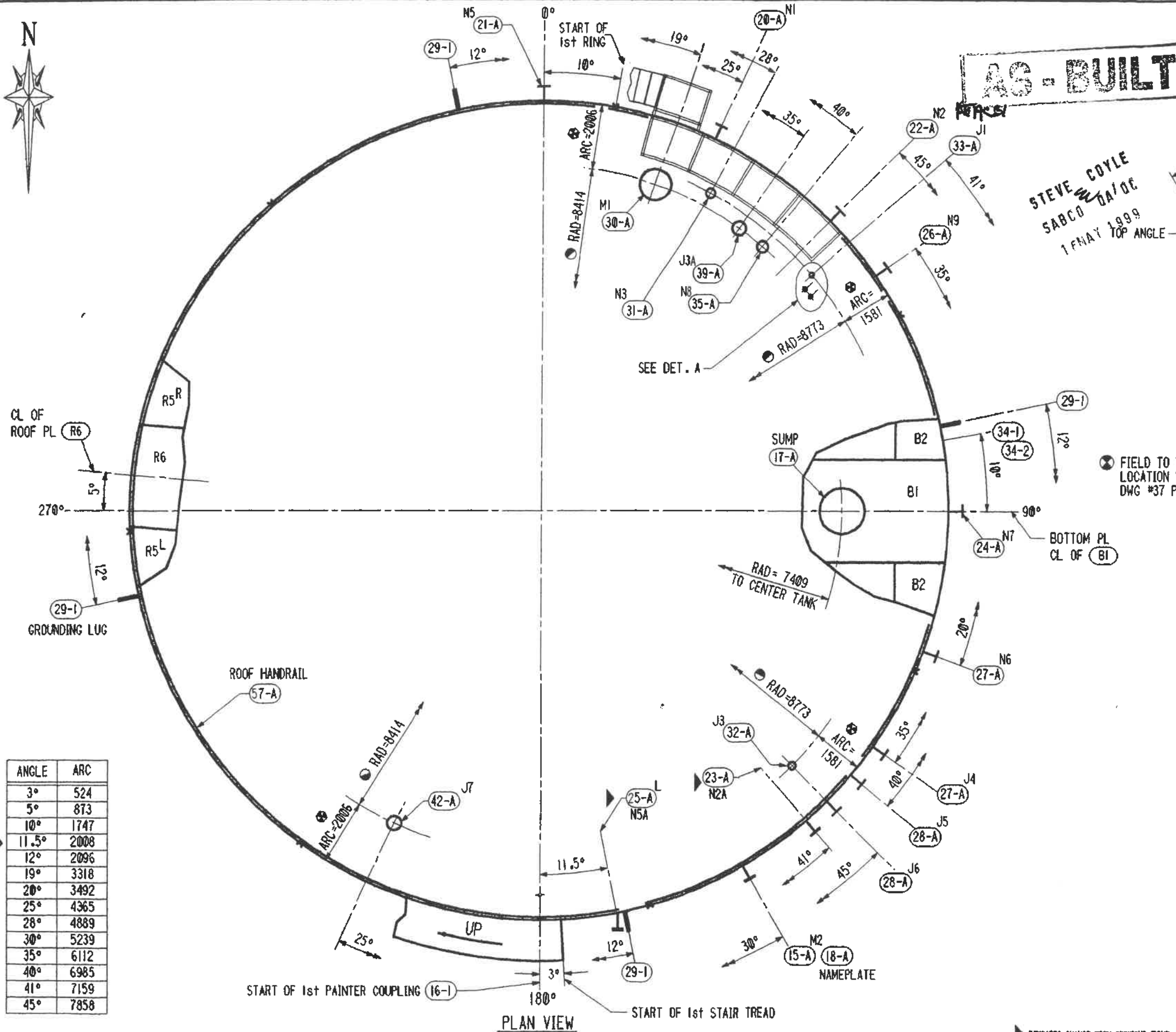
INDICATES CHANGE FROM PREVIOUS ISSUE

103-F-006

6520002a.DGN

10:25:52 Oct. 30, 1996

652002b.dcn



FIELD TO VERIFY CPLG LOCATION W/PIPING ON DWG #37 PRIOR TO INSTALLATION

NOTES:

1. ALL ARC'S ARE MEASURED ON OUTSIDE OF FIRST SHELL RING UNLESS OTHERWISE NOTED.
2. ROOF NOZZLE BOLT HOLES TO STRADDLE 0°-180° CL
3. 'X' DENOTES FIRST SHELL RING JOINTS.
4. SEE DWG # FIB FOR ANCHOR CHAIRS LOCATION

| ANGLE | ARC |
|-------|------|
| 3° | 524 |
| 5° | 873 |
| 10° | 1747 |
| 11.5° | 2008 |
| 12° | 2096 |
| 19° | 3318 |
| 20° | 3492 |
| 25° | 4365 |
| 28° | 4889 |
| 30° | 5239 |
| 35° | 6112 |
| 40° | 6985 |
| 41° | 7159 |
| 45° | 7858 |

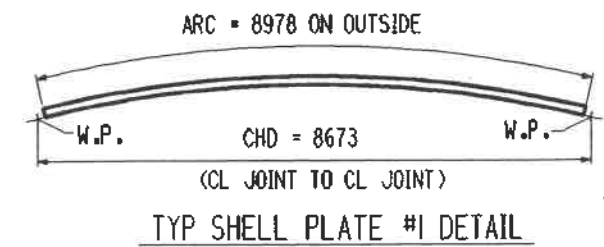
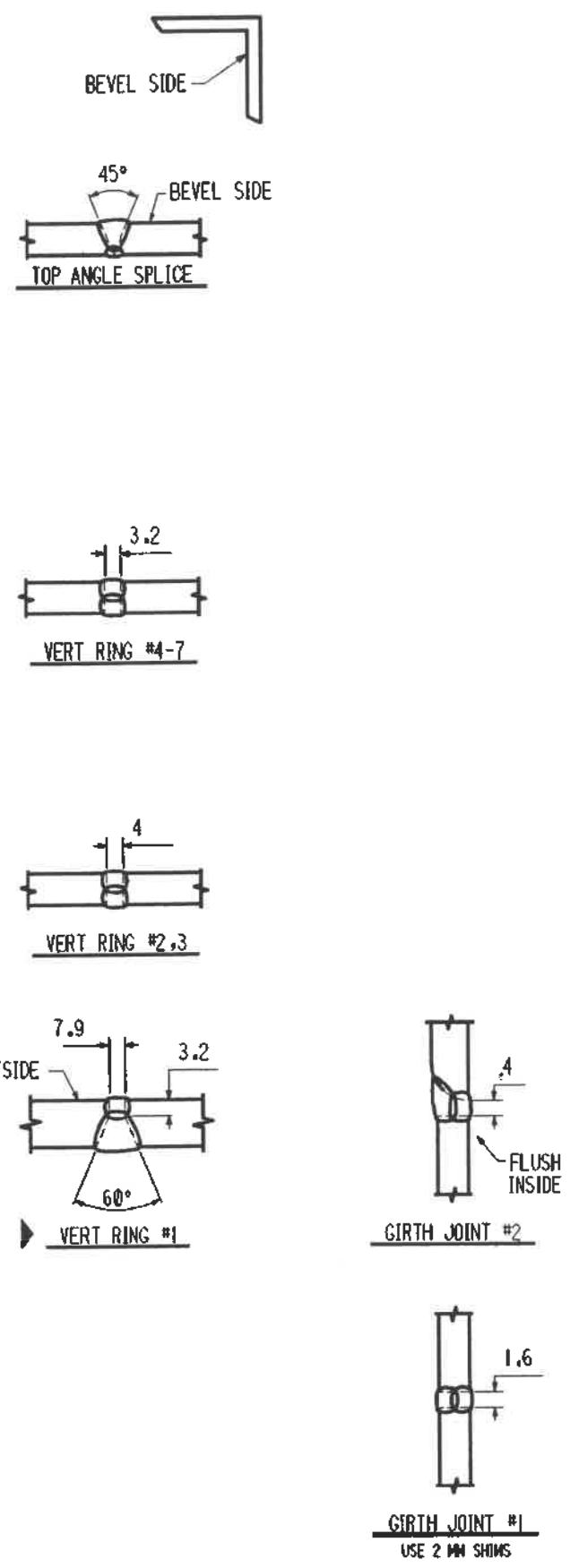
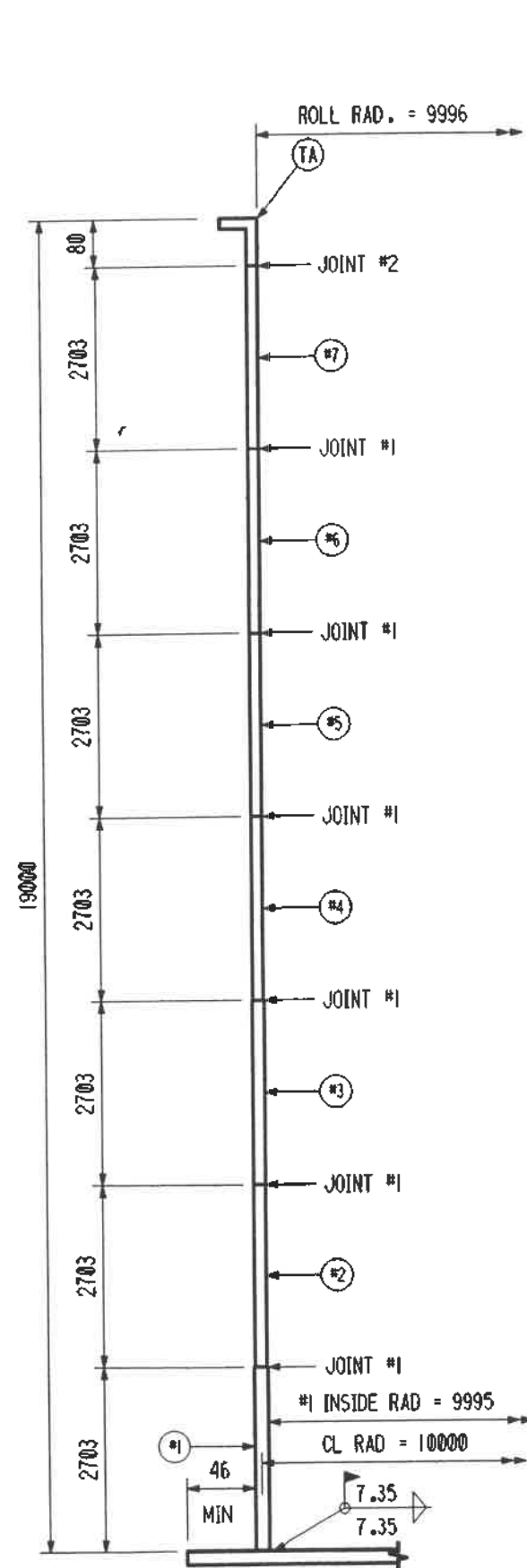
DETAILED FOR (1) TANK -- (1) TANK REQUIRED
 ORTHOXYLENE STORAGE TANK
 BECHTEL LTD CONTRACT No. 22854-LCC-005
 (22854-000-F-001)

| | |
|---|---|
| ARABIAN CBI LTD. | |
| ORIENTATION 20.0m DIA. x 19.0m HIGH SS DRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO BY DATE CHKD DATE DATE | 103-F-006 KI 5-28-96 R L HERBERT ENGINEERING SUPERVISOR |
| CONTRACT NO DWG REV | ED 965208 2B 6 |
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INDICATES CHANGE FROM PREVIOUS ISSUE

inf 103-F-005
 South

| SHIP PC | MARK | ASSY PC | DESCRIPTION | LENGTH MM | SPEC | D |
|---------|--------|---------|--------------------------------------|-----------|------|----|
| | | | SHELL SECTION | | | |
| 7 | #1 | | PL 2703 x 9.89 (2719 x 8990) | 8974 | A36 | A |
| 14 | #2, #3 | | PL 2703 x 8.42 (2719 x 8990) | 8974 | A36 | A |
| 28 | #4-#7 | | PL 2703 x 7.38 (2719 x 8990) | 8974 | A36 | A |
| 1 | TA | | L 80 x 80 x 10 * RUN ROLL SHR ** | 63176 | A36 | Ac |
| | | | * 305 MM INCLUDED FOR FIELD TRIM | | | |
| | | | ** ADD 914 MM TO EA. PIECE FOR SHEAR | | | |



GENERAL NOTES:
 1. BILLED PLATE LENGTHS ARE FINISHED 2 MM SHORTER THAN THEORETICAL LENGTH.
 STEVE 2. SHOP PUNCH MARK INSIDE TOP EDGE OF PLATES 2991 MM FROM EACH END.
 SABCO 16 MAY 1999
 DETAILED & BILLED FOR (1) TANK - (2) TANKS REQUIRED

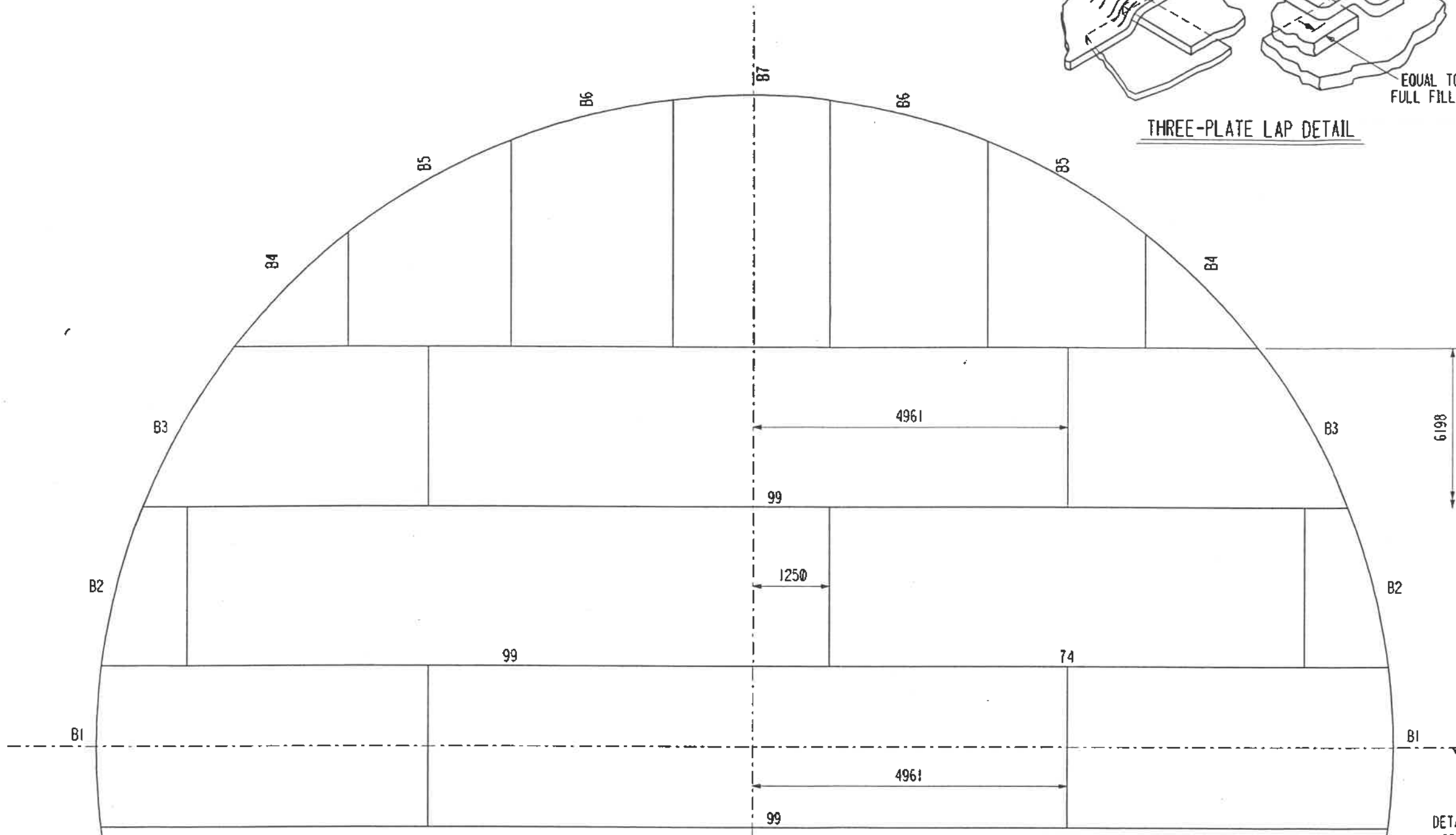
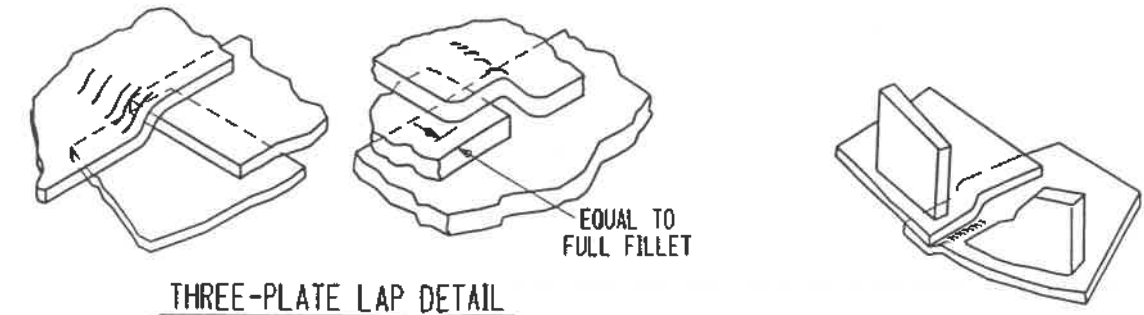
ORTHOXYLENE STORAGE TANK
 BECHTEL LTD CONTRACT No. 22854-LCC-005

Art IR 1 Jun 99
AS-BUILT
 K96 ACBI

| | |
|---|--|
| ARABIAN CBI LTD. | |
| SHELL SECTION 20.0m DIA. x 19.0m HIGH SS DRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO 103-F-005 & 103-F-006 BY Key CHD MSTG DATE 3/26/96 R L HERBERT ENGINEERING SUPERVISOR | CONTRACT NO ED 965208 DWG 3 REV 1 |
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INDICATES CHANGE FROM PREVIOUS ISSUE

ALL PL CL STACKED
 OUTSIDE CIRC ON FIRST RING = 62863
 OUTSIDE CIRC ON TOP RING = 62855



STEVE COYLE
SABCO QA/QC
16MAY 1999

AS-BUILT

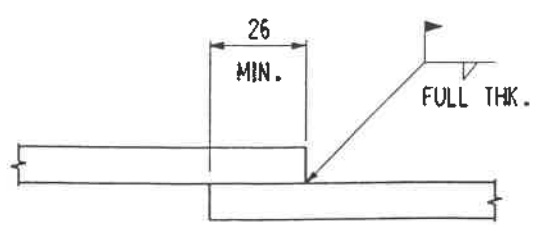
15/6/99

SYMMETRICAL ABOUT CL

DETAILED FOR (1) TANK -- (2) TANKS REQUIRED
WORK THIS DRAWING WITH DRAWING #6

ORTHOXYLENE STORAGE TANK

BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)



HALF PLAN OF BOTTOM

ALL LAPS 26 MM
174 METERS OF 7.35 LAP WELD
DIMENSIONS ARE TO EDGE OF PLATE
ON WHICH THEY APPEAR

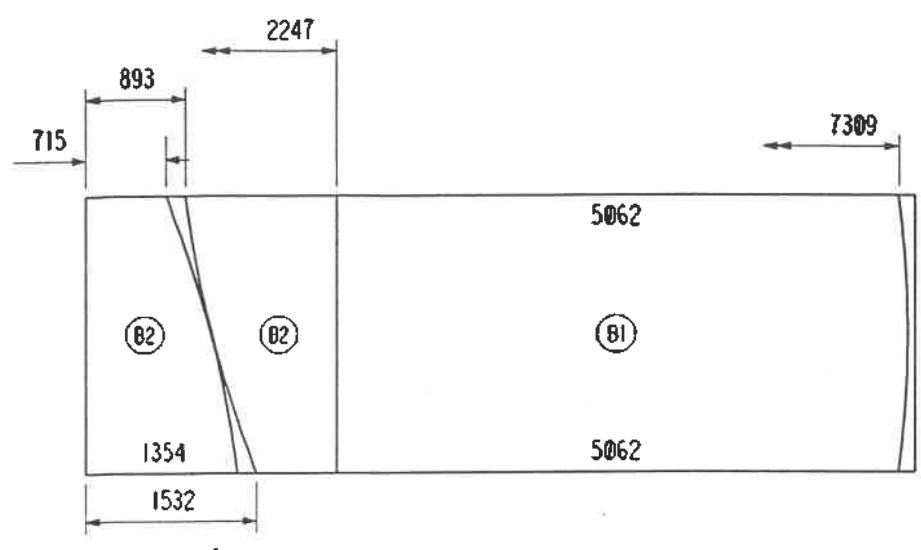
BURN & TAN RAD = 10075

STEVE COYLE
SABCO QA/QC
16MAY 1999

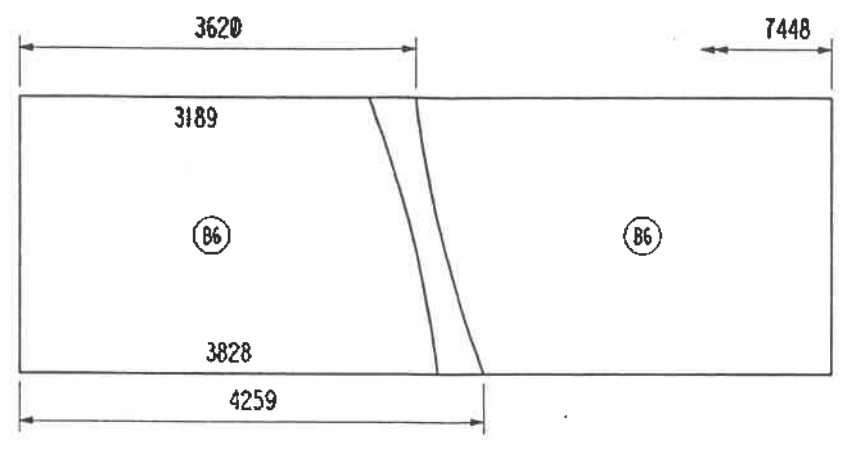
INDICATES CHANGE FROM PREVIOUS ISSUE

| | |
|--|---|
| <p>A CBI ARABIAN CBI LTD.</p> <p>BOTTOM ASSEMBLY</p> <p>20.0m DIA. x 19.0m HIGH SS DRT</p> <p>IBN RUSHD PTA AND AROMATICS PLANT PROJECT</p> <p>ARABIAN INDUSTRIAL FIBERS CO. LTD</p> <p>YANBU, SAUDI ARABIA</p> | |
| <p>ITEM NO 103-F-005/006</p> <p>BY MSTG CHKD KWB DATE 4-22-96</p> <p>R L HERBERT</p> <p>ENGINEERING SUPERVISOR</p> | <p>CONTRACT NO ED 965208</p> <p>DWG 5</p> <p>SHT 0</p> <p>REV 0</p> |
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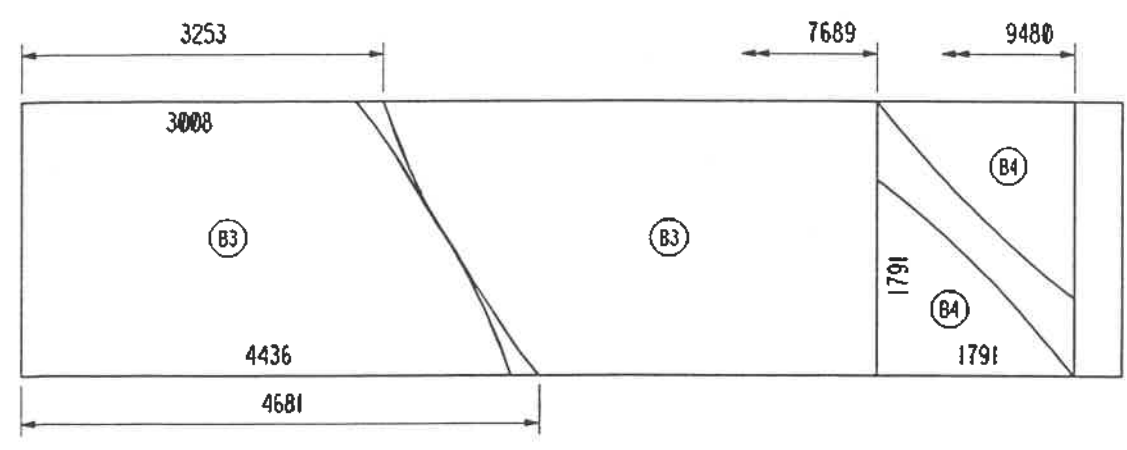
16.31.99 Apr. 22. 1996



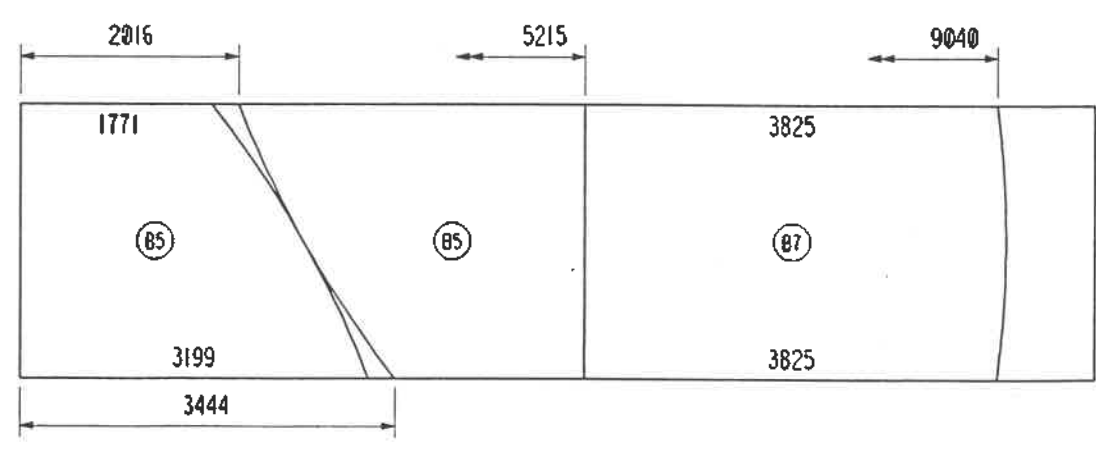
(74) (2) REQUIRED



(74) (2) REQUIRED



(99) (2) REQUIRED



(99) (2) REQUIRED

| SHP PC | MARK | ASSM PC | DESCRIPTION | LENGTH MM | SPEC | ID |
|--------|------|---------|-----------------|-----------|------|----|
| | | | --RECTANGULAR-- | | | |
| 5 | 99 | | PL-2500 X 7.35 | 9922 | A36 | A |
| 2 | 74 | | PL-2500 X 7.35 | 7448 | A36 | A |
| | | | --SKETCHES-- | | | |
| 2 | B1 | | PL-SK X 7.35 | | A36 | A |
| 4 | B2 | | PL-SK X 7.35 | | A36 | A |
| 4 | B3 | | PL-SK X 7.35 | | A36 | A |
| 4 | B4 | | PL-SK X 7.35 | | A36 | A |
| 4 | B5 | | PL-SK X 7.35 | | A36 | A |
| 4 | B6 | | PL-SK X 7.35 | | A36 | A |
| 2 | B7 | | PL-SK X 7.35 | | A36 | A |

THEORETICAL WT OF APPLIED MATERIAL
FOR CUTTING SKETCHES = 10022
TOTAL MATERIAL REQUIRED FOR SKETCHES
(4) - PL-2500 X 7.35 X 9922
(4) - PL-2500 X 7.35 X 7448

IR
1 Jun 99

STEVE COYLE
SABCO QA/QC
16 MAY 1999

AS-BUILT
RGT ASB

DETAILED AND BILLED FOR (1) TANK -- (2) TANKS REQUIRED
WORK THIS DRAWING WITH DRAWING #5
BURN RAD = 10075

STEVE COYLE
SABCO QA/QC
16 MAY 1999

ORTHOXYLENE STORAGE TANK
BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

A CBI ARABIAN CBI LTD.
BOTTOM SKETCHES
20.0m DIA. x 19.0m HIGH SS DRT
IBN RUSHD PTA AND AROMATICS PLANT PROJECT
ARABIAN INDUSTRIAL FIBERS CO. LTD
YANBU, SAUDI ARABIA

ITEM NO 103-F-005/006 CONTRACT NO ED 965208
BY MSTG CHKD *LRB* DATE 4-22-96
R L HERBERT DWG 6 REV 0
ENGINEERING SUPERVISOR SHT

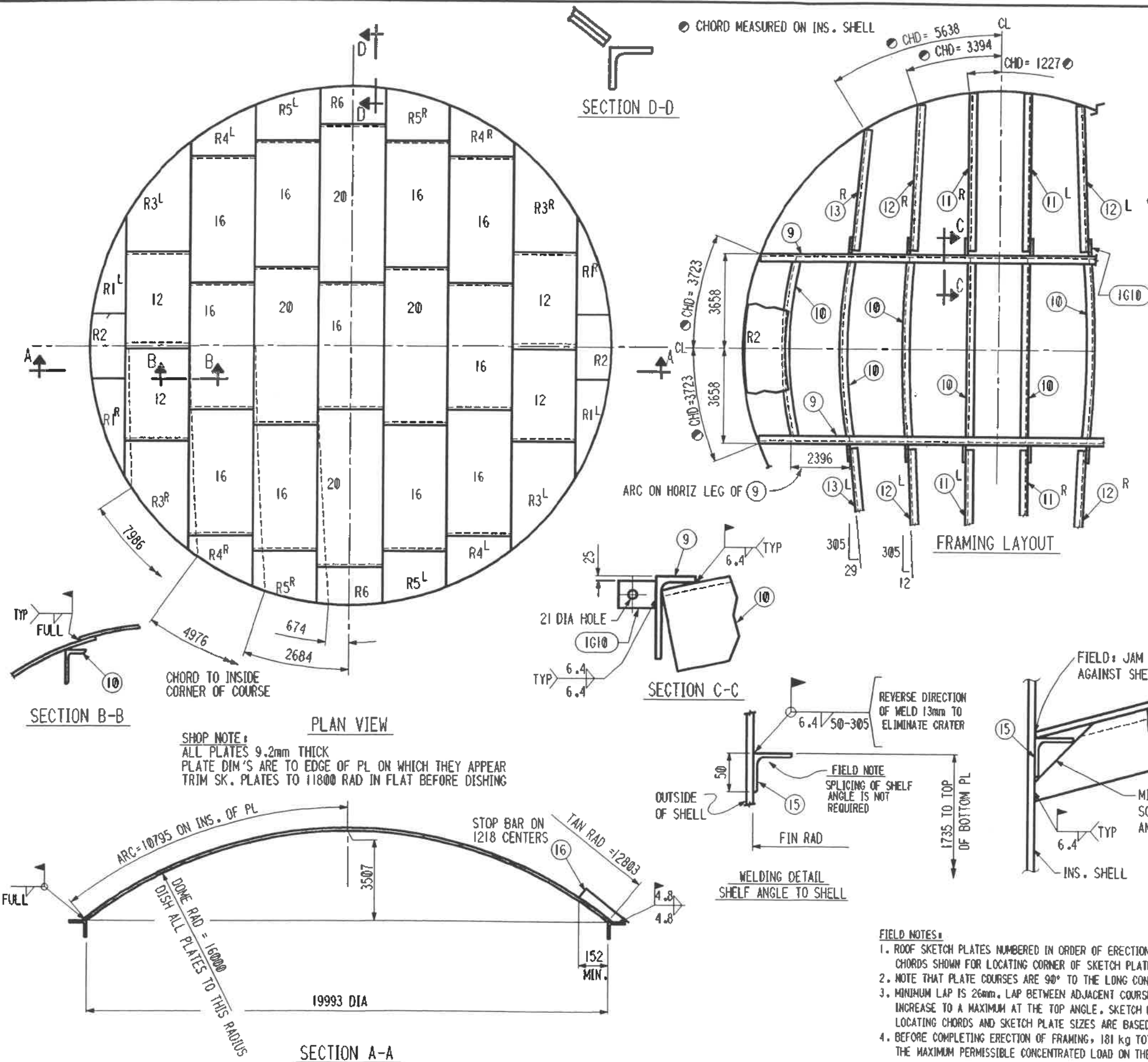
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INDICATES CHANGE FROM PREVIOUS ISSUE

65208006.DGN

101000022 JUL. 3, 1996

NSIP 80000209



| SHIP PC | MARK | ASST PC | DESCRIPTION | LENGTH MM | SPEC | D |
|-----------|----------|---------|------------------------------------|-----------|-------|---|
| DOME ROOF | | | | | | |
| 4 | R1 R/L | | PL SK x 9.20 (CF 2500 x 4877 C2) | | A36 | A |
| 2 | R2 | | PL SK x 9.20 (CF 2500 x 4877) | | A36 | A |
| 4 | R3 R/L | | PL SK x 9.20 (CF 2500 x 6096) | | A36 | A |
| 4 | R4 R/L | | PL SK x 9.20 (CF 2500 x 6096 C2) | | A36 | A |
| 4 | R5 R/L | | PL SK x 9.20 (CF 2500 x 6096 C2) | | A36 | A |
| 2 | R6 | | PL SK x 9.20 (CF 2500 x 6096 C2) | | A36 | A |
| 4 | 20 | | PL 2500 x 9.20 | 6096 | A36 | A |
| 11 | 16 | | PL 2500 x 9.20 | 4877 | A36 | A |
| 4 | 12 | | PL 2500 x 9.20 | 3657 | A36 | A |
| 2 | 8-A | | MAIN ANGLE ASSEMBLY | | | |
| | 8-9 | 4 | L200 x 100 x 15 x SK FIN | 10121 | A36 | C |
| | | | FIN ON RAD=15576 SHR | 11091 | | |
| | 1G10 | 12 | BAR 65 x 10 | 89 | A36 | C |
| 8 | 8-10 | | L200 x 100 x 15 FIN | 7364 | A36 | C |
| | | | FIN ON RAD=16000 SHR | 8364 | | |
| 4 | 8-11 L/R | | L200 x 100 x 15 x SK FIN | 7138 | A36 | C |
| | | | FIN ON RAD=15953 SHR | 8101 | | |
| 4 | 8-12 L/R | | L200 x 100 x 10 x SK FIN | 6513 | A36 | C |
| | | | FIN ON RAD=15558 SHR | 7479 | | |
| 4 | 8-13 L/R | | L200 x 100 x 10 x SK FIN | 5271 | A36 | C |
| | | | FIN ON RAD=14754 SHR | 6242 | | |
| 1 | 8-15 | | L50 x 50 x 5 RUN | 72900 | A36 | C |
| | | | FIN ON RAD=9995 | | | |
| 52 | 8-16 | | BAR 50 x 6 x SK | 280 | A36 | D |
| 13 | 8-17 | | BOLT 3/4" DIA HVY HEX | 38 | A307B | D |
| 13 | 8-18 | | NUT 3/4" DIA HVY HEX | | A563A | D |

MAYBE SHIPPED IN TWO PIECES

STEVE COYLE
SABCO DA/OC
16 MAY 1999

AS-BUILT

LENGTH OF 9.2 WELDS FOR ROOF PLATES (m)
 ROOF TO TOP ANGLE = 62.8
 LAP DOWN = 53.5
 LAP SLOPING = 165.1
 LAP OVERHEAD (IF REQ'D.) = 222.4

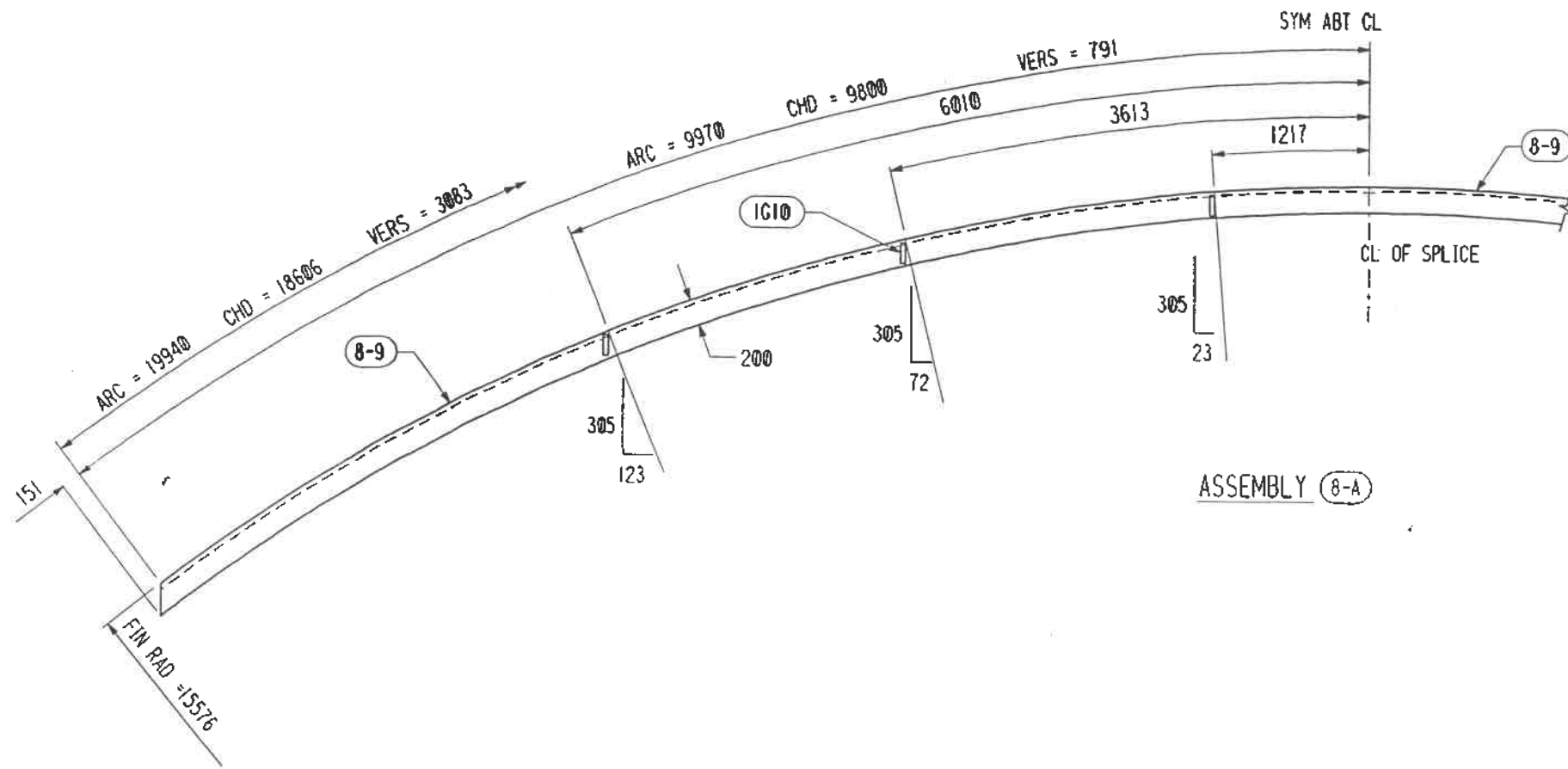
NOTE:
1. WORK THIS DWG WITH DWG # 9 & 10.

DETAILED & BILLED FOR (1) TANK - (2) TANKS REQUIRED
 ORTHOXYLENE STORAGE TANK
 BECHTEL LTD CONTRACT No. 22854-LCC-005

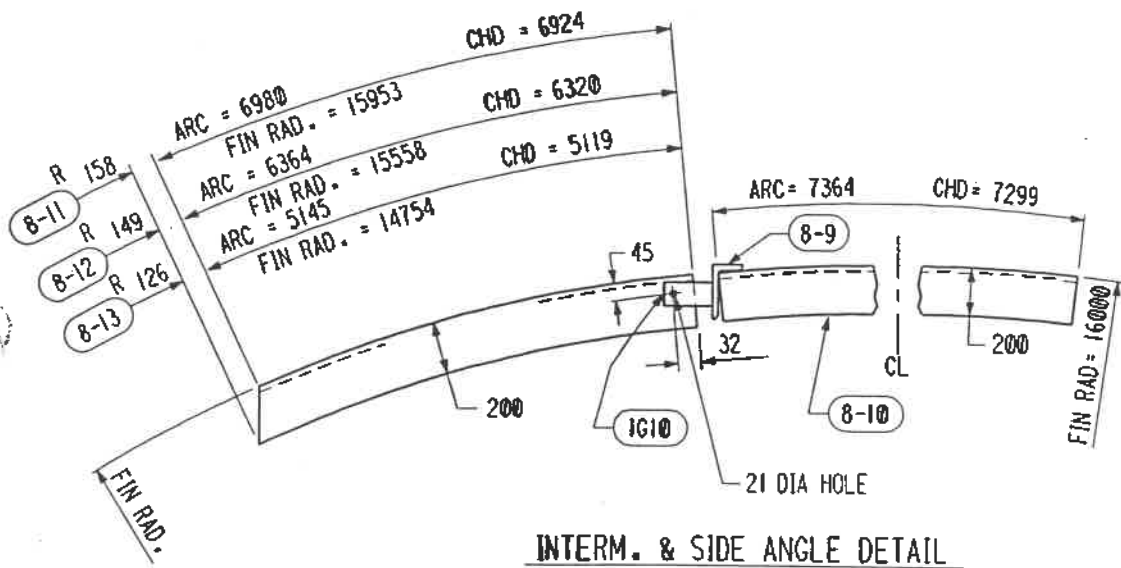
- FIELD NOTES:**
1. ROOF SKETCH PLATES NUMBERED IN ORDER OF ERECTION. USE THE CHORDS SHOWN FOR LOCATING CORNER OF SKETCH PLATE.
 2. NOTE THAT PLATE COURSES ARE 90° TO THE LONG CONTINUOUS ANGLE.
 3. MINIMUM LAP IS 26mm. LAP BETWEEN ADJACENT COURSES WILL INCREASE TO A MAXIMUM AT THE TOP ANGLE. SKETCH PLATE LOCATING CHORDS AND SKETCH PLATE SIZES ARE BASED ON 38mm LAP.
 4. BEFORE COMPLETING ERECTION OF FRAMING, 181 kg TOTAL IS THE MAXIMUM PERMISSIBLE CONCENTRATED LOAD ON THE FRAMING.

| | |
|---|--------------------------|
| A CBI ARABIAN CBI LTD. | |
| DOME ROOF | |
| 20.0m DIA. x 19.0m HIGH SS DRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO 103-F-005/006 | CONTRACT NO ED 965208 |
| BY KEY CHKD MSTG DATE 4/26/96 | DWG 8 REV |
| R L HERBERT | ENGINEERING SUPERVISOR |
| SHT 1 | |
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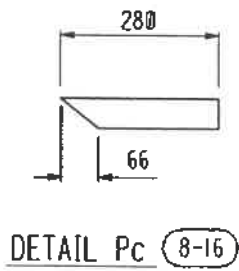
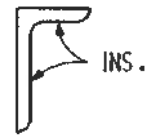
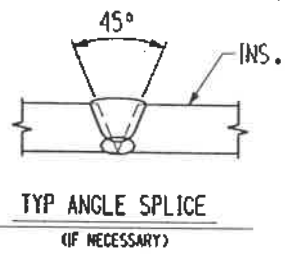
INDICATES CHANGE FROM PREVIOUS ISSUE



ASSEMBLY 8-A



INTERM. & SIDE ANGLE DETAIL



STEVE COYLE
SABCO QA/QC
16 MAY 1999
IR
1 Jun 99

AS-BUILT

DETAILED FOR (1) - (2) REQUIRED
WORK THIS DRAWING WITH DRAWING #8

ORTHOXYLENE STORAGE TANK

BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

| | | | |
|---|--------------------------|-------------------------|--|
| | | ARABIAN CBI LTD. | |
| DOME ROOF 20.0m DIA. x 19.0m HIGH SS DRT IGN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | | | |
| ITEM NO 103-F-005/006 | CONTRACT NO ED 965208 | | |
| BY Key, CHKD <i>RLH</i> DATE <i>4/25/99</i> R L HERBERT ENGINEERING SUPERVISOR | DWG 9 SHEET 0 | | |
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INDICATES CHANGE FROM PREVIOUS ISSUE

ZONE 2

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01


DOCUMENT TITLE:

CHARGE HEATER DATA SHEET

DOCUMENT NO:

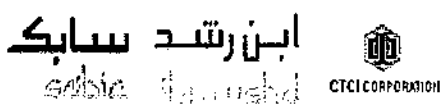
DS-54-BA-501

GN-502 84.10

| | | | | | | | | |
|-----|--------------------|------|------|------------|------------|------------------------|--|---|
| | | | | | | ابن رشيد ibn rushid | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA |  CTCI CORPORATION |
| | | | | | | CERTIFIED | | |
| 2 | Revised as Marked | KWY. | CBC | <i>YSL</i> | 11 Aug. 11 | PROJ. | | |
| 1 | Issued for Design | KWY | CBC | YSL | 27-May-11 | MGR | _____ | DATE _____ |
| 0 | Issue For Approval | KWY | CBC | YSL | 23-Mar.-11 | CLIENT | _____ | DATE _____ |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | XC33D-54-501 | |

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GN-504 84.10



CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|--------------------------|----------------------|------------------|-----------------|------------------|
| 1. | 54-B-01 | 1 THRU 5 OF 5 | 2 | 11-Aug.-2011 |
| Attachment total 9 pages | | | | |

| | | | | |
|--|-----------------------------|--|--------------|----------------------|
| ابن رشد سابق ابن رشد سابق CTCL CORPORATION | CHARGE HEATER DATA SHEET | | XC33D-54-501 | |
| | | | 2 OF 2 | DATE 11-Aug.-2011 |
| | | | | REV. 2 |

**FIRED HEATER
DATA SHEET**

Contract: 10E0541A01
Equipment No.: 54-B-01
Revision: 2 Date: 11-Aug-2011
Unit: 54 - Isomar
P.O. No.:
Document No.: DS-54-BA-01
Sheet: 1 of 5



Client: Arabian Industrial Fibers Company (Ibn Rushd) Vendor: Existing Born Heater - Revamped for New Service
Service: Charge Heater Plant: Isomar Site: Yanbu, Saudi Arabia
Type of Heater: Wicket Vendor: Existing Born Heater
Total Heater Absorbed Duty: 20.22 MW Assembly: Wicket with Deheptanizer Reboiler in Convection Section

PROCESS DESIGN CONDITIONS

| | | REVAMP EOR | REVAMP EOR | | |
|---|----------------------|-------------|-----------------------|--|--|
| | | Radiant | Convection | | |
| HEATER SECTION | | | | | |
| SERVICE | | Charge | Deheptanizer Reboiler | | |
| HEAT ABSORPTION | MW | 14.45 | 5.77 | | |
| FLUID NAME | | Hydrocarbon | Hydrocarbon | | |
| FLOW RATE | kg/hr | 276,955 | 185,472 | | |
| FLOW RATE | B.P.D. | | | | |
| PRESSURE DROP - ALLOWABLE (CLEAN / FOULED) | bar | | | | |
| PRESSURE DROP - CALCULATED (CLEAN / FOULED) | bar | 0.31 | 1.33 | | |
| FOULING ALLOWANCE | m ² ·°C/W | | | | |
| THERMAL CONDUCTIVITY OF COKE/SCALE | W/m·°C | | | | |
| COKING ALLOWANCE | mm | | | | |
| AVG. RADIANT SECTION FLUX DENSITY - ALLOWABLE | W/m ² | | | | |
| AVG. RADIANT SECTION FLUX DENSITY - CALCULATED | W/m ² | | | | |
| MAX. RADIANT SECTION FLUX DENSITY | W/m ² | | | | |
| CONVECTION SECTION FLUX DENSITY, (BARE TUBE) | W/m ² | | | | |
| VELOCITY LIMITATION | m/s | | | | |
| PROCESS FLUID MASS VELOCITY | kg/s·m ² | | | | |
| MAX. ALLOWABLE / CALCULATED INSIDE FILM TEMPERATURE | °C | | | | |

| INLET CONDITIONS: | | | | | |
|---|--|---------|---------|--|--|
| TEMPERATURE | °C | 358 | 235 | | |
| PRESSURE | <input checked="" type="checkbox"/> bar (g) <input type="checkbox"/> bar (g) | 13.28 | 8.09 | | |
| LIQUID FLOW | kg/hr | | 185,472 | | |
| VAPOR FLOW | kg/hr | 276,955 | | | |
| DENSITY - LIQUID | kg/m ³ | | 652.4 | | |
| VAPOR MOLECULAR WEIGHT | | 28.9 | | | |
| VISCOSITY - (LIQUID / VAPOR) | mPa·s | 0.017 | 0.172 | | |
| SPECIFIC HEAT - (LIQUID / VAPOR) | kJ/kg·°C | 2.962 | 2.576 | | |
| THERMAL CONDUCTIVITY - (LIQUID / VAPOR) | W/m·°C | 0.111 | 0.098 | | |

| OUTLET CONDITIONS: | | | | | |
|---|--|---------|---------|-------|--|
| TEMPERATURE | °C | 420 | 237 | | |
| PRESSURE | <input checked="" type="checkbox"/> bar (g) <input type="checkbox"/> bar (g) | 12.97 | 6.76 | | |
| LIQUID FLOW | kg/hr | | 112,619 | | |
| VAPOR FLOW | kg/hr | 276,955 | 72,853 | | |
| DENSITY - LIQUID | kg/m ³ | | 648.8 | | |
| VAPOR MOLECULAR WEIGHT | | 28.9 | 106.2 | | |
| VISCOSITY - (LIQUID / VAPOR) | mPa·s | 0.018 | 0.170 | 0.011 | |
| SPECIFIC HEAT - (LIQUID / VAPOR) | kJ/kg·°C | 3.110 | 2.587 | 2.068 | |
| THERMAL CONDUCTIVITY - (LIQUID / VAPOR) | W/m·°C | 0.122 | 0.098 | 0.027 | |

REMARKS AND SPECIAL REQUIREMENTS:
DISTILLATION DATA OR FEED COMPOSITION: See Fluid Properties on Sheets 3 and 4
SHORT TERM OPERATING CONDITIONS:
OTHER:

NOTES:
See Notes on Sheet 5

**FIRED HEATER
DATA SHEET**

Contract: 10E0541A01
Equipment No.: 64-B-01
Revision: 2 Date: 11-Aug-2011
Unit: 54 - Isomar
P.O. No.:
Document No.: DS-54-BA-01
Sheet: 2 of 5



COMBUSTION DESIGN CONDITIONS

| REVAMP EOR | | | | | | REV |
|------------|--|-------------------------|--------|-----|--|-----|
| | * OPERATING CASE | | | | | |
| | * TYPE OF FUEL | Sales Gas | | | | |
| | * EXCESS AIR | % | 15.0 | | | |
| | CALCULATED HEAT RELEASE (LHV) | MW | 23.62 | | | |
| | CALCULATED THERMAL EFFICIENCY | % (LHV) | | | | |
| | CALCULATED FUEL EFFICIENCY | % (LHV) | 88.0 | | | |
| | * GUARANTEED FUEL EFFICIENCY | % (LHV) | | | | |
| | RADIATION LOSS | % OF HEAT RELEASE (LHV) | 2.0 | | | |
| | FLUE GAS TEMPERATURE LEAVING: RADIANT SECT. | °C | 742 | | | |
| | | CONVECTION SECTION | °C | 276 | | |
| | | AIR PREHEATER | °C | n/a | | |
| | FLUE GAS ACID DEW POINT TEMPERATURE, | °C | 93 | | | |
| | FLUE GAS QUANTITY | kg/hr | 35,917 | | | |
| | FLUE GAS MASS VELOCITY THRU CONVECTION SECTION | kg/s.m ² | | | | |
| | VOLUMETRIC HEAT RELEASE (LHV) | KW/m ³ | | | | |
| | DRAFT: Immediately Above Top Convection Row, | mm H2O | | | | |
| | Immediately Below Bottom Convection Row, | mm H2O | 2.5 | | | |
| | At Burners, | mm H2O | 50.0 | | | |
| | COMBUSTION AIR TEMP.: Leaving Steam/Air Preheater, | °C | - | | | |
| | At Burners, | °C | 15.6 | | | |
| | COMBUSTION AIR QUANTITY | kg/hr | 33,819 | | | |
| | AMBIENT AIR TEMPERATURE - EFFICIENCY CALCULATION | °C | 15.6 | | | |
| | * AMBIENT AIR TEMPERATURE - STACK DESIGN | °C | 50.0 | | | |
| | * ALTITUDE ABOVE SEA LEVEL | m | 7.25 | | | |

FUEL CHARACTERISTICS

| * GAS TYPE | | Sales Gas | * GAS TYPE | | * LIQUID TYPE | |
|--------------------|-------------|---|--------------------|--|--------------------------|---------|
| * LHV | 40,512 | <input checked="" type="checkbox"/> kJ/kg <input type="checkbox"/> kJ/Sm ³ | * LHV | <input type="checkbox"/> kJ/kg <input type="checkbox"/> kJ/Sm ³ | * LHV | kJ/kg |
| * HHV | | <input type="checkbox"/> kJ/kg <input type="checkbox"/> kJ/Sm ³ | * HHV | <input type="checkbox"/> kJ/kg <input type="checkbox"/> kJ/Sm ³ | * HHV | kJ/kg |
| * PRESS. @ BURNER | 1.75 | bar (g) | * PRESS. @ BURNER | | * PRESS. @ BURNER | bar (g) |
| * TEMP. @ BURNER | 15.6 | °C | * TEMP. @ BURNER | | * TEMP. @ BURNER | °C |
| * MOLECULAR WEIGHT | | | * MOLECULAR WEIGHT | | * VISCOSITY @ | °C SSU |
| | | | | | * ATOMIZING STEAM TEMP. | °C |
| | | | | | * ATOMIZING STEAM PRESS. | bar (g) |
| COMPOSITION | MOLE % | COMPOSITION | MOLE % | COMPOSITION | WT % | |
| N2 | 12.0 | | | | | |
| C1 | 82.7 | | | | | |
| C2 | 5.0 | | | | | |
| C3 | 0.3 | | | | | |
| H2S | <2.0 w/ ppm | | | | | |
| TOTAL | 100.0 | | | | | |
| | | | | * VANADIUM | (ppm) | |
| | | | | * SODIUM | (ppm) | |
| | | | | * SULFUR | | |
| | | | | * ASH | | |

DATA FOR EXISTING BURNERS

| | | | |
|---|----------------------------|------------------------|----------------------------|
| MANUFACTURER: | SIZE / MODEL: | NUMBER: | 13 |
| TYPE: | LOCATION: | ORIENTATION: | |
| HEAT RELEASE PER BURNER: MW | DESIGN: 2.38 | NORMAL: 1.82 | MINIMUM: |
| PRESSURE DROP ACROSS BURNER @ DESIGN HEAT RELEASE: | By Vendor mm H2O | | |
| DISTANCE BURNER CENTER LINE TO TUBE CENTER LINE: | HORIZONTAL: | mm | VERTICAL: mm |
| DISTANCE BURNER CENTER LINE TO UNSHIELDED REFRACTORY: | HORIZONTAL: | mm | VERTICAL: mm |
| BURNER PILOT: CAPACITY kW | FUEL Sales Gas | FUEL PRESSURE | bar (g) |
| IGNITION METHOD: Automatic | | | |
| SPECIAL REQUIREMENTS (FLAME DETECTION DEVICES, SAFETY INTERLOCKS, ETC.): | | | |
| REQUIRED EMISSIONS: <input type="checkbox"/> ppmv(d) (CORRECTED TO 3% O ₂) | NO _x : Remark 1 | CO: Remark 1 | SO _x : Remark 1 |
| See REMARK 1 <input type="checkbox"/> kg/kJ <input type="checkbox"/> (LHV) <input type="checkbox"/> (HHV) | UHC: Remark 1 | PARTICULATES: Remark 1 | |

REMARKS:

1. The Royal Commission for Jubail and Yanbu has issued the "Royal Commission Environmental Regulations (RCER)" to be adopted by Industries both in Jubail and Yanbu. Any facility operating or planning to operate on the Royal Commission property shall comply with those regulations.

**FIRED HEATER
DATA SHEET**

Contract: 10E0541A01
Equipment No.: 54-B-01
Revision: 2 Date: 11-Aug-2011
Unit: 54 - Isomar
P.O. No.:
Document No.: DS-54-BA-01
Sheet: 3 of 5

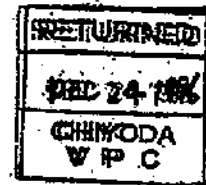
| FLUID PROPERTIES: | | | | | | | | | | | | | REV |
|-------------------------|------------|-----------------------------|-------------------|------------------------------|------------------------------|--------------------|----------------------------|-------------------|------------------------------|------------------------------|--------------------|----------------------------|-------------------------------|
| Debeptanizer Reboiler | | | | | | | | | | | | | |
| Thermodynamic condition | | | Vapor | | | | | Liquid | | | | | |
| Pressure bar(a) | Temp °C | Weight fraction vapor | Enthalpy kJ/kg | Density kg/m ³ | Specific heat kJ/kg·°C | Viscosity mPa·s | Thermal cond. W/m·°C | Enthalpy kJ/kg | Density kg/m ³ | Specific heat kJ/kg·°C | Viscosity mPa·s | Thermal cond. W/m·°C | Surface tension dyne/cm |
| 7.770 | 233.33 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 457.59 | 869.55 | 2.5690 | 0.1725 | 0.0981 | 7.99 |
| 7.770 | 234.47 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 480.51 | 861.95 | 2.5745 | 0.1717 | 0.0980 | 7.90 |
| 7.770 | 235.90 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 483.43 | 850.35 | 2.5803 | 0.1708 | 0.0978 | 7.80 |
| 7.770 | 236.72 | 0.0000 | 735.90 | 23.06 | 2.0645 | 0.0108 | 0.0272 | 456.39 | 648.75 | 2.5858 | 0.1701 | 0.0976 | 7.70 |
| 7.770 | 236.74 | 0.0420 | 735.93 | 23.06 | 2.0649 | 0.0106 | 0.0272 | 466.37 | 648.75 | 2.5858 | 0.1701 | 0.0976 | 7.70 |
| 7.770 | 236.75 | 0.0839 | 736.97 | 23.06 | 2.0649 | 0.0106 | 0.0272 | 466.41 | 648.91 | 2.5858 | 0.1701 | 0.0976 | 7.70 |
| 7.770 | 236.76 | 0.1259 | 736.01 | 23.06 | 2.0649 | 0.0106 | 0.0272 | 466.44 | 648.91 | 2.5858 | 0.1701 | 0.0976 | 7.70 |
| 7.770 | 236.78 | 0.1679 | 736.04 | 23.06 | 2.0649 | 0.0106 | 0.0272 | 466.48 | 648.91 | 2.5862 | 0.1701 | 0.0976 | 7.70 |
| 7.770 | 236.79 | 0.2098 | 736.08 | 23.06 | 2.0649 | 0.0106 | 0.0272 | 466.52 | 648.91 | 2.5862 | 0.1701 | 0.0976 | 7.70 |
| 7.770 | 236.81 | 0.2518 | 736.12 | 23.06 | 2.0649 | 0.0106 | 0.0272 | 466.56 | 648.91 | 2.5862 | 0.1701 | 0.0976 | 7.70 |
| 7.770 | 236.82 | 0.2938 | 736.15 | 23.06 | 2.0649 | 0.0106 | 0.0272 | 466.60 | 648.91 | 2.5862 | 0.1701 | 0.0976 | 7.70 |
| 7.770 | 236.83 | 0.3358 | 736.19 | 23.06 | 2.0653 | 0.0108 | 0.0272 | 466.63 | 648.91 | 2.5862 | 0.1701 | 0.0976 | 7.70 |
| 7.770 | 236.84 | 0.3778 | 736.23 | 23.06 | 2.0653 | 0.0106 | 0.0272 | 466.67 | 648.91 | 2.5862 | 0.1701 | 0.0976 | 7.70 |
| 7.770 | 236.86 | 0.4197 | 736.27 | 23.06 | 2.0653 | 0.0106 | 0.0272 | 466.71 | 648.91 | 2.5862 | 0.1701 | 0.0976 | 7.70 |
| 7.924 | 234.44 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 460.45 | 852.11 | 2.5745 | 0.1717 | 0.0980 | 7.90 |
| 7.924 | 235.00 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 463.43 | 850.51 | 2.5803 | 0.1708 | 0.0978 | 7.80 |
| 7.924 | 236.76 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 466.42 | 846.91 | 2.5858 | 0.1701 | 0.0976 | 7.70 |
| 7.924 | 237.90 | 0.0000 | 737.96 | 23.52 | 2.0704 | 0.0106 | 0.0273 | 469.38 | 647.31 | 2.5916 | 0.1692 | 0.0974 | 7.60 |
| 7.924 | 237.91 | 0.0420 | 737.90 | 23.52 | 2.0704 | 0.0106 | 0.0273 | 469.41 | 647.31 | 2.5916 | 0.1693 | 0.0974 | 7.60 |
| 7.924 | 237.92 | 0.0839 | 737.94 | 23.52 | 2.0704 | 0.0106 | 0.0273 | 469.45 | 647.31 | 2.5916 | 0.1693 | 0.0974 | 7.60 |
| 7.924 | 237.94 | 0.1259 | 737.97 | 23.52 | 2.0704 | 0.0106 | 0.0273 | 469.49 | 647.31 | 2.5916 | 0.1693 | 0.0974 | 7.60 |
| 7.924 | 237.95 | 0.1679 | 738.01 | 23.52 | 2.0704 | 0.0106 | 0.0273 | 469.52 | 647.31 | 2.5920 | 0.1693 | 0.0974 | 7.60 |
| 7.924 | 237.97 | 0.2098 | 738.04 | 23.52 | 2.0704 | 0.0106 | 0.0273 | 469.56 | 647.31 | 2.5920 | 0.1693 | 0.0974 | 7.60 |
| 7.924 | 237.98 | 0.2518 | 738.08 | 23.52 | 2.0704 | 0.0106 | 0.0273 | 469.60 | 647.31 | 2.5920 | 0.1693 | 0.0974 | 7.60 |
| 7.924 | 237.99 | 0.2938 | 738.12 | 23.53 | 2.0708 | 0.0108 | 0.0273 | 469.64 | 647.31 | 2.5920 | 0.1693 | 0.0974 | 7.60 |
| 7.924 | 238.01 | 0.3358 | 738.15 | 23.53 | 2.0708 | 0.0106 | 0.0273 | 469.67 | 647.31 | 2.5920 | 0.1693 | 0.0974 | 7.60 |
| 7.924 | 238.02 | 0.3778 | 738.19 | 23.53 | 2.0708 | 0.0108 | 0.0273 | 469.71 | 647.31 | 2.5920 | 0.1693 | 0.0974 | 7.60 |
| 7.924 | 238.03 | 0.4197 | 738.23 | 23.53 | 2.0708 | 0.0106 | 0.0273 | 469.75 | 647.31 | 2.5920 | 0.1693 | 0.0974 | 7.60 |
| 8.078 | 235.56 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 463.32 | 850.67 | 2.5799 | 0.1709 | 0.0978 | 7.60 |
| 8.078 | 236.73 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 466.34 | 849.07 | 2.5858 | 0.1701 | 0.0976 | 7.70 |
| 8.078 | 237.90 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 469.38 | 847.31 | 2.5916 | 0.1693 | 0.0974 | 7.60 |
| 8.078 | 239.07 | 0.0000 | 739.80 | 23.99 | 2.0758 | 0.0106 | 0.0273 | 472.39 | 645.70 | 2.5975 | 0.1686 | 0.0973 | 7.60 |
| 8.078 | 239.08 | 0.0420 | 739.84 | 23.99 | 2.0758 | 0.0106 | 0.0273 | 472.42 | 645.70 | 2.5975 | 0.1686 | 0.0973 | 7.60 |
| 8.078 | 239.09 | 0.0839 | 739.87 | 23.99 | 2.0758 | 0.0106 | 0.0273 | 472.45 | 645.70 | 2.5975 | 0.1686 | 0.0973 | 7.60 |
| 8.078 | 239.09 | 0.1259 | 739.91 | 23.99 | 2.0758 | 0.0106 | 0.0273 | 472.49 | 645.70 | 2.5975 | 0.1686 | 0.0973 | 7.60 |
| 8.078 | 239.11 | 0.1679 | 739.94 | 23.99 | 2.0758 | 0.0106 | 0.0273 | 472.53 | 645.70 | 2.5979 | 0.1686 | 0.0973 | 7.60 |
| 8.078 | 239.12 | 0.2098 | 739.98 | 23.99 | 2.0758 | 0.0106 | 0.0273 | 472.56 | 645.70 | 2.5979 | 0.1686 | 0.0973 | 7.60 |
| 8.078 | 239.13 | 0.2518 | 740.01 | 23.99 | 2.0758 | 0.0106 | 0.0273 | 472.60 | 645.70 | 2.5979 | 0.1686 | 0.0973 | 7.60 |
| 8.078 | 239.15 | 0.2938 | 740.05 | 23.99 | 2.0762 | 0.0106 | 0.0273 | 472.64 | 645.70 | 2.5979 | 0.1686 | 0.0973 | 7.60 |
| 8.078 | 239.16 | 0.3358 | 740.09 | 23.99 | 2.0762 | 0.0106 | 0.0273 | 472.68 | 645.70 | 2.5979 | 0.1686 | 0.0973 | 7.60 |
| 8.078 | 239.18 | 0.3778 | 740.13 | 23.99 | 2.0762 | 0.0108 | 0.0273 | 472.72 | 645.70 | 2.5979 | 0.1686 | 0.0973 | 7.50 |
| 8.078 | 239.19 | 0.4197 | 740.17 | 23.99 | 2.0762 | 0.0106 | 0.0273 | 472.76 | 645.70 | 2.5978 | 0.1686 | 0.0973 | 7.50 |
| 8.232 | 236.39 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 465.47 | 849.55 | 2.5841 | 0.1704 | 0.0978 | 7.73 |
| 8.232 | 237.66 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 468.76 | 847.79 | 2.5904 | 0.1695 | 0.0974 | 7.62 |
| 8.232 | 238.93 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 472.05 | 846.02 | 2.5971 | 0.1686 | 0.0973 | 7.51 |
| 8.232 | 240.19 | 0.0000 | 741.71 | 24.46 | 2.0813 | 0.0107 | 0.0275 | 475.35 | 644.26 | 2.6034 | 0.1677 | 0.0971 | 7.40 |
| 8.232 | 240.21 | 0.0420 | 741.74 | 24.46 | 2.0813 | 0.0107 | 0.0275 | 475.39 | 644.26 | 2.6034 | 0.1677 | 0.0971 | 7.40 |
| 8.232 | 240.22 | 0.0839 | 741.78 | 24.46 | 2.0813 | 0.0107 | 0.0275 | 475.42 | 644.26 | 2.6034 | 0.1677 | 0.0971 | 7.40 |
| 8.232 | 240.24 | 0.1259 | 741.82 | 24.46 | 2.0813 | 0.0107 | 0.0275 | 475.45 | 644.26 | 2.6034 | 0.1677 | 0.0971 | 7.40 |
| 8.232 | 240.25 | 0.1679 | 741.85 | 24.46 | 2.0813 | 0.0107 | 0.0275 | 475.49 | 644.26 | 2.6034 | 0.1677 | 0.0971 | 7.40 |
| 8.232 | 240.26 | 0.2098 | 741.89 | 24.46 | 2.0813 | 0.0107 | 0.0275 | 475.53 | 644.26 | 2.6036 | 0.1677 | 0.0971 | 7.40 |
| 8.232 | 240.28 | 0.2518 | 741.92 | 24.46 | 2.0813 | 0.0107 | 0.0275 | 475.57 | 644.26 | 2.6036 | 0.1677 | 0.0971 | 7.40 |
| 8.232 | 240.29 | 0.2938 | 741.96 | 24.46 | 2.0813 | 0.0107 | 0.0275 | 475.61 | 644.26 | 2.6036 | 0.1677 | 0.0971 | 7.40 |
| 8.232 | 240.30 | 0.3358 | 742.00 | 24.46 | 2.0817 | 0.0107 | 0.0275 | 475.64 | 644.26 | 2.6036 | 0.1677 | 0.0971 | 7.40 |
| 8.232 | 240.32 | 0.3778 | 742.03 | 24.46 | 2.0817 | 0.0107 | 0.0275 | 475.68 | 644.26 | 2.6036 | 0.1677 | 0.0971 | 7.40 |
| 8.232 | 240.33 | 0.4197 | 742.07 | 24.46 | 2.0817 | 0.0107 | 0.0275 | 475.72 | 644.26 | 2.6036 | 0.1677 | 0.0971 | 7.40 |
| 8.385 | 236.39 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 465.47 | 849.71 | 2.5841 | 0.1704 | 0.0976 | 7.73 |
| 8.385 | 238.04 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 469.74 | 847.31 | 2.5925 | 0.1692 | 0.0974 | 7.59 |
| 8.385 | 239.69 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 474.02 | 846.06 | 2.6006 | 0.1681 | 0.0973 | 7.45 |
| 8.385 | 241.32 | 0.0000 | 743.59 | 24.93 | 2.0863 | 0.0107 | 0.0275 | 478.28 | 642.66 | 2.6062 | 0.1669 | 0.0969 | 7.31 |
| 8.385 | 241.33 | 0.0420 | 743.62 | 24.93 | 2.0863 | 0.0107 | 0.0275 | 478.32 | 642.66 | 2.6062 | 0.1669 | 0.0969 | 7.31 |
| 8.385 | 241.35 | 0.0839 | 743.68 | 24.93 | 2.0867 | 0.0107 | 0.0275 | 478.35 | 642.66 | 2.6062 | 0.1669 | 0.0969 | 7.31 |
| 8.385 | 241.36 | 0.1259 | 743.69 | 24.93 | 2.0867 | 0.0107 | 0.0275 | 478.39 | 642.66 | 2.6062 | 0.1669 | 0.0969 | 7.31 |
| 8.385 | 241.37 | 0.1679 | 743.73 | 24.93 | 2.0867 | 0.0107 | 0.0275 | 478.43 | 642.66 | 2.6062 | 0.1669 | 0.0969 | 7.31 |
| 8.385 | 241.39 | 0.2098 | 743.77 | 24.93 | 2.0867 | 0.0107 | 0.0275 | 478.47 | 642.66 | 2.6062 | 0.1669 | 0.0969 | 7.31 |
| 8.385 | 241.40 | 0.2518 | 743.80 | 24.93 | 2.0867 | 0.0107 | 0.0275 | 478.50 | 642.66 | 2.6066 | 0.1669 | 0.0969 | 7.31 |
| 8.385 | 241.41 | 0.2938 | 743.84 | 24.93 | 2.0867 | 0.0107 | 0.0275 | 478.54 | 642.66 | 2.6066 | 0.1669 | 0.0969 | 7.31 |
| 8.385 | 241.43 | 0.3358 | 743.88 | 24.93 | 2.0867 | 0.0107 | 0.0275 | 478.58 | 642.66 | 2.6066 | 0.1670 | 0.0969 | 7.31 |
| 8.385 | 241.44 | 0.3778 | 743.91 | 24.93 | 2.0867 | 0.0107 | 0.0275 | 478.61 | 642.66 | 2.6066 | 0.1670 | 0.0969 | 7.31 |
| 8.385 | 241.46 | 0.4197 | 743.95 | 24.93 | 2.0871 | 0.0107 | 0.0275 | 478.65 | 642.66 | 2.6066 | 0.1670 | 0.0969 | 7.31 |

**FIRED HEATER
DATA SHEET**

Contract: 10E0541A01
Equipment No.: 54-B-01
Revision: 2 Date: 11-Aug-2011
Unit: 54 - Isomar
P.O. No.:
Document No.: DS-54-BA-01
Sheet: 4 of 5

| FLUID PROPERTIES: | | | | | | | | | | | | | REV |
|-------------------------|---------|-----------------------|----------------|---------------------------|------------------------|-----------------|----------------------|----------------|---------------------------|------------------------|-----------------|----------------------|-------------------------|
| Deheptanizer Reboiler | | | | | | | | | | | | | |
| Thermodynamic condition | | | Vapor | | | | | Liquid | | | | | |
| Pressure bar(a) | Temp °C | Weight fraction vapor | Enthalpy kJ/kg | Density kg/m ³ | Specific heat kJ/kg·°C | Viscosity mPa·s | Thermal cond. W/m·°C | Enthalpy kJ/kg | Density kg/m ³ | Specific heat kJ/kg·°C | Viscosity mPa·s | Thermal cond. W/m·°C | Surface tension dyna/cm |
| 8.539 | 236.39 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 465.47 | 649.71 | 2.5841 | 0.1704 | 0.0976 | 7.73 |
| 8.539 | 238.41 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 470.69 | 646.99 | 2.5941 | 0.1680 | 0.0974 | 7.86 |
| 8.539 | 240.42 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 475.93 | 644.10 | 2.6046 | 0.1679 | 0.0971 | 7.98 |
| 8.539 | 242.43 | 0.0000 | 745.44 | 25.40 | 2.0917 | 0.0107 | 0.0277 | 481.18 | 641.22 | 2.6151 | 0.1662 | 0.0967 | 7.21 |
| 8.539 | 242.44 | 0.0420 | 745.48 | 25.40 | 2.0917 | 0.0107 | 0.0277 | 481.22 | 641.22 | 2.6151 | 0.1662 | 0.0967 | 7.21 |
| 8.539 | 242.46 | 0.0839 | 745.51 | 25.40 | 2.0917 | 0.0107 | 0.0277 | 481.25 | 641.22 | 2.6151 | 0.1662 | 0.0967 | 7.21 |
| 8.539 | 242.47 | 0.1259 | 745.55 | 25.40 | 2.0917 | 0.0107 | 0.0277 | 481.29 | 641.22 | 2.6151 | 0.1662 | 0.0967 | 7.21 |
| 8.539 | 242.48 | 0.1679 | 745.59 | 25.40 | 2.0917 | 0.0107 | 0.0277 | 481.33 | 641.22 | 2.6151 | 0.1662 | 0.0967 | 7.21 |
| 8.539 | 242.49 | 0.2098 | 746.62 | 25.40 | 2.0921 | 0.0107 | 0.0277 | 481.38 | 641.22 | 2.6151 | 0.1662 | 0.0967 | 7.21 |
| 8.539 | 242.61 | 0.2518 | 746.66 | 25.40 | 2.0921 | 0.0107 | 0.0277 | 481.40 | 641.22 | 2.6151 | 0.1662 | 0.0967 | 7.21 |
| 8.539 | 242.52 | 0.2938 | 746.69 | 25.40 | 2.0921 | 0.0107 | 0.0277 | 481.44 | 641.22 | 2.6151 | 0.1662 | 0.0967 | 7.21 |
| 8.539 | 242.54 | 0.3358 | 746.73 | 25.40 | 2.0921 | 0.0107 | 0.0277 | 481.48 | 641.22 | 2.6155 | 0.1662 | 0.0967 | 7.21 |
| 8.539 | 242.55 | 0.3778 | 746.77 | 25.40 | 2.0921 | 0.0107 | 0.0277 | 481.51 | 641.22 | 2.6155 | 0.1662 | 0.0967 | 7.21 |
| 8.539 | 242.56 | 0.4198 | 745.80 | 25.40 | 2.0921 | 0.0107 | 0.0277 | 481.55 | 641.22 | 2.6155 | 0.1662 | 0.0967 | 7.21 |
| 8.693 | 236.39 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 465.47 | 649.87 | 2.5841 | 0.1704 | 0.0976 | 7.73 |
| 8.693 | 238.77 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 471.84 | 646.51 | 2.5962 | 0.1688 | 0.0973 | 7.86 |
| 8.693 | 241.16 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 477.85 | 643.14 | 2.6084 | 0.1671 | 0.0969 | 7.98 |
| 8.693 | 243.53 | 0.0000 | 747.27 | 25.87 | 2.0972 | 0.0107 | 0.0277 | 484.05 | 639.78 | 2.6205 | 0.1655 | 0.0967 | 7.12 |
| 8.693 | 243.54 | 0.0420 | 747.31 | 25.87 | 2.0972 | 0.0107 | 0.0277 | 484.08 | 639.78 | 2.6205 | 0.1655 | 0.0967 | 7.12 |
| 8.693 | 243.55 | 0.0839 | 747.34 | 25.87 | 2.0972 | 0.0107 | 0.0277 | 484.12 | 639.78 | 2.6205 | 0.1655 | 0.0967 | 7.12 |
| 8.693 | 243.57 | 0.1259 | 747.38 | 25.87 | 2.0972 | 0.0107 | 0.0277 | 484.15 | 639.78 | 2.6205 | 0.1655 | 0.0967 | 7.12 |
| 8.693 | 243.58 | 0.1679 | 747.41 | 25.87 | 2.0972 | 0.0107 | 0.0277 | 484.19 | 639.78 | 2.6209 | 0.1655 | 0.0966 | 7.12 |
| 8.693 | 243.59 | 0.2098 | 747.46 | 25.87 | 2.0972 | 0.0107 | 0.0277 | 484.23 | 639.78 | 2.6209 | 0.1655 | 0.0966 | 7.12 |
| 8.693 | 243.61 | 0.2518 | 747.49 | 25.87 | 2.0972 | 0.0107 | 0.0277 | 484.27 | 639.78 | 2.6209 | 0.1655 | 0.0966 | 7.12 |
| 8.693 | 243.62 | 0.2938 | 747.52 | 25.87 | 2.0972 | 0.0107 | 0.0277 | 484.30 | 639.78 | 2.6209 | 0.1655 | 0.0966 | 7.12 |
| 8.693 | 243.63 | 0.3358 | 747.56 | 25.87 | 2.0976 | 0.0107 | 0.0277 | 484.34 | 639.78 | 2.6209 | 0.1655 | 0.0966 | 7.12 |
| 8.693 | 243.64 | 0.3778 | 747.60 | 25.87 | 2.0976 | 0.0107 | 0.0277 | 484.38 | 639.78 | 2.6209 | 0.1655 | 0.0966 | 7.12 |
| 8.693 | 243.66 | 0.4198 | 747.63 | 25.87 | 2.0976 | 0.0107 | 0.0277 | 484.42 | 639.78 | 2.6209 | 0.1655 | 0.0966 | 7.12 |
| 8.847 | 236.39 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 465.47 | 649.87 | 2.5841 | 0.1704 | 0.0976 | 7.73 |
| 8.847 | 238.13 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 472.58 | 646.02 | 2.5979 | 0.1685 | 0.0973 | 7.49 |
| 8.847 | 241.98 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 479.73 | 642.18 | 2.6121 | 0.1668 | 0.0969 | 7.26 |
| 8.847 | 244.61 | 0.0000 | 749.07 | 26.34 | 2.1022 | 0.0107 | 0.0279 | 486.88 | 638.18 | 2.6264 | 0.1647 | 0.0966 | 7.03 |
| 8.847 | 244.62 | 0.0420 | 749.11 | 26.34 | 2.1022 | 0.0107 | 0.0279 | 486.92 | 638.18 | 2.6264 | 0.1647 | 0.0966 | 7.03 |
| 8.847 | 244.63 | 0.0839 | 749.14 | 26.34 | 2.1022 | 0.0107 | 0.0279 | 486.95 | 638.18 | 2.6264 | 0.1647 | 0.0966 | 7.03 |
| 8.847 | 244.64 | 0.1259 | 749.18 | 26.34 | 2.1022 | 0.0107 | 0.0279 | 486.99 | 638.18 | 2.6264 | 0.1647 | 0.0966 | 7.03 |
| 8.847 | 244.66 | 0.1679 | 749.22 | 26.34 | 2.1026 | 0.0107 | 0.0279 | 487.02 | 638.18 | 2.6264 | 0.1647 | 0.0966 | 7.03 |
| 8.847 | 244.67 | 0.2098 | 749.25 | 26.34 | 2.1026 | 0.0107 | 0.0279 | 487.06 | 638.18 | 2.6264 | 0.1647 | 0.0966 | 7.03 |
| 8.847 | 244.68 | 0.2518 | 749.29 | 26.34 | 2.1026 | 0.0107 | 0.0279 | 487.10 | 638.18 | 2.6268 | 0.1648 | 0.0966 | 7.03 |
| 8.847 | 244.69 | 0.2938 | 749.32 | 26.34 | 2.1026 | 0.0107 | 0.0279 | 487.13 | 638.34 | 2.6268 | 0.1648 | 0.0966 | 7.03 |
| 8.847 | 244.71 | 0.3358 | 749.36 | 26.34 | 2.1026 | 0.0107 | 0.0279 | 487.17 | 638.34 | 2.6268 | 0.1648 | 0.0966 | 7.03 |
| 8.847 | 244.72 | 0.3778 | 749.40 | 26.34 | 2.1026 | 0.0107 | 0.0279 | 487.21 | 638.34 | 2.6268 | 0.1648 | 0.0966 | 7.03 |
| 8.847 | 244.74 | 0.4198 | 749.44 | 26.34 | 2.1026 | 0.0107 | 0.0279 | 487.25 | 638.34 | 2.6268 | 0.1648 | 0.0966 | 7.03 |
| 9.000 | 236.39 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 465.47 | 650.03 | 2.5841 | 0.1705 | 0.0978 | 7.73 |
| 9.000 | 238.48 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 473.49 | 645.70 | 2.5996 | 0.1693 | 0.0973 | 7.46 |
| 9.000 | 242.58 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 481.56 | 641.22 | 2.6155 | 0.1662 | 0.0967 | 7.20 |
| 9.000 | 245.87 | 0.0000 | 750.85 | 26.81 | 2.1076 | 0.0108 | 0.0280 | 489.68 | 636.73 | 2.6318 | 0.1640 | 0.0964 | 6.94 |
| 9.000 | 245.88 | 0.0420 | 750.89 | 26.81 | 2.1076 | 0.0108 | 0.0280 | 489.72 | 636.73 | 2.6318 | 0.1640 | 0.0964 | 6.94 |
| 9.000 | 245.70 | 0.0839 | 750.92 | 26.81 | 2.1076 | 0.0108 | 0.0280 | 489.76 | 636.73 | 2.6322 | 0.1640 | 0.0964 | 6.94 |
| 9.000 | 245.71 | 0.1259 | 750.96 | 26.81 | 2.1076 | 0.0108 | 0.0280 | 489.79 | 636.73 | 2.6322 | 0.1640 | 0.0964 | 6.94 |
| 9.000 | 245.72 | 0.1679 | 751.00 | 26.81 | 2.1076 | 0.0108 | 0.0280 | 489.83 | 636.73 | 2.6322 | 0.1640 | 0.0964 | 6.94 |
| 9.000 | 245.73 | 0.2098 | 751.03 | 26.81 | 2.1076 | 0.0108 | 0.0280 | 489.86 | 636.73 | 2.6322 | 0.1640 | 0.0964 | 6.94 |
| 9.000 | 245.75 | 0.2518 | 751.07 | 26.81 | 2.1076 | 0.0108 | 0.0280 | 489.90 | 636.73 | 2.6322 | 0.1640 | 0.0964 | 6.94 |
| 9.000 | 245.76 | 0.2938 | 751.10 | 26.81 | 2.1076 | 0.0108 | 0.0280 | 489.94 | 636.73 | 2.6322 | 0.1641 | 0.0964 | 6.94 |
| 9.000 | 245.78 | 0.3358 | 751.14 | 26.81 | 2.1081 | 0.0108 | 0.0280 | 490.07 | 636.73 | 2.6322 | 0.1641 | 0.0964 | 6.94 |
| 9.000 | 245.79 | 0.3778 | 751.17 | 26.81 | 2.1081 | 0.0108 | 0.0280 | 490.01 | 636.73 | 2.6322 | 0.1641 | 0.0964 | 6.94 |
| 9.000 | 245.80 | 0.4198 | 751.21 | 26.81 | 2.1081 | 0.0108 | 0.0280 | 490.05 | 636.73 | 2.6322 | 0.1641 | 0.0964 | 6.94 |
| 9.154 | 236.39 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 465.47 | 650.03 | 2.5841 | 0.1705 | 0.0978 | 7.73 |
| 9.154 | 239.84 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 474.42 | 645.22 | 2.6017 | 0.1681 | 0.0973 | 7.43 |
| 9.154 | 243.29 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 483.42 | 640.26 | 2.6193 | 0.1657 | 0.0967 | 7.14 |
| 9.154 | 246.72 | 0.0000 | 752.61 | 27.29 | 2.1127 | 0.0108 | 0.0280 | 492.46 | 635.29 | 2.6377 | 0.1633 | 0.0962 | 6.85 |
| 9.154 | 246.74 | 0.0420 | 752.65 | 27.29 | 2.1127 | 0.0108 | 0.0280 | 492.49 | 635.29 | 2.6377 | 0.1633 | 0.0962 | 6.85 |
| 9.154 | 246.75 | 0.0839 | 752.68 | 27.29 | 2.1127 | 0.0108 | 0.0280 | 492.53 | 635.29 | 2.6377 | 0.1633 | 0.0962 | 6.85 |
| 9.154 | 246.76 | 0.1259 | 752.71 | 27.29 | 2.1127 | 0.0108 | 0.0280 | 492.56 | 635.29 | 2.6377 | 0.1633 | 0.0962 | 6.85 |
| 9.154 | 246.78 | 0.1679 | 752.75 | 27.29 | 2.1127 | 0.0108 | 0.0280 | 492.60 | 635.29 | 2.6377 | 0.1633 | 0.0962 | 6.85 |
| 9.154 | 246.79 | 0.2098 | 752.79 | 27.29 | 2.1131 | 0.0108 | 0.0280 | 492.64 | 635.29 | 2.6377 | 0.1634 | 0.0962 | 6.85 |
| 9.154 | 246.80 | 0.2518 | 752.82 | 27.29 | 2.1131 | 0.0108 | 0.0280 | 492.67 | 635.29 | 2.6377 | 0.1634 | 0.0962 | 6.85 |
| 9.154 | 246.82 | 0.2938 | 752.86 | 27.29 | 2.1131 | 0.0108 | 0.0280 | 492.71 | 635.29 | 2.6381 | 0.1634 | 0.0962 | 6.85 |
| 9.154 | 246.83 | 0.3358 | 752.89 | 27.29 | 2.1131 | 0.0108 | 0.0280 | 492.75 | 635.29 | 2.6381 | 0.1634 | 0.0962 | 6.85 |
| 9.154 | 246.84 | 0.3778 | 752.93 | 27.29 | 2.1131 | 0.0108 | 0.0280 | 492.78 | 635.29 | 2.6381 | 0.1634 | 0.0962 | 6.85 |
| 9.154 | 246.86 | 0.4198 | 752.97 | 27.29 | 2.1131 | 0.0108 | 0.0280 | 492.82 | 635.29 | 2.6381 | 0.1634 | 0.0962 | 6.85 |

CLIENT : CHIYODA / ARABIAN INDUSTRIAL FIBERS CO LTD
 CHIYODA PO : SAY POE 0002
 LOCATION : IBN RUSHD PTA & AROMATICS PLANT PROJECT
 EQUIPMENT : 54-B-01 CHARGE HEATER
 REQUISITION NO : 22854-MR-000-B-501



| CHIYODA CORPORATION | |
|---|-----------------------------|
| JOB NO. 51046 | IBN RUSHD AROMATICS PROJECT |
| PO NO. SAY POE 0002 | |
| REQ NO. 22854000B501 | |
| IDENT NO. 22854000B501 | |
| A-NO COMMENTS. PROCEED WITH FABRICATION | SAY TEAM |
| B-FABRICATION COMMENTS TO BE CONSIDERED | BYO MB |
| C-DO NOT PROCEED WITH FABRICATION | DATE 19 Dec 1986 |
| PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER | |



| REV | INIT | DATE | REVISIONS | CHKD | DATE | APP | DATE |
|-----|------|---------|------------------------|------|----------|-----|----------|
| 7 | JKS | 2/11/86 | AS NOTED | MRZ | 2/11/86 | Q | 2/11/86 |
| 6 | JKS | 8/18/86 | AS NOTED | MAS | 12/18/86 | Q | 12/18/86 |
| 5 | BP | 2/11/86 | AS PER CLIENT COMMENTS | ETW | 2/2/86 | Q | 2/2/86 |
| 4 | BP | 7/3/86 | AS NOTED | RW | 7/3/86 | Q | 7/3/86 |

CAT CODE: D1
 UNIT: 54-B-01

TITLE: FIRE HEATER DATA SHEET
 SPEC NO: 2881-54B01-ETD 002/A
 SHEET 1 OF 9 REV 7

MANUFACTURE AND CONSTRUCTION TO BE CARRIED OUT STRICTLY IN ACCORDANCE WITH THE REQUIREMENTS OF THIS DRAWING SPECIFICATION. NO CHANGES ARE TO BE MADE WITHOUT THE PRIOR AGREEMENT OF THE CHIEF ENGINEER OR THE ORGANISING SECTION WITHIN ENGINEERING DEPARTMENT.

066406

4/7

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS



Service/Item Charge Heater 54B01
Type rad arbor Plant Location
w/ con sectr. Quantity 1
Owner Ref. No.
Purchaser Chiyoda Ref. No.
Date 24/09/96 Born Ref. No. BJ 2881
By: JAS Page 1 of 8

PROCESS DESIGN CONDITIONS

1. Total duty heater, MW
2. Heater section
3. Service of heater
4. Heat Absorption heater, MW
5. Fluid Name
6. Flow rate, kg/hr
7. Flow rate, dm³(cuba)/s
8. Press drop (allow, clean/fouled), bar
9. Press drop (calc, clean/fouled), bar
10. Fouling allowance, m(sq)-C(deg)/W
11. Therm conductivity of coke/scale, WmC(deg)
12. Avg. radiant flux density (allowable), W/m(sq)
13. Avg. radiant flux density (calculated), W/m(sq)
14. Avg. convection flux density (allowable), W/m(sq)
15. Avg. convection flux density (calculated), W/m(sq)
16. Max radiant flux density, W/m(sq)
17. Max convection flux density, W/m(sq)
18. Velocity limitation, m/sec
19. Max. Allowable Inside film temperature, C(deg)

INLET CONDITIONS:

20. Temperature, C(deg)
21. Pressure, barg
22. Liquid flow, kg/hr
23. Vapor flow, kg/hr
24. Density of Liquid @ T. P., S.G
25. Vapor, molecular weight
26. Viscosity, liquid, mPa.s
27. Viscosity, vapor, mPa.s
28. Specific heat, liquid, KJ/kgC(deg)
29. Specific heat, vapor, KJ/kgC(deg)
30. Thermal conductivity, liquid, WmC(deg)
31. Thermal conductivity, vapor, WmC(deg)

OUTLET CONDITIONS:

32. Temperature, Degree C
33. Pressure, barg
34. Liquid flow, kg/hr
35. Vapor flow, kg/hr
36. Density of Liquid @ T. P., Kg/cuM
37. Vapor, molecular weight
38. Viscosity, liquid, mPa.s
39. Viscosity, vapor, mPa.s
40. Specific heat, liquid, KJ/kgC(deg)
41. Specific heat, vapor, KJ/kgC(deg)
42. Thermal conductivity, liquid, WmC(deg)
43. Thermal conductivity, vapor, WmC(deg)

REMARKS

44. Distillation data should be attached for vaporization service
45. Other

| | Daheptaniser reboiler | | |
|---------------------|-----------------------|--------|--|
| | 16.89 | 7.55 | |
| | Radiant | Conv. | |
| Charge Heater 54B01 | | | |
| | 16.89 | 7.55 | |
| | HC | HC | |
| | 283340 | 185472 | |
| | | | |
| | 0.345 | 3.45 | |
| | 0.316 | 2.11 | |
| | | | |
| | | | |
| | 31548 | | |
| | 31423 | | |
| | | | |
| | | 2538 | |
| | 56562 | | |
| | | 57085 | |
| | | | |
| | | | |
| | 362 | 224 | |
| | 12.845 | 8.85 | |
| | 0 | 185472 | |
| | 283340 | 0 | |
| | | 0.668 | |
| | 21 | | |
| | | 0.18 | |
| | 0.018 | | |
| | | 2.515 | |
| | 3.255 | | |
| | | 0.099 | |
| | 0.13 | | |
| | | | |
| | 426 | 227 | |
| | 12.50 | 5.40 | |
| | 0 | 92736 | |
| | 283340 | 92736 | |
| | | 0.883 | |
| | 21 | 106.2 | |
| | | 0.177 | |
| | 0.02 | 0.01 | |
| | | 2.529 | |
| | 3.410 | 2.009 | |
| | | 0.099 | |
| | 0.143 | 0.026 | |

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Rev. 7.

066407

DATASHT.XLS

10.4-2

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service/Item Charge Heater 54B01
Unit rad arbor Plant Location
Type w/ con sectn. Quantity 1
Owner Ref. No.
Purchaser Chiyoda Ref. No.
Date: 24/09/96 Born Ref No. BJ 2881
By: JAS Page 3 of 8



Coil Design: (RADIANT)

- 4. Design basis of tube wall thk. (code or specs)
- 5. Design basis for rupture strength, (min or avg)
- 6. Design life, hr
- 7. Elastic design pressure, bar
- 8. Rupture design pressure, bar
- 9. Temperature allowance, C(deg)
- 10. Corrosion allowance, mm
- 11. Stress relieve (YES or NO)
- 12. Weld inspection requirements radiography, %
- 13. Hydrostatic test pressure, BARG
- 14. Max tube metal temperature (clean) C(deg)
- 15. Design tube metal temperature C(deg)
- 16. Inside film coefficient, W/m C(deg)

Coil Configuration: (RADIANT)

- 17. Tubes (vertical or horizontal)
- 18. No. of flow passes
- 19. Effective tube length, m
- 20. Bare tubes, number
- 21. Bare tubes, exposed surface, m(sq)
- 22. Bare tubes, total exposed surface, m(sq)
- 23. Tubes, inline or staggered
- 24. Tube spacing, C to C, mm

Tubes: (RADIANT)

- 25. Material (ASTM spec. or grade)
- 26. Outside diameter, mm
- 27. wall thickness, mm or Sch
- 28. Overall tube length, m
- 29. No. of intermediate welds/pass
- 30. Distance from Center Line of tube to wall, mm

Heater Section

Plug-Type Headers:

- 31. Location (one end or both ends)
- 32. Manufacture and type
- 33. Nominal rating
- 34. Welded or rolled joint

Return Bends:

- 35. Location (header box or firebox)
- 36. Material (ASTM spec and grade)

| | | |
|----------|--|--|
| API 550 | | |
| 100000 | | |
| 14.60 | | |
| 12.845 | | |
| 28 | | |
| 1.6 | | |
| YES | | |
| 100 | | |
| 38.2 | | |
| 478 | | |
| 506 | | |
| 1539 | | |
| ARBOR | | |
| 76 | | |
| 25.35 | | |
| 76 | | |
| 538.00 | | |
| 538.00 | | |
| IN LINE | | |
| 180.00 | | |
| A335 P22 | | |
| 88.9 | | |
| sch 40aw | | |
| | | |
| 2 | | |
| 180 | | |
| Radiant | | |
| None | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

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066409

DATASHT.XLS

10-11-11

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service/Item Charge Heater 54801
Unit rad arbrpr Plant Location
Type w/ con sectn. Quantity
Owner Ref. No.
Purchaser Chiyoda Ref. No.
Date: 24/09/96 Born Ref No. BJ 2881
By: JAS Page 4 of 8



Coil Design: (CONVECTION)

4. Design basis of tube wall thk. (code)
5. Design basis for rupture strength
6. Design life, hr.
7. Elastic design pressure, BAR
8. Rupture design pressure, BAR
9. Temperature allowance, C(deg)
10. Corrosion allowance, mm
11. Stress relieve (yes or no)
12. Weld inspection requirements radiography, %
13. Hydrostatic test pressure, Barg
14. Max tube metal temperature (clean), C(deg)
15. Design tube metal temperature, C(deg)
16. Inside film coefficient, W/m(sq) C(deg)

Coil Configuration: (CONV.)

17. Tubes (vertical or horizontal)
18. No. of flow passes/tubes per row
19. Effective tube length, m
20. Bare tubes, number
21. Bare tubes, exposed surface, m(sq)
22. Ext tubes, number
23. Ext surface tubes, exp. surface, m(sq)
24. Ext surface tubes, total exp. surface, m(sq)
25. Tubes, staggered/inline
26. Tube spacing, C to C, mm

Tubes: (CONVECTION)

27. Material (ASTM spec. or grade)
 28. Outside diameter, mm
 29. wall thickness, mm or Sch
 30. Overall tube length, m
 31. No. of intermediate welds
 32. Distance from tube center line to wall, mm
- Description of Extended Surface:
33. Type (studs, serrated fins or solid fins)
 34. Material
 35. Fin Height, mm
 36. Fin Thickness, mm
 37. Fins Per m
 38. Max tip temperature, C(deg)
 39. Extension ratio

Heater Section

Plug-Type Headers:

40. Location (one end or both ends)
41. Manufacture and type
42. Nominal rating
43. Welded or rolled joint

Return Bends:

44. Location (header box or firebox)
45. Material (ASTM spec and grade)

| | BARE | EXT. | EXT. | EXT. |
|--|------------|------------|------------|------------|
| | API 530 | API 530 | API 530 | API 530 |
| | 100.000 | 100.000 | 100.000 | 100.000 |
| | 11.2 | 11.2 | 11.2 | 11.2 |
| | 28 | 28 | 28 | 28 |
| | 3.0 | 3.0 | 3.0 | 3.0 |
| | NO | NO | NO | NO |
| | 100 | 100 | 100 | 100 |
| | 19.6 | 19.6 | 19.6 | 19.6 |
| | 294 | 308 | 308 | 291 |
| | 322 | 337 | 334 | 319 |
| | 1709 | 1675 | 1630 | 1551 |
| | HORI. | HORI. | HORI. | HORI. |
| | 4 6 | 4 6 | 4 6 | 4 6 |
| | 14.021 | 14.021 | 14.021 | 14.021 |
| | 18 | 0 | 0 | 0 |
| | 112.04 | | | |
| | 0 | 6 | 6 | 30 |
| | | 160.54 | 293.85 | 2408.00 |
| | | 2862.39 | | |
| | STAGGERED | STAGGERED | STAGGERED | STAGGERED |
| | 254 | 254 | 254 | 254 |
| | A106 GRB | A106 GRB | A106 GRB | A106 GRB |
| | 141.3 | 141.3 | 141.3 | 141.3 |
| | sch 40aw | sch 40 aw | sch 40 aw | sch 40 aw |
| | 18 | 6 | 6 | 30 |
| | 127 | 127 | 127 | 127 |
| | | SOLID FIN | SOLID FIN | SOLID FIN |
| | | Car/Stl | Car/Stl | Car/Stl |
| | | 12.70 | 18.10 | |
| | | 1.30 | 1.30 | 1.30 |
| | | 118 | 157 | 197 |
| | | 353 | 370 | 354 |
| | | 4.299 | 7.868 | 12.897 |
| | | Convection | | |
| | | NONE | | |
| | Header box | Header box | Header box | Header box |
| | A-234-WPB | A-234-WPB | A-234-WPB | A-234-WPB |

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065410

DATASHT.XLS

10-4-5

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
S'UNITS

Service/Item Charge Heater 54B01
 Unit rad arbor Plant Location
 Type w/ con sectn. Quantity 1
 Owner Ref. No.
 Purchaser Chiyoda Ref. No.
 Date: 24/09/96 Born Ref No. BJ 2881
 By: JAS Page 5 of 8



Heater Section Continued:

Terminals:

1. Type (welded or flanged)

Inlet:

2. Material (ASTM spec and grade)
3. Size/rating, schedule or thickness
4. Number of terminals

Outlet:

5. Material (ASTM spec and grade)
6. Size/rating, schedule or thickness
7. Number of terminals

Manifolds:

8. Connection to tubes (weld or flanged)
9. Location (internal or external)

Inlet: Dead End

10. Material (ASTM spec and grade)
11. Size/schedule or thickness
12. Flange/material (ASTM spec and grade)
13. Flange size and rating

Outlet: Dead End

14. Material (ASTM spec and grade)
15. Size schedule or thickness
16. Flange/material (ASTM spec and grade)
17. Flange size and rating

Crossovers:

18. Location (internal or external)
19. Pipe matl (ASTM spec and grade)
20. Pipe size/schedule or thickness
21. Flange matl (ASTM spec and grade)
22. Flange size and rating

Tube Supports:

23. Location (top, bottom, intermediate)
24. Material (ASTM spec and grade)
25. Spacing
26. Coating (type and thickness)

Tube Guides:

27. Location and spacing (Top/Bottom)
28. Material (ASTM spec and grade)

Settings:

Floor:

- | | | |
|--|--|------------|
| 29. Lining: Thickness - Hot face temp. - calc - design | 200 | 780 C |
| 30. Mat/thk/service temperature | 200 MM LW CASTABLE | |
| 31. Anchor (type & matl) | | |
| 32. Casing: Thickness - Material - Temperature | 6 | C.S. plate |
| Exposed Vertical Walls: | | |
| 33. Lining: Thickness - Hot face temp. - calc - design | 150 | 780 C |
| 34. Mat/thk/service temperature | 50- 128 kg/cum CFNB +100- 96 kg/cum CFNB+3mmstaletic | |
| 35. Anchor (type & matl) | TP 310 SS Studs and Washers | |
| 36. Casing: Thickness - Material - Temperature | 6 | C.S. PLATE |

Radiant

welded _____

A335 P11 _____

28" x 9.525 mm AW _____

1 _____

A335 P11 _____

30" x 9.525 mm AW _____

1 _____

welded _____

external _____

A335 P11 _____

28" _____

A182 Gr F11 _____

28" 9.525mmAW 300# _____

A335 P11 _____

30" _____

A182 Gr F11 _____

30" 9.525mm AW 300# _____

Convection

Flanged _____

A106 GRB _____

6" SCH 40 AW 300# _____

4 _____

A106 GRB _____

12" SCH 40AW 300# RFWN _____

1 _____

welded _____

external _____

A234-WPB _____

12" _____

Pipe Cap _____

SCH 40 AW _____

INTER ENDS

25/20CR NI C.S. PLATE

approx 3800 mm

100 mm LW cast

INTER

25/20 Cr Ni

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065411

DATASHT.XLS

10-4-6

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service/Item Charge Heater 54B01
Unit rad arbor Plant Location
Type w/ con sectn. Quantity 1
Owner Ref. No.
Purchaser Chiyoda Ref. No.
Date: 24/09/96 Born Ref No. BJ 2881
By: JAS Page 6 of 8



Mechanical Design Conditions (continued)

Heater Section (continued):

Shielded Vertical Walls:

| | | | |
|---|--|------------|--------|
| 1. Lining: Thickness - Hot face temp. - calc - design | 125 | 629 C | 1260 C |
| 2. Thk/Mat/service temperature | 50 -128 kg/ cu m CFNB + 75 -96 kg/ cu m CFNB+3mm stalastic | | |
| 3. Anchor (type & matl) | TP 310 SS Studs and Washers | | |
| 4. Casing: Thickness - Material - Temperature | 6 | C.S. plate | |

Arch:

| | | | |
|---|---|------------|--------|
| 5. Lining: Thickness - Hot face temp. - calc - design | 150 | 780 C | 1260 C |
| 6. Thk/Mat/service temperature | 50 mm 128kg/cu m CFNB + 100 inmm 98 kg/ cu m CFNB+3mm stalastic | | |
| 7. Anchor (type & matl) | TP 310 SS Studs and Washers | | |
| 8. Casing: Thickness - Material - Temperature | 6 | C.S. plate | |

Convection Walls:

| | | | |
|---|--------------------|------------|--------|
| 9. Lining: Thickness - Hot face temp. - calc - design | 125 | 516 C | 1100 C |
| 10. Thk/Mat/service temperature | 125 mm LW castable | | |
| 11. Anchor (type & matl) | V type | 304 SS | |
| 12. Casing: Thickness - Material - Temperature | 6 | C.S. plate | |

Breeching:

| | | | |
|--|-------------|-------|--------|
| 13. Lining: Thickness - Hot face temp. - calc - design | 75 | 252 C | 1093 C |
| 14. Thk/Mat/service temperature | LW CASTABLE | | |
| 15. Anchor (type & matl) | V type | CS | |
| 16. Casing: Thickness - Material - Temperature | 5 | | |

Flue Gas Ducts:

| | | | |
|-----------------------------------|---------------------------|--|--|
| 17. Location | top of convection section | | |
| 18. Lining (internal or external) | internal | | |
| 19. Thickness & Material | 50 mm LW castable | | |
| 20. Anchor, type and material | CS V anchors | | |
| 21. Hot face design temperature | | | |
| 22. Cold face design temperature | | | |

Combustion Air Ducts:

| | | | |
|---|------------------|--|--|
| 23. Location | FD fan to burner | | |
| 24. Lining (internal or external) | | | |
| 25. Thickness and Material | | | |
| 26. Anchor, type and material | | | |
| 27. Hot face / cold face design temperature, C(deg) | | | |

Header Boxes:

| | | | |
|-------------------------------------|-------------------|---------------------|--------|
| 28. Location | | | |
| 29. lining (Thickness & Material) | Conv. ends | Hinged doors/bolted | Bolted |
| 30. Anchor (type and material) | 50 mm LW castable | | |
| 31. Door/panel (matl and thickness) | V type. | CS | |
| | | C.S. plate | |

Burner Windboxes

| | | | |
|-----------------------------------|--------------------------|-------------|--------------|
| 32. Lining (internal or external) | internal | Matl & thk. | mineral wool |
| 33. Anchor (type and matl) | CS 'v' | | |
| 34. Casing: Materials and thk. | CS 5 | | |
| 35. Hot face design temp., C(deg) | Cold face design temp.,C | | |

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066412

DATASHT.XLS

10-4-7

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service /Item Charge Heater 54B01
Unit rad arbor Plant Location
Type w/ con sectn. Quantity 1
Owner Ref. No.
Purchaser Chiyoda Ref. No.
Date: 24/09/96 Born Ref No. BJ 2881
By: JAS Page 7 of 8



Mechanical Design Conditions (continued)
Heater Section (continued):

Stack:

1. Location
inside met. dia. at exit, mm
2. Min stack height above grade
3. Plate, min. thickness, mm
4. Lining : (Internal or External)
5. Thickness and Material, mm
6. Anchor, type and material:

Bridgwall:

7. Height, mm
- Matl and thickness:

Dampers:

8. Location
9. Material of blade
10. Material of shaft
11. Bearing type
12. Multiple or single blade
13. Desc of provision for operation
14. Location and type of operator

Miscellaneous:

Platforms:

- | | Location/No. |
|------------------------------|--------------|
| 15. Hearth / One | |
| 16. Convection Side(s) / One | |
| 17. Convection End(s) / Two | |
| 18. Rad Intermediate / One | |
| 19. Stack Damper / One | |
| 20. Stack Sample Port | |
| 21. Type of flooring | |
| Doors: | |
| 22. Access Doors | |
| 23 | |
| 24. Observation Doors | |
| 25 | |
| 26 | |
| 27. Steam Lance Doors | |
| 28 | |
| 29. Explosion Door | |
| 30 | |
| 31 | |

Instruments and Aux. connections

32. Process fluid temperature
33. Flue gas / combustion air temp.
34. Flue gas / combustion air pressure
35. Flue gas composition (sample)
36. Snuffing steam
37. Purge
38. Vents and drains
39. Tubekln thermocouples

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| | top of heater | Corr Allow |
|-----------|-------------------------------|--------------|
| 2012 | inside metal dia. at base, mm | 3078 |
| 40 metres | total Stack length, mm | 20016 |
| 6 | Material: | Carbon steel |
| Internal | Extent of lining | To top |
| 50 | LW Castable | |
| V type | CS | |

| none | Location |
|------|----------|
| | |
| | |

| Stack |
|----------------|
| TP304SS |
| TP304SS |
| PILLOW BLOCK |
| Multiple blade |
| actuated |

| Width | Length/Arc | Access | |
|---------|-----------------|----------------|------------|
| | | Stairs/Ladder | Gr./Platf. |
| 1100 mm | 1 side + 2 ends | 1stair/1ladder | GRADE |
| 1100 mm | | 1 LADDER | |
| 1100 mm | | 2 WALKWAYS | |
| 1100 mm | | 1 Ladder | |
| 1100 mm | 270 DEGREE | 1 LADDER | |

| Number | Location | Size | Hinged/Bolted |
|--------|----------|-----------|---------------|
| 2 | FLOOR | 450 x 600 | Hinged |

| | | | |
|----|----------|-----------|-------------------|
| 13 | RAD SIDE | 127 x 406 | HINGED(20-std-03) |
|----|----------|-----------|-------------------|

| | | | |
|---|-----------|------------------------------|--|
| 4 | CONV SIDE | 600 x 150 bolted (BLS-D-108) | |
|---|-----------|------------------------------|--|

| Number | Size | Type |
|--------|------|------|
|--------|------|------|

SEE DRAWING No. 2881/403/162DA

2261-51B01-02A & 02B

| | | |
|---|--------|---------------------|
| 4 | 2" NPS | 3000# CRG with Plug |
|---|--------|---------------------|

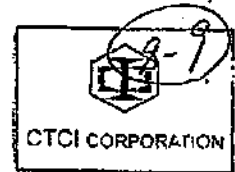
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DATASHT.XLS

10-4-8

BORN
 WORLD-WIDE MANUFACTURERS OF
 DIRECT FIRED HEATERS
 SI UNITS

Service /Item Charge Heater 54801
 Unit rad arbor Plant Location
 Type w/ con sectn. Quantity 1
 Owner Ref. No.
 Purchaser Chiyoda Ref. No.
 Date 24/09/98 Born Ref No. BJ 2881
 By: JAS Page 8 of 8



Mechanical Design Conditions (continued)
Heater Section (continued):

| | |
|---|--|
| 1. Painting requirements: | 22854-SF-000-X-002 System 2 and Prime Coat Only |
| 2. Galvanizing requirements: | Ladders and Platforms |
| 3. Internal coatings (casing, ducts, stack) | Stalastic behind ceramic fibre blanket |
| 4. Fireproofing requirements: | None |

Burner and Auxiliary Equipment:

Burners:

| | | | | |
|---|-----------|-------------------|--------------------|-----------|
| 5. Manufacture/type | J.Z. PSFG | FD gas only | Location | rad floor |
| 6. Designation/size | 12 | Number: | 13 | Fuel: gas |
| 7. Heat rel. (MW per burner) at design excess air (Max/Norm/Min) | 2.98 | | 2.16 | |
| 8. Design press drop across burner | 50mm | | @ max heat release | |
| 9. Distance burner centerline to tube centerline or Distance burner centerline to unshielded refractory: | mm | 1100 mm | HORIZONTAL | |
| 10. Burner pilot: | | | | |
| Capacity (KW) | 20 | Fuel: Gas | Fuel press | |
| Fuel Pressure/ Fuel: | | Type of ignition: | AUTO | |
| 11. Special requirements: (flame detection devices, safety interlocks etc.) | | | UV SCANNERS | |

Sootblowers:

| | | | |
|---|-------------------------------|--|--|
| 12. Location | SPACE FOR FUTURE INSTALLATION | | |
| 13. Manufacture and type | | | |
| 14. Number | | | |
| 15. Maximum cleaning radius, mm | | | |
| 16. Lane dimensions (min. clearance) | | | |
| 17. Orientation (horizontal or vertical) | | | |
| 18. Cleaning medium | | | |
| 19. Supply pressure/temperature | | | |
| 20. Flow rate per blower, kg/s | | | |
| 21. Materials of construction | | | |
| 22. Driver type (manual, air, or elec.) | | | |
| 23. Control systems type (auto or manual, sequential, local, or remote panel) | | | |

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 Rev. 7

056414

DATASHT.XLS

10-4-9

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

XYLENE COLUMN REBOILER DATA SHEET

DOCUMENT NO:

DS-55-BA-501

| | | | | | | | | | |
|-----------|--------------------|-----|------|-------|-----------|------------------------|---|--------------|------------------|
| | | | | | | ابن رشيد ibn.rushid | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | | CTCI CORPORATION |
| CERTIFIED | | | | | | | | | |
| 2 | Revised As Marked | KCK | CBC | YSL | 11-Aug-11 | PROJ. _____ | | | |
| 1 | Issued For Design | KCK | CBC | YSL | 27-May-11 | MGR _____ | DATE _____ | | |
| 0 | Issue For Approval | KCK | CBC | YSL | 23-Mar-11 | CLIENT _____ | DATE _____ | | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | | XC33D-55-501 | |

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GN-504 84.10



**XYLENE COLUMN REBOILER
 DATA SHEET**

XC33D-55-501

2 OF 2

DATE
11-Aug.-2011

REV.
2

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| 1. | 55-B-01 A/B | 1 THRU 5 OF 5 | 2 | 11-Aug.-2011 |

Attachment total 9 page.

**FIRED HEATER
DATA SHEET**

Contract: 10E0841A01
Equipment No.: 55-B-01 A/B
Revision: 2 Date: 11-Aug-2011
Unit: 55 - Xylenes Fractionation
P.O. No.:
Document No.: DS-55-BA-01
Sheet: 1 of 5



| | | | | | |
|--|---|--|---|---------------------------|-----|
| 1 | Client: Arabian Industrial Fibers Company (Ibn Rushd) | | Vendor: Existing Born Heater - Revamped for New Service | | REV |
| 2 | Service: Xylene Column Reboiler | | Plant: Xylene Fractionation | Site: Yanbu, Saudi Arabia | |
| 3 | Type of Heater: Vertical Cylindrical | | Vendor: Existing Born Heater | | 1 |
| 4 | Total Heater Absorbed Duty: 114.44 MW | | Assembly: Twin Vertical Cylindrical with Individual Convection Sections | | |
| PROCESS DESIGN CONDITIONS | | | | | |
| 6 | * OPERATION CASE | | REVAMP | | |
| 7 | HEATER SECTION | | Radiant/Convec | | |
| 8 | SERVICE | | Process | | |
| 9 | HEAT ABSORPTION MW | | 114.44 | | |
| 10 | FLUID NAME | | Hydrocarbon | | |
| 11 | FLOW RATE kg/hr | | 1,675,457 | | |
| 12 | FLOW RATE B.P.D. | | | | |
| 13 | PRESSURE DROP - ALLOWABLE (CLEAN / FOULED) bar | | | | |
| 14 | PRESSURE DROP - CALCULATED (CLEAN / FOULED) bar | | 2.1 | | |
| 15 | FOULING ALLOWANCE m ² ·°C/W | | | | |
| 16 | THERMAL CONDUCTIVITY OF COKE/SCALE W/m·°C | | | | |
| 17 | COKING ALLOWANCE mm | | | | |
| 18 | AVG. RADIANT SECTION FLUX DENSITY - ALLOWABLE W/m ² | | | | |
| 19 | AVG. RADIANT SECTION FLUX DENSITY - CALCULATED W/m ² | | | | |
| 20 | MAX. RADIANT SECTION FLUX DENSITY W/m ² | | | | |
| 21 | CONVECTION SECTION FLUX DENSITY, (BARE TUBE) W/m ² | | | | |
| 22 | VELOCITY LIMITATION m/s | | | | |
| 23 | PROCESS FLUID MASS VELOCITY kg/s·m ² | | | | |
| 24 | MAX. ALLOWABLE / CALCULATED INSIDE FILM TEMPERATURE °C | | | | |
| INLET CONDITIONS: | | | | | |
| 26 | TEMPERATURE °C | | 267 | | |
| 27 | PRESSURE <input checked="" type="checkbox"/> bar (g) <input type="checkbox"/> bar (g) | | 12.27 | | |
| 28 | LIQUID FLOW kg/hr | | 1,675,457 | | |
| 29 | VAPOR FLOW kg/hr | | 0 | | |
| 30 | DENSITY - LIQUID kg/m ³ | | 634.9 | | |
| 31 | VAPOR MOLECULAR WEIGHT | | | | |
| 32 | VISCOSITY - (LIQUID / VAPOR) mPa·s | | 0.177 | | |
| 33 | SPECIFIC HEAT - (LIQUID / VAPOR) kJ/kg·°C | | 2.733 | | |
| 34 | THERMAL CONDUCTIVITY - (LIQUID / VAPOR) W/m·°C | | 0.093 | | |
| OUTLET CONDITIONS: | | | | | |
| 38 | TEMPERATURE °C | | 299 | | |
| 37 | PRESSURE <input checked="" type="checkbox"/> bar (g) <input type="checkbox"/> bar (g) | | 10.17 | | |
| 38 | LIQUID FLOW kg/hr | | 479,348 | | |
| 39 | VAPOR FLOW kg/hr | | 1,196,109 | | |
| 40 | DENSITY - LIQUID kg/m ³ | | 588.2 | | |
| 41 | VAPOR MOLECULAR WEIGHT | | 124.7 | | |
| 42 | VISCOSITY - (LIQUID / VAPOR) mPa·s | | 0.155 0.011 | | |
| 43 | SPECIFIC HEAT - (LIQUID / VAPOR) kJ/kg·°C | | 2.927 2.356 | | |
| 44 | THERMAL CONDUCTIVITY - (LIQUID / VAPOR) W/m·°C | | 0.089 0.031 | | |
| REMARKS AND SPECIAL REQUIREMENTS: | | | | | |
| 46 | DISTILLATION DATA OR FEED COMPOSITION: | | See Fluid Properties on Sheets 3 and 4 | | |
| 47 | SHORT TERM OPERATING CONDITIONS: | | | | |
| 48 | OTHER: | | | | |
| NOTES: | | | | | |
| 50 | See Notes on Sheet 5 | | | | |
| 51 | | | | | |
| 52 | | | | | |
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| 54 | | | | | |
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| 62 | | | | | |

**FIRED HEATER
DATA SHEET**

Contract: 10E0541A01
Equipment No.: 55-B-01 A/B
Revision: 2 Date: 11-Aug-2011
Unit: 55 - Xylenes Fractionation
P.O. No.:
Document No.: DS-55-BA-01
Sheet: 2 of 5

| 1 | COMBUSTION DESIGN CONDITIONS | | | | REV |
|----|---|--|--------------------------------------|----------------|-----|
| 2 | * OPERATING CASE | Revamp with Air Preheat On-line | Revamp with Air Preheat Off-line | | |
| 3 | * TYPE OF FUEL | Sales Gas | Sales Gas | | |
| 4 | * EXCESS AIR % | 15.0 | 15.0 | | |
| 5 | CALCULATED HEAT RELEASE (LHV) MW | 125.69 | 144.89 | | |
| 6 | CALCULATED THERMAL EFFICIENCY % (LHV) | | | | |
| 7 | CALCULATED FUEL EFFICIENCY % (LHV) | 91.0 | 78.9 | | |
| 8 | * GUARANTEED FUEL EFFICIENCY % (LHV) | | | | |
| 9 | RADIATION LOSS % OF HEAT RELEASE (LHV) | 2.5 | 2.5 | | |
| 10 | FLUE GAS TEMPERATURE LEAVING: RADIANT SECT. °C | 831 | 820 | | |
| 11 | CONVECTION SECTION °C | 381 | 395 | | |
| 12 | AIR PREHEATER °C | 145 | | | |
| 13 | FLUE GAS QUANTITY kg/hr | 191,314 | 220,695 | | |
| 14 | FLUE GAS MASS VELOCITY THRU CONVECTION SECTION kg/s/m² | | | | |
| 15 | VOLUMETRIC HEAT RELEASE (LHV) kW/m³ | | | | |
| 16 | DRAFT: Immediately Above Top Convection Row, mm H2O | 4.1 | 4.6 | | |
| 17 | Immediately Below Bottom Convection Row, mm H2O | 2.5 | 2.5 | | |
| 18 | At Burners, mm H2O | 17.0 | 17.0 | | |
| 19 | Combustion Air Temp.: Leaving Steam/Air Preheater, °C | | | | |
| 20 | At Burners, °C | 285 | 15.6 | | |
| 21 | COMBUSTION AIR QUANTITY kg/hr | 180,171 | 207,899 | | |
| 22 | AMBIENT AIR TEMPERATURE - EFFICIENCY CALCULATION °C | 15.6 | 15.6 | | |
| 23 | * AMBIENT AIR TEMPERATURE - STACK DESIGN °C | 50.0 | 50.0 | | |
| 24 | * ALTITUDE ABOVE SEA LEVEL m | 7.25 | 7.25 | | |
| 25 | FUEL CHARACTERISTICS | | | | |
| 26 | * GAS TYPE Sales Gas | * GAS TYPE | * LIQUID TYPE | | |
| 27 | * LHV 40,512 kJ/kg <input type="checkbox"/> kJ/Sm³ | * LHV <input type="checkbox"/> kJ/kg <input type="checkbox"/> kJ/Sm³ | * LHV <input type="checkbox"/> kJ/kg | | |
| 28 | * HHV <input type="checkbox"/> kJ/kg <input type="checkbox"/> kJ/Sm³ | * HHV <input type="checkbox"/> kJ/kg <input type="checkbox"/> kJ/Sm³ | * HHV <input type="checkbox"/> kJ/kg | | |
| 29 | * PRESS. @ BURNER 1.75 bar (g) | * PRESS. @ BURNER bar (g) | * PRESS. @ BURNER bar (g) | | |
| 30 | * TEMP. @ BURNER 15.6 °C | * TEMP. @ BURNER °C | * TEMP. @ BURNER °C | | |
| 31 | * MOLECULAR WEIGHT | * MOLECULAR WEIGHT | * VISCOSITY @ °C SSU | | |
| 32 | | | * ATOMIZING STEAM TEMP. °C | | |
| 33 | | | * ATOMIZING STEAM PRESS. bar (g) | | |
| 34 | COMPOSITION | MOLE % | COMPOSITION | MOLE % | |
| 35 | N2 | 12.0 | | | |
| 36 | C1 | 82.7 | | | |
| 37 | C2 | 5.0 | | | |
| 38 | C3 | 0.3 | | | |
| 39 | H2S | <2.0 wt ppm | | | |
| 40 | TOTAL | 100.0 | | | |
| 41 | | | | | |
| 42 | | | | | |
| 43 | | | | | |
| 44 | | | | | |
| 45 | | | | | |
| 46 | | | | | |
| 47 | | | | | |
| 48 | | | | | |
| 49 | MANUFACTURER: John Zink | SIZE / MODEL: PSFG-18 | NUMBER: 2 x 12 = 24 | | |
| 50 | TYPE: Forced Draft, Low Nox, Staged Fuel | LOCATION: RADIANT FLOOR | ORIENTATION: FIRING UP | | |
| 51 | HEAT RELEASE PER BURNER: MW | DESIGN: 6.006 | NORMAL: _____ | MINIMUM: _____ | |
| 52 | PRESSURE DROP ACROSS BURNER @ DESIGN HEAT RELEASE: _____ | By Vendor | mm H2O | | |
| 53 | DISTANCE BURNER CENTER LINE TO TUBE CENTER LINE: _____ | HORIZONTAL: _____ mm | VERTICAL: _____ mm | | |
| 54 | DISTANCE BURNER CENTER LINE TO UNSHIELDED REFRACTORY: _____ | HORIZONTAL: _____ mm | VERTICAL: _____ mm | | |
| 55 | BURNER PILOT: CAPACITY _____ kW | FUEL _____ | FUEL PRESSURE _____ bar (g) | | |
| 56 | IGNITION METHOD: _____ | | | | |
| 57 | SPECIAL REQUIREMENTS (FLAME DETECTION DEVICES, SAFETY INTERLOCKS, ETC.): _____ | | | | |
| 58 | REQUIRED EMISSIONS: <input type="checkbox"/> ppmv(d) (CORRECTED TO 3% O2) | NOx: Remark 1 | CO: Remark 1 | SOx: Remark 1 | |
| 59 | See REMARK NO. 1 <input type="checkbox"/> kg/kJ <input type="checkbox"/> (LHV) <input type="checkbox"/> (HHV) | UHC: Remark 1 | PARTICULATES: Remark 1 | | |
| 60 | REMARKS: | | | | |
| 61 | 1. The Royal Commission for Jubail and Yanbu has issued the "Royal Commission Environmental Regulations (RCER)" to be adopted by | | | | |
| 62 | industries both in Jubail and Yanbu. Any facility operating or planning to operate on the Royal Commission property shall comply with | | | | |
| 63 | those regulations. | | | | |

**FIRED HEATER
DATA SHEET**

Contract: 10E0541A01
Equipment No.: 55-B-01 A/B
Revision: 2 Date: 11-Aug-2011
Unit: 55 - Xylenes Fractionation
P.O. No.:
Document No.: DS-55-BA-01
Sheet: 3 of 5

| FLUID PROPERTIES: | | | | | | | | | | | | REV | |
|-------------------------|---------|-----------------------|----------------|---------------|------------------------|-----------------|----------------------|----------------|---------------|------------------------|-----------------|----------------------|-------------------------|
| PROCESS | | | | | | | | | | | | | |
| Thermodynamic condition | | | Vapor | | | | | Liquid | | | | | |
| Pressure bar(a) | Temp °C | Weight fraction vapor | Enthalpy kJ/kg | Density kg/m³ | Specific heat kJ/kg·°C | Viscosity mPa-s | Thermal cond. W/m·°C | Enthalpy kJ/kg | Density kg/m³ | Specific heat kJ/kg·°C | Viscosity mPa-s | Thermal cond. W/m·°C | Surface tension dyne/cm |
| 11.218 | 269.67 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 546.33 | 633.53 | 2.7323 | 0.1767 | 0.0935 | 6.93 |
| 11.218 | 278.64 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 573.97 | 619.75 | 2.7980 | 0.1694 | 0.0919 | 6.14 |
| 11.218 | 288.62 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 602.00 | 604.86 | 2.8491 | 0.1623 | 0.0905 | 5.58 |
| 11.218 | 296.59 | 0.0000 | 851.48 | 37.54 | 2.3484 | 0.0108 | 0.0310 | 630.74 | 588.52 | 2.9174 | 0.1562 | 0.0891 | 4.64 |
| 11.218 | 296.78 | 0.0710 | 861.85 | 37.85 | 2.3498 | 0.0108 | 0.0310 | 631.21 | 588.36 | 2.9182 | 0.1552 | 0.0891 | 4.63 |
| 11.218 | 296.97 | 0.1420 | 852.23 | 37.86 | 2.3496 | 0.0108 | 0.0310 | 631.70 | 588.36 | 2.9195 | 0.1552 | 0.0891 | 4.63 |
| 11.218 | 297.17 | 0.2132 | 852.83 | 37.87 | 2.3505 | 0.0108 | 0.0310 | 632.19 | 588.36 | 2.9203 | 0.1552 | 0.0890 | 4.63 |
| 11.218 | 297.38 | 0.2844 | 853.04 | 37.89 | 2.3513 | 0.0108 | 0.0310 | 632.70 | 588.20 | 2.9216 | 0.1552 | 0.0890 | 4.63 |
| 11.218 | 297.58 | 0.3558 | 853.46 | 37.90 | 2.3521 | 0.0108 | 0.0310 | 633.23 | 588.20 | 2.9224 | 0.1552 | 0.0890 | 4.62 |
| 11.218 | 297.81 | 0.4273 | 853.89 | 37.91 | 2.3534 | 0.0108 | 0.0310 | 633.78 | 588.20 | 2.9236 | 0.1553 | 0.0890 | 4.62 |
| 11.218 | 298.04 | 0.4988 | 854.34 | 37.93 | 2.3542 | 0.0108 | 0.0310 | 634.34 | 588.04 | 2.9248 | 0.1553 | 0.0890 | 4.62 |
| 11.218 | 298.27 | 0.5706 | 854.80 | 37.94 | 2.3551 | 0.0108 | 0.0310 | 634.92 | 588.04 | 2.9262 | 0.1553 | 0.0890 | 4.61 |
| 11.218 | 298.52 | 0.6424 | 855.28 | 37.96 | 2.3559 | 0.0108 | 0.0310 | 635.52 | 588.04 | 2.9274 | 0.1553 | 0.0888 | 4.61 |
| 11.218 | 298.77 | 0.7144 | 856.78 | 37.97 | 2.3572 | 0.0108 | 0.0312 | 636.14 | 587.88 | 2.9287 | 0.1553 | 0.0888 | 4.61 |
| 11.601 | 266.67 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 546.33 | 633.65 | 2.7323 | 0.1768 | 0.0935 | 6.93 |
| 11.601 | 277.42 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 578.03 | 618.96 | 2.7926 | 0.1690 | 0.0919 | 6.08 |
| 11.601 | 288.17 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 606.41 | 602.77 | 2.8592 | 0.1613 | 0.0903 | 5.28 |
| 11.601 | 298.92 | 0.0000 | 855.71 | 39.28 | 2.3614 | 0.0108 | 0.0312 | 637.55 | 584.83 | 2.9346 | 0.1536 | 0.0889 | 4.46 |
| 11.601 | 299.10 | 0.0710 | 856.08 | 39.29 | 2.3622 | 0.0108 | 0.0312 | 638.02 | 584.83 | 2.9358 | 0.1536 | 0.0888 | 4.46 |
| 11.601 | 299.29 | 0.1421 | 856.46 | 39.30 | 2.3626 | 0.0108 | 0.0312 | 638.50 | 584.67 | 2.9368 | 0.1536 | 0.0888 | 4.46 |
| 11.601 | 299.49 | 0.2132 | 856.85 | 39.32 | 2.3634 | 0.0108 | 0.0312 | 639.00 | 584.67 | 2.9379 | 0.1537 | 0.0888 | 4.46 |
| 11.601 | 299.70 | 0.2845 | 857.26 | 39.33 | 2.3643 | 0.0108 | 0.0312 | 639.51 | 584.67 | 2.9397 | 0.1537 | 0.0888 | 4.46 |
| 11.601 | 299.91 | 0.3558 | 857.68 | 39.35 | 2.3651 | 0.0108 | 0.0312 | 640.03 | 584.51 | 2.9407 | 0.1537 | 0.0888 | 4.45 |
| 11.601 | 300.13 | 0.4273 | 858.11 | 39.36 | 2.3664 | 0.0108 | 0.0312 | 640.57 | 584.51 | 2.9412 | 0.1537 | 0.0888 | 4.45 |
| 11.601 | 300.35 | 0.4989 | 858.58 | 39.37 | 2.3672 | 0.0108 | 0.0312 | 641.13 | 584.51 | 2.9425 | 0.1537 | 0.0888 | 4.45 |
| 11.601 | 300.58 | 0.5706 | 859.02 | 39.39 | 2.3681 | 0.0108 | 0.0313 | 641.71 | 584.35 | 2.9433 | 0.1537 | 0.0888 | 4.44 |
| 11.601 | 300.82 | 0.6426 | 859.49 | 39.41 | 2.3689 | 0.0108 | 0.0313 | 642.30 | 584.35 | 2.9448 | 0.1538 | 0.0884 | 4.44 |
| 11.601 | 301.07 | 0.7144 | 859.99 | 39.42 | 2.3701 | 0.0108 | 0.0313 | 642.92 | 584.19 | 2.9463 | 0.1538 | 0.0884 | 4.44 |
| 11.984 | 266.67 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 546.33 | 634.01 | 2.7323 | 0.1769 | 0.0935 | 6.93 |
| 11.984 | 278.17 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 578.14 | 618.15 | 2.7927 | 0.1685 | 0.0917 | 6.02 |
| 11.984 | 289.68 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 610.74 | 600.69 | 2.8692 | 0.1603 | 0.0902 | 6.15 |
| 11.984 | 301.18 | 0.0000 | 859.82 | 40.74 | 2.3743 | 0.0108 | 0.0313 | 644.23 | 581.15 | 2.9521 | 0.1521 | 0.0884 | 4.30 |
| 11.984 | 301.37 | 0.0710 | 860.19 | 40.75 | 2.3752 | 0.0108 | 0.0313 | 644.68 | 581.15 | 2.9530 | 0.1521 | 0.0884 | 4.30 |
| 11.984 | 301.56 | 0.1421 | 860.57 | 40.77 | 2.3760 | 0.0108 | 0.0313 | 645.17 | 581.15 | 2.9542 | 0.1521 | 0.0884 | 4.30 |
| 11.984 | 301.75 | 0.2132 | 860.98 | 40.78 | 2.3764 | 0.0108 | 0.0313 | 645.67 | 580.99 | 2.9555 | 0.1521 | 0.0884 | 4.29 |
| 11.984 | 301.98 | 0.2845 | 861.37 | 40.79 | 2.3773 | 0.0108 | 0.0313 | 646.18 | 580.99 | 2.9563 | 0.1522 | 0.0884 | 4.29 |
| 11.984 | 302.17 | 0.3559 | 861.79 | 40.81 | 2.3781 | 0.0108 | 0.0313 | 646.70 | 580.99 | 2.9578 | 0.1522 | 0.0883 | 4.29 |
| 11.984 | 302.38 | 0.4274 | 862.21 | 40.82 | 2.3794 | 0.0108 | 0.0313 | 647.24 | 580.83 | 2.9588 | 0.1522 | 0.0883 | 4.29 |
| 11.984 | 302.61 | 0.4989 | 862.66 | 40.84 | 2.3802 | 0.0108 | 0.0315 | 647.80 | 580.83 | 2.9597 | 0.1522 | 0.0883 | 4.28 |
| 11.984 | 302.83 | 0.5707 | 863.12 | 40.85 | 2.3810 | 0.0108 | 0.0315 | 648.37 | 580.83 | 2.9609 | 0.1522 | 0.0883 | 4.28 |
| 11.984 | 303.07 | 0.6425 | 863.59 | 40.87 | 2.3819 | 0.0108 | 0.0315 | 648.96 | 580.67 | 2.9622 | 0.1522 | 0.0883 | 4.28 |
| 11.984 | 303.32 | 0.7145 | 864.06 | 40.89 | 2.3827 | 0.0108 | 0.0315 | 649.57 | 580.67 | 2.9636 | 0.1522 | 0.0881 | 4.27 |
| 12.368 | 266.67 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 546.33 | 634.33 | 2.7323 | 0.1769 | 0.0935 | 6.93 |
| 12.368 | 278.91 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 580.21 | 617.35 | 2.8014 | 0.1681 | 0.0916 | 5.97 |
| 12.368 | 291.16 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 614.69 | 605.77 | 2.8793 | 0.1594 | 0.0898 | 5.04 |
| 12.368 | 303.39 | 0.0000 | 863.83 | 42.22 | 2.3873 | 0.0109 | 0.0315 | 650.78 | 577.63 | 2.9587 | 0.1506 | 0.0881 | 4.14 |
| 12.368 | 303.58 | 0.0710 | 864.18 | 42.23 | 2.3882 | 0.0109 | 0.0315 | 651.25 | 577.63 | 2.9710 | 0.1506 | 0.0881 | 4.14 |
| 12.368 | 303.77 | 0.1421 | 864.57 | 42.25 | 2.3890 | 0.0109 | 0.0315 | 651.73 | 577.47 | 2.9718 | 0.1506 | 0.0881 | 4.14 |
| 12.368 | 303.96 | 0.2133 | 864.96 | 42.26 | 2.3898 | 0.0109 | 0.0315 | 652.22 | 577.47 | 2.9730 | 0.1507 | 0.0881 | 4.13 |
| 12.368 | 304.16 | 0.2845 | 865.37 | 42.28 | 2.3907 | 0.0109 | 0.0315 | 652.72 | 577.47 | 2.9739 | 0.1507 | 0.0881 | 4.13 |
| 12.368 | 304.37 | 0.3559 | 865.78 | 42.29 | 2.3915 | 0.0109 | 0.0317 | 653.25 | 577.31 | 2.9751 | 0.1507 | 0.0881 | 4.13 |
| 12.368 | 304.58 | 0.4274 | 866.21 | 42.30 | 2.3923 | 0.0109 | 0.0317 | 653.78 | 577.31 | 2.9764 | 0.1507 | 0.0879 | 4.13 |
| 12.368 | 304.80 | 0.4990 | 866.65 | 42.32 | 2.3932 | 0.0109 | 0.0317 | 654.34 | 577.31 | 2.9777 | 0.1507 | 0.0879 | 4.12 |
| 12.368 | 305.03 | 0.5707 | 867.10 | 42.34 | 2.3940 | 0.0109 | 0.0317 | 654.91 | 577.15 | 2.9789 | 0.1507 | 0.0879 | 4.12 |
| 12.368 | 305.26 | 0.6425 | 867.57 | 42.35 | 2.3949 | 0.0109 | 0.0317 | 655.49 | 577.15 | 2.9802 | 0.1507 | 0.0879 | 4.12 |
| 12.368 | 305.51 | 0.7145 | 868.06 | 42.37 | 2.3957 | 0.0109 | 0.0317 | 656.10 | 577.15 | 2.9814 | 0.1508 | 0.0879 | 4.12 |
| 12.751 | 266.67 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 546.33 | 634.65 | 2.7323 | 0.1770 | 0.0935 | 6.93 |
| 12.751 | 279.83 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 582.23 | 616.71 | 2.8060 | 0.1676 | 0.0916 | 5.91 |
| 12.751 | 292.60 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 618.15 | 606.86 | 2.8886 | 0.1686 | 0.0897 | 4.93 |
| 12.751 | 305.56 | 0.0000 | 867.72 | 43.72 | 2.4003 | 0.0109 | 0.0317 | 657.22 | 574.10 | 2.9877 | 0.1492 | 0.0879 | 3.99 |
| 12.751 | 305.74 | 0.0710 | 868.09 | 43.73 | 2.4011 | 0.0109 | 0.0317 | 657.68 | 573.94 | 2.9886 | 0.1492 | 0.0877 | 3.98 |
| 12.751 | 305.93 | 0.1421 | 868.47 | 43.74 | 2.4020 | 0.0109 | 0.0317 | 658.16 | 573.94 | 2.9896 | 0.1492 | 0.0877 | 3.98 |
| 12.751 | 306.12 | 0.2133 | 868.86 | 43.76 | 2.4028 | 0.0109 | 0.0317 | 658.65 | 573.94 | 2.9906 | 0.1492 | 0.0877 | 3.98 |
| 12.751 | 306.32 | 0.2846 | 869.26 | 43.78 | 2.4036 | 0.0109 | 0.0318 | 659.16 | 573.78 | 2.9919 | 0.1492 | 0.0877 | 3.98 |
| 12.751 | 306.52 | 0.3559 | 869.67 | 43.79 | 2.4045 | 0.0109 | 0.0318 | 659.68 | 573.78 | 2.9931 | 0.1492 | 0.0877 | 3.97 |
| 12.751 | 306.73 | 0.4274 | 870.09 | 43.81 | 2.4053 | 0.0109 | 0.0318 | 660.21 | 573.78 | 2.9944 | 0.1493 | 0.0877 | 3.97 |
| 12.751 | 306.95 | 0.4990 | 870.53 | 43.82 | 2.4062 | 0.0109 | 0.0318 | 660.76 | 573.62 | 2.9957 | 0.1493 | 0.0876 | 3.97 |
| 12.751 | 307.17 | 0.5707 | 870.98 | 43.84 | 2.4070 | 0.0109 | 0.0318 | 661.33 | 573.62 | 2.9969 | 0.1493 | 0.0876 | 3.97 |
| 12.751 | 307.41 | 0.6426 | 871.45 | 43.85 | 2.4078 | 0.0109 | 0.0318 | 661.91 | 573.62 | 2.9982 | 0.1493 | 0.0876 | 3.96 |
| 12.751 | 307.64 | 0.7145 | 871.93 | 43.87 | 2.4091 | 0.0109 | 0.0318 | 662.51 | 573.46 | 2.9994 | 0.1493 | 0.0876 | 3.96 |

FIRED HEATER
DATA SHEET

Contract: 10E0541A01
Equipment No.: 55-B-01 A/B
Revision: 2 Date: 11-Aug-2011
Unit: 55 - Xylenes Fractionation
P.O. No.:
Document No.: DS-55-BA-01
Sheet: 4 of 5

| FLUID PROPERTIES: | | | | | | | | | | | | | REV |
|-------------------------|------------|-----------------------------|-------------------|------------------------------|------------------------------|--------------------|----------------------------|-------------------|------------------------------|------------------------------|--------------------|----------------------------|-------------------------------|
| PROCESS | | | | | | | | | | | | | |
| Thermodynamic condition | | | Vapor | | | | | Liquid | | | | | |
| Pressure bar(a) | Temp °C | Weight fraction vapor | Enthalpy kJ/kg | Density kg/m ³ | Specific heat kJ/kg·°C | Viscosity mPa·s | Thermal cond. W/m·°C | Enthalpy kJ/kg | Density kg/m ³ | Specific heat kJ/kg·°C | Viscosity mPa·s | Thermal cond. W/m·°C | Surface tension dyne/cm |
| 13.134 | 266.67 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 546.33 | 634.81 | 2.7323 | 0.1771 | 0.0935 | 6.93 |
| 13.134 | 280.33 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 564.20 | 616.07 | 2.8102 | 0.1672 | 0.0914 | 5.88 |
| 13.134 | 294.00 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 623.21 | 564.93 | 2.8989 | 0.1576 | 0.0895 | 4.83 |
| 13.134 | 307.67 | 0.0000 | 871.52 | 45.23 | 2.4137 | 0.0109 | 0.0318 | 663.55 | 570.58 | 3.0057 | 0.1478 | 0.0876 | 3.83 |
| 13.134 | 307.85 | 0.0710 | 871.89 | 45.25 | 2.4145 | 0.0109 | 0.0318 | 664.01 | 570.42 | 3.0066 | 0.1478 | 0.0876 | 3.83 |
| 13.134 | 308.03 | 0.1421 | 872.26 | 45.26 | 2.4154 | 0.0109 | 0.0318 | 664.49 | 570.42 | 3.0078 | 0.1478 | 0.0876 | 3.83 |
| 13.134 | 308.22 | 0.2133 | 872.65 | 45.28 | 2.4162 | 0.0109 | 0.0320 | 664.98 | 570.42 | 3.0091 | 0.1478 | 0.0874 | 3.83 |
| 13.134 | 308.42 | 0.2846 | 873.05 | 45.29 | 2.4168 | 0.0109 | 0.0320 | 665.48 | 570.26 | 3.0099 | 0.1478 | 0.0874 | 3.83 |
| 13.134 | 308.62 | 0.3560 | 873.46 | 45.31 | 2.4175 | 0.0109 | 0.0320 | 666.00 | 570.26 | 3.0111 | 0.1478 | 0.0874 | 3.82 |
| 13.134 | 308.83 | 0.4275 | 873.88 | 45.33 | 2.4183 | 0.0109 | 0.0320 | 666.53 | 570.26 | 3.0124 | 0.1478 | 0.0874 | 3.82 |
| 13.134 | 309.04 | 0.4991 | 874.32 | 45.34 | 2.4191 | 0.0109 | 0.0320 | 667.08 | 570.10 | 3.0137 | 0.1478 | 0.0874 | 3.82 |
| 13.134 | 309.27 | 0.5708 | 874.78 | 45.36 | 2.4204 | 0.0109 | 0.0320 | 667.64 | 570.10 | 3.0148 | 0.1478 | 0.0874 | 3.82 |
| 13.134 | 309.49 | 0.6428 | 875.23 | 45.38 | 2.4212 | 0.0109 | 0.0320 | 668.22 | 570.10 | 3.0168 | 0.1478 | 0.0872 | 3.81 |
| 13.134 | 309.73 | 0.7146 | 875.71 | 45.39 | 2.4221 | 0.0109 | 0.0320 | 668.82 | 569.94 | 3.0178 | 0.1478 | 0.0872 | 3.81 |
| 13.518 | 266.67 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 546.33 | 635.15 | 2.7323 | 0.1772 | 0.0935 | 6.93 |
| 13.518 | 281.02 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 566.14 | 615.27 | 2.8144 | 0.1699 | 0.0914 | 5.81 |
| 13.518 | 295.38 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 627.21 | 593.00 | 2.9066 | 0.1597 | 0.0893 | 4.72 |
| 13.518 | 309.73 | 0.0000 | 875.22 | 46.77 | 2.4271 | 0.0110 | 0.0320 | 669.77 | 567.05 | 3.0241 | 0.1454 | 0.0872 | 3.69 |
| 13.518 | 309.91 | 0.0710 | 875.58 | 46.79 | 2.4279 | 0.0110 | 0.0322 | 670.24 | 566.89 | 3.0254 | 0.1454 | 0.0872 | 3.69 |
| 13.518 | 310.09 | 0.1421 | 875.98 | 46.80 | 2.4288 | 0.0110 | 0.0322 | 670.71 | 566.89 | 3.0262 | 0.1454 | 0.0872 | 3.68 |
| 13.518 | 310.28 | 0.2133 | 876.34 | 46.82 | 2.4292 | 0.0110 | 0.0322 | 671.20 | 566.89 | 3.0275 | 0.1454 | 0.0872 | 3.68 |
| 13.518 | 310.48 | 0.2846 | 876.74 | 46.83 | 2.4300 | 0.0110 | 0.0322 | 671.70 | 566.73 | 3.0287 | 0.1454 | 0.0872 | 3.68 |
| 13.518 | 310.68 | 0.3560 | 877.15 | 46.85 | 2.4309 | 0.0110 | 0.0322 | 672.22 | 566.73 | 3.0300 | 0.1454 | 0.0871 | 3.68 |
| 13.518 | 310.88 | 0.4275 | 877.57 | 46.87 | 2.4317 | 0.0110 | 0.0322 | 672.75 | 566.73 | 3.0308 | 0.1455 | 0.0871 | 3.68 |
| 13.518 | 311.10 | 0.4991 | 878.00 | 46.88 | 2.4325 | 0.0110 | 0.0322 | 673.29 | 566.57 | 3.0326 | 0.1455 | 0.0871 | 3.67 |
| 13.518 | 311.32 | 0.5708 | 878.45 | 46.90 | 2.4334 | 0.0110 | 0.0322 | 673.85 | 566.57 | 3.0338 | 0.1455 | 0.0871 | 3.67 |
| 13.518 | 311.54 | 0.6427 | 878.91 | 46.92 | 2.4342 | 0.0110 | 0.0322 | 674.43 | 566.57 | 3.0350 | 0.1455 | 0.0871 | 3.67 |
| 13.518 | 311.78 | 0.7146 | 879.38 | 46.94 | 2.4355 | 0.0110 | 0.0322 | 675.03 | 566.41 | 3.0383 | 0.1455 | 0.0871 | 3.67 |
| 13.901 | 266.67 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 546.33 | 635.29 | 2.7323 | 0.1772 | 0.0935 | 6.93 |
| 13.901 | 281.70 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 588.06 | 614.53 | 2.8191 | 0.1684 | 0.0912 | 6.75 |
| 13.901 | 295.73 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 631.16 | 591.24 | 2.9186 | 0.1599 | 0.0891 | 4.62 |
| 13.901 | 311.76 | 0.0000 | 878.83 | 48.33 | 2.4405 | 0.0110 | 0.0324 | 676.91 | 568.53 | 3.0426 | 0.1450 | 0.0871 | 3.55 |
| 13.901 | 311.93 | 0.0710 | 879.19 | 48.34 | 2.4413 | 0.0110 | 0.0324 | 677.37 | 568.53 | 3.0438 | 0.1451 | 0.0869 | 3.55 |
| 13.901 | 312.11 | 0.1421 | 879.56 | 48.36 | 2.4422 | 0.0110 | 0.0324 | 677.84 | 568.37 | 3.0451 | 0.1451 | 0.0869 | 3.54 |
| 13.901 | 312.30 | 0.2133 | 879.95 | 48.38 | 2.4430 | 0.0110 | 0.0324 | 677.93 | 568.37 | 3.0483 | 0.1451 | 0.0869 | 3.54 |
| 13.901 | 312.49 | 0.2846 | 880.34 | 48.39 | 2.4438 | 0.0110 | 0.0324 | 677.89 | 568.21 | 3.0478 | 0.1451 | 0.0869 | 3.54 |
| 13.901 | 312.69 | 0.3560 | 880.75 | 48.41 | 2.4443 | 0.0110 | 0.0324 | 678.34 | 568.21 | 3.0488 | 0.1451 | 0.0869 | 3.54 |
| 13.901 | 312.89 | 0.4275 | 881.17 | 48.43 | 2.4451 | 0.0110 | 0.0324 | 678.87 | 568.21 | 3.0501 | 0.1451 | 0.0869 | 3.53 |
| 13.901 | 313.11 | 0.4991 | 881.60 | 48.44 | 2.4459 | 0.0110 | 0.0324 | 679.41 | 568.05 | 3.0513 | 0.1451 | 0.0867 | 3.53 |
| 13.901 | 313.32 | 0.5708 | 882.04 | 48.46 | 2.4468 | 0.0110 | 0.0324 | 679.97 | 568.05 | 3.0526 | 0.1451 | 0.0867 | 3.53 |
| 13.901 | 313.54 | 0.6427 | 882.50 | 48.48 | 2.4480 | 0.0110 | 0.0324 | 680.56 | 568.05 | 3.0539 | 0.1451 | 0.0867 | 3.53 |
| 13.901 | 313.78 | 0.7146 | 882.97 | 48.50 | 2.4489 | 0.0110 | 0.0324 | 681.14 | 568.89 | 3.0555 | 0.1452 | 0.0867 | 3.52 |
| 14.285 | 266.67 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 546.33 | 635.61 | 2.7323 | 0.1773 | 0.0935 | 6.93 |
| 14.285 | 282.36 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 589.89 | 613.99 | 2.8223 | 0.1691 | 0.0912 | 5.70 |
| 14.285 | 295.04 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 636.00 | 598.48 | 2.9282 | 0.1591 | 0.0890 | 4.53 |
| 14.285 | 313.73 | 0.0000 | 882.34 | 49.81 | 2.4543 | 0.0110 | 0.0325 | 681.95 | 569.01 | 3.0618 | 0.1437 | 0.0867 | 3.41 |
| 14.285 | 313.91 | 0.0710 | 882.71 | 49.82 | 2.4551 | 0.0110 | 0.0325 | 682.41 | 569.01 | 3.0631 | 0.1437 | 0.0867 | 3.41 |
| 14.285 | 314.09 | 0.1422 | 883.08 | 49.84 | 2.4560 | 0.0110 | 0.0325 | 682.88 | 569.85 | 3.0643 | 0.1437 | 0.0867 | 3.41 |
| 14.285 | 314.27 | 0.2134 | 883.46 | 49.86 | 2.4564 | 0.0110 | 0.0325 | 683.37 | 569.85 | 3.0656 | 0.1437 | 0.0865 | 3.40 |
| 14.285 | 314.47 | 0.2847 | 883.85 | 49.87 | 2.4572 | 0.0110 | 0.0325 | 683.87 | 569.85 | 3.0668 | 0.1438 | 0.0865 | 3.40 |
| 14.285 | 314.66 | 0.3561 | 884.26 | 49.89 | 2.4581 | 0.0110 | 0.0325 | 684.38 | 569.85 | 3.0681 | 0.1438 | 0.0865 | 3.40 |
| 14.285 | 314.86 | 0.4276 | 884.67 | 50.01 | 2.4589 | 0.0110 | 0.0325 | 684.90 | 569.68 | 3.0693 | 0.1438 | 0.0865 | 3.40 |
| 14.285 | 315.07 | 0.4992 | 885.10 | 50.03 | 2.4597 | 0.0110 | 0.0325 | 685.44 | 569.68 | 3.0706 | 0.1438 | 0.0865 | 3.39 |
| 14.285 | 315.28 | 0.5709 | 885.54 | 50.05 | 2.4605 | 0.0110 | 0.0325 | 686.00 | 569.52 | 3.0719 | 0.1438 | 0.0865 | 3.39 |
| 14.285 | 315.51 | 0.6427 | 886.00 | 50.07 | 2.4614 | 0.0110 | 0.0325 | 686.57 | 569.52 | 3.0735 | 0.1438 | 0.0864 | 3.39 |
| 14.285 | 315.73 | 0.7147 | 886.46 | 50.09 | 2.4623 | 0.0110 | 0.0325 | 687.16 | 569.36 | 3.0748 | 0.1438 | 0.0864 | 3.39 |
| 14.668 | 266.67 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 546.33 | 635.93 | 2.7323 | 0.1774 | 0.0935 | 6.93 |
| 14.668 | 283.01 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 591.79 | 613.35 | 2.8265 | 0.1657 | 0.0910 | 5.55 |
| 14.668 | 299.34 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 636.81 | 597.72 | 2.9379 | 0.1543 | 0.0888 | 4.43 |
| 14.668 | 315.67 | 0.0000 | 886.78 | 51.51 | 2.4681 | 0.0110 | 0.0327 | 687.90 | 556.48 | 3.0815 | 0.1424 | 0.0864 | 3.28 |
| 14.668 | 315.84 | 0.0710 | 886.14 | 51.53 | 2.4690 | 0.0110 | 0.0327 | 688.36 | 556.48 | 3.0827 | 0.1424 | 0.0864 | 3.27 |
| 14.668 | 316.02 | 0.1422 | 886.51 | 51.54 | 2.4698 | 0.0110 | 0.0327 | 688.84 | 556.32 | 3.0840 | 0.1424 | 0.0864 | 3.27 |
| 14.668 | 316.21 | 0.2134 | 886.89 | 51.56 | 2.4705 | 0.0110 | 0.0327 | 689.32 | 556.32 | 3.0853 | 0.1424 | 0.0864 | 3.27 |
| 14.668 | 316.39 | 0.2847 | 887.28 | 51.58 | 2.4711 | 0.0110 | 0.0327 | 689.82 | 556.32 | 3.0865 | 0.1424 | 0.0864 | 3.27 |
| 14.668 | 316.59 | 0.3561 | 887.68 | 51.60 | 2.4719 | 0.0110 | 0.0327 | 690.33 | 556.16 | 3.0878 | 0.1425 | 0.0864 | 3.26 |
| 14.668 | 316.79 | 0.4276 | 888.10 | 51.62 | 2.4727 | 0.0110 | 0.0327 | 690.85 | 556.16 | 3.0890 | 0.1425 | 0.0862 | 3.26 |
| 14.668 | 316.99 | 0.4992 | 888.52 | 51.64 | 2.4736 | 0.0110 | 0.0327 | 691.39 | 556.16 | 3.0907 | 0.1425 | 0.0862 | 3.26 |
| 14.668 | 317.21 | 0.5709 | 888.96 | 51.65 | 2.4744 | 0.0110 | 0.0327 | 691.94 | 556.00 | 3.0920 | 0.1425 | 0.0862 | 3.26 |
| 14.668 | 317.43 | 0.6428 | 889.41 | 51.67 | 2.4752 | 0.0111 | 0.0327 | 692.51 | 556.00 | 3.0932 | 0.1425 | 0.0862 | 3.26 |
| 14.668 | 317.66 | 0.7147 | 889.88 | 51.69 | 2.4761 | 0.0111 | 0.0328 | 693.10 | 556.00 | 3.0949 | 0.1425 | 0.0862 | 3.25 |

**FIRED HEATER
DATA SHEET**

| | |
|----------------|----------------------------|
| Contract: | 10E0541A01 |
| Equipment No.: | 55-B-01 A/B |
| Revision: | 2 Date: 11-Aug-2011 |
| Unit: | 55 - Xylenes Fractionation |
| P.O. No.: | |
| Document No.: | DS-55-BA-01 |
| Sheet: | 5 of 5 |

| NOTES | | REV |
|-------|--|-----|
| 1 | | |
| 2 | | |
| 3 | MODIFICATIONS | |
| 4 | 1. The existing Xylene Column Reboiler, Equipment No. 55-B-01 A/B, is suitable for the revamp conditions. | |
| 5 | 2. No other modifications, except those given below are required for the existing heater as long as it is "fit for service", which shall be determined by CTCI : (Also, see "Revamp Notes" below). | 0 |
| 6 | a. UOP combustion conditions shown on Sheet 2 of this data sheet are based on 'Sales Gas' composition given in UOP | 0 |
| 7 | document number 951806 - A.4 "Basic Engineering Design Questionaire, Rev. 3. CTCI/Heater Vendor shall confirm the | |
| 8 | adequacy of the existing burners and fuel gas supply system for the full range of fuel gas compositions anticipated for the | |
| 9 | revamp operation as shown in latest revision of Fluor document SP-000-AA-5002 "Basic Engineering Design Data". | 2 |
| 10 | b. Due to inadequate data regarding the flue gas/combustion air heater, UOP has estimated the combustion air temperature | |
| 11 | at the burners based on heat balance. Heater vendor shall evaluate the adequacy of the entire air preheat system for the | |
| 12 | revamp operation. | |
| 13 | | |
| 14 | REFERENCE DATA | |
| 15 | 1. Born Overall Layout & Plot Drawing No. 2881-55B01-01A Rev. 2 dated 7-Mar-96. | |
| 16 | 4. Born General Arrangement Drawing No. 2881-55B01-02A Rev. 2 dated 7-Mar-95. | |
| 17 | 5. Born API Fired Heater Data Sheet Rev. 5 dated 7-Mar-96 (8 pages). | |
| 18 | | |
| 19 | REVAMP NOTES | |
| 20 | 1. The revamp conclusions are based on the assumption that all existing coil components that are to be re-used for the | |
| 21 | revamp are identical to the vendor's data sheets referenced above, and: | |
| 22 | a. The tubes/fittings have normal original wall thickness. | |
| 23 | b. No significant corrosion or metallurgical damage has occurred. | |
| 24 | c. The tubes/fittings are not severely warped, bulged, nor oxidized. | |
| 25 | d. The tubes/fittings are free of internal and external deposits. | |
| 26 | Changes to this information will require further review of this specification by UOP. | |
| 27 | 2. CTCI/heater vendor is responsible for the following: | 0 |
| 28 | a. Providing confirmation and guarantee that the existing heater will meet UOP's predicted thermal and hydraulic performance | 0 |
| 29 | while complying with specified noise and emissions limits. | 0 |
| 30 | b. Conducting a detailed field inspection based upon consultation with the component vendors. | 0 |
| 31 | c. Ensuring that the heaters and ancillary equipment are refurbished, as required, to provide for safe operation at the | 0 |
| 32 | revamp conditions. | 0 |
| 33 | d. Verifying that the structural and mechanical integrity of the heater and ancillary equipment is satisfactory for the | 0 |
| 34 | revamp conditions. | 0 |
| 35 | e. Ensuring compliance with existing codes and practices, including environmental regulations. | 0 |
| 36 | f. Ensuring that any replacement parts or modifications shall comply with the latest appropriate API/ISO standards. As | 0 |
| 37 | a minimum, the replacement parts or modifications shall comply with the same standards as the original equipment. | |
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CLIENT : CHIYODA / ARABIAN INDUSTRIAL FIBERS CO LTD
 CHIYODA PO : SAY POE 0002
 LOCATION : IBN RUSHD PTA & AROMATICS PLANT PROJECT
 EQUIPMENT : 55-B-01 XYLENE COLUMN REBOILER
 REQUISITION NO : 22854-MR-000-B-501

RETURNED
 JUL 19 1996
 CHIYODA
 V P C

RECVD
 JUL 1 1996
 CHIYODA
 VPC

| | |
|---|-----------------------------|
| CHIYODA CORPORATION | |
| JOB NO. S1046 | IBN RUSHD AROMATICS PROJECT |
| PO NO. SAYPOE0002 | |
| REQ NO. 22854000B501 | 130 |
| IDENT NO. 22854000B501 | OC 0-27 15 |
| A-AND COMMENTS PROCEED WITH FABRICATION | SAY TEAM |
| B-PROCEED WITH FABRICATION COMMENTS TO BE CONSIDERED | PYD P/mt |
| C-DO NOT PROCEED WITH FABRICATION | DATE July 16 1996 |
| PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER. | |

| REV | INTL | DATE | REVISIONS | CHKD | DATE | APP | DATE |
|-----|------|---------|-------------------|------|--------|-----|---------|
| 5 | BP | 10/5/96 | AS CLIENT COMMENT | ERW | 2/5/96 | DA | 7/15/96 |
| 4 | BP | 7/3/96 | AS NOTED | RW | 7/3/96 | Q | 11/1/96 |

CAT CODE: 71

UNIT: 55-B-01

069235



TITLE: FIRE HEATER
 DATA SHEET.

SPEC NO:
 2881-55B01-ETD 002/A

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SHEET 1 OF 9 REV 5

MANUFACTURE AND CONSTRUCTION TO BE CARRIED OUT STRICTLY IN ACCORDANCE WITH THE REQUIREMENTS OF THIS DRAWING SPECIFICATION.
 NO CHANGES ARE TO BE MADE WITHOUT THE PRIOR AGREEMENT OF THE CHIEF ENGINEER OR THE ORGANISING SECTION WITHIN ENGINEERING DEPARTMENT.

ALTERNATE DESIGN

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service /Item Xylene column Reboiler 55B01
Type RAD CON VC Plant Location
Quantity 2
Owner Ref. No
Purchaser Chiyoda Ref. No.
Date 07/03/96 Bom Ref No. BJ 2881
By: BDP Page 1 of 8

PROCESS DESIGN CONDITIONS

1. Total duty heater, MW
2. Heater section
3. Service of heater
4. Heat Absorption per heater, MW
5. Fluid Name
6. Flow rate, kg/hr
7. Flow rate, dm(cube)/s
8. Press drop (allow, clean/fouled), bar
9. Press drop (calc, clean/fouled), bar
10. Fouling allowance, m(sq)-C(deg)/W
11. Therm conductivity of coke/scale, WmC(deg)
12. Avg. radiant flux density (allowable), W/m(sq)
13. Avg. radiant flux density (calculated), W/m(sq)
14. Avg. convection flux density (allowable), W/m(sq)
15. Avg. convection flux density (calculated), W/m(sq)
16. Max radiant flux density, W/m(sq)
17. Max convection flux density, W/m(sq)
18. Velocity limitation, m/sec
19. Max. Allowable Inside film temperature, C(deg)

INLET CONDITIONS:

20. Temperature, C(deg)
21. Pressure, barg
22. Liquid flow, kg/hr
23. Vapor flow, kg/hr
24. Density of Liquid @ T. P. , S.G
25. Vapor, molecular weight
26. Viscosity, liquid, mPa.s
27. Viscosity, vapor, mPa.s
28. Specific heat, liquid, KJ/kgC(deg)
29. Specific heat, vapor, KJ/kgC(deg)
30. Thermal conductivity, liquid, W/mC(deg)
31. Thermal conductivity, vapor, W/mC(deg)

OUTLET CONDITIONS:

32. Temperature, Degree C
33. Pressure, barg
34. Liquid flow, kg/hr
35. Vapor flow, kg/hr
36. Density of Liquid @ T. P. , Kg/cuM
37. Vapor, molecular weight
38. Viscosity, liquid, mPa*s
39. Viscosity, vapor, mPa*s
40. Specific heat, liquid, KJ/kgC(deg)
41. Specific heat, vapor, KJ/kgC(deg)
42. Thermal conductivity, liquid, W/mC(deg)
43. Thermal conductivity, vapor, W/mC(deg)

REMARKS

44. Distillation data should be attached
for vaporization service
45. Other

| | 107.82 | | |
|------------------------------|----------|--------|--|
| | Radiant | Conv. | |
| Xylene column Reboiler 55B01 | | | |
| | 40.06 | 13.85 | |
| | HC | HC | |
| | 837728 | | |
| | | | |
| | 3.80 | | |
| | 2.000 | | |
| | | | |
| | 31546 | | |
| | 31528 | | |
| | | | |
| | | 3748 | |
| | 58751 | | |
| | | 56833 | |
| | | | |
| | | 281 | |
| | | 14.60 | |
| | | 837728 | |
| | | 0 | |
| | | 0.665 | |
| | | | |
| | | 0.174 | |
| | | | |
| | | 2.729 | |
| | | | |
| | | 0.091 | |
| | | | |
| | 310 | | |
| | 10.80 | | |
| | 291780.5 | | |
| | 545947.5 | | |
| | 0.639 | | |
| | 118.7 | | |
| | 0.16 | | |
| | 0.011 | | |
| | 2.862 | | |
| | 2.335 | | |
| | 0.087 | | |
| | 0.033 | | |

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Combustion Design Conditions

1. Type of fuel
2. Excess air, percent
3. Calc heat release, MW (LHV)
4. Calc fuel efficiency, percent (LHV)
5. Calc thermal efficiency, percent (LHV)
6. Guaranteed thermal efficiency, percent (LHV)
7. Radiation loss, percent of heat rel (LHV)
8. Flue gas temp. leaving radiant section, C(deg)
9. Flue gas temp. leaving conv section, C(deg)
10. Flue gas temp. leaving air heater (uncorrected), C
11. Flue gas temp. leaving air heater (corrected), C(deg)
12. Max flue gas mass vel thru conv sect, kg/s² m(sq)
13. Volumetric heat release, W/m(cube) (LHV)
14. Ambient air temperature, C(deg)
15. Air temperature, stack design, C(deg)
16. Air temperature leaving air heater, C(deg)
17. Altitude above sea level, m
18. Draft @ Bridgwall, mm wg
19. Draft @ Burner, mm wg

Fuel Characteristics

20. Type of Fuel
21. Heating value (LHV), KJ/kg
22. Heating value (LHV), KJ/Nm(cube)
23. sp Gr. @ P, T.
24. H/C ratio (by weight)
25. Viscosity, @ _____ C(deg), mPa*s
26. Viscosity, @ _____ C(deg), mPa*s
27. Total salts, ppm
28. Vanadium, ppm
29. Sodium, ppm
30. Fixed nitrogen, ppm
31. Sulfur, percent by weight
32. Hydrogen sulfide, percent by volume
33. Ash, percent by weight
34. Liquids: ASTM initial boiling point, C(deg)
35. _____ ASTM end point, C(deg)
36. Gases: Molecular weight
37. _____ Composition, mol percent
38. Temperature at burner, C(deg)
39. Fuel pressure (available @ burner), kPa
40. Atomizing air stream pressure, kPa

Mechanical Design Conditions (General:)

41. Plot limitations _____
 42. Tube limitations _____
- Structural Design Data:
1. Wind Velocity, m/s
 2. Wind exposure
 3. Minimum ambient air temperature C(deg)

Service /Item Xylene column Reboiler 55B01
 Unit RAD CON VC Plant Location
 Type _____ Quantity 2
 Owner _____ Ref. No.
 Purchaser Chiyoda Ref. No.
 Date: 07/03/96 Born Ref No. BJ 2881
 By: BDP Page 2 of 8

| with preheat | no preheat |
|----------------------|------------|
| GAS | gas |
| 15 | 15 |
| 59.157 | 65.50 |
| 91.1 | 82.3 |
| 90.1 | 81.3 |
| 2.50 | 2.50 |
| 848 | 841 |
| 332 | 347 |
| 145 | |
| 1.36 | 1.50 |
| 15 combustion design | |
| 50 | |
| 224 | |
| 0 | |
| 3.00 | |
| 15.11 | |
| gas | |
| 23376 | |
| 0.306 @ 15C | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| 15.6 | |
| 138 | |

Min Stack Ht. _____ m
 Noise Limitations _____
 Wind occurrence _____
 Seismic Zone _____
 0

069237

ALTERNATE DESIGN

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service/Item Xylene column Reboiler 55B01
Unit RAD CON VC Plant Location
Type Quantity 2
Owner Ref. No.
Purchaser Chiyoda Ref. No.
Date: 07/03/96 Born Ref No. BJ 2881
By: BDP Page 3 of 8

Coil Design: (RADIANT)

4. Design basis of tube wall thk. (code or specs)
5. Design basis for rupture strength, (min or avg)
6. Design life, hr
7. Elastic design pressure, barg
8. Rupture design pressure, barg
9. Temperature allowance, C(deg)
10. Corrosion allowance, mm
11. Stress relieve (YES or NO)
12. Weld inspection requirements radiography, %
13. Hydrostatic test pressure, BARG
14. Max tube metal temperature (clean) C(deg)
15. Design tube metal temperature C(deg)
16. Inside film coefficient, W/m2 C(deg)

Coil Configuration: (RADIANT)

17. Tubes (vertical or horizontal)
 18. No. of flow passes
 19. Effective tube length, m
 20. Bare tubes, number
 21. Bare tubes, exposed surface, m(sq)
 22. Bare tubes, total exposed surface, m(sq)
 23. Tubes, inline or staggered
 24. Tube spacing, C to C, mm
- Tubes: (RADIANT)**
25. Material (ASTM spec. or grade)
 26. Outside diameter, mm
 27. wall thickness, mm or Sch
 28. Overall tube length, m
 29. No. of intermediate welds
 30. Distance from Center Line of tube to wall, mm

Heater Section

Plug-Type Headers:

31. Location (one end or both ends)
32. Manufacture and type
33. Nominal rating
34. Welded or rolled joint

Return Bends:

35. Location (header box or firebox)
36. Material (ASTM spec and grade)

| API 530 | RADIANT SHOCK | API 530 |
|----------|---------------|------------|
| 100000 | | 100000 |
| 20.65 | | 20.65 |
| 28 | | 28 |
| 3 | | 3 |
| no | | no |
| 100 | | 100 |
| 51.0 | | 51.0 |
| 408 | | |
| 436 | | 436 |
| 710 | | 1221 |
| VERT | | HORI |
| 8 | | 8 |
| 18.059 | | 9.144 |
| 96 | | 16 |
| 1193.24 | | 77.39 |
| 1270.63 | | |
| IN LINE | | STAGGERED |
| 408.40 | | 304.80 |
| A106 GRB | | A106 GRB |
| 219.1 | | 168.3 |
| sch 40aw | | sch 40aw |
| 96 | | None |
| 305 | | 152 |
| Radiant | | |
| None | | |
| firebox | | header box |
| A234 WPB | | A234 WPB |

ALTERNATE DESIGN

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service/Item Xylene column Reboiler 55B01
Unit RAD CON VC Plant Location
Type Quantity 2
Owner Ref. No.
Purchaser Chiyoda Ref. No.
Date: 07/03/98 Born Ref No. BJ 2881
By: BDF Page 5 of 8

Heater Section Continued:

Terminals:

1. Type (welded or flanged)

Inlet:

2. Material (ASTM spec and grade)
3. Size/rating, schedule or thickness
4. Number of terminals

Outlet:

5. Material (ASTM spec and grade)
6. Size/rating, schedule or thickness
7. Number of terminals

Manifolds:

8. Connection to tubes (weld or flanged)
9. Location (internal or external)

Inlet:

10. Material (ASTM spec and grade)
11. Size/schedule or thickness
12. Flange/material (ASTM spec and grade)
13. Flange size and rating

Outlet:

14. Material (ASTM spec and grade)
15. Size schedule or thickness
16. Flange/material (ASTM spec and grade)
17. Flange size and rating

Crossovers:

18. Location (internal or external)
19. Pipe mat'l (ASTM spec and grade)
20. Pipe size/schedule or thickness
21. Flange mat'l (ASTM spec and grade)
22. Flange size and rating

Tube Supports:

23. Location (top, bottom, intermediate)
24. Material (ASTM spec and grade)
25. Spacing
26. Coaling (type and thickness)

Tube Guides:

27. Location and spacing (Top/Bottom)
28. Material (ASTM spec and grade)

Settings:

Floor:

29. Lining: Thickness - Hot face temp. - calc - design
30. Mat'l/thk/service temperature
31. Anchor (type & mat'l)
32. Casing: Thickness - Material - Temperature

Exposed Vertical Walls:

33. Lining: Thickness - Hot face temp. - calc - design
34. Mat'l/thk/service temperature
35. Anchor (type & mat'l)
36. Casing: Thickness - Material - Temperature

Radiant

Convection

FLANGED

Flanged

A105

6" SCH 40 300#

8 PER HEATER

A105

8" SCH 40AW 300#

8 PER HEATER

Flanged

External

None

A106 GrB

26" x STD WT

None (Connections to Heater terminals only)

26" x STD WT Bevelled

EXTERNAL

A 106 GRB

6" SCH 40AW

TOP

INTER

ENDS

25/20 CR NI

25/20/ CR/NI

C.S. PLATE

4700 mm

100 mm LW cast

BOTTOM

310 SS

Rev

DSHTB.XLS

069240

11-5-

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service/Item Xylene column Reboiler 55B01
Unit RAD CON VC Plant Location
Type Quantity 2
Owner Ref. No.
Purchaser Chiyoda Ref. No.
Date: 07/03/98 Born Ref No. BJ 2881
By: BDP Page 4 of 8

Coil Design: (CONVECTION)

- 4. Design basis of tube wall thk. (code)
- 5. Design basis for rupture strength
- 6. Design life, hr
- 7. Elastic design pressure, BARG
- 8. Rupture design pressure, BARG
- 9. Temperature allowance, C(deg)
- 10. Corrosion allowance, mm
- 11. Stress relieve (yes or no)
- 12. Weld inspection requirements radiography, %
- 13. Hydrostatic test pressure, Barg
- 14. Max tube metal temperature (clean), C(deg)
- 15. Design tube metal temperature, C(deg)
- 16. Inside film coefficient, W/m(sq) C(deg)

| | BARE | EXT. | EXT. | EXT. |
|--|---------|---------|---------|---------|
| | API 530 | API 530 | API 530 | API 530 |
| | 100,000 | 100,000 | 100,000 | 100,000 |
| | 20.65 | 20.65 | 20.65 | 20.65 |
| | 28 | 28 | 28 | 28 |
| | 3 | 3 | 3 | 3 |
| | NO | NO | NO | NO |
| | 100 | 100 | 100 | 100 |
| | 51.0 | 51 | 51 | 51 |
| | 323 | 356 | 334 | 352 |
| | 351 | 384 | 362 | 380 |
| | 1130 | 1141 | 1130 | 1130 |

Coil Configuration: (CONV.)

- 17. Tubes (vertical or horizontal)
- 18. No. of flow passes/tubes per row
- 19. Effective tube length, m
- 20. Bare tubes, number
- 21. Bare tubes, exposed surface, m(sq)
- 22. Ext tubes, number
- 23. Ext surface tubes, exp. surface, m(sq)
- 24. Ext surface tubes, total exp. surface, m(sq)
- 25. Tubes, staggered/inline
- 26. Tube spacing, C to C, mm

| | HORI. | HORI. | HORI. | HORI. |
|--|-----------|-----------|-----------|-----------|
| | 8 16 | 8 16 | 8 16 | 8 16 |
| | 9.144 | 9.144 | 9.144 | 9.144 |
| | 32 | 0 | 0 | 0 |
| | 154.68 | | | |
| | 0 | 16 | 16 | 48 |
| | | 328.87 | 328.87 | 2922.15 |
| | | 3579.89 | | |
| | STAGGERED | STAGGERED | STAGGERED | STAGGERED |
| | 304.8 | 304.8 | 304.8 | 304.8 |

Tubes: (CONVECTION)

- 27. Material (ASTM spec. or grade)
- 28. Outside diameter, mm
- 29. wall thickness, mm or Sch
- 30. Overall tube length, m
- 31. No. of intermediate welds
- 32. Distance from tube center line to wall, mm

| | A108 GR B | A106 GR B | A106 GR B | A106 GR B |
|--|-----------|-----------|-----------|-----------|
| | 168.3 | 168.3 | 168.3 | 168.3 |
| | sch 40aw | sch 40aw | sch 40aw | sch 40aw |
| | None | None | None | None |
| | 152 | 152 | 152 | 152 |

Description of Extended Surface:

- 33. Type (studs, serrated fins or solid fins)
- 34. Material
- 35. Fin Height, mm
- 36. Fin Thickness, mm
- 37. Fins Per m
- 38. Max tip temperature, C(deg)
- 39. Extension ratio

| | SOLID FIN | SOLID FIN | SOLID FIN |
|--|-----------|-----------|-----------|
| | CS | CS | Car/StL |
| | 12.70 | 12.70 | 25.40 |
| | 1.30 | 1.30 | 1.30 |
| | 118 | 118 | 197 |
| | 366 | 355 | 411 |
| | 4.252 | 4.252 | 12.594 |

Heater Section

Plug-Type Headers:

- 40. Location (one end or both ends)
- 41. Manufacture and type
- 42. Nominal rating
- 43. Welded or rolled joint

Convection

NONE

Return Bends:

- 44. Location (header box or firebox)
- 45. Material (ASTM spec and grade)

| Header box | Header box | Header box | Header box |
|------------|------------|------------|------------|
| A-234-WPB | A-234-WPB | A-234-WPB | A-234-WPB |

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

| | | | |
|--------------|------------------------------|----------------|---------|
| Service/Item | Xylene column Reboiler 55B01 | Plant Location | |
| Unit | RAD CON VC | Quantity | 2 |
| Type | | Ref. No. | |
| Owner | | Ref. No. | |
| Purchaser | Chiyoda | Born Ref No. | BJ 2881 |
| Date: | 07/03/96 | Page 6 of | 8 |
| By: | BDP | | |

Mechanical Design Conditions (continued)

Heater Section (continued):

Shielded Vertical Walls:

| | | | |
|---|--|------------|--------|
| 1. Lining: Thickness - Hot face temp. - calc - design | 125 | 618 C | 1260 C |
| 2. Thk/Mat'l/service temperature | 50 -128 kg/ cu m CFNB + 75 -96 kg/ cu m CFNB+3mm stalastic | | |
| 3. Anchor (type & matl) | TP 310 SS Studs and Washers | | |
| 4. Casing: Thickness - Material - Temperature | 6 | C.S. plate | |

Arch:

| | | | |
|---|---|------------|--------|
| 5. Lining: Thickness - Hot face temp. - calc - design | 150 | 827 C | 1260 C |
| 6. Thk/Mat'l/service temperature | 50 mm 128kg/cu m CFNB + 100 mm 96 kg/ cu m CFNB+3mm stlasti | | |
| 7. Anchor (type & matl) | TP 310 SS Studs and Washers | | |
| 8. Casing: Thickness - Material - Temperature | 6 | C.S. plate | |

Convection Walls:

| | | | |
|---|--------------------|------------|--------|
| 9. Lining: Thickness - Hot face temp. - calc - design | 125 | 584 C | 1100 C |
| 10. Thk/Mat'l/service temperature | 125 mm LW castable | | |
| 11. Anchor (type & matl) | v' type | 304 SS | r1 |
| 12. Casing: Thickness - Material - Temperature | 6 | C.S. plate | |

Breeching:

| | | | |
|--|-------------|-------|--------|
| 13. Lining: Thickness - Hot face temp. - calc - design | 75 | 340 C | 1093 C |
| 14. Thk/Mat'l/service temperature | LW CASTABLE | | |
| 15. Anchor (type & matl) | v' type | CS | |
| 16. Casing: Thickness - Material - Temperature | 5 | | |

Flue Gas Ducts:

| | | |
|-----------------------------------|--------------------|-------------------|
| 17. Location | TO PREHEATER | FROM PREHEATER |
| 18. Lining (internal or external) | internal | internal |
| 19. Thickness & Material | 125 mm LW castable | 75 mm LW castable |
| 20. Anchor, type and material | CS 'v' anchors | CS 'v' anchors |
| 21. Hot face design temperature | | |
| 22. Cold face design temperature | | |

Combustion Air Ducts:

| | |
|---|------------------|
| 23. Location | APH to burners |
| 24. Lining (internal or external) | internal |
| 25. Thickness and Material | 50mm LW castable |
| 26. Anchor, type and material | CS |
| 27. Hot face / cold face design temperature, C(deg) | |

Header Boxes:

| | | | |
|-------------------------------------|-------------------|---------------------|--------|
| 28. Location | Conv. ends | Hinged doors/bolted | Bolted |
| 29. Lining (Thickness & Material) | 50 mm LW castable | | |
| 30. Anchor (type and material) | v' type | CS | |
| 31. Door/panel (matl and thickness) | | C.S. plate | |

Burner Windboxes

| | | | |
|-----------------------------------|----------|--------------------------|--------------|
| 32. Lining (internal or external) | internal | Matl & thk. | mineral wool |
| 33. Anchor (type and matl) | CS 'v' | | |
| 34. Casing: Materials and thk. | CS 5 | | |
| 35. Hot face design temp., C(deg) | | Cold face design temp.,C | |

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service /Item Xylene column Reboiler 55801
Unit RAD CON VC Plant Location
Type Quantity 2
Owner Ref. No.
Purchaser Chiyoda Ref. No.
Date: 07/03/96 Born Ref No. BJ 2881
By: BDP Page 7 of 8

Mechanical Design Conditions (continued)

Heater Section (continued):

Stack:

1. Location
2. Inside met. dia. at exit , mm
Inside met. dia. at base, mm
3. Plate, min. thickness, mm
4. Lining : (Internal or External)
5. Thickness and Material, mm
6. Anchor, type and material:

Bridgwall:

7. Height:, mm
Matl and thickness:

Dampers:

8. Location
9. Material of blade
10. Material of shaft
11. Bearing type
12. Multiple or single blade
13. Desc of provision for operation
14. Location and type of operator

Miscellaneous:

Platforms:

- | | Location/No. |
|-----------------------------|--------------|
| 15. Hearth / One | |
| 16. Convection Side(s) /One | |
| 17. Convection End(s) /Two | |
| 18. Rad Intermediate /One | |
| 19. Stack Damper / One | |
| 20. Stack Sample Port | |
| 21. Type of flooring | |
| Doors: | |
| 22. Access Doors | |
| 23 | |
| 24. Observation Doors | |
| 25 | |
| 26 | |
| 27. Steam Lance Doors | |
| 28 | |
| 29 Explosion Door | |
| 30 | |
| 31 | |

Instruments and Aux. connections

32. Process fluid temperature
33. Flue gas / combustion air temp.
34. Flue gas / combustion air pressure
35. Flue gas composition (sample)
36. Snuffing steam
37. Purge
38. Vents and drains
39. Tubekin thermocouples

grade mounted stack common to both heaters
3642 Hit. above grade: mm 80910
4176 refer born drwg for layout
6 Material: Carbon steel
Internal Extent of lining To top
50 LW Castable
v' type CS

none
Location
Stack
TP304SS
TP304SS
PILLOW BLOCK
Multiple blade
actuated

| Width | Length/Arc | Access | |
|---------|------------|----------------|-------------|
| | | Stairs/Ladder | Gr./Pl/loc. |
| 1100 mm | 360 DEGREE | 1stair/1ladder | GRADE |
| 1100 mm | | 1 LADDER | |
| 1100 mm | | 2 WALKWAYS | |
| 1100 mm | | 1 Ladder | |
| 1100 mm | 270 DEGREE | 1 LADDER | |

| Number | Location | Size | Hinged/Bolted |
|--------|-----------|------------------|-------------------|
| 2 | FLOOR | 450 x 600 | Hinged |
| 24 | RAD SIDE | 127 x 406 | HINGED(20-std-03) |
| 4 | CONV SIDE | 600 x 150 bolted | (BLS-D-106) |
| 1 | RAD SIDE | 473 x 432 | HINGED |

| Number | Size | Type |
|--------|--------|--|
| | | SEE DRAWING No. 2881/403/162EA 2881-55801-02A & 02B |
| 4 | 2" NPS | 3000# CRG With Plug |

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

| | | | |
|---------------|------------------------------|----------------|---------|
| Service /Item | Xylene column Reboiler 55B01 | Plant Location | |
| Unit | RAD CON VC | Quantity | 2 |
| Type | | Ref. No. | |
| Owner | | Ref. No. | |
| Purchaser | Chiyoda | Born Ref No. | BJ 2881 |
| Date | 07/03/96 | Page | 8 of 8 |
| By: | BDP | | |

Mechanical Design Conditions (continued)

Heater Section (continued):

| | |
|---|---|
| 1. Painting requirements: | 22854-SP-000-X-002 System 2 to Prime Coat Only |
| 2. Galvanizing requirements. | Ladders and Platforms to ASTM A123 |
| 3. Internal coatings (casing, ducts, stack) | Stalastic behind ceramic fibre blanket |
| 4. Fireproofing requirements. | None |

Burner and Auxiliary Equipment:

Burners:

| | | | | |
|---|-----------|---------------|------------------------|-------------------------|
| 5. Manufacture/type | J.Z. PSFG | FD gas only | Location | rad floor |
| 6. Designation/Size | 18 | Number: | 12 | Fuel: gas |
| 7. Heat rel. (MW per burner) at design excess air (Max\Norm) | | | | 4.93 with preheated air |
| Heat rel. (MW per burner) at design excess air (Max\Norm) | | 6.006 | | 5.46 ambient air |
| 8. Design press drop across burner | | 50 mm Wg | | |
| Distance burner centerline to unshielded refractory: | | 18059 mm | | |
| 10. Burner pilot: | | BCD = 5900 MM | | |
| Capacity (KW) | 20 | Fuel: Gas | Fuel press | |
| Fuel Pressure/ Fuel: | | | Type of ignition: AUTO | |
| 11. Special requirements: (flame detection devices, safety interlocks etc.) | | | UV SCANNERS | |

Sootblowers:

| | |
|---|-------------------------------|
| 12. Location | SPACE FOR FUTURE INSTALLATION |
| 13. Manufacture and type | |
| 14. Number | |
| 15. Maximum cleaning radius, mm | |
| 16. Lane dimensions (min. clearance) | |
| 17. Orientation (horizontal or vertical) | |
| 18. Cleaning medium | |
| 19. Supply pressure/temperature | |
| 20. Flow rate per blower, kg/s | |
| 21. Materials of construction | |
| 22. Driver type (manual, air, or elec.) | |
| 23. Control systems type (auto or manual, sequential, local, or remote panel) | |

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GN-502 84.10



ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

XYLENE COLUMN DATA SHEET

DOCUMENT NO:

DS-55-CA-501

| | | | | | | | | |
|-----|--------------------|----------|------|-----------|-----------|-------------|---|------------------|
| | | | | | | ابن رشد | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | CTCI CORPORATION |
| 3 | Revised as Marked | KWT. CBC | YSL | 11-Aug-11 | CERTIFIED | | | |
| 2 | Issued for Design | KWY | CBC | YSL | 31-Mar-11 | PROJ. | | |
| 1 | Revised as Marked | KWY | CBC | YSL | 11-Mar-11 | MGR | DATE | |
| 0 | Issue For Approval | KWY | SYL | YSL | 1-Feb-11 | CLIENT | DATE | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | | XC32A-55-501 |

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GN-504 84.10


 ابن رشيد سابك
 ibn.rushd sabic
 CTCI CORPORATION

XYLENE COLUMN
DATA SHEET

XC32A-55-501

2 OF 2

DATE
11-Aug.-2011

REV.
3

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| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 55-C-01 | 1 THRU 2 OF 2 | 3 | 11-Aug.-2011 |

Attachment total 1 page.

ابن رشيد
ibn rushid

FLUOR

**VERTICAL VESSEL
DATASHEET**

Contract: 10E0541A010
 Equip. No.: 55-C-01
 Revision: 3 Date: 11-Aug-2011
 Unit: 55 - Xylene Fract
 PO No.:
 Document No DS-55-CA-501
 Sheet: 1 of 2

سابك
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CTCI CORPORATION

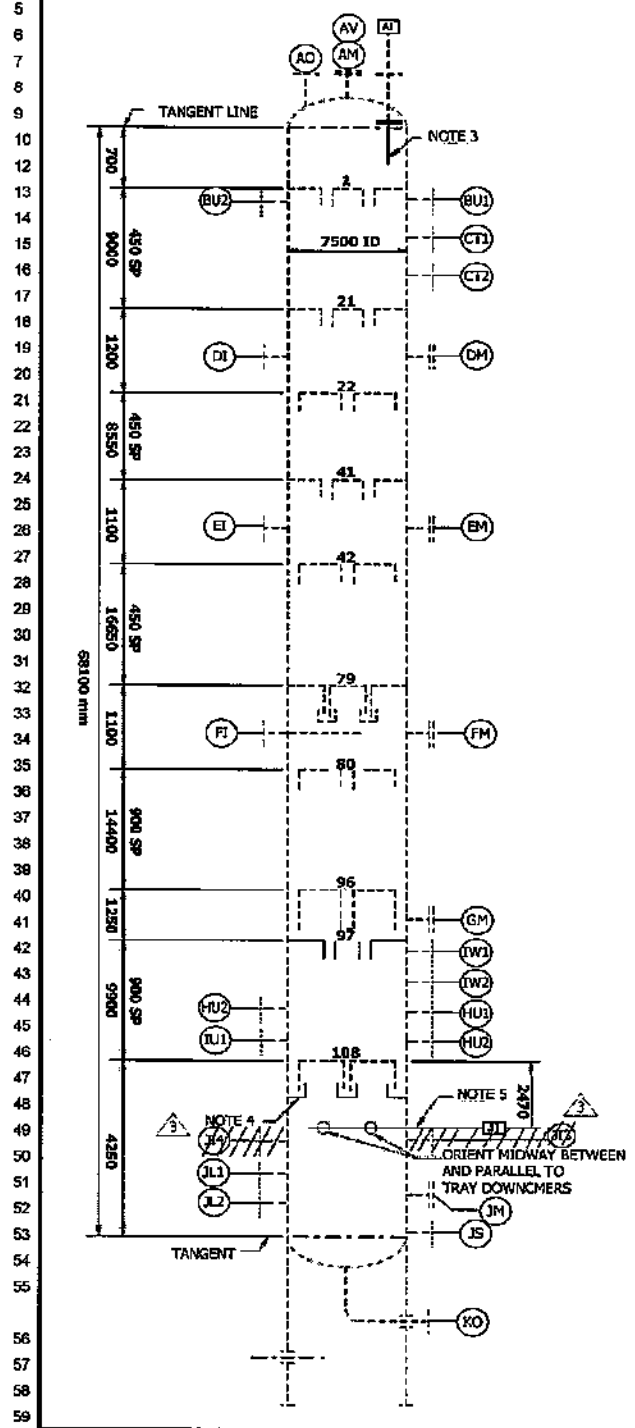
REV

1 Client: Arabian Industrial Fibers Company
 2 Service: Xylene Column

Plant: Xylene Fract
 Site: Yanbu, Kingdom of Saudi Arabia

DESIGN SKETCH

VESSEL DIMENSIONS: ID: 7500 mm T/T: 68100 mm



DESIGN CONDITIONS

| | | | |
|-----------------------------|--------------|----|-------------|
| Pressure: | 16.0 bar(g) | at | 348 °C |
| Vacuum: | FV bar(g) | at | 320 °C |
| Min. Metal Temp: | 9(NOTE16) °C | at | MAWP bar(g) |
| Liquid Level: | Note 11 | | mm |
| Specific Gravity of Liquid: | 0.587 | at | (NOTE15) °C |

OPERATING CONDITIONS

| | | | |
|-------------------------|---------------|----|------------|
| Pressure: | NOTE15 bar(g) | at | Note 10 °C |
| Vacuum: | bar(g) | at | °C |
| Low Temperature: | °C | at | °C |
| Hydrogen Partial Press. | bar (a) | at | °C |

INTERNALS & INSULATION

| DESCRIPTION | Bulk Density kg/m ³ | Liquid Holdup vol% | Pressure Drop bar(g) |
|------------------|--------------------------------|---|----------------------|
| Packing: | | | Note 14 |
| Catalyst: | | | |
| Mist Eliminator: | | | |
| Insulation | 90 mm | Hot <input checked="" type="checkbox"/> Cold <input type="checkbox"/> | |
| Fire Proofing | 75 mm | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | |

CONSTRUCTION

| | Materials | Corrosion Allowance |
|---------|-------------|---------------------|
| Shell: | SA-516-70 N | 3 mm |
| Heads | SA-516-70 N | 3 mm |
| Support | SA-516-70 N | 1.8 mm |

SPECIAL CONDITIONS

| | |
|---------------------------------------|---|
| Stress Relieve (Process Reason Only): | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Vessel in Wet Sour Service: | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Steamout Required: | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |

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FLUOR.

**VERTICAL VESSEL
DATASHEET**

Contract: 10E0541A01
Equip. No.: 55-C-01
Revision: 3 Date: 11-Aug-2011
Unit: 55 - Xylene Fract
P.O. No.:
Document No.: DS-55-CA-501
Sheet: 2 of 2



CTCI CORPORATION

REV

NOZZLE SCHEDULE

| TAG | QTY | SIZE in | PRESSURE RATING | DESCRIPTION |
|---------------|-----|------------|--------------------|------------------------------|
| AI | 1 | 14 | 300# RFWN | INLET (MODIFIED, SEE NOTE 3) |
| AM | 1 | 30 | 300# RFWN | MANWAY WITH COVER/LIFT.LUG |
| AO | 1 | 34 | 300# RFWN | OUTLET |
| AV | 1 | 4 | 300# RFWN | VENT |
| BU1/2 | 2 | 1 | 300# RFWN | TDIC-TI |
| CT1/2 | 2 | 1 1/2 | 300# RFWN | ANALYZER |
| DI | 1 | 8 | 300# RFWN | INLET (NOT IN USE) |
| DMEM/FM/GM/JM | 5 | 24 | 300# RFWN | MANWAY WITH COVER/DAVIT |
| EI | 1 | 8 | 300# RFWN | INLET |
| FI | 1 | 8 | 300# RFWN | INLET |
| HU1/2 | 2 | 1 | 300# RFWN | TDIC-TI |
| IU1/2 | 2 | 1 | 300# RFWN | TI-TW |
| IW1/2 | 2 | 1 1/2 | 300# RFWN | ANALYZER (NOT IN USE) |
| JL1/2 | 2 | 2 | 300# RFWN | LEVEL |
| JS | 1 | 4 | 300# RFWN | STEAMOUT (NOTE17) |
| KO | 1 | 30 | 300# RFWN | OUTLET |
| JH1/2 | 2 | 40 | 300# RFWN | INLET (NEW, SEE NOTE 5) |
| JH4 | 2 | 24 | | INLET (NOT IN USE) |

3

NOTES:

- This vessel tag number 55-C-01 is an existing vessel in the same service. Modifications required are as follows:
- From Tray #80-138 (existing tray numbering), every 4th tray (ie. 84, 88, 92, 96, 100, 104, 108, 112, 116, 120, 124, 128, 132, and 136) is to be retained. The other trays are to be removed / relocated as required for 800 mm tray spacing. Trays #137 and 138 are to be removed.
- Remove existing distributor at Nozzle "AI" and replace with new distributor with 12-inch outlet per U.O.P. DWG 3-170.
- Remove existing traps and install new traps below tray #108 per U.O.P. DWG 3-280.
- Remove existing Inlet Nozzles "JI" and replace with new 40-inch inlet Nozzles "JI", as shown.
- CTCI to verify the available thickness after evaluating maintenance records and performing UT testing and confirm. The CTCI to provide necessary ASME code documentation for the repair "R" stamp and new nameplate.
- Dimensions are in millimeter unless otherwise noted.
- Vessel heads are 2:1 Elliptical
- For nozzle elevation and orientation refer to vendor certified drawings nos. 1-96-B9750-1 REV 4 (1997) and 1-86-B9750-2 REV 4 (1997).
- Operating Temperature. Top: 248°C. Bottom: 299°C
- Normal liquid level (NLL) is 805 mm above bottom tangent line. HLL: 1049 mm. NLL: 561 mm.
- Applicable specifications: SP-000-AA-5002, 22854-SP-000-A-003, 22854-SP-000-A-004, 22854-SP-000-D-001, 22854-SP-000-W-001, 22854-SP-000-W-002, 22854-SP-000-W-003, P01-E07, T01-S01, 3-11.
- The following UOP standard drawings are applicable: 3-170, 3-280.
- Total pressure drop through column internals = 1.056 bar.
- Operating pressure Top: 8.27 bar(g) Bottom: 9.33 bar(g)
- The min. design ambient temperature should be 6 °C.
- Steamout at 150 (232 max) °C and 3.5 (4.1 max) bar (g).

2

FOR RECORD

| | | | | | |
|----------|-------------------|------|------------|-----|---|
| PROJECT | PTA & AROMATICS - | APRD | ✓ | | |
| TITLE | AROMATICS | CHRD | ✓ | | |
| JOB NO. | 58016 | MADE | ✓ | | |
| DOC. NO. | 05-55-C-001 & 1/1 | DATE | May 08 '74 | DRN | ✓ |



UOP
23 East Algonquin Road • PO Box 2017 • Des Plaines, Illinois 60017-2017 • U.S.A.
VESSELS

| PROJECT SPECIFICATION | | | | | |
|--------------------------|---------|-----|-------|-----|------|
| 520893 - 301 - 2 SHEET 3 | | | | | |
| REV | DATE | BY | APP'D | REV | DATE |
| 0 | 5-11-74 | | | | |
| 1 | 5-21-74 | CHK | ✓ | | |
| 2 | 7-01-74 | MR | ✓ | | |

SERVICE ② XYLENE COLUMN 1VEN NO 55-C-01 ②-0000

Design INT 16.00 BAR (g) 232.0 °C (4) BY CONTRACTOR
 Conditions EXT FULL VACUUM 1320 °C
 At Top Metal Temperature (Mia) 9 °C
 Operating Conditions TOP 232 °C
 BOTTOM 1320 °C

Material Specifications
 Heads SA516-70
 Shell SA516-70

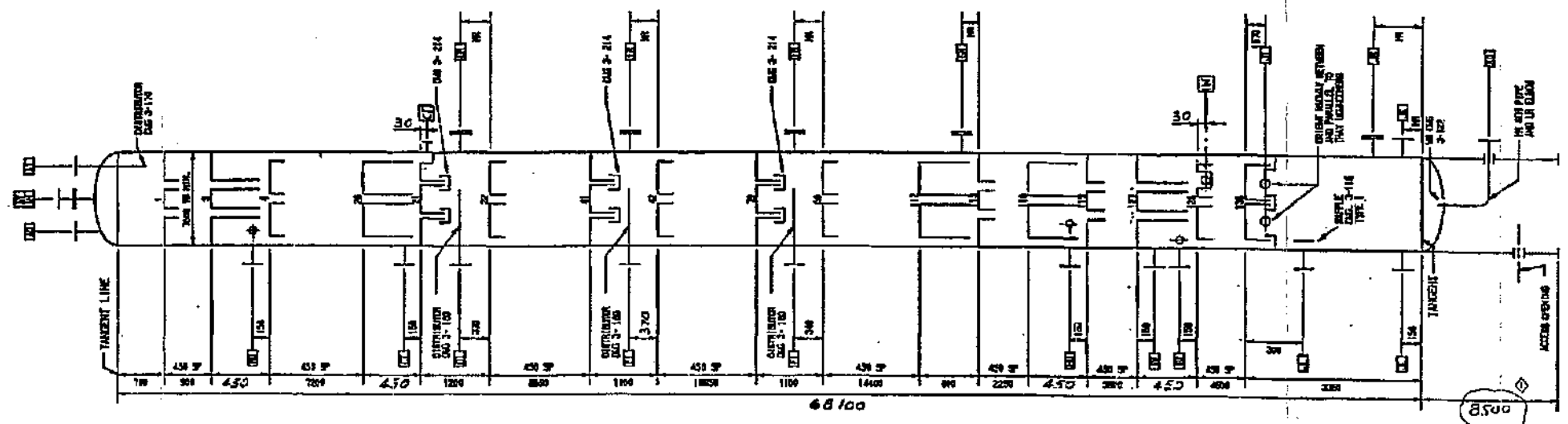
Shell Thickness & Corrosion Allowance
 Required by Allowance (in. Min) 3

Vessel Heads
 Top Head 2:1 ELLIPTICAL
 Bottom Head 2:1 ELLIPTICAL
 Reinforcement Applied by Fabricator
 Ladder & Platform Climb AS REQUIRED (4)
 Transition Climb & Rings YES
 Vessel Support YES

Accessories and Manways

| Mark No | Size Inches | Service |
|---------|-------------|-------------|
| 21 | 1 1/2 | INLET |
| 22 | 30 | HANWAY |
| 23 | 30 | BUTLET (4) |
| 24 | 4 | VENT |
| 25 | 1 | TORQ-FLD |
| 26 | 1 1/2 | ANALYZER |
| 27 | 8 | INLET |
| 28 | 2 1/2 | HANWAY |
| 29 | 8 | INLET |
| 30 | 2 1/2 | HANWAY |
| 31 | 2 1/2 | HANWAY |
| 32 | 2 1/2 | HANWAY |
| 33 | 1 | TI 10 |
| 34 | 1 | TORQ-FLD 10 |
| 35 | 1 1/2 | ANALYZER |
| 36 | 2 1/2 | INLET |
| 37 | 2 | L.C. - G |
| 38 | 2 1/2 | HANWAY |
| 39 | 4 | STEAMWOLF |

Class - ANSI C.300 (4) SHEET 2-NOTE A
 Fining - RAISED FACE
 Normal Liquid Level = 805 MM ABOVE BOTTOM TANGENT
 Specific Gravity = 0.864
 Reflux Ratio (Total) = 1.21 BAR
 REFLUX MUST NOT BE LOCATED ON DOWNCOMERS



| Mark No | Size Inches | Service |
|---------|-------------|------------|
| 20 | 30 | BUTLET (4) |

Drawings Referred to in this Specification

| | | | | |
|---------|---------|---------|---------|---------|
| 3-118-2 | 3-122-0 | 3-170-2 | 3-180-1 | 3-214-2 |
|---------|---------|---------|---------|---------|

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GN-502 34.10



ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

HEAVY AROMATICS COLUMN DATA SHEET

DOCUMENT NO:

DS-55-CA-502

| | | | | | | | | | |
|-----|--------------------|-----|------|-------|-----------|-----------------------------|--|--------------|------------------|
| | | | | | | ابن رشد مؤسسة التقنية | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | | CTCI CORPORATION |
| 3 | Revised as Marked | KWY | CBC | YSL | 11-Aug-11 | CERTIFIED | | | |
| 2 | Issued for Design | KWY | CBC | YSL | 31-Mar-11 | PROJ. _____ | | | |
| 1 | Revised as Marked | KWY | CBC | YSL | 11-Mar-11 | MGR _____ DATE _____ | | | |
| 0 | Issue For Approval | KWY | SYL | YSL | 1-Feb-11 | CLIENT _____ DATE _____ | | | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | | XC32A-55-502 | |

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HEAVY AROMATICS COLUMN
 DATA SHEET

XC32A-55-502

2 OF 2

DATE
 11-Aug.-2011

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 3

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| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
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| 1. | 55-C-02 | 1 THRU 3 OF 3 | 3 | 11-Aug.-2011 |
| Attachment total 1 page | | | | |

ابن رشيد
ibn rushid

FLUOR

VERTICAL VESSEL DATASHEET

Contract: 10E0541A01
 Equip. No.: 55-C-02
 Revision: 3 Date: 11-Aug-2011
 Unit: 55 - Xylene Fract
 PO No.:
 Document No.: DS-55-CA-502
 Sheet: 1 of 3

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CTCI CORPORATION

REV

Client: Arabian Industrial Fibers Company
 Service: Heavy Aromatics Column

Plant: Xylene Fract
 Site: Yanbu, Kingdom of Saudi Arabia

DESIGN SKETCH

DESIGN CONDITIONS

VESSEL DIMENSIONS: ID: 2600 mm T/T: 45700 mm

| | | | |
|-----------------------------|--------------|---------|-------------|
| Pressure: | 3.45 bar(g) | at | 280 °C |
| Vacuum: | FV bar(g) | at | 223 °C |
| Min. Metal Temp: | 9(NOTE20) °C | at | MAWP bar(g) |
| Liquid Level: | | Note 13 | mm |
| Specific Gravity of Liquid: | 0.684 | at | (NOTE12) °C |

OPERATING CONDITIONS

| | | | |
|-------------------------|----------------|----|------------|
| Pressure: | Note 19 bar(g) | at | Note 12 °C |
| Vacuum: | bar(g) | at | °C |
| Low Temperature: | °C | at | °C |
| Hydrogen Partial Press. | 0 bar(a) | at | °C |

INTERNALS & INSULATION

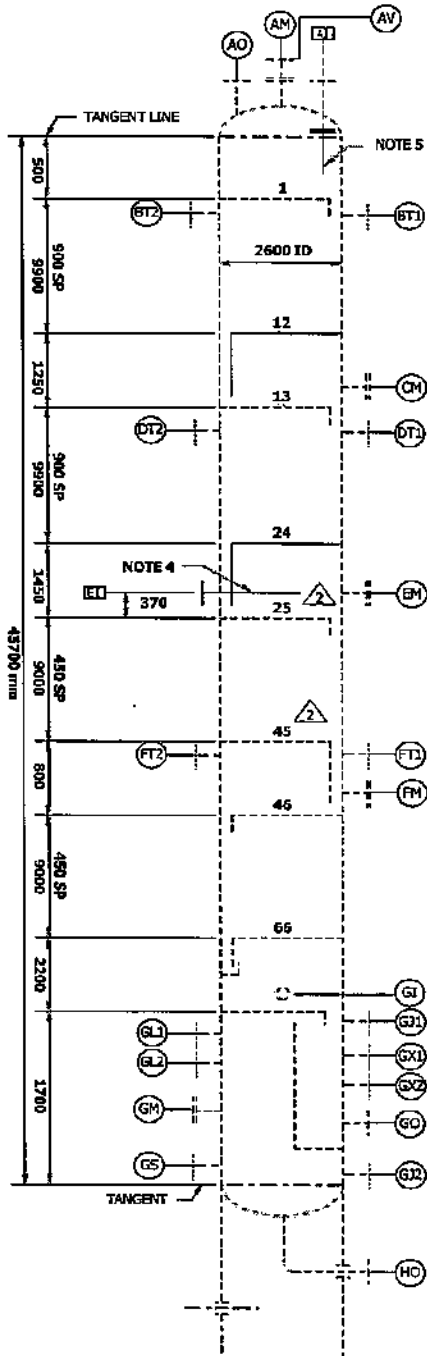
| DESCRIPTION | Bulk Density kg/m ³ | Liquid Holdup vol% | Pressure Drop bar(g) |
|------------------|-----------------------------------|--|-------------------------|
| Packing: | | | |
| Catalyst: | | | |
| Mist Eliminator: | | | |
| Insulation | Note 14 | Hot <input type="checkbox"/> Cold <input type="checkbox"/> | |
| Fire Proofing | 75 mm | Yes <input type="checkbox"/> No <input type="checkbox"/> | |

CONSTRUCTION

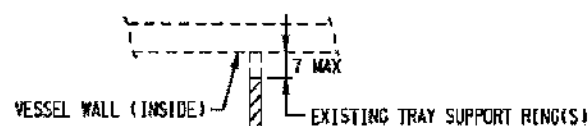
| | Materials | Corrosion Allowance |
|---------|------------------|---------------------|
| Shell: | SA-516-70N | 3 mm |
| Heads | SA-516-70N | 3 mm |
| Support | SA-516-70N / A36 | 1.6 mm |

SPECIAL CONDITIONS

| | |
|---------------------------------------|---|
| Stress Relieve (Process Reason Only): | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Vessel in Wet Sour Service: | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Steamout Required: | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |



DESIGN SKETCH (CONTINUED)



REMOVE EXISTING TRAY SUPPORT RING(S)
 (IF NOT UTILIZED FOR THE NEW SERVICE)

| | |
|---|---------|
| WEIGHTS ARE BASED ON THE VENDOR CERTIFIED | |
| DRAWING No. DA-7033-05-001 REV 3 (1997) | (kg) |
| EMPTY | |
| OPERATING | 184 500 |
| FULL OF WATER | 473 500 |
| THICKNESS ARE BASED ON THE VENDOR CERTIFIED | |
| DRAWING No. DA-7033-05-001 REV 3 (1997) | (mm) |
| TOP HEAD | 19 |
| SHELL | 13-20 |
| BTM HEAD | 20 |
| SKIRT | 20 |

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FLUOR.

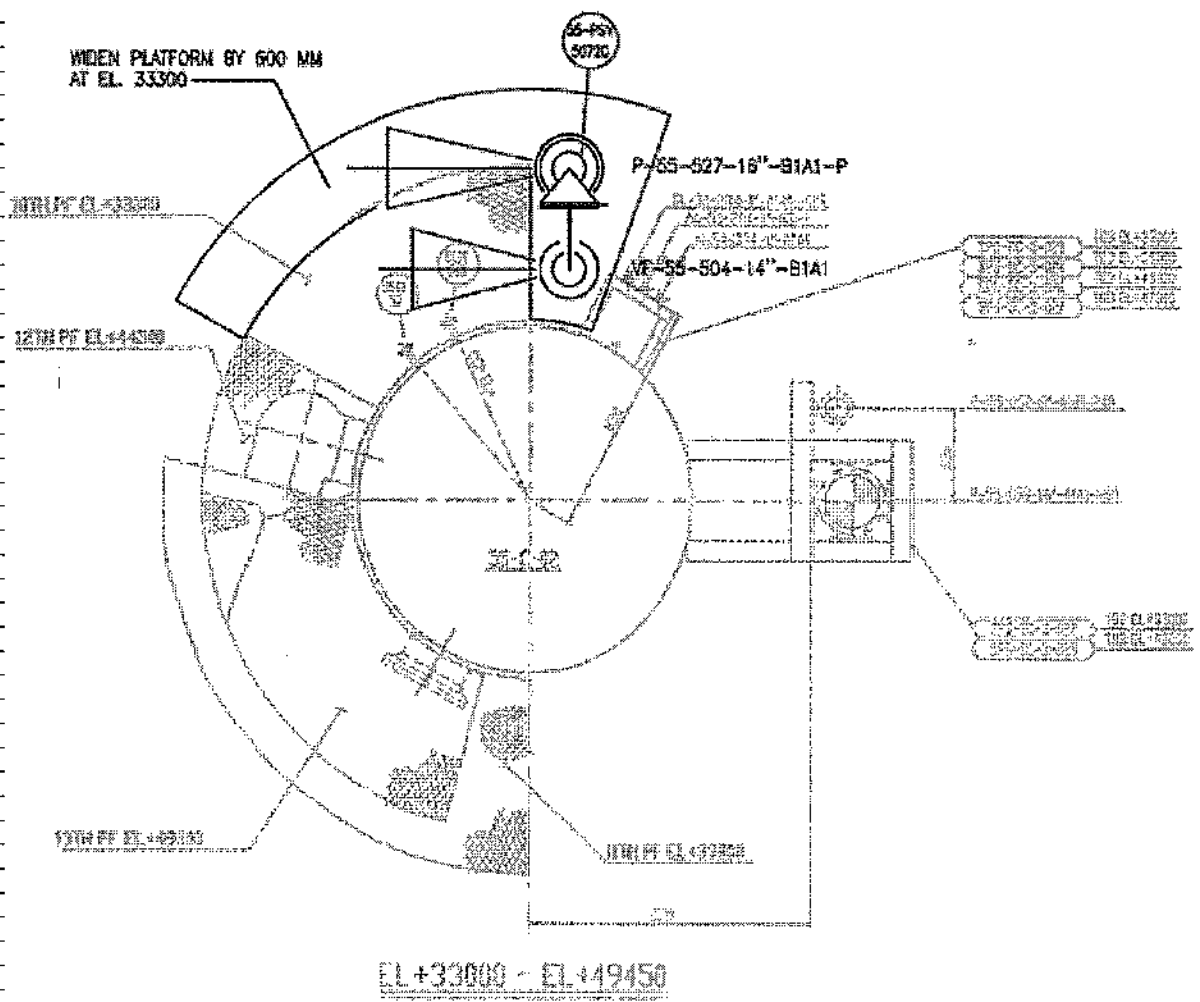
**VERTICAL VESSEL
DATASHEET**

Contract: 10E0541A01
Equip. No.: 65-C-02
Revision: 3
Unit: 55 - Xylene Fract
P.O. No.:
Document No.: DS-65-CA-502
Sheet: 3 of 3

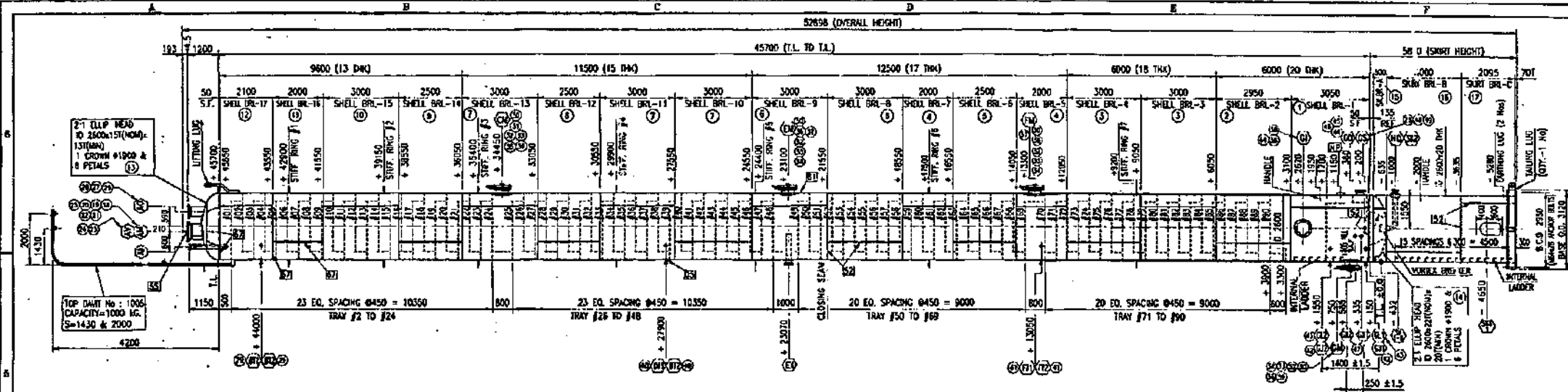
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PLATFORM SKETCH

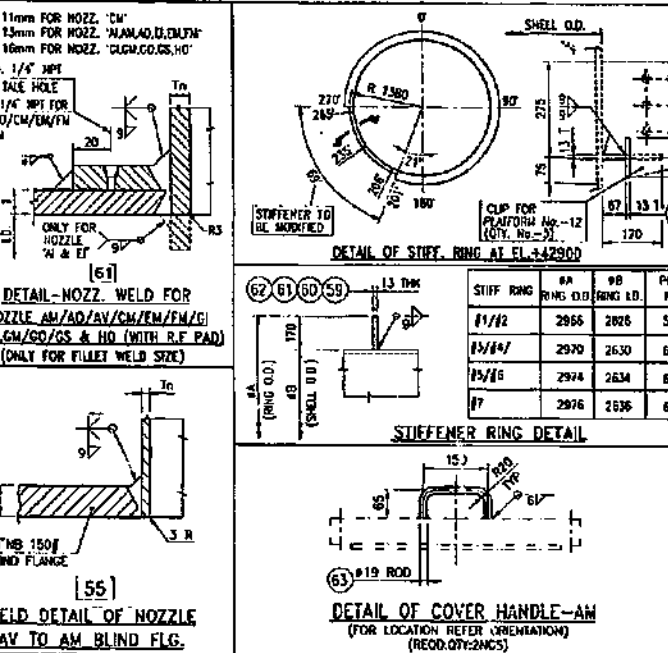
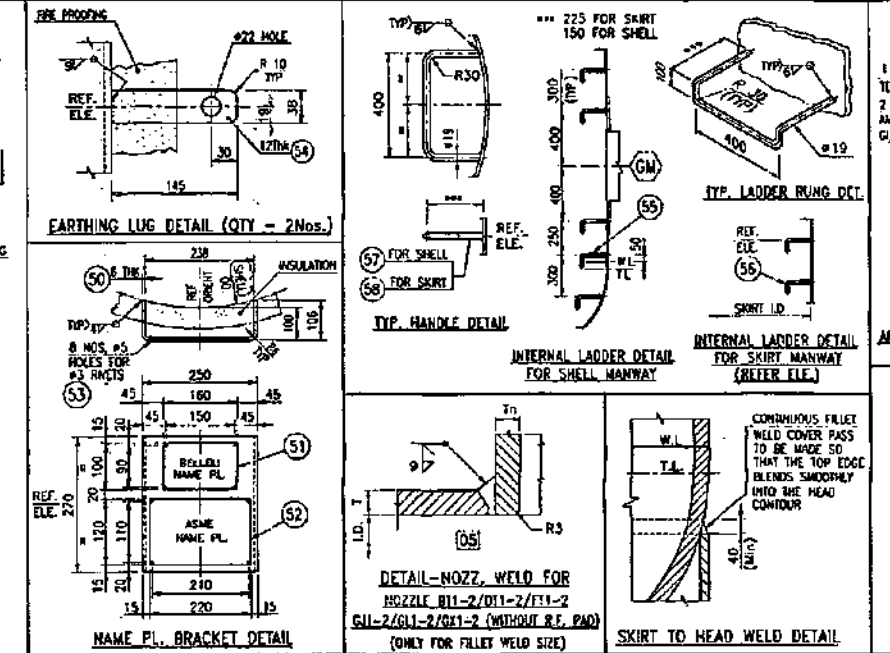
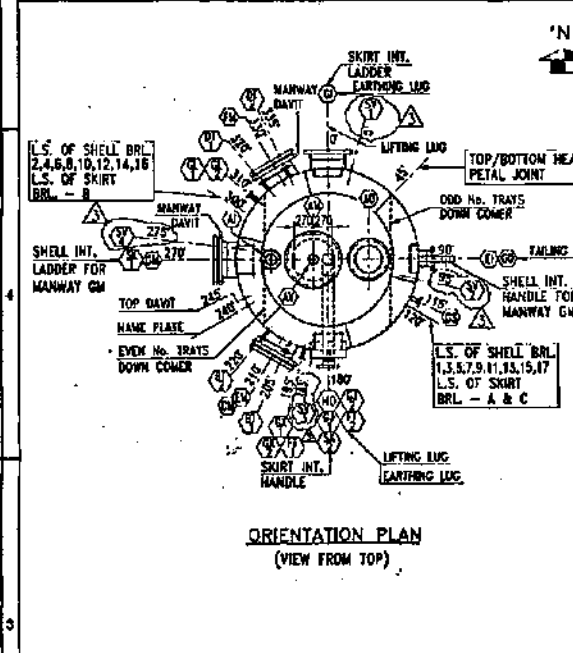
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REV



ELEVATION table listing dimensions and material specifications for the vessel's shell rings.



LIST OF MATERIAL table providing a comprehensive list of materials used in the vessel construction, including quantities and material codes.

BELELI REFERENCE DRAWINGS table listing various drawing titles and their corresponding drawing numbers.

NOZZLE SCHEDULE table listing nozzle specifications including nozzle number, size, service, and material.

DESIGN DATA table listing various design parameters and conditions such as design pressure, temperature, and material grades.

AS BUILT certification and project information section, including company logos, drawing title, and revision history.

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

HEAVY AROMATICS COLUMN RECEIVER DATA SHEET


DOCUMENT NO:

DS-55-DA-503

| | | | | | | | | | |
|-----|--------------------|-----|------|-------|-----------|------------------------|---|--|------------------|
| | | | | | | ابن رشيد ibn.rushid | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | | CTCI CORPORATION |
| | | | | | | CERTIFIED | | | |
| 2 | Revised as Marked | KWY | CBC | YSL | 11-Aug-11 | PROJ. | | | |
| 1 | Issued for Design | KWY | CBC | YSL | 26-Apr-11 | MGR _____ | | | DATE _____ |
| 0 | Issue For Approval | KWY | CBC | YSL | 9-Mar-11 | CLIENT _____ | | | DATE _____ |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | | | XC32B-55-503 |

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ابن رشد سابق
 salbia ibn rushd

 CTCI CORPORATION

HEAVY AROMATICS
 COLUMN RECEIVER
 DATA SHEET

XC32B-55-503

2 OF 2

DATE
 11-Aug.-2011

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 2

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| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 55-D-03 | 1 THRU 2 OF 2 | 2 | 11-Aug.-2011 |

Attachment total 2 pages

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ibn rushd

**HORIZONTAL VESSEL
DATA SHEET**

Contract: 10E0541A01
 Equip. No.: 55-D-03
 Revision : 2 Date: 11-Aug.-2011
 Unit : 55 - Xylene Fractionation
 P.O. No.:
 Document No. DS-55-DA-503
 Sheet 1 of 2

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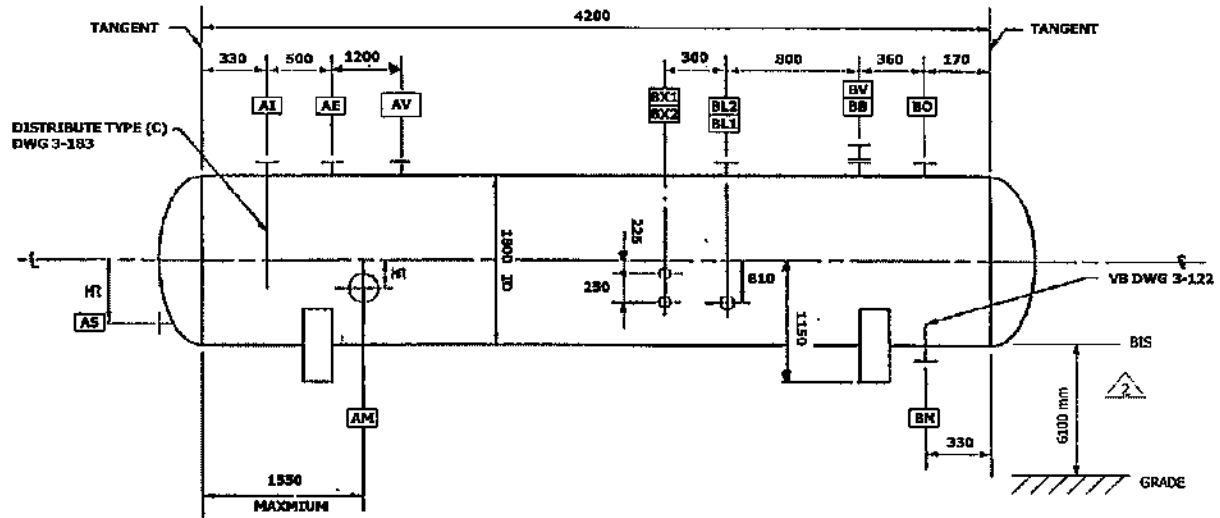
CTCI CORPORATION

REV

Client: Arabien Industrial Fibers Company (Ibn Rushd) Plant: Xylene Fractionation
 Service: Heavy Aromatic Column Receive Site: Yanbu, Kingdom of Saudi Arabia

DESIGN SKETCH

VESSEL DIMENSIONS: ID: 1800 FT: 4200



| DESIGN CONDITIONS | | | CONSTRUCTION | | |
|-----------------------------|----------|--------|----------------------------------|-----------------------|-------------------------|
| Pressure: | 3.79 | bar(g) | MATERIALS | | CORROSION ALLOWANCE |
| At: | 175 | °C | Shell: | SA-516-70 | 3 mm |
| Vacuum: | FV | bar(g) | Head: | SA-516-70 | 3 mm |
| At: | 145.0 | °C | | | |
| Min. Design Metal Temp: | 9(NOTE9) | °C | | | |
| At: | MAWP | bar(g) | | | |
| Liquid Level: | (Note4) | mm | INTERNALS | | |
| Specific Gravity of Liquid: | 0.739 | | DESCRIPTION | BULK DENSITY kg/m³ | LIQUID HOLDUP Vol. % |
| | | | | | ΔP bar |
| OPERATING CONDITIONS | | | Packing/Tray: | n/a | n/a |
| Pressure +: | 0.09 | bar(g) | Catalyst: | n/a | n/a |
| At: | 165 | °C | Mist Eliminator: | n/a | n/a |
| Vacuum -: | | bar(g) | | | |
| At: | | °C | NOTES & SPECIAL CONDITIONS | | |
| Low Temperature: | | °C | Stress Relieve (Process Reason): | | |
| At: | | bar(g) | Vessel In Special Service: | | |
| Hydrogen Partial Pressure: | | bar(g) | Steamout Required: | | |
| At: | | °C | | | |
| INSULATION | | | | | |
| Type: | HOT | | | | |
| Req'd Thickness: | 40 mm | | | | |
| Fireproofing: | NO | | | | |

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CLIENT : IBN RUSHD
 PROJECT : PTA & AROMATICS -
 TITLE : AROMATICS
 JOB NO. : 31046
 DOC. NO. : DS-55-D-003 (V 1)

| | | REVISIONS | | | |
|------|------------|------------|------------|------------|------------|
| MARK | | ① | ② | ③ | ④ |
| APRD | | | | | |
| CHKD | | | | | |
| MADE | | | | | |
| DATE | Mar 28 '96 | Apr 29 '96 | May 29 '96 | Oct 28 '96 | Feb 03 '97 |

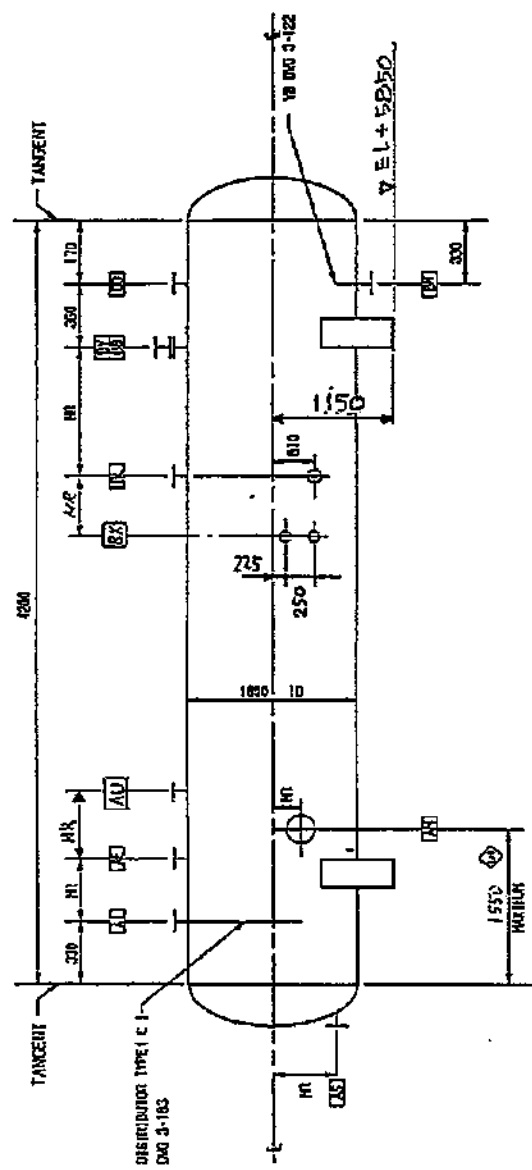
| | | | | | | |
|---|--------------------------|---------|----|-------|-----|------|
| uop 25 East Algonquin Road • PO Box 5017 • Oak Park, Illinois 60177-5017 • U.S.A. | PROJECT SPECIFICATION | | | | | |
| | 560893 - 301 - / SHEET 6 | | | | | |
| VESSELS | REV | DATE | BY | APP'D | REV | DATE |
| | 0 | 5-11-95 | | | | |
| | 1 | 1-24-95 | MR | AKA | | |

SERVICE ORTHOXYLENE COLUMN RECEIVER

ITEM NO ~~550~~ 59-0-03

| | | |
|--|--|-------------|
| Design | INT 3.79 BAR (g) | ① 175°C |
| Conditions | EXT FULL VACUUM | ① 145°C |
| at Top | Wet Temperature (Min) | ① 8°C |
| Operating | | 145°C |
| Conditions | | °C |
| Radiograph | NR | |
| Postweld Heat Treat | NR | |
| Joint Efficiency | NR | |
| Material Specifications | | |
| Heads | SA 516-70 | |
| Shell | SA 516-70 | |
| Shell | Thickness & Corrosion Required by Allowance Code-mm. | mm. (Min) |
| | | 3 |
| Heads | | 3 |
| Vessel Heads | | |
| Vessel | 2:1 ELLIPTICAL | |
| Drop Leg | | |
| Accessories Applied by Fabricator | | |
| Ladder & Platform Clibs | BY CONTRACTOR | |
| Insulation Clips & Rings | YES | |
| Vessel Support | YES | |
| Nozzles and Manways | | |
| Mark No | Size Inches | Service |
| AR 1 | 2 | RECTALIZING |
| AI 1 | 8 | INLET |
| AM 1 | 2.0 | MANWAY |
| AS 1 | 2 | STEAM/OUT |
| BS 1 | 6 | VENTILATION |
| BL 2 | 1 1/2 | LC/LG |
| BN 1 | 8 | OUTLET |
| BO 1 | 2 | GAS IN/OUT |
| BY 1 | 2 | VENT |
| BX 2 | 1 | LLS |
| AU 1 | 4 IN | RELIEF |
| Class - ANSI CL150 | | |
| Facing - RAISED FACE | | |
| Normal Liquid Level - VESSEL CENTER LINE | | |
| Specific Gravity = 0.767 | | |

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Drawings Referred to in this Specification

| | | | | |
|---------|---------|---------|--|--|
| 3-122-0 | 3-103-0 | 3-317-1 | | |
|---------|---------|---------|--|--|

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01


DOCUMENT TITLE:

TOLUENE/A9+ SURGE TANK DATA SHEET

DOCUMENT NO:

DS-55-DA-507

GN-502 84.10

| | | | | | | | | |
|-----|--------------------|-----|------|-------|-----------|------------------------|---|---|
| | | | | | | ابن رشيد ibn.rushid | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA |  CTCI CORPORATION |
| 3 | Revised as Mareked | KWY | CBC | YSL | 09-Aug-11 | CERTIFIED | | |
| 2 | Revised as Mareked | KWY | CBC | YSL | 22-Apr-11 | PROJ. | | |
| 1 | Issued for Design | KWY | CBC | YSL | 22-Apr-11 | MGR | DATE | |
| 0 | Issue For Approval | KWY | CBC | YSL | 23-Mar-11 | CLIENT | DATE | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | XC32B-55-507 | |

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GN-504 84.10

ابن رشد سابق
 abia ibn rushd



TOLUENE/A9+ SURGE TANK
 DATA SHEET

XC32B-55-507

2 OF 2

DATE
 27-Oct.-2011
 REV.
 3

CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 55-D-07A/B | 1 THRU 2 OF 2 | 3 | 27-Oct.-2011 |

Attachment total 4 page

ابن رشيد
ibn rushid

STORAGE TANK DATA SHEET

Contract: 10E0541A01
Equip. No.: 55-D-07 A/B
Revision: 3 Date: 27-Oct.-2011
Unit: 55 - Xylene Fractionation
P.O. No.:
Document No. DS-55-DA-507
Sheet 1 of 2

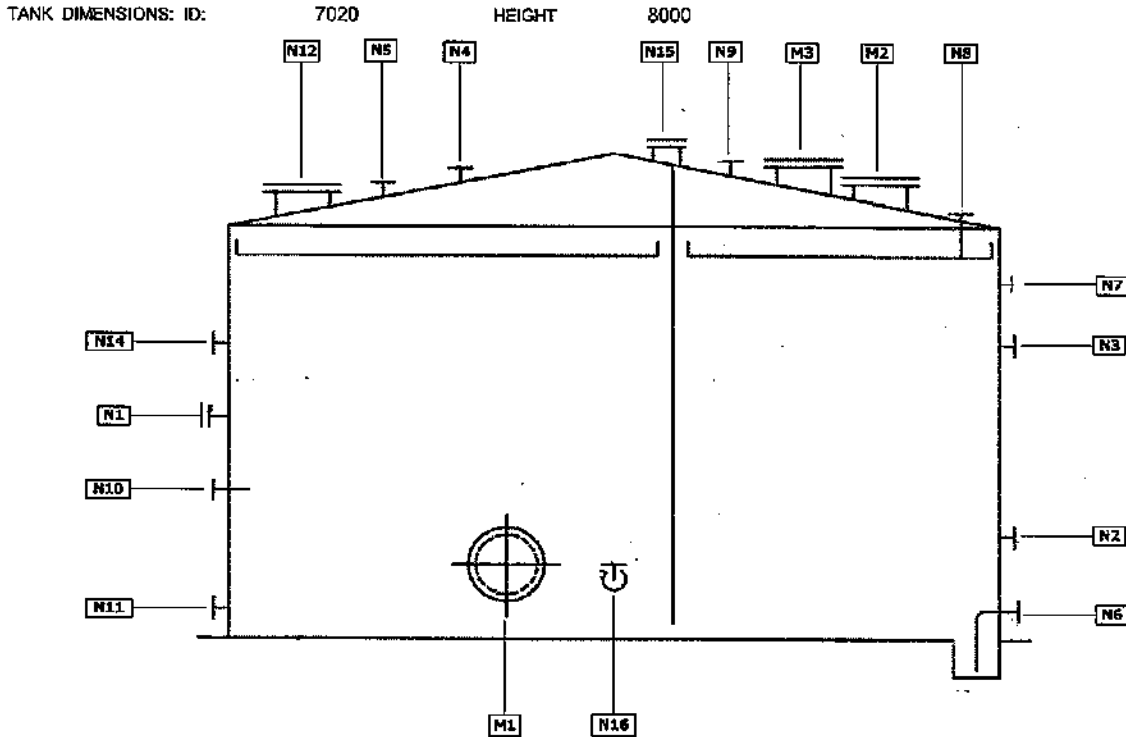


CTCI CORPORATION

REV

Client: Arabian Industrial Fibers Company (Ibn Rushid) Plant: Xylene Fractionation
Service: TOLUENE/A9+ SURGE TANK Site: Yanbu, Kingdom of Saudi Arabia

DESIGN SKETCH



| DESIGN CONDITIONS | | | CONSTRUCTION | | |
|-----------------------------|---------------|----------|---------------------------------------|---------------------------------|---------------------|
| Pressure: | 254 | mmH2O(g) | MATERIALS | | CORROSION ALLOWANCE |
| At: | 85 | °C | Shell: | A36 | 1.5 mm |
| Vacuum: | 100 | mmH2O(g) | Roof: | A36 | NONE mm |
| At: | | °C | Structure: | A307-B | NONE mm |
| Min. Design Metal Temp: | 10.6(NOTE 11) | °C | Bottom: | A36 | 1.5 mm |
| At: | | mmH2O(g) | | | |
| Liquid Level: | (NOTE9) | mm | | | |
| Specific Gravity of Liquid: | 0.873 | | | | |
| At: | 15.0 | °C | | | |
| OPERATING CONDITIONS | | | NOTES & SPECIAL CONDITIONS | | |
| Fluid: | Toluene/A9+ | | Roof Type: | Cone and Internal Floating Roof | |
| Pressure +: | 12.7(NOTE6) | mmH2O(g) | Stress Relieve (Process Reason Only): | Yes | |
| At: | 44 | °C | Earthquake Design: | | |
| Vacuum -: | | mmH2O(g) | Seismic Zone: | API 650 APP. E ZONE 1 | |
| At: | | °C | Roof Tie Rods: | | |
| Low Temperature: | | °C | Essential Facilities Factor: | | |
| At: | | mmH2O(g) | Site Amplification Factor: | | |
| Hydrogen Partial Pressure: | | mmH2O(g) | Zone Coefficient: | | |
| At: | | °C | | | |
| INSULATION | | | | | |
| Type: | N/A | | | | |
| Req'd Thickness: | N/A | | | | |
| Fireproofing: | | | | | |

1

1

1

1

ابن رشد
ibn rushd

STORAGE TANK
DATA SHEET

Contract: 10E0541A01
Equip. No.: 55-D-07 A/B
Revision : 3 Date: 27-Oct.-2011
Unit : 55 -Xylene Fractionation
P.O. No. :
Document No. DS-55-DA-507
Sheet : 2 of 2



CTCI CORPORATION REV

NOZZLE SCHEDULE

| TAG | QTY | SIZE In | PRESSURE RATING | DESCRIPTION | REV |
|-----|-----|------------|--------------------|--------------------------------------|-----|
| M1 | 1 | 24 | EXISTING | SHELL MANHOLE | |
| M2 | 1 | 24 | EXISTING | ROOF MANHOLE | |
| M3 | 1 | 36 | EXISTING | ROFF MANHOLE | |
| N1 | 1 | 2 | EXISTING | SPARE NOZZLE (NOTE4) | |
| N2 | 1 | 6 | EXISTING | SUCTION NOZZLE | |
| N3 | 1 | 1 | EXISTING | TEMPERATURE INDICATOR | |
| N4 | 1 | 1 | EXISTING | GAS BLANKETING NOZZLE | |
| N5 | 1 | 2 | EXISTING | GAS BLANKETING NOZZLE | |
| N6 | 1 | 4 | EXISTING | DRAIN NOZZLE W/SUMP | |
| N8 | 1 | 1 1/2 | EXISTING | LEVEL INDICATOR | |
| N9 | 1 | 4 | EXISTING | PRESSURE VACUUM VENT | |
| N10 | 1 | 4 | EXISTING | JET MIXER | |
| N11 | 1 | 4 | EXISTING | SPILLBACK NOZZLE | |
| N12 | 1 | 20 | EXISTING | EMERGENCY VENT | |
| N14 | 1 | 4 | EXISTING | FILLING ZOZZLE (NOTE5) | |
| N15 | 1 | 8 | EXISTING | GAUGE HATCH W/8" SLOT DIPPING DEVICE | |
| N16 | 1 | 1 | EXISTING | LI & TI NOZZLE | |
| N7 | 2 | 2 1/2 | EXISTING | FOAM CHAMBER | 1 |

NOTES:

- Formerly Orthoxylene Tank, 55-D-07A/B.
- Dimensions are in millimeter unless otherwise noted.
- Following UOP data sheet 951610-308.
- Existing filling nozzle to be re-used as spare nozzle.
- Existing spare nozzle to be re-used as filling nozzle.
- Tank contents : true vapor pressure 0.04848 bar(a) at 38 °C , Flashing Point 4.4 °C.
- Pump In Rate = 35.4 (m3/h) & Pump Out Rate = 35.4 (m3/h).
- Deleted
- HLL : 7200 mm, HLL : 6400 mm, LLLL : 1000 mm, LLL : 1600 mm
- Deleted
- The min. design ambient temperature should be 6 degree C.
- Nominal capacity : 310 m3 Working capacity : 240 m3
- Existing design condition : 254 mmH2O(g) at 85 deg. C. New design condition : same as existing condition.

2
1
3
1
1
3
1



A Honeywell Company

UOP LLC • 25 East Algonquin Road • Des Plaines, Illinois 60017-5017 USA

ATMOSPHERIC STORAGE TANKS

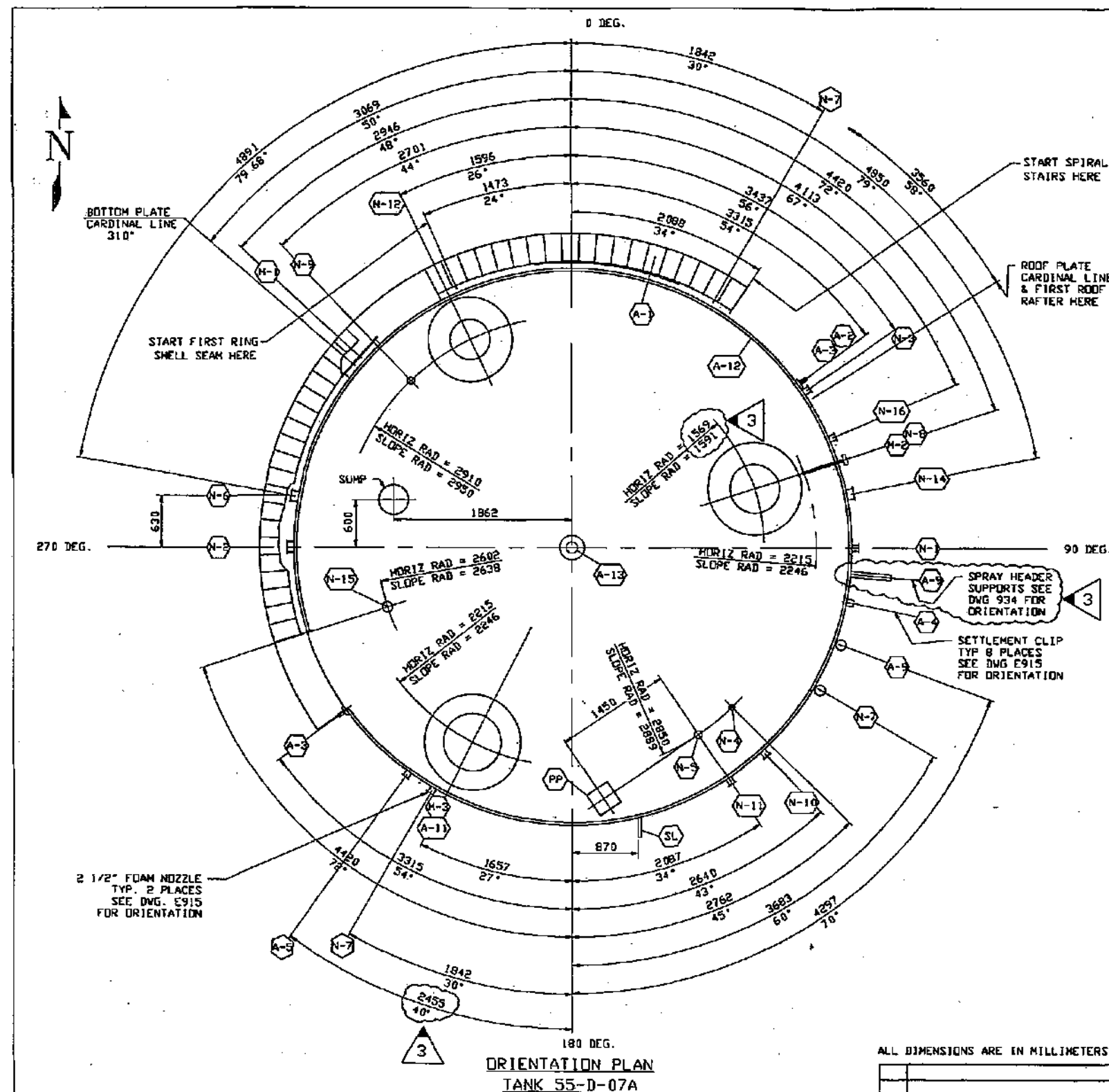
PROJECT SPECIFICATION

951610 - 306 SHEET 2

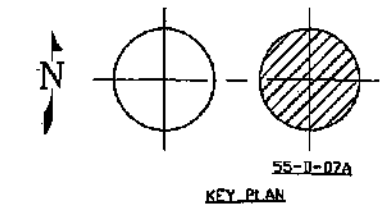
| REV | DATE | BY | APVD | REV | DATE | BY | APVD |
|-----|-----------|-----|------|-----|------|----|------|
| 0 | 10-Jul-09 | PSK | MEH | | | | |
| | | | | | | | |
| | | | | | | | |

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| REV | | | |
|--|----------------------------------|----------------------------------|--------------|
| Tank Name | | Toluene And A9/A10 Surge Tank | |
| Item Number | | 55-D-08A/B (Formerly 55-D-07A/B) | |
| Number of Tanks | | 2 | |
| Tank Size | Nominal Capacity | As Existing | |
| | Diameter, ID | As Existing | |
| | Height | As Existing | |
| Working Capacity | | As Existing | |
| Design Internal Pressure, pressure above atmospheric | | As Existing | |
| Design External Pressure, pressure below atmospheric | | As Existing | |
| Design Temperature | | As Existing | |
| Minimum Design Metal Temperature | | As Existing | |
| Material of Construction | | As Existing | |
| Roof Type | | Internal Floating Roof | |
| Tank Contents | Material Stored | Toluene & A9/A10 Hydrocarbon | |
| | True Vapor Pressure | .04848 bar [a] @ 38 °C | |
| | Flash Point | 4.4 °C | |
| | Specific Gravity @ 60 °F (15 °C) | 0.873 | |
| Storage Temperature | | 44 °C | |
| Tank Mixer Type | | Jet Mixer (see page 5) | |
| Return Nozzle | | As Existing | |
| Sample Connection Nozzle | | Not Required | |
| Caustic Filling Nozzle | | Not Required | |
| Filling Nozzle | | As Existing | |
| Suction Nozzle | | As Existing | |
| Temperature Indicator Nozzle | | As Existing | |
| Gauging Hatch Connection | | As Existing | |
| Pressure / Vacuum Vent Nozzles | | As Existing | |
| Level Indicator Nozzles | | As Existing | |
| Drain Valve Nozzles | | As Existing | |
| Overflow Nozzle | | Not Required | |
| LP Steam/Condensate Nozzle (for tank heater) | | Not Required | Not Required |
| Gauge Nozzle | | Not Required | |
| Sensing Probe Nozzle (for nitrogen blanketing) | | As Existing | |
| Blanketing Pipe Nozzle (for nitrogen blanketing) | | As Existing | |
| Air Nozzle | | Not Required | |
| Pumpout Nozzle | | As Existing | |
| Filling Rate / Pumpout Rate | | 28.0 m³/h | 28.0 m³/h |
| Shell Manway(s) Size, ID | | As Existing | |
| Notes - See Sheet 4 | | 5,6,22,26 | |



ORIENTATION PLAN
TANK 55-D-07A



| ACCESSORIES LIST | | | | | |
|------------------|-----------|-----------|---|-----------|------------|
| CUST. MARK | PDM MARK | NO. REQ'D | DESCRIPTION | ELEVATION | PROJECTION |
| M-1 | 914-1 | 1 | 24" SHELL MANHOLE | 762 | 127 |
| M-2 | 928-1 | 1 | 24" ROOF MANHOLE | ROOF | 209 |
| M-3 | 926-1 | 1 | 36" ROOF MANHOLE | ROOF | 208 |
| N-1 | 917-2 | 1 | 2" FILLING NOZZLE | 178 | 152 |
| N-2 | 917-3 | 1 | 6" SUCTION NOZZLE | 279 | 203 |
| N-3 | 917-1 | 1 | 1" TEMPERATURE INDICATOR | 600 | 152 |
| N-4 | 912-2 | 1 | 1" GAS BLANKETING NOZZLE | ROOF | 152 |
| N-5 | 912-3 | 1 | 2" GAS BLANKETING NOZZLE | ROOF | 152 |
| N-6 | 916-2 | 1 | 4" DRAIN NOZZLE W/SUMP | 229 | 178 |
| N-7 | 933-1 | 2 | 2 1/2" FOAM CHAMBER | 7840 | 152 |
| N-8 | 98904-12 | 1 | 1 1/2" LEVEL INDICATOR | ROOF | 25 |
| N-9 | 923-2 | 1 | 4" PRESSURE/VACUUM VENT | ROOF | 152 |
| N-10 | 917-5 | 1 | 4" JET MIXER | 229 | 178 |
| N-11 | 917-4 | 1 | 4" SPILLBACK NOZZLE | 229 | 178 |
| N-12 | 923-1 | 1 | 20" EMERGENCY VENT | ROOF | 195 |
| N-14 | 917-4 | 1 | 4" SPARE NOZZLE | 229 | 178 |
| N-15 | 913-9 | 1 | 8" GAUGE HATCH W/6" SLOT DIPPING DEVICE | ROOF | X |
| N-16 | 917-1 | 1 | 1" LI & TI NOZZLE | 700 | 152 |
| A-1 | 919-1 | 1 | SPIRAL STAIRWAY | SHELL | ---- |
| A-2 | 915-1 | 1 | NAMEPLATE | SHELL | ---- |
| A-3 | 918-2 | 2 | EARTH LUG | SHELL | ---- |
| A-4 | 918-3 | 8 | SETTLEMENT CLIP | SHELL | ---- |
| A-5 | 918-1 | 1 | CATHODIC PROTECTION LUG | SHELL | ---- |
| A-6 | 920-1 | 10 | ELECTRICAL CABLE SUPPORT | SHELL | ---- |
| A-7 | DWG F901 | 15 | ANCHOR BOLT | SHELL | ---- |
| A-8 | X | 1 | INSTRUMENT CONDUIT SUPPORT | SHELL | ---- |
| A-9 | SUB CONTR | 1 | WATER SPRAY SYSTEM | SHELL | ---- |
| A-11 | 925-1 | 1 | INNER LADDER (ANTI-ROTATION DEVICE) | SHELL | ---- |
| A-12 | 925-1 | 1 | PERIMETER HANDRAIL | ROOF | ---- |
| A-13 | 912-1 | 1 | SCAFFOLD CABLE SUPPORT | ROOF | 152 |
| PP | 932-2 | 1 | PAD PLATE | ROOF | ---- |
| SL | 932-1/R | 1 | SUPPORT LUG | SHELL | ---- |

NOTES: ELEVATIONS GIVEN ARE FROM THE TOP OF THE BOTTOM PLATE AT THE SHELL TO CENTERLINE OF FITTING. PROJECTIONS GIVEN ARE FROM OUTSIDE FACE OF SHELL OR ROOF TO FACE OF FITTINGS.

ARC LENGTHS MEASURED ON OUTSIDE SURFACE OF SHELL. RING 1. RADIUS = 3517

| DEGREES | ARC LENGTH |
|---------|------------|
| 180 | 11047 |
| 90 | 5523 |
| 10 | 614 |
| 1 | 61 |

ALL DIMENSIONS ARE IN MILLIMETERS.

| NO | REVISION DESCRIPTION | BY | DATE | CHK | DATE |
|----|---|-----|----------|-----|---------|
| 3 | REVISED TO "AS BUILT" | RK | 20SEPT97 | HJ | 18OCT97 |
| 2 | ADD A-4, A-5 & N-7 MK, A-6 QUAN. & REV. RAFTER LOC. | RAS | 01MAY97 | AJH | 01MAY97 |
| 1 | ELEV. OF N-16 DELETE 1 VENT, ADD PDM MKS. TO LIST, ADD FOAM CHAMBER SIZE & QUANTITY, ADD CARDINAL LINES, ADD C.P. LUG A-5 | ARF | 01APR97 | AJH | 01APR97 |

OPEN HOLES: N/A
ERECTOR REF: N/A
WELD SPECS: API 650
CIS: N/A

CERTIFIED FOR CONFORMANCE TO PLANS AND SPECIFICATIONS
BY: _____
DATE: _____

IBN RUSHO PTA & AROMATICS PROJECT - AROMATICS ORTHOXYLENE TANKS 55-D-07A & B

PDM Saudi Arabia
DESIGNERS - FABRICATORS - CONTRACTORS

IBN RUSHO PTA
(2) 7.02 m DIA X 8 m FBSSCRIFR
YANBU, SAUDI ARABIA

ORIENTATION PLAN
DWG. PREPARED AT PJT
BY: RRS DATE: 25NOV96
CHECKED: AJH DATE: 07FEB97

FABRICATED AT YANBU
DRAWING E901AD
CONTRACT 76319-9

MATERIAL SPECIFICATIONS

| | | |
|---------------------|---|--|
| PLATE | | |
| BOTTOM | - | A36 |
| ANNULAR RING | - | N/A |
| SHELL | - | A36 |
| ROOF | - | A36 |
| DECK | - | A36 |
| MISC PLATE | - | TYPE 304 SS |
| SHAPES | - | A36 (OR EQUAL) |
| COL. PIPE | - | N/A |
| PIPE | - | A53-B, A106-B, API 5L-B (OR EQUAL) |
| FLANGES | - | A105 |
| FITTINGS | - | A234-WPB |
| BOLTING | | |
| PIPING | - | A307-B |
| STRUCTURAL | - | A307-B |
| GASKETS | - | NON-ASBESTOS COMPRESSED SHEET NITRILE BINDER |
| FLOATING ROOF SEAL | - | VITON (BY SEAL SUPPLIER) |
| AND SPECIAL GASKETS | | |

DESIGN SPECIFICATIONS

| | | |
|-------------------------------|---|-----------------------------|
| DESIGN SPECIFIC GRAVITY | - | 0.883 |
| DESIGN LIQUID LEVEL | - | 6770 mm |
| DESIGN PRESSURE | - | 254 mm VC |
| DESIGN VACUUM | - | 100 mm VC (100 kg/sq.m) |
| DESIGN METAL TEMPERATURE | - | +10.6 DEG. C |
| MAXIMUM OPERATING TEMPERATURE | - | +85 DEG. C |
| WIND | - | ASCE 7-93 (34.7 m/s EXP. C) |
| SEISMIC | - | API 650 APP. E ZONE 1 |
| CORROSION ALLOWANCE : | | |
| ROOF | - | NONE |
| SHELL | - | 1.5 mm |
| BOTTOM | - | 1.5 mm |
| FRAMING | - | N/A |

DECK

| | | |
|---------------------------|---|----------------|
| CONTENTS SPECIFIC GRAVITY | - | 0.883 |
| DESIGN SPECIFIC GRAVITY | - | 0.70 - 1.00 |
| DECK DISP. @ 0.70 SP. GR. | - | 305 mm |
| DECK DISP. @ 1.00 SP. GR. | - | 210 mm |
| RIM SPACE | - | 200 mm NOMINAL |
| CORROSION ALLOWANCE : | | |
| DECK PL | - | NONE |
| OUTER RIM | - | NONE |
| INNER RIM | - | N/A |
| COMPARTMENT PL | - | N/A |
| COVER PL | - | N/A |

DRAWING LIST

| CPL IDENT NO. | DRAWING | DESCRIPTION | CPL IDENT NO. | DRAWING | DESCRIPTION |
|-------------------|---------|---|-------------------|---------|--------------------------------|
| 55-D-07AB-DW 0002 | F901AB | ANCHOR SETTING PLAN -TANK No. 55-D-07A | 55-D-07AB-DW 0028 | 911 | ROOF EMERGENCY DRAIN |
| 55-D-07AB-DW 0046 | F901B | ANCHOR SETTING PLAN -TANK No. 55-D-07A- | 55-D-07AB-DW 0029 | 912 | ROOF NOZZLES |
| 55-D-07AB-DW 0052 | F901AB | FOUNDATION ELEVATION | 55-D-07AB-DW 0030 | 913 | SIX INCH GAUGE HATCH |
| 55-D-07AB-DW 0053 | F901B | FOUNDATION ELEVATION | 55-D-07AB-DW 0031 | 914 | TWENTY FOUR INCH SHELL MANHOLE |
| 55-D-07AB-DW 0050 | G901 | DRAWING LIST | 55-D-07AB-DW 0032 | 915 | API 650 NAMEPLATE |
| 55-D-07AB-DW 0001 | G902 | GENERAL NOTES | 55-D-07AB-DW 0033 | 916 | SHELL NOZZLES |
| 55-D-07AB-DW 0003 | E901AB | ORIENTATION PLAN | 55-D-07AB-DW 0034 | 917 | SHELL NOZZLES |
| 55-D-07AB-DW 0004 | E901BD | DECK ORIENTATION PLAN | 55-D-07AB-DW 0035 | 918 | MISC. SHELL ATTACHMENTS |
| 55-D-07AB-DW 0048 | E901CB | ORIENTATION PLAN | 55-D-07AB-DW 0036 | 919 | SPIRAL STAIRCASE |
| 55-D-07AB-DW 0049 | E901D | DECK ORIENTATION PLAN | 55-D-07AB-DW 0037 | 920 | ELECTRICAL BRACKETS |
| 55-D-07AB-DW 0005 | E902 | SHELL ELEVATION | 55-D-07AB-DW 0038 | 921 | TOP PLATFORM |
| 55-D-07AB-DW 0006 | E903 | BOTTOM PLATE LAYOUT | 55-D-07AB-DW 0039 | 922 | HANDRAILS |
| 55-D-07AB-DW 0007 | E904 | SPIRAL STAIRCASE | 55-D-07AB-DW 0040 | 923 | ROOF VENT / EMERGENCY VENT |
| 55-D-07AB-DW 0008 | E905 | DECK PLATE LAYOUT | 55-D-07AB-DW 0041 | 924 | LADDER WELL |
| 55-D-07AB-DW 0009 | E906 | PONTON PLAN | 55-D-07AB-DW 0042 | 925 | INNER LADDER |
| 55-D-07AB-DW 0010 | E907AC | FOAM DAM | 55-D-07AB-DW 0043 | 926 | THIRTY SIX INCH ROOF MANHOLE |
| 55-D-07AB-DW 0011 | E907BC | SUPPORT LEG ELEVATION | 55-D-07AB-DW 0044 | 927 | LEVEL INDICATOR |
| 55-D-07AB-DW 0057 | E907C | FOAM DAM | 55-D-07AB-DW 0045 | 928 | TWENTY FOUR INCH ROOF MANHOLE |
| 55-D-07AB-DW 0012 | E908 | INNER LADDER | 55-D-07AB-DW 0051 | 929 | DECK GROUND CABLE |
| 55-D-07AB-DW 0013 | E909 | SPIRAL STAIRCASE | 55-D-07AB-DW 0056 | 930 | FLOAT WELL |
| 55-D-07AB-DW 0014 | E910 | HANDRAIL | 55-D-07AB-DW 0058 | 931 | INTERMEDIATE PLATFORM |
| 55-D-07AB-DW 0015 | E911 | SPIRAL STAIRCASE | 55-D-07AB-DW 0059 | 932 | PIPE SUPPORTS |
| 55-D-07AB-DW 0016 | E912 | ROOF SEAL | 55-D-07AB-DW 0061 | 933 | FOAM NOZZLE DETAILS |
| 55-D-07AB-DW 0017 | E913 | PIPE CONNECTIONS | 55-D-07AB-DW 0062 | 934 | WATER SPRAY SYSTEM SUPPORTS |
| 55-D-07AB-DW 0047 | E914 | TWENTY FOUR INCH SHELL MANHOLE | 55-D-07AB-DW 0063 | 935 | ROOF HANDRAIL |
| 55-D-07AB-DW 0060 | E915 | FOAM NOZZLE & SETTLEMENT CLIP ORIENTATION | | | |
| 55-D-07AB-DW 0054 | W0901AB | WELD QUALITY CONTROL - API 650 | | | |
| 55-D-07AB-DW 0055 | W0901B | WELD QUALITY CONTROL - API 650 | | | |
| 55-D-07AB-DW 0018 | 901 | BOTTOM DETAILS | | | |
| 55-D-07AB-DW 0019 | 902 | SHELL PLATE, RIM GIRDER & ANCHOR CHAIRS | | | |
| 55-D-07AB-DW 0020 | 903 | ROOF DETAILS | | | |
| 55-D-07AB-DW 0021 | 904 | DECK PLATES | | | |
| 55-D-07AB-DW 0022 | 905 | DECK RIM PLATES | | | |
| 55-D-07AB-DW 0023 | 906 | DECK | | | |
| 55-D-07AB-DW 0024 | 907 | DECK SUPPORT LEGS | | | |
| 55-D-07AB-DW 0025 | 908 | DECK BLEEDER VENT | | | |
| 55-D-07AB-DW 0026 | 909 | DECK MANHOLE | | | |
| 55-D-07AB-DW 0027 | 910 | TWENTY INCH INSPECTION HATCH | | | |



| | | | | | | |
|---|---------|----------------------|-----|---------|-----|---------|
| OPEN HOLES | N/A | | | | | |
| ERECTION REF. | N/A | | | | | |
| WELD SPECS. | API 650 | | | | | |
| ES- | N/A | | | | | |
| CERTIFIED FOR CONFORMANCE TO PLANS AND SPECIFICATIONS | | | | | | |
| BY | 2 | ISSUED "AS BUILT" | RK | 20SEP97 | NJ | 20OCT97 |
| | 1 | REVISE DRAWING LIST | ARF | 31MAR97 | AJM | 31MAR97 |
| DATE | NO | REVISION DESCRIPTION | BY | DATE | CHK | DATE |



| | | | |
|---|----------|---------------|---------|
| | | | |
| JOB NO. 54001 IBN RUSHD AROMATICS PROJECT | | | |
| PD NO. 54001 T009 | | | |
| RED NO. SC-90-0-003 | | | |
| IDENT NO. 55-D-07AB-DW 0050 | | | |
| NO CORRECTS PROCESSED WITH FABRICATION | SAY TEAM | | |
| NO CORRECTS PROCESSED WITH FABRICATION | DATE | | |
| PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER | | | |
| IBN RUSHD PTA & AROMATICS PROJECT - AROMATICS ORTHOXYLENE TANKS 55-D-07A & B | | | |
| PDM Saudi Arabia ENGINEERS - FABRICATORS - CONTRACTORS | | | |
| IBN RUSHD PTA | | | |
| (Ø) 7.02 m DIA X 8 m FBSSCRIFR | | | |
| YANBU, SAUDI ARABIA | | | |
| DRAWING LIST | | | |
| DWG. PREPARED AT | PIT | FABRICATED AT | YANBU |
| BY | DATE | | |
| DRAWN: AMW | 12FEB97 | DRAWING | G901 |
| CHECKED: RHL | 13FEB97 | CONTRACT | 76519-9 |

GENERAL NOTES

THE STORAGE TANK, MATERIALS, DESIGN, FABRICATION AND ERECTION ARE IN COMPLIANCE WITH THE CUSTOMER'S SPECIFICATIONS AND API 650 9TH EDITION, INCLUDING APPENDIX A, E, F AND H.

1. GENERAL INFORMATION
 - A. FOUNDATION
 1. DESIGNED BY : OTHERS
 2. CONSTRUCTED BY : OTHERS
 - B. STORAGE TANK
 1. DESIGNED BY : PITT-DES MOINES, INC.
 2. FABRICATED AND ERECTED BY : PDM SAUDI ARABIA
 - C. COATINGS
 1. PAINTING SHALL BE PER PAINTING INSTRUCTIONS (P-1).
 2. GALVANIZE PER ASTM A123 REQUIREMENTS.
2. FOUNDATIONS
 - A. WHERE RINGWALLS ARE PROVIDED UNDER THE TANK SHELL, THE TOP OF THE RINGWALL SHALL BE SMOOTH AND LEVEL WITHIN ±3 mm OF ANY 9144 mm OF CIRCUMFERENTIAL LENGTH. NO POINT ON THE CIRCUMFERENCE OF THE RINGWALL SHALL VARY MORE THAN ±6 mm FROM THE ESTABLISHED ELEVATION.
 - B. RECESSES IN THE FOUNDATION SHALL BE PROVIDED FOR FLUSH TYPE CLEANDUTS, DRAIN-OFF SUMPS, ETC.
 - C. WHERE RINGWALLS ARE NOT PROVIDED, THE FOUNDATION UNDER THE TANK SHELL SHALL BE LEVEL WITHIN ±3 mm IN ANY 9144 mm OF CIRCUMFERENTIAL LENGTH. NO POINT IN THE CIRCUMFERENCE SHALL VARY MORE THAN ±13 mm FROM THE ESTABLISHED ELEVATION.
 - D. THE ENTIRE FOUNDATION UNDER THE TANK SHALL BE WITHIN ±13 mm OF TRUE ELEVATION.
3. STORAGE TANK
 - A. SHELL
 1. SHELL PLATES SHALL HAVE A COMMON INSIDE DIAMETER.
 2. ALL VERTICAL AND HORIZONTAL SHELL PLATE JOINTS SHALL BE DOUBLE-WELDED COMPLETE PENETRATION (CP) BUTT JOINTS.
 - B. WELDING
 1. ALL TANK WELDS SHALL BE PER A QUALIFIED PROCEDURE AS SPECIFIED ON THE DRAWINGS.
 2. ALL TEMPORARY ATTACHMENTS TO THE TANK SHELL SHALL BE WELDED USING WELD PROCEDURE SH-52.
 3. ALL SHELL OPENING CONNECTIONS WHICH REQUIRE REINFORCING, SUCH AS NOZZLES, MANHOLES, ETC., SHALL BE ATTACHED BY WELDS FULLY PENETRATING THE SHELL UNLESS OTHERWISE SPECIFIED.
 - C. STRESS RELIEVING
 1. STRESS RELIEVE IS NOT REQUIRED.
 - D. WELD INSPECTION
 1. SHELL PLATE TO SHELL PLATE WELDS SHALL BE INSPECTED BY THE RADIOGRAPHIC METHOD AS SPECIFIED IN SECTION 6.1 AND PARAGRAPH A.5.3 OF API 650.
 2. ALL WELDS (INCLUDING PERMANENT AND TEMPORARY ATTACHMENTS) SHALL BE INSPECTED BY VISUAL EXAMINATION.
 3. ALL WELDS ATTACHING SHELL NOZZLES OR MANHOLES SHALL BE EXAMINED BY EITHER THE MAGNETIC PARTICLE METHOD OR THE DYE-PENETRANT METHOD. IF ANY PWHT IS PERFORMED, THE EXAMINATION SHALL BE PERFORMED BEFORE AND AFTER PWHT.
 4. FLUSH CLEANDUTS AND NOZZLES ARE NOT REQUIRED.

GENERAL NOTES (CONTINUED)

- E. TESTING
 1. THE TANK BOTTOM SHALL BE EXAMINED BY THE VACUUM BOX TEST METHOD.
 2. THE TANK SHELL TO BOTTOM WELD SHALL BE TESTED BY THE PENETRATING OIL METHOD AND THE COMPLETED JOINT SHALL BE VISUALLY INSPECTED. THE INSIDE FILLET WELD SHALL BE COMPLETED FIRST AND INSPECTED FOR LEAK TIGHTNESS WITH PENETRATING OIL BEFORE THE OUTSIDE WELD IS STARTED. ALLOW 1 HOUR OF WAITING TIME FOR EACH 3 mm OF SHELL THICKNESS AFTER THE PENETRATING OIL IS APPLIED. THE MINIMUM WAITING TIME SHALL BE 4 HOURS.
 3. REINFORCING PLATES SHALL BE TESTED PRIOR TO THE HYDROSTATIC TEST. APPLY 1.05 ± 0.07 kg/sq cm AIR PRESSURE USING THE TELLTALE HOLE WHILE UNDER PRESSURE. A SOAP SUDS SOLUTION SHALL BE APPLIED TO ALL ATTACHMENT WELDS FOR DETECTION OF LEAKS.
 4. PDM SAUDI ARABIA SHALL HYDRO-PNEUMATICALLY TEST THE TANK PER API 650 AND PDM-SA PROCEDURE HT-4. PDM-SA SHALL SUPPLY POTABLE WATER FOR HYDROTEST. A LAB ANALYSIS WILL BE PERFORMED TO DETERMINE THE WATER QUALITY. PDM-SA WILL TREAT THE WATER IF NECESSARY BY ADDITION OF A CHEMICAL ADDITIVE. PDM-SA DOES NOT INCLUDE FOR SUPPLY OF SACRIFICIAL ANODES OR ANY OTHER CATHODIC PROTECTION SYSTEM. PDM-SA ASSUMES TEST WATER MAY BE DISPOSED OF IN THE VICINITY OF THE TANKS WITHOUT COST TO PDM-SA. PDM-SA INCLUDES ALL EQUIPMENT AND LABOR TO FILL THE TANKS, WATER TRANSFER, MONITORING THE HYDROTEST. SURVEY OF FOUNDATION SETTLEMENT IS REQUIRED DURING HYDROTEST. (CPL WILL MONITOR THE FOUNDATION SETTLEMENT).
 5. PENETRATING OIL TEST SHALL BE PERFORMED ON BOTTOM DECK, PENETRATIONS AND OUTER RIM TO DECK JOINT PRIOR TO HYDROTEST.
 6. THE FLOATING ROOF SHALL BE FLOTATION TESTED ON WATER DURING THE HYDROSTATIC TEST. DURING THE TEST THE UPPER SIDE OF THE DECK IN CONTACT WITH LIQUID SHALL BE EXAMINED FOR LEAKS. IN ADDITION ALL WELDS ON THE UPPER SIDE OF THE FLOATING ROOF SHALL BE INSPECTED BY VISUAL EXAMINATION.
- F. FLANGE ORIENTATION
 1. THE FLANGE BOLT HOLES FOR SHELL MANHOLES AND NOZZLES SHALL STRADDLE A VERTICAL CENTERLINE UNLESS OTHERWISE NOTED.
 2. THE FLANGE BOLT HOLES FOR ROOF MANHOLES AND NOZZLES SHALL STRADDLE A RADIAL TANK CENTERLINE UNLESS OTHERWISE NOTED.
- G. MILL TEST REPORTS
 1. MILL TEST REPORTS SHALL BE PROVIDED FOR SHELL, ROOF AND BOTTOM PLATES, REPADS AND NOZZLES/MANHOLES FABRICATED FROM PLATE.
 2. CERTIFICATE OF COMPLIANCE SHALL BE PROVIDED FOR FLANGES, BOLTS, NUTS AND STRUCTURAL COMPONENTS.
- H. AS BUILT DRAWINGS
 1. SHOP AND FIELD TO FURNISH MARKED-UP DRAWINGS OR A WRITTEN DESCRIPTION TO PDM SAUDI ARABIA REGARDING ANY CHANGES TO THE PROJECT FOR AS BUILT DRAWINGS.
- I. SPECIAL HANDLING REQUIREMENTS ARE NOT REQUIRED.
- J. TANK CALIBRATION IS REQUIRED. STRAPPING AND CALIBRATION, INCLUDING GAUGING TABLES.
- K. GRIND ALL SHARP EDGES/CORNERS SMOOTH REMOVE ALL BURRS.

| | | | | | | |
|---|---------|----------------------|-----|----------|-----|---------|
| OPEN HOLES | N/A | | | | | |
| ERECTION REF. | N/A | | | | | |
| WELD SPECS. | API 650 | | | | | |
| EIS | N/A | | | | | |
| CERTIFIED FOR CONFORMANCE TO PLANS AND SPECIFICATIONS | | | | | | |
| BY | 2 | ISSUED "AS BUILT" | RK | 20SEPT97 | HJ | 19OCT97 |
| | 1 | REVISE NOTE 3.E.4 | ARF | 31MAR97 | AJM | 31MAR97 |
| DATE | NO | REVISION DESCRIPTION | BY | DATE | CHK | DATE |



| | |
|---|----------|
| CHITACA PETROCHEMICAL LTD. | |
| JOB NO. 54001 IBN RUSHD AROMATICS PROJECT | |
| PO NO. 54001 T009 | |
| REQ NO. SC-50-Q-003 | |
| IDENT NO. 55-D-07AB-DW 0001 | |
| APPROVED FOR PROCEED WITH FABRICATION | SAY TEAM |
| APPROVED FOR FABRICATION EDWARDS TO BE COMPLETED | |
| CHECKED BY | DATE |
| PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER | |
| IBN RUSHD PTA & AROMATICS PROJECT - AROMATICS ORTHOXYLENE TANKS 55-D-07A & B | |
| PDM Saudi Arabia ENGINEERS - FABRICATORS - CONTRACTORS | |
| IBN RUSHD PTA | |
| (2) 7.02 m DIA X 8 m FBSSCRIFR | |
| YANBU, SAUDI ARABIA | |
| GENERAL NOTES | |
| DWG. PREPARED AT | PIT |
| FABRICATED AT | YANBU |
| BY | DATE |
| DRAWN: AMV | 13FEB97 |
| DRAWING | G902 |
| CHECKED: RHL | 13FEB97 |
| CONTRACT | 76519-9 |

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT


PROJECT NO. 10E0541A01

DOCUMENT TITLE:

WATER STRIPPER REBOILER DATA SHEET

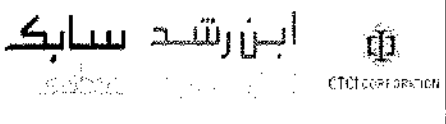
DOCUMENT NO:

DS-56-EA-517

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|-----|--------------------|-----|------|-------|-----------|------------------|--|---|
| | | | | | | ابن رشيد aifc | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA |  CTGI CORPORATION |
| | | | | | | CERTIFIED | | |
| | | | | | | PROJ. | | |
| 1 | Issued for Design | WCC | SYL | YSL | 15 Apr 11 | MGR | DATE | |
| 0 | Issue For Approval | WCC | SYL | YSL | 25-Feb-11 | CLIENT | DATE | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | | XC33-56-517 |

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GN-504 84.10





**WATER STRIPPER REBOILER
 DATA SHEET**



XC33-56-517

| | |
|---------------|-----------------------------|
| 2 OF 2 | DATE 15-Apr.-2011 |
| | REV. 1 |

CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 56-E-17 | 1 THRU 8 OF 8 | 1 | 15-Apr.-2011 |

| | | | | | | | | | |
|--|--|---|--|--|--|---|--|---------------|---|
|  | | SHELL AND TUBE HEAT EXCHANGER DATA SHEET | | Contract: 10E0541A01 | |  | | REV | |
| | | | | Equipment No.: 56-E-17 | | | | | Revision: 1 Date: 15-Apr-2011 |
| Client: Arabian Industrial Fibers Company (Ibn Rushd) | | Vendor: | | Plant: Sulfolane | | Site: Yanbu, Saudi Arabia | | 0 | |
| Service: Water Stripper Reboiler | | Design Duty: 5,340,000 x 1.2 W | | TEMA Type/Size: BKU / 1250/1750 x 4300 | | Orientation: Horizontal | | | |
| Transfer Rate Service: 638.58 W/m ² ·°C | | Clean: 1150.23 W/m ² ·°C | | Mid (eff): 21.9 °C | | 0 | | | |
| Total Surface (Eff.): 457.5 m ² | | Shell/Unit: 1 | | Surface/Shell (Gross): 467.9 m ² | | 0 | | | |
| Case: | | Governing Case: | | PERFORMANCE OF ONE UNIT | | | | | |
| | | SHELL SIDE | | TUBE SIDE: | | | | | |
| Fluid: | | Water Stripper Bottoms | | Lean Sulfolane | | | | | |
| Total Flow: kg/hr | | 9,377 x 1.2 | | 359,891 x 1.2 | | | | | |
| | | INLET | | OUTLET | | INLET | | OUTLET | |
| Liquid Flow: kg/hr | | 9,377 x 1.2 | | 743 x 1.2 | | 359,891 x 1.2 | | 359,891 x 1.2 | |
| Molecular Weight: | | 18.14 | | 18.14 | | 114.8 | | 114.8 | |
| Density: kg/m ³ | | 915 | | 1,109 | | 1,125 | | 1,152 | |
| Thermal Cond.: W/(m·°C) | | 0.482 | | 0.195 | | 0.174 | | 0.179 | |
| Specific Heat: kJ/(kg·°C) | | 4.04 | | 2.09 | | 1.88 | | 1.81 | |
| Viscosity: mPa·s | | 0.246 | | 0.813 | | 1.043 | | 1.339 | |
| Surface Tension: mN/m | | | | | | | | | |
| Vapor Flow: kg/hr | | | | 8,634 x 1.2 | | | | | |
| Molecular Weight: | | | | 18.2 | | | | | |
| Density: kg/m ³ | | 0.8874 | | 0.8730 | | | | | |
| Thermal Cond.: W/(m·°C) | | 0.0258 | | 0.0265 | | | | | |
| Specific Heat: kJ/(kg·°C) | | 1.92 | | 1.91 | | | | | |
| Viscosity: mPa·s | | 0.013 | | 0.013 | | | | | |
| Latent Heat: kJ/kg @ °C | | | | | | | | | |
| Steam Flow: kg/hr | | | | | | | | | |
| Water Flow: kg/hr | | | | | | | | | |
| Noncondensable Flow: kg/hr | | | | | | | | | |
| Temperature: °C | | 113.2 | | 134.81 | | 173.9 | | 144.9 | |
| Pressure: bar (g) | | 0.6205 | | | | 18.04 | | | |
| Pressure Drop: bar | | Allow: 0.0828 Calc: 0.014 | | Allow: 0.689 Calc: 0.604 | | | | 0 | |
| Velocity: m/s | | | | | | 1.46 | | 0 | |
| Fouling Resistance: m ² ·°C/W | | 0.00035 | | | | 0.00026 | | | |
| Dew Point: °C | | | | | | | | | |
| Bubble Point: °C | | | | | | | | | |
| Boiling Range: °C | | | | | | | | | |
| Critical Pressure: bar (a) | | 218 | | | | | | | |
| Critical Temperature: °C | | 377 | | | | | | | |
| Remarks: | | | | | | | | | |
| 1 Design for 120% heat duty and flow rates. | | | | | | | | | |
| 2 Water Stripper Column, 56-C-07, will be installed on top of the 30" connection nozzle. Vendor shall design this nozzle to take the load. Wall thickness of shell course in that section may need to increase because nozzle reinforcement probably not sufficient. The operating weight for 56-C-07 is approximately 3,000 kg. | | | | | | | | | |
| 3 The maximum bundle size is 1200 mm and the maximum bundle weight is 15,000 kg. A waiver will be required due to the 1250 mm bundle size. | | | | | | | | | |

| | | | | | | | | | |
|--|--|---|--|---|---|---|--|---------|--|
|  | | SHELL AND TUBE HEAT EXCHANGER DATA SHEET | | Contract: 10E0541A01 Equipment No.: 56-E-17 Revision: 1 Date: 15-Apr-2011 Unit: 56 - Sulfolane P.O. No.: Document No.: DS-56-EA-517 Sheet: 2 of 8 | |  | | REV | |
| 1 Case: | | 2 Governing Case: | | | | | | | |
| 3 DESIGN CONDITIONS | | | | | | | | | |
| 4 SHELL SIDE: | | | | | 6 TUBE SIDE: | | | | |
| 5 Design Pressure: min / max bar (g) | | FV at 122 C / 4.0 | | | FV at 174 C / 27.0 | | | | |
| 6 Test Pressure: bar (g) | | Code | | | Code | | | | |
| 7 Design Temperature: min / max °C | | / 150 | | | / 205 | | | | |
| 8 Corrosion Allowance: mm | | 3 | | | 3 | | | | |
| 9 Number of Passes: | | 1 | | | 4 | | | | |
| 10 Minimum Design Metal Temperature: °C | | 6 | | | 6 | | | | |
| 11 Flow Arrangement: Parallel / Series | | 1 / 1 | | | 1 / 1 | | | | |
| 12 CONSTRUCTION | | | | | | | | | |
| 13 Shell Dia, I.D.: 1750 / 1250 mm | | Baffle Type: Full Support | | Wt Bundle & Shell: 16,010 kg | | Wt Bundle: 9,210 kg | | 0 | |
| 14 No. Tubes/Shell: 830 U's | | Crosspasses: Cut: % Dia. | | Wt Full of Water: 26,760 kg | | ρV ² Shell Inlet Nozzle: kg/m ² | | | |
| 15 O.D. x Length: 19.05 x 4,300 mm | | Spacing Center: 599 mm | | ρV ² Bundle Entry: kg/m ² | | ρV ² Bundle Exit: kg/m ² | | | |
| 16 Tube Thickness: 2.11 MW (Note 4) mm | | (In/Out) | | TEMA Class: R <input checked="" type="checkbox"/> C <input type="checkbox"/> B <input type="checkbox"/> | | Code Required: ASME Sec VII, Div. 1 | | | |
| 17 Tube Pitch: 25.4 mm Layout: 90° | | Peripheral Seals: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | | Code Stamp: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | | API 660: Yes <input type="checkbox"/> No <input type="checkbox"/> | | | |
| 18 Tube/TS Joint: Expanded and Rolled | | Number of Pairs: | | National Board: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | | Lethal Service: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | | | |
| 19 Impingement Protection: None | | Pass Lane Seals: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | | | | | | | |
| 20 Expansion Joint: None | | Number: | | | | | | | |
| 21 Removable Tube Bundle: Yes | | Diameter: mm | | | | | | | |
| 22 Stacking: No | | Insulation: Shell: 40 Chan.: 50 mm | | | | | | | |
| 23 Specification: | | Prep & Paint - Shell: SES-PCS-10 (Note 5) Chan.: SES-PCS-10 (Note 5) | | | | | | | |
| 24 Special Services: Wet Sour: <input type="checkbox"/> Side: <input type="checkbox"/> | | Hydrogen: <input type="checkbox"/> Side: <input type="checkbox"/> | | Other: <input type="checkbox"/> | | Side: <input type="checkbox"/> | | | |
| 25 MATERIALS | | | | | | | | | |
| 26 Tubes: SA-179, Killed | | | | | 26 Shell: SA-516-70 | | | | |
| 27 Tubesheet: SA-266-2 or 4 | | | | | 27 Shell Cover: SA-516-70 | | | | |
| 28 Baffles/Tube Supports: SA-36 | | | | | 28 Shell Flange: SA-266-2 or 4 | | | | |
| 29 Tie Rods and Spacers: CS | | | | | 29 Channel/Bonnet: SA-516-70 | | | | |
| 30 Long Baffle: N/A | | | | | 30 Channel Cover: N/A | | | | |
| 31 Gasket Shell Side: DBL JKT Graphite Filled | | | | | 31 Channel Flange: SA-266-2 or 4 | | | | |
| 32 Gasket Tube Side: DBL JKT Graphite Filled | | | | | 32 Floating Head Cover: N/A | | | | |
| 33 Gasket Float. Head Cover: N/A | | | | | 33 Shell Bolting: SA-193-B7/SA-194-2H | | | | |
| 34 Expansion Joint: N/A | | | | | 34 Channel Bolting: SA-193-B7/SA-194-2H | | | | |
| 35 Exchanger Supports: SA-516-70 Pad/SA-36 Saddle | | | | | 35 Floating Head Bolting: N/A | | | | |
| 36 NOZZLES | | 36 SHELL SIDE: | | | | 36 TUBE SIDE: | | | |
| 37 Description | | No. | | Size | | Rating | | Facing | |
| 38 Inlet | | 1 | | 10" (Note 7) | | 150# | | RFLWN | |
| 39 Vapor Outlet | | 1 | | 10" | | 150# | | RFLWN | |
| 40 Liquid Outlet | | 1 | | 3" | | 150# | | RFLWN | |
| 41 Column Connection | | 1 | | 30" | | 150# | | RFLWN | |
| 42 Drain | | 1 | | 2" | | 150# | | RFLWN | |
| 43 Level Control | | 2 | | 2" | | 300# | | RFLWN | |
| 44 Pump Return | | 1 | | 1-1/2" | | 150# | | RFLWN | |
| 45 Steam Out | | 1 | | 2" | | 150# | | RFLWN | |
| 46 Pressure Gauge* | | 1 | | 3/4" | | 6000# CPLG | | w/ Plug | |
| 47 Level Alarm | | 2 | | 1-1/2" | | 150# | | RFLWN | |
| 48 * Each process nozzle. | | | | | | | | 1 | |
| 49 Remarks (cont'd): | | | | | | | | | |
| 50 4. 2.11 mm (14 gage) minimum wall thickness. | | | | | | | | | |
| 51 5. Uninsulated protrusions shall be painted per SES-PCS-4. | | | | | | | | | |
| 52 6. Some of the applicable project specifications for shell and tube heat exchangers are: Z01-G07 (SABIC), 3-11-6 (UOP), | | | | | | | | | |
| 53 4-11-6 (UOP), 22854-SP-000-D-001 (Bechtel), 22854-SP-000-E-001 (Bechtel), 22854-SP-000-W-001 (Bechtel), | | | | | | | | | |
| 54 22854-SP-W-002 (Bechtel), 22854-SP-W-003 (Bechtel), T01-S01 (SABIC), SP000X5001 (SABIC), 22854-SP-000-N-001 (Bechtel). | | | | | | | | | |
| 55 7. Liquid enters the reboiler through the water stripper column connection. | | | | | | | | | |
| 56 | | | | | | | | | |
| 57 | | | | | | | | | |
| 58 | | | | | | | | | |
| 59 | | | | | | | | | |

SHELL AND TUBE
HEAT EXCHANGER
DATA SHEET

Contract: 10E0541A01
Equipment No. 56-E-17
Revision: 1 Date: 15-Apr-2011
Unit: 56 - Sulfolane
P.O. No.:
Document No.: DS-56-EA-517
Sheet 4 of 8

COLD SIDE PROPERTIES

Properties at .7822 bar(g)

| Temp. C | Mass Vapor Frac. | Enthalpy Normalized kJ/kg | VAPOR | | | | TOTAL LIQUID | | | | | | |
|------------|------------------------|---------------------------------|------------------------------|---------------|---------------------------|-----------------------------|------------------------------|---------------|---------------------------|-----------------------------|----------------------------|------------------------------|------------------------|
| | | | Density kg/m ³ | Visc. mPas | Thermal Cond. W/m.C | Specific Heat kJ/kg.C | Density kg/m ³ | Visc. mPas | Thermal Cond. W/m.C | Specific Heat kJ/kg.C | Surface Tension mN/m | Critical Press. bar(a) | Critical Temp. C |
| 87.7 | 0.0000 | | | | | | 942.1 | 0.325 | 484 | 4.00 | 60.4 | 218 | 377 |
| 101.9 | 0.0000 | 56.95 | | | | | 927.2 | 0.277 | 483 | 4.02 | 57.7 | 218 | 377 |
| 116.0 | 0.0000 | 113.9 | .9659 | 0.013 | .0260 | 1.92 | 912.0 | 0.239 | 481 | 4.04 | 54.9 | 218 | 377 |
| 116.0 | 0.1378 | 419.7 | .9659 | 0.013 | .0260 | 1.92 | 913.5 | 0.240 | 463 | 4.01 | 54.9 | 218 | 377 |
| 116.1 | 0.2756 | 725.6 | .9659 | 0.013 | .0260 | 1.92 | 916.5 | 0.242 | 441 | 3.97 | 54.8 | 217 | 378 |
| 116.2 | 0.4135 | 1.031 | .9659 | 0.012 | .0260 | 1.92 | 920.5 | 0.244 | 414 | 3.91 | 54.7 | 217 | 379 |
| 116.5 | 0.5514 | 1.337 | .9659 | 0.013 | .0261 | 1.92 | 927.1 | 0.248 | 380 | 3.81 | 54.6 | 215 | 380 |
| 116.9 | 0.6895 | 1.642 | .9659 | 0.013 | .0261 | 1.92 | 940.5 | 0.256 | 331 | 3.63 | 54.0 | 212 | 384 |
| 118.0 | 0.8278 | 1.949 | .9643 | 0.013 | .0262 | 1.92 | 980.4 | 0.286 | 265 | 3.15 | 53.2 | 203 | 395 |
| 152.8 | 0.9755 | 2.255 | .9245 | 0.014 | .0289 | 1.90 | 1,128 | 0.885 | 180 | 1.91 | 38.7 | 86.6 | 536 |

Properties at .5792 bar(g)

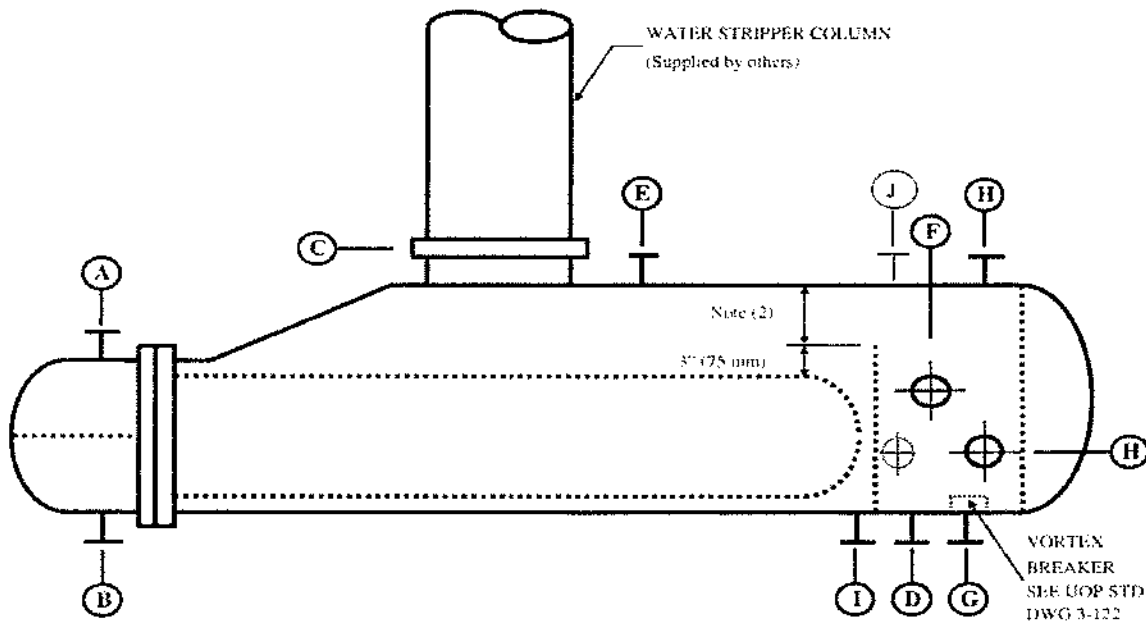
| Temp. C | Mass Vapor Frac. | Enthalpy Normalized kJ/kg | VAPOR | | | | TOTAL LIQUID | | | | | | |
|------------|------------------------|---------------------------------|------------------------------|---------------|---------------------------|-----------------------------|------------------------------|---------------|---------------------------|-----------------------------|----------------------------|------------------------------|------------------------|
| | | | Density kg/m ³ | Visc. mPas | Thermal Cond. W/m.C | Specific Heat kJ/kg.C | Density kg/m ³ | Visc. mPas | Thermal Cond. W/m.C | Specific Heat kJ/kg.C | Surface Tension mN/m | Critical Press. bar(a) | Critical Temp. C |
| 87.7 | 0.0000 | | | | | | 942.1 | 0.325 | 484 | 4.00 | 60.4 | 218 | 377 |
| 100.7 | 0.0000 | 52.32 | | | | | 928.4 | 0.281 | 483 | 4.02 | 57.9 | 218 | 377 |
| 113.7 | 0.0000 | 104.6 | .9018 | 0.012 | .0258 | 1.92 | 914.4 | 0.215 | 482 | 4.04 | 55.1 | 218 | 377 |
| 113.7 | 0.1381 | 411.8 | .9018 | 0.013 | .0259 | 1.92 | 916.3 | 0.246 | 464 | 4.01 | 55.3 | 218 | 377 |
| 113.8 | 0.2761 | 719.0 | .9018 | 0.013 | .0259 | 1.92 | 919.0 | 0.247 | 442 | 3.97 | 55.3 | 217 | 378 |
| 114.0 | 0.4142 | 1.026 | .9018 | 0.013 | .0259 | 1.92 | 923.0 | 0.250 | 415 | 3.90 | 55.2 | 217 | 379 |
| 114.2 | 0.5524 | 1.332 | .9018 | 0.013 | .0259 | 1.92 | 929.7 | 0.253 | 380 | 3.80 | 55.0 | 215 | 380 |
| 114.6 | 0.6907 | 1.640 | .9018 | 0.013 | .0259 | 1.92 | 943.2 | 0.262 | 334 | 3.61 | 54.7 | 212 | 384 |
| 115.7 | 0.8202 | 1.948 | .9002 | 0.013 | .0260 | 1.92 | 983.8 | 0.294 | 265 | 3.13 | 53.6 | 203 | 396 |
| 151.8 | 0.9781 | 2.255 | .8618 | 0.014 | .0288 | 1.90 | 1,130 | 0.915 | 180 | 1.90 | 38.6 | 84.6 | 538 |

Properties at .4602 bar(g)

| Temp. C | Mass Vapor Frac. | Enthalpy Normalized kJ/kg | VAPOR | | | | TOTAL LIQUID | | | | | | |
|------------|------------------------|---------------------------------|------------------------------|---------------|---------------------------|-----------------------------|------------------------------|---------------|---------------------------|-----------------------------|----------------------------|------------------------------|------------------------|
| | | | Density kg/m ³ | Visc. mPas | Thermal Cond. W/m.C | Specific Heat kJ/kg.C | Density kg/m ³ | Visc. mPas | Thermal Cond. W/m.C | Specific Heat kJ/kg.C | Surface Tension mN/m | Critical Press. bar(a) | Critical Temp. C |
| 87.7 | 0.0000 | | | | | | 942.1 | 0.325 | 484 | 4.00 | 60.4 | 218 | 377 |
| 99.5 | 0.0000 | 47.57 | | | | | 929.7 | 0.284 | 483 | 4.02 | 58.1 | 218 | 377 |
| 111.3 | 0.0000 | 95.14 | .8394 | 0.013 | .0256 | 1.92 | 917.0 | 0.251 | 482 | 4.04 | 55.8 | 218 | 377 |
| 111.4 | 0.1393 | 403.7 | .8394 | 0.013 | .0257 | 1.92 | 918.9 | 0.252 | 464 | 4.01 | 55.8 | 218 | 377 |
| 111.5 | 0.2766 | 712.2 | .8394 | 0.013 | .0257 | 1.92 | 921.6 | 0.253 | 442 | 3.96 | 55.7 | 217 | 378 |
| 111.6 | 0.4150 | 1.021 | .8394 | 0.013 | .0257 | 1.92 | 925.6 | 0.256 | 415 | 3.90 | 55.6 | 217 | 379 |
| 111.8 | 0.5534 | 1.329 | .8394 | 0.012 | .0257 | 1.92 | 932.3 | 0.260 | 380 | 3.80 | 55.5 | 215 | 380 |
| 112.2 | 0.6919 | 1.638 | .8378 | 0.013 | .0257 | 1.92 | 946.0 | 0.268 | 334 | 3.61 | 55.1 | 217 | 384 |
| 113.4 | 0.8306 | 1.946 | .8378 | 0.013 | .0258 | 1.92 | 987.4 | 0.302 | 264 | 3.12 | 54.0 | 202 | 390 |
| 150.7 | 0.9809 | 2.255 | .8009 | 0.014 | .0287 | 1.89 | 1,133 | 0.946 | 180 | 1.89 | 38.5 | 82.7 | 541 |

WATER STRIPPER COLUMN REBOILER TYPICAL ARRANGEMENT

Item No.: 56-E-17



NOTES

(1) Nozzle Requirements

| Nozzle | Service | Quantity | Size (NPS) | Rating | Facing |
|--------|---|----------|------------|--------|--------|
| A | Tube Side Inlet | 1 | 12 | CL 300 | RF |
| B | Tube Side Outlet | 1 | 12 | CL 300 | RF |
| C | Water Stripper Column Welding Neck Flange | 1 | 30 | CL 150 | RF |
| D | Steamout | 1 | 2 | CL 150 | RF |
| E | Shell Side Vapor Outlet | 1 | 10 | CL 150 | RF |
| F | Pump Return | 1 | 1 1/2 | CL 150 | RF |
| G | Shell Side Liquid Outlet | 1 | 3 | CL 150 | RF |
| H | Level Control - Gauge Glass | 2 | 2 | CL 300 | RF |
| I | Drain | 1 | 2 | CL 150 | RF |
| J | Level Alarm | 2 | 1-1/2 | CL 150 | RF |

(2) Manufacturer's recommendation, but not less than 1'-6" (460 mm). Shell size shall be sufficient to assure the horizontal vapor velocity (in fpm OR m/s) in the vapor space above the maximum liquid level not to exceed 20 OR 0.1016 times the square root of the ratio of liquid density over vapor density.

(3) The reboiler shell must be capable of supporting the Water Stripper Column mounted on the top of the unit as shown above. Contractor shall advise the weight of this column and the moment due to wind load. Column details shall be as required by the 301 specification of this project.

PROPERTIES OF SULFOLANE
PROPERTIES OF PURE SULFOLANE LIQUID

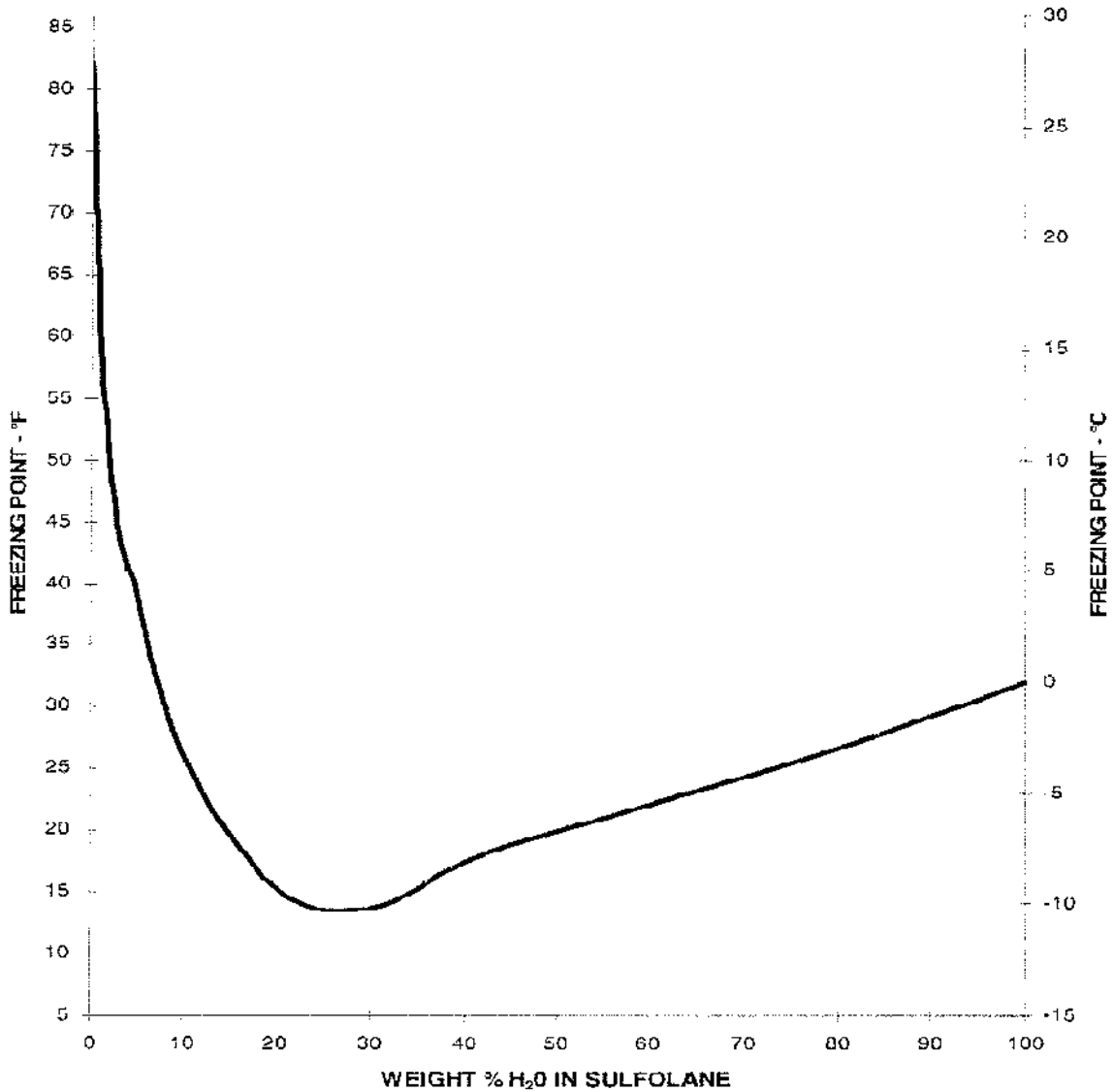
| | | | |
|---|----------------------------|-------|---------|
| CHEMICAL NAME: | Tetramethylene Sulfone | | |
| MOLECULAR WEIGHT: | 120 | | |
| FREEZING POINT: | 82°F (27.8°C) | | |
| LATENT HEAT AT 350°F (177°C): | 207 BTU/lb (115.0 kcal/kg) | | |
| ATMOSPHERIC BOILING POINT: | 545°F (285°C) | | |
| SPECIFIC GRAVITY: | | | |
| 100°F (38°C) | | 1.256 | |
| 200°F (93°C) | | 1.208 | |
| 350°F (177°C) | | 1.137 | |
| 450°F (232°C) | | 1.091 | |
| SPECIFIC HEAT, BTU/lb·°F (or kcal/kg·°C): | | | |
| 100°F (38°C) | | 0.36 | |
| 200°F (93°C) | | 0.40 | |
| 350°F (177°C) | | 0.44 | |
| 450°F (232°C) | | 0.47 | |
| VISCOSITY, CENTIPOISE: | | | |
| 100°F (38°C) | | 8.20 | |
| 200°F (93°C) | | 2.75 | |
| 350°F (177°C) | | 1.14 | |
| 450°F (232°C) | | 0.87 | |
| THERMAL CONDUCTIVITY, BTU/hr-ft·°F (kcal/hr-m·°C) | | | |
| 100°F (38°C) | | 0.091 | (0.135) |
| 200°F (93°C) | | 0.088 | (0.131) |
| 350°F (177°C) | | 0.082 | (0.122) |
| 450°F (232°C) | | 0.079 | (0.118) |

NOTE: TO AVOID POSSIBLE DECOMPOSITION OF SULFOLANE, ITS FILM TEMPERATURE IN ANY HEAT EXCHANGE SERVICE SHALL BE LIMITED TO 450°F (232°C) MAXIMUM.

Suppliers shall make such calculations as are necessary to ensure that above maximum temperature requirement is met. Such calculations shall be based on the specified heating medium temperature and "clean" tube conditions.

PROPERTIES OF SULFOLANE (CONTINUED)

FREEZING POINT OF SULFOLANE - WATER MIXTURES



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SHELL AND TUBE
HEAT EXCHANGER
DATA SHEET

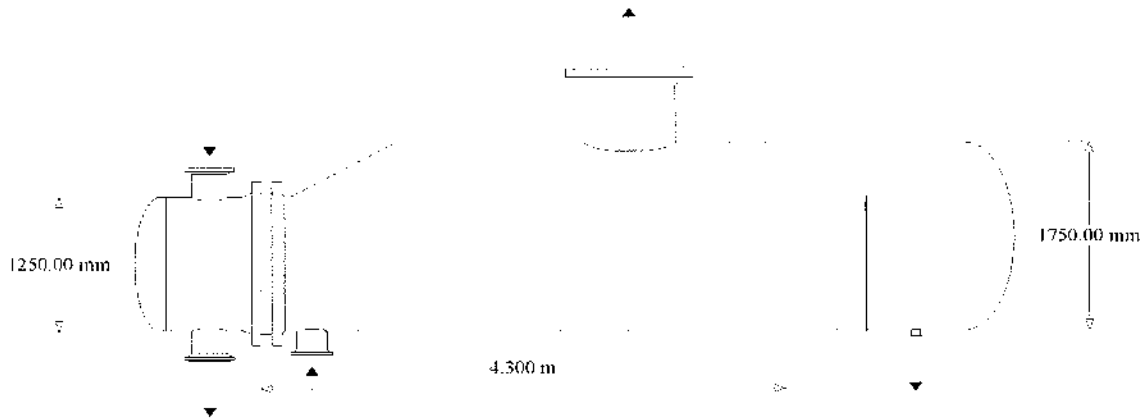
Contract: 10E0541A01
Equipment No: 56-E-17
Revision: 1 Date: 15-Apr.-2011
Unit: 56 - Sulfolane
P.O. No.:
Document No.: DS-56-EA-517
Sheet 8 of 8

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HEAT EXCHANGER SKETCH



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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01



DOCUMENT TITLE:

PLANT INVENTORY STORAGE TANK DATA SHEET

DOCUMENT NO:


DS-56-FA-503

GN-502 84.10

| | | | | | | | |
|------------------|--------------------|-----|------|-------|-----------|---|---|
| | | | | | |  ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA |  CTCI CORPORATION |
| CERTIFIED | | | | | | | |
| 2 | Revised as Marked | LSH | SYL | YSL | 22-Apr-11 | PROJ. | |
| 1 | Issued for Design | LSH | SYL | YSL | 23-Mar-11 | MGR | DATE |
| 0 | Issue For Approval | LSH | SYL | YSL | 23-Mar-11 | CLIENT | DATE |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | XC32C-56-503 |

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GN-504 84.10


 ابن رشيد سابك
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PLANT INVENTORY STORAGE TANK
 DATA SHEET

XC32C-56-503

2 OF 2

DATE
 09-Aug-2011

REV.
 2

CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 56-F-03 | 1 THRU 10 OF 10 | 2 | 09-Aug-2011 |

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**API 650 TANK
DATA SHEET**

Note: This data sheet has been modified from that in the annex of API Standard 650, Eleventh Edition.

Contract: 10E0541A01
Item No: 56-F-03
Revision: 2 Date: 09-Aug-2011
Unit: 56 - Sulfolane
P.O. No.:
Document No.: DS-56-FA-503
Sheet 1 of 10

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REV

1 Client: Arabian Industrial Fibers Company - Ibn Rushd Vendor: _____
2 Service: Plant Inventory Storage Tank Plant: IBN Rushd Site: Yanbu, Saudi Arabia
3 Item Name: 56-F-03 P & ID No.: DR-56-AD-135 Vendor Shop Order No: _____
4 Number Req'd.: 1 Type: Shop Built Field Erected Open Top Dome Roof Umbrella Roof Cone Roof
5 Floating Roof: No Yes - See sheet 8 of 8 for details of design and construction.
6 Issued for: Proposal Purchase As Built Vendor Serial No: _____

GENERAL:

8 1 Size Limitation: 9.5 m dia and 9 m height Tank Diameter: 9.5 m Shell Height: 9 m
9 Capacity: Max: 638 m³ Net Working: 465 m³ Criteria: _____
10 2 Products Stored:
11 Liquid: Sulfolane and Aromatic Hydrocarbon Min. S.G.: 1.261 (Note 23) @ 15 °C / Max. S.G.: _____ @ _____ °C
12 Vapor: _____ Vapor Pressure: 0.758 bar (a) At Maximum Operating Temperature 44 °C
13 % Aromatic: _____ Suppl. Spec.: _____ H₂S Service: No Yes Suppl. Spec.: _____
14 Other Special Service Conditions: No Yes Suppl. Spec.: _____

DESIGN CRITERIA

16 3 Year Built: _____ In accordance with API 650 11th Edition and Addendum
17 Appl. API 650 Appendices: A B C D E F G H I J M O P S U V
18 Appendix W Sections Waived: All Other: Appendix R Suppl. Spec.: _____
19 4 Max. Operating Temp.: 49 °C Design Metal Temp.: 85 °C Roof Max. Operating Temp.: 85 °C M.D.M.T.: 6 °C
20 Design Pressure: 14.48 mbar(g) External Pressure: 7.58 mbar(g) Design Liquid Level: 9000 mm
21 Maximum Fill Rate: 25.6 m³/h Maximum Emptying Rate: 25.6 m³/h
22 5 Seismic Design: No Yes Alternate Seismic Criteria: 22854-SP-M-001& SES B51-S01
23 Site Class: C Vertical Seismic Design: No Yes Vertical Ground Motion Accelerator A_v: _____ m/sec²
24 Basis of Lateral Accel. (select one): Mapped Seismic Parameters S₀ 0.183 S₁ 0.048 S₂ _____ ; Site-Specific Procedures
25 MCE Design Required: No Yes Other (Non-ASCE) Methods: _____ Freeboard: _____
26 Roof Tie Rods at Outer Ring: No Yes Sliding Friction Factor: _____
27 6 Wind Velocity: 140 km/h Prevailing Wind Direction: From: _____ To: _____
28 Check Overturning Stability: No Yes Check Buckling in Corroded Condition: No Yes
29 Top Wind Girder Style: _____ Dimensions: _____ mm Use Top Wind Girder as Walkway: No Yes
30 Intermediate Wind Girders: No Yes Intermediate Wind Girder Style: _____ Dimensions: _____ mm

CONSTRUCTION

32 7 Shell Design: 1-Ft. Method: No Yes Variable-Design-Point Method: No Yes Alternate
33 Elastic Analysis Method: No Yes Alternate:
34 Plate Stacking Criteria: Center-line Stacked: No Yes Flush Stacked: No Yes Inside Outside
35 Plate Widths (Shell Course Height) and Thickness (New). Numbers below indicate course number. Dimensions are in millimeters.
36 1. _____ x _____ 2. _____ x _____ 3. _____ x _____ 4. _____ x _____ 5. _____ x _____
37 6. _____ x _____ 7. _____ x _____ 8. _____ x _____ 9. _____ x _____ 10. _____ x _____
38 11. _____ x _____ 12. _____ x _____ 13. _____ x _____ 14. _____ x _____ 15. _____ x _____
39 Joint Efficiency: _____ % Shell to Bottom Weld Type: _____ Corner Weld Insp. Mthd.: _____
40 8 Open Top & Fixed Roofs: Open Top: No Yes - See sheet 8 for floating roof details of design and construction.
41 Fixed Roof Type: Dome Roof Umbrella Roof Cone Roof
42 Roof Structural Columns: Pipe Struc. Shape: _____ Dome / Umbrella Rad.: _____ m Cone Slope: _____ mm/m
43 Weld Joint Type: _____ Seal Weld Underside of Lap Joints: No Yes
44 Seal Weld Underside of Wind Girder Joints: No Yes
45 Gas Tight: No Yes Joint Efficiency: _____ % Thickness: _____ (mm) Live Load: _____ kPa
46 Applicable Supplementary Load Specification: _____ Column Lateral Load: _____ N
47 Normal Venting Devices: Yes Note 11 Emergency Venting Devices: Yes Note 11, 24
48 Frangible Roof to Shell Joint: No Yes Seal Weld Roof Plates to Top Angle on the Inside: No Yes
49 Radial Projection of Horizontal Component Top Angle: Inward Outward Roof to Shell Detail: _____
50 Point Load Required: No Yes

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**API 650 TANK
DATA SHEET**

Note: This data sheet has been modified from that in the annex of API Standard 650, Eleventh Edition.

Contract: 10E0541A01
Item No: 56-F-03
Revision: 2 Date: 09-Aug-2011
Unit: 56 - Sulfolane
P.O. No.:
Document No.: DS-56-FA-503
Sheet 2 of 10

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CONSTRUCTION (Continued)

9 Bottom: (F Thickness: _____ mm Weld Joint Type:
Style: Flat Cone Up - Centered Cone Down - Center Cone Down - Off-Center Tilted Slope: 1:120 mm/m
Provide Drip Flange: No Yes Alternate Specification:
Annular Ring: No Yes Minimum Width: _____ mm Thickness: _____ mm Sump Required: No Yes
10 Foundation: Furnished by: Purchaser Vendor Other Type: _____
Soil Allowable Bearing Pressure: _____ bar(g) Per Spec.: _____ Anchor Size: _____ mm Qty: _____
Foundation Design Loads: Base Shear Force: _____ Wind: _____ N Seismic: _____ N
See Note 6 Overturning Moment: _____ Wind: _____ N-m Seismic: _____ N-m
Ring Forces: Weight of Roof + Shell: New: _____ kg Corroded: _____ kg Roof Live Load: _____ kPa
Internal Pressure: _____ bar(g) Partial Vacuum: _____ bar(g) Wind: _____ km/h Seismic: _____ N
Bottom Forces: Floor Wt.: New: _____ kg Corroded: _____ kg Product Wt.: _____ kg Water Wt.: _____ kg
Internal Pressure: _____ bar(g) Partial Vacuum: _____ bar(g) Other Foundation Loads: _____
Minimum Projection of Foundation Above Grade: later mm

INSPECTION and TESTING

11 Responsibility for Heating Water, if Required: Purchaser Vendor Other:
Hydrotest Fill Height: Note 9 Min. Hydrotest Temp.: API 650 °C Extended Duration of Hydrotest: Note 9 hours
Settlement Measurements Required: No Yes Predicted Settlement Profile is Attached: No Yes
Responsibility for Setting Water Quality: Purchaser Vendor Suppl. Test Water Quality Spec.: _____
Test Water Source & Disposal Tie-In Locations: Vendor approved by owner Hydrotest Appendix J Tank: No Yes
Post-Pressure-Test Activities Required of the Vendor: Broom Clean Potable Water Rinse Dry Interior
Other: Note 9
12 Inspection by: _____ In Shop ; Tank Supplier, Company _____ in Field.
Supplemental NDE Responsibility: Tank Supplier Supplemental NDE Spec.: 22854-SP-000-W-002
Positive Material Identification: No Yes PMI Requirements:
Waive Dimensional Tolerances of Section 7.5: No Yes Max. Plate Thickness for Shearing: _____ Shearing not allowed
Welds Not Exceeding 6 mm Shall Be Multi-Pass: No Yes Welds Exceeding 6 mm Shall Be Multi-Pass: No Yes
Leak Test Method: Roof: _____ Shell: _____ Nozzle/Manhole Repad Plate: _____
Approved Tank supplier _____ Bottom: _____ Floating Roof Components: _____
procedure

COATINGS

Internal Coatings by: Not Req'd. Vendor Others: _____ Per Spec.: _____
External Coating by: Not Req'd. Vendor Others: _____ Per Spec.: T01-S01-SES-PCS-3
Under Bottom Coating by: Not Req'd. Vendor Others: _____ Per Spec.: T01-S01-SES-PCS-9

ADDITIONAL INFORMATION

14 Surface Weld Prep.: Internal; Floating Roof Requirements External; _____ Roof: _____
NACE Requirements: No Yes Per Std.: _____
15 Cathodic Protection System: No Yes Internal External Per Spec.: Impressed Current per E29-E01, E29-S01
16 Fire Protection: No Yes Per Spec.: See note 12
17 Leak Detection System: No Yes Per Spec.: API 650 Appendix I
18 Release Prevention Barrier: No Yes Per Spec.: API 650 Appendix I
19 Tank Measurement System Req'd.: No Yes Remote Capability Req'd.: No Yes
By: Others Per Spec.: 22854-SP-000-J-019
20 Weight Of Tank: Full of Water: _____ kg Empty: _____ kg Shipping: _____ kg
Brace/Lift Spec.: _____
21 References: API 650 PIP VESTA002 PIP VESTA003 Other: 22854-SP-000-F-001

REMARKS

22 Remarks:
1. Vent vendor to provide vent with bird and insect screen
2. Deleted.
3. Tank bottom to have cone-up centered configuration to provide for completely emptying the tank during emergency.
4. Pump connection on one side of the tank to be provided with inverted nozzle to facilitate connecting to the portable pump.
5. Vendor can provide different sloping configuration if economical.
6. Tank Supplier shall design, procure and install foundations in accordance with specifications B51-S01, B52-E01, B52-S01 and E29-E01.
7. Flange bolts and nuts shall have a Xylan® fluoropolymer coating (* Registered Trademark of Whitford Corporation).
8. Gaskets: 1.6 mm thick flexible graphite with 304 or 316 SS corrugated insert.
9. Hydrotesting shall be in accordance with Specification 22854-SP-000-F-001 Section 11.
10. Roof shall have 360 degree hand rails.

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**API 650 TANK
DATA SHEET**

Note: This data sheet has been modified from that in the annex of API Standard 650, Eleventh Edition.

Contract: 10E0541A01
Item No: 56-F-03
Revision: 2 Date: 09-Aug-2011
Unit: 56 - Sulfolane
P.O. No.:
Document No.: DS-56-FA-503
Sheet 3 of 10

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* If box is blank, Vendor shall determine and submit as per Appendix L.

Table 1 MATERIALS OF CONSTRUCTION

| Component | Material* / Thickness* (mm) | C.A. | Component | Material* / Thickness* (mm) | C.A. |
|----------------------|-----------------------------|------|------------------------|----------------------------------|------|
| Shell, Course All to | A516 Grade 70 (KCS) / | 1.6 | Reinforcing Pads | A516 Grade 70 (KCS) / | 1.6 |
| Shell, Course to | / | | Manhole/Nozzle Necks | A516 Grade 70 (KCS), A106 GR B / | 1.6 |
| Shell, Course to | / | | Manhole/Nozzle flanges | A516 Grade 70 (KCS), A105 | 1.6 |
| Shell, Course to | / | | Flange Covers | A516 Grade 70 (KCS) / | 1.6 |
| Shell, Course to | / | | Anchor Attachments | A516 Grade 70 (KCS) / | 1.6 |
| Roof | A516 Grade 70 (KCS) / | 1.6 | Submerged Piping | A106 Grade B / | 1.6 |
| Bottom | A516 Grade 70 (KCS) / | 1.6 | Wetted Structural | + A36 / | 1.6 |
| Annular Ring | A516 Grade 70 (KCS) / | 1.6 | Non-wetted Structural | + A36 / | 1.6 |

+ C.A. is to apply to each exposed surface: No Yes

Table 2 BOLTS and ANCHORS

| Component | Head Type | Bolt or Anchor Material | Nut Material | Thread Series | C.A. (mm) |
|--------------------|-----------|-------------------------|---------------|---------------|-----------|
| Flange Bolting | | A193 Grade B7 | A194 Grade 2H | | 1.6 |
| Structural Bolting | | | | | |
| Anchor Bolts | | A307 Grade A | A563 | | 1.6 |

REMARKS (Continued)

| | | |
|----|---|---|
| 22 | Remarks (Continued): | |
| 23 | 11. Vent supplier shall size and supply psv for the floating roof and fixed roof for combined pressure/vacuum relief. Tank pressure/vacuum vent shall be in accordance with API 2000. | 2 |
| 24 | 12. Tank supplier to provide battery limit, deluge and water spray system in accordance with Sabic Specification | 2 |
| 25 | 13. Design Temperature = 85°C. | |
| 26 | 14. CTCl shall confirm PSV nozzle size. | |
| 27 | 15. Liquid level: HLL: 7500 mm, LLL: 1000 mm. | |
| 28 | 16. Provide one 4" gas tight gauging and sample device. Include all necessary accessories to permit gauging and sampling without venting gas to atmosphere. | 1 |
| 29 | 17. Entire tank side wall and roof shall be insulated. | 1 |
| 30 | 18. Locate filling and suction nozzles 180 degree apart to allow sufficient residence time for water settling and thermal equilibrium. | 1 |
| 31 | 19. Flash point: -28°C | 1 |
| 32 | 20. One level indicator to indicate position of internal roof. One level indicator shall extend into the liquid to indicate interface liquid level. | 1 |
| 33 | 21. Limit the inlet velocity to 3 ft/s(1 m/s) until inlet pipe is submerged. | 1 |
| 34 | Add distributor at N1 nozzle as detail A | 1 |
| 35 | 22. Painting code follows 22854-SP-000-X002. | 1 |
| 36 | 23. This tank can contain an interface of hydrocarbons and solvents. Specific gravity@44°C : upper : 0.637 ; lower : 1.240 | 1 |
| 37 | 24. Set pressure : 14.48 mbar(g) Design Relief Rate : 17737.9 Nm3/hr Air. | 2 |
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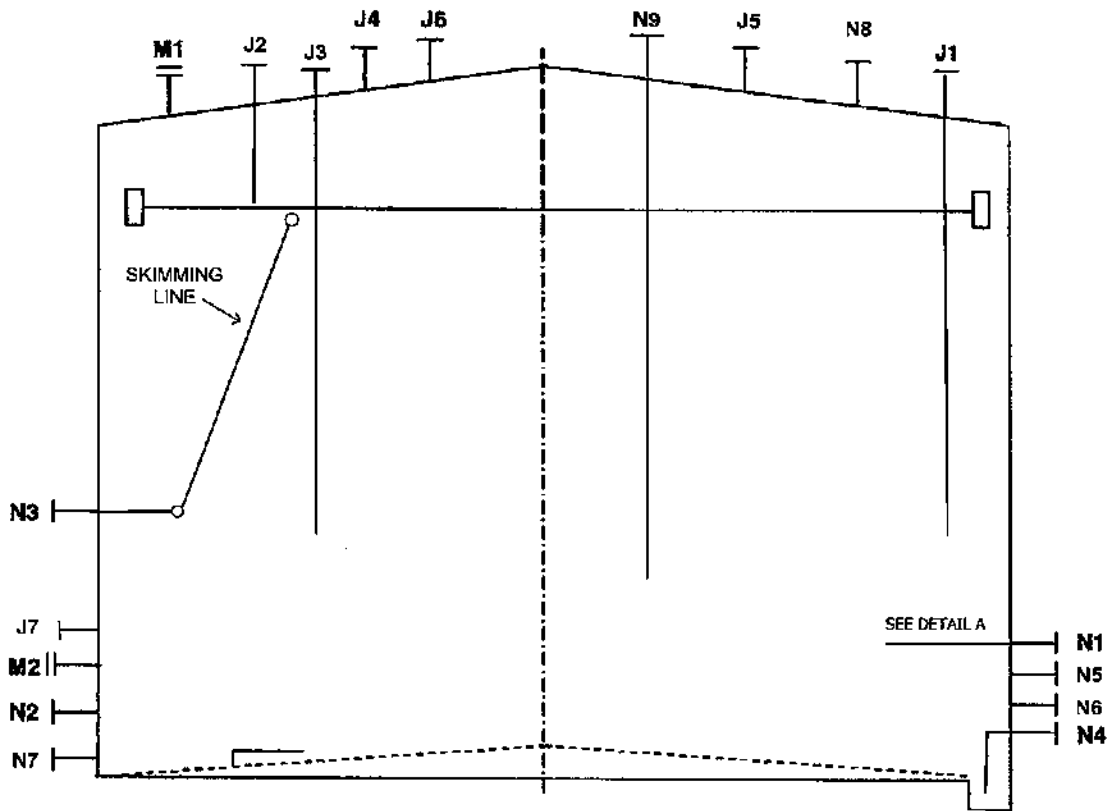
**API 650 TANK
DATA SHEET**

Note: This data sheet has been modified
from that in the annex of API Standard 650,
Eleventh Edition.

| | |
|---------------|---------------------|
| Contract: | 10E0541A01 |
| Item No: | 56-F-03 |
| Revision: | 2 Date: 09-Aug-2011 |
| Unit: | 56 - Sulfolane |
| P.O. No.: | |
| Document No.: | DS-56-FA-503 |
| Sheet | 6 of 10 |

29 Tank Elevation Sketch

VESSEL DIMENSIONS: ID: 9500 mm Height: 9000 mm



Notes:

1. Add a overflow box on nozzle N3
2. Deleted.
3. Deleted.
4. This tank can contain an interface of hydrocarbons and solvents.
A floating suction system shall be provided to allow pumping the top hydrocarbon layer.

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API 650 TANK DATA SHEET

Note: This data sheet has been modified
from that in the annex of API Standard 650,
Eleventh Edition.

| | |
|---------------|---------------------|
| Contract: | 10E0541A01 |
| Item No: | 56-F-03 |
| Revision: | 2 Date: 09-Aug-2011 |
| Unit: | 56 - Sulfolane |
| P.O. No.: | |
| Document No.: | DS-56-FA-503 |
| Sheet | 7 of 10 |

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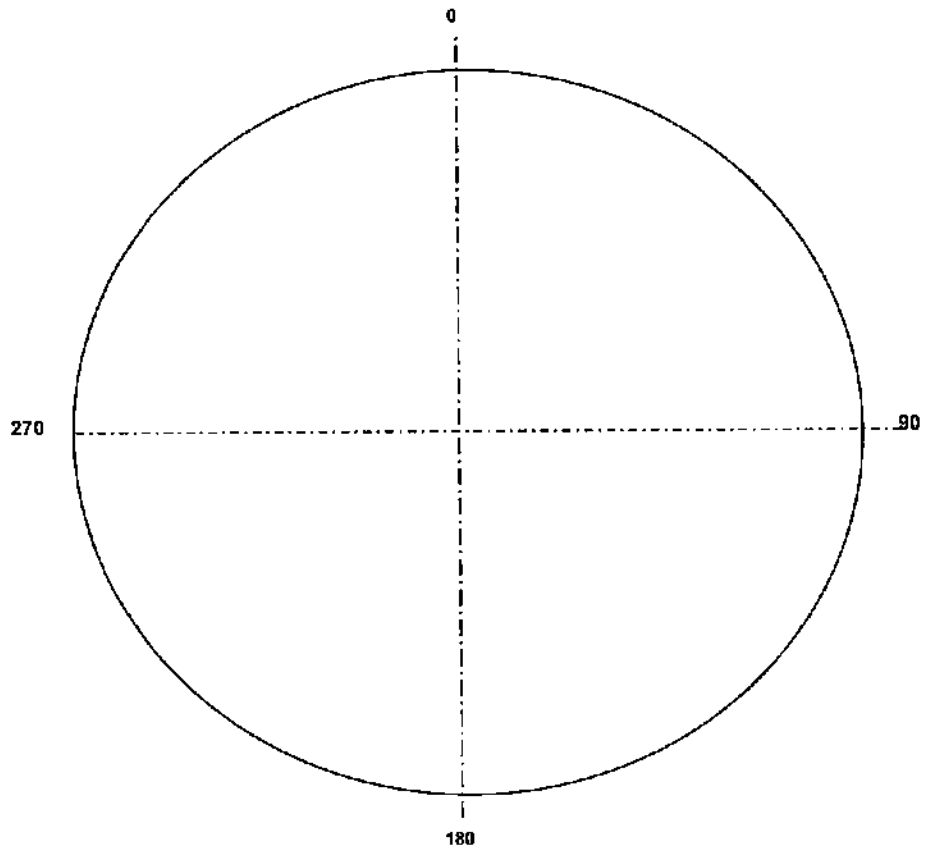


CTCI CORPORATION

REV

1 30 Tank Plan/Nozzle Orientation Sketch

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Note:
Orientations will be furnished later

**API 650 TANK
DATA SHEET**

Note: This data sheet has been modified from that in the annex of API Standard 650, Eleventh Edition.

Contract: 10E0541A01
Item No: 56-F-03
Revision: 2 Date: 09-Aug-2011
Unit: 56 - Sulfolane
P.O. No.:
Document No.: DS-56-FA-503
Sheet B of 10



CTCI CORPORATION

REV

FLOATING ROOF DATA

31 Roof Selection: Design Basis: Appendix C or Appendix H Supplemental Spec.: 22854-SP-000-F-003 Section 8
 External: Single Deck Pontoon Double Deck
 Type of Roof: Internal: Tubular Pontoon Metallic Sandwich Panel Other: _____ Spec.: _____
 32 Seals: Primary Seal: Shoe Envelope Wiper/Compression Plate Other: _____ Spec.: _____
 Shoe Mechanism: Vendor's Standard Other: _____
 Electrically Isolate Mechanism from Shoes: No Yes Wax Scrapers Required: No Yes
 Minimum Shoe Thickness: _____ mm Carbon Steel Shoes to be Galvanized: No Yes
 Secondary Seal: None Shoe Envelope Wiper Other Supplemental Spec.: _____
 33 Data For All Floating Roofs:
 Overflow Opening in Shell Acceptable: No Yes Shell Extension: No Yes
 Roof Drain Check Valves Required: No Yes Roof Drain Isolation Valves Required: No Yes
 Freeze Protection for Roof Drains Required: No Yes Supplemental Requirements: _____
 Roof Drain Piping to Ext. Nozzles: Vendor Std. Armored Flex. Pipe Swivels in Rigid Pipe Other: _____
 Minimum Deck Thickness: _____ mm Foam Dam? No Yes Suppl. Spec.: _____
 Bulkhead Top Edges to be Liquid Tight: No Yes Seal Weld Underside of roof: No Yes
 Electrical Bonding: Shunts: No Yes Cable: No Yes Suppl. Spec.: _____
 Quantity of Non-Guide Pole Gauge Wells Required: _____ Quantity of Sample Hatches Required: _____
 Guide Pole for Gauging: No Yes Datum Plates: No Yes
 Slots in Guide Pole: No Yes Striking Plates: No Yes
 Guide Pole Emissions Limiting Devices: Sliding Cover Pole Wiper Pole Sleeve Float Float Wiper Pole Cap
 Qty. of Roof Manholes: _____ Min. High-Roof Clearance Above Bottom: Operating: 1600 mm Maintenance: 1600 mm
 Removable Leg Storage: No Yes Leg Sleeves Or Fixed Low Legs
 34 Additional Data For External Roof: Not Applicable
 Weather Shield: No Yes Supplemental Specification: _____
 Rolling Ladder: No Yes Field Adjustable Legs No Yes
 Design Rainfall Intensity: _____ mm/hr Based on a _____ Minute Duration Associated with the _____ Storm
 Design Accumulated 24-Hour Rainfall: _____ mm Based on the _____ Storm
 Distortion and Stability Determinations Required: No Yes Supplemental Spec.: _____
 Landed Live Load: _____ N
 35 Additional Data For Internal Roof:
 Two Position Leg: No Yes Cable Supported Roof: No Yes Fixed Roof Inspection Hatches: No Yes
 Internal Roof Drain: No Yes Omit Distribution Pads Supporting Uniform Live Loads: No Yes
 Corrosion Gauge Rq'd.: No Yes Fixed Ladder Rq'd.: No Yes Type of Roof Vent: _____
 Modified Minimum Point Load: No Yes Supplemental Specification: _____
 Mfr. To Leak Test: _____ % of Compartments. In Assembly Yard In Erected Position Unknown; see separate contract terms.
 Roof Erector's Flotation Test: Not Required With Tank Hydrotest at Completion of Roof at Later Date: After Tank Test
 Flotation Test Media: Water Product (see H.6.6.1) Water Quality: Potable Other Suppl. Spec.: _____
 Flotation Test: Duration: _____ hrs Fill Height: _____ mm
 Flotation Test Items provided by Purchaser (see H.6.7): None List attached
 Responsible Party for Inspecting Roof during Initial Fill: Purchaser Other:

Table 5 FLOATING ROOF MATERIALS

| Component | Material/Thickness (mm) | C.A./Coating | Component | Material/Thickness (mm) | C.A./Coating |
|-------------------------|-------------------------|--------------|-----------------------|-------------------------|--------------|
| Deck Plate | CS / | 1.6 | Datum Plate | / | |
| Inner Rim Plate | / | | Tubular Pontoon | / | |
| Outer Rim Plate | / | | Pontoon Bulkhead | / | |
| Foam Dam | / | | Submerged Pipe | / | |
| Sandwich Panel Face Pl. | / | | Guide Pole | / | |
| Sandwich Panel Core | / | | Secondary Seal | / | |
| Gauge Well | / | | Secondary Seal Fabric | / | |
| Drain Sumps | / | | Wiper Tip | / | |
| Opening Sleeves | / | | Wax Scrapers Required | / | |
| Floating Suction Lines | / | | Weather Seal | / | |
| Primary Fabric Seal | / | | Envelope Fabric | / | |
| Foam Log Core | / | | Shoe Mechanism | / | |
| Landing Legs | / | | Primary Seal Shoe | / | |
| Landing Leg Bottom Pad | / | | Removable Covers | / | |
| Manhole Necks | / | | Rolling Ladder | / | |
| Vents | / | | Inlet Diffusers | / | |

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**API 650 TANK
DATA SHEET**

Note: This data sheet has been modified from that in the annex of API Standard 650, Eleventh Edition.

Contract: 10E0541A01
Item No: 56-F-03
Revision: 2 Date: 09-Aug-2011
Unit: 56 - Sulfolane
P.O. No.:
Document No.: DS-56-FA-503
Sheet 9 of 10



36 Heater Nozzle Sketch

Revision Indication

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UOP
A HONEYWELL COMPANY

UOP LLC
25 East Algonquin Road
Des Plaines, Illinois 60017 507, USA

STANDARD DRAWING
3-390-3

| DATE | STATUS | APVD | AUTHD |
|---------|---------|------|-------|
| 31DEC08 | REVISED | JLB | NOF |

STORAGE TANK STEAM AND CONDENSATE NOZZLE

NOTES:

- ALL INTERNAL STEAM AND CONDENSATE PIPING SHALL BE MADE OF KILLED CARBON STEEL, SCHEDULE 80 PIPE.
- DIMENSIONS SHOWN IN PARENTHESES ARE IN MILLIMETERS.
- DETAILS, DIMENSIONS, AND NOTES IN UOP PROJECT SPECIFICATION-36-TANK HEATERS TAKE PRECEDENCE OVER THOSE SHOWN HEREON.

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**API 650 TANK
DATA SHEET**

Note: This data sheet has been modified
from that in the annex of API Standard 650,
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| | |
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| Contract: | 10E0541A01 |
| Item No: | 56-F-03 |
| Revision: | 2 Date: 09-Aug-2011 |
| Unit: | 56 - Sulfolane |
| P.O. No.: | |
| Document No.: | DS-56-FA-503 |
| Sheet | 10 of 10 |

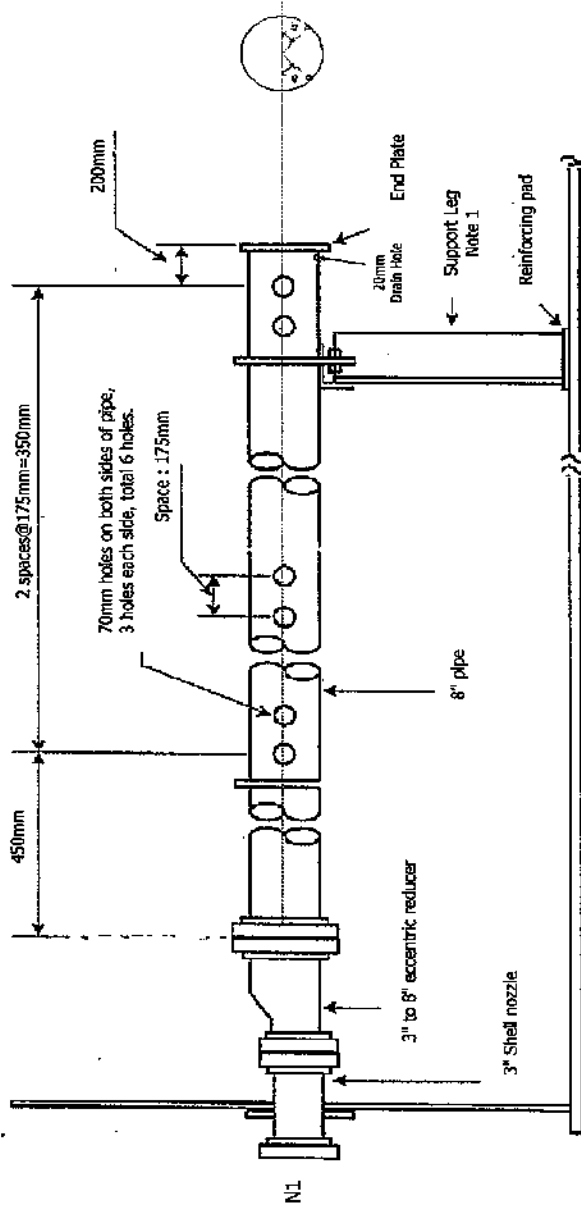
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CTCI CORPORATION

REV

DETAIL A



Note :

1. Support shall be confirmed by manufacturer.

2

2

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GN-502 84.10



ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

TOLUENE COLUMN DATA SHEET

DOCUMENT NO:

DS-58-CA-502

| | | | | | | | | | |
|-----|--------------------|-----|------|-------|-----------|------------------------|---|----------------------|------------------|
| | | | | | | ابن رشيد ibn.rushid | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | | CTCI CORPORATION |
| | | | | | | CERTIFIED | | | |
| | | | | | | PROJ. <u>S P L for</u> | | DATE <u>31/31/11</u> | |
| | | | | | | MGR | | DATE | |
| | | | | | | CLIENT | | DATE | |
| 1 | Issued For Design | CAG | CMW | YSL | 31-Mar-11 | | | | |
| 0 | Issue For Approval | CAG | CMW | YSL | 9-Mar-11 | | | | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | XC32A-58-502 | | |

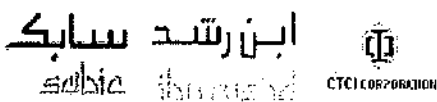
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CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 58-C-02 | 1 THRU 2 OF 2 | 1 | 31-Mar.-2011 |

Attachment total 1 page.

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TOLUENE COLUMN
 DATA SHEET

XC32A-58-502

2 OF 2

DATE
 31-Mar.-2011

REV.
 1

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COLUMN
DATASHEET

Contract: 10E0541A01
Equip. No.: 58-C-02
Revision: 1 Date: 31-Mar.-2011
Unit: 58 - BT Fractionation
PO No.:
Document No.: DS-58-CA-502
Sheet: 1 of 2



| 1 | Client: Arablan Industrial Fibers Company | | Plant: BT Fractionation | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|--|---------------------|---|--------------------|---------------------|-------------------|-----------|------|-------|-----------|-----------|---------|--|----|------------------|--|--|--|------------|---|--|--|---------------|--|--|--|
| 2 | Service: Toluene Column | | Site: Yanbu, Kingdom of Saudi Arabia | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | DESIGN SKETCH | | DESIGN CONDITIONS | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | VESSEL DIMENSIONS ID: 5200 mm T/T: 35000 mm | | Pressure: 3.5 bar(g) at 203 °C | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | Vacuum: FV bar(g) at 175 °C | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | Min. Metal Temp: 9 °C at MAWP bar(g) | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | Liquid Level: Note1 mm | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | Specific Gravity of Liquid: 0.742 at °C | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | OPERATING CONDITIONS | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | Pressure: Note 2 bar(g) at Note 2 °C | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | Vacuum: - bar(g) at - °C | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | Low Temperature: - °C at - °C | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | Hydrogen Partial Press.: - bar(a) at - °C | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | INTERNALS & INSULATION | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | <table border="1"> <thead> <tr> <th>DESCRIPTION</th> <th>Bulk Density kg/m³</th> <th>Liquid Holdup vol%</th> <th>Pressure Drop bar</th> </tr> </thead> <tbody> <tr> <td>Packing:</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Catalyst:</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Mist Eliminator:</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Insulation</td> <td>40/50 mm Hot <input type="checkbox"/> Cold <input type="checkbox"/></td> <td></td> <td></td> </tr> <tr> <td>Fire Proofing</td> <td>76 mm Yes <input type="checkbox"/> No <input type="checkbox"/></td> <td></td> <td></td> </tr> </tbody> </table> | | DESCRIPTION | Bulk Density kg/m³ | Liquid Holdup vol% | Pressure Drop bar | Packing: | | | | Catalyst: | | | | Mist Eliminator: | | | | Insulation | 40/50 mm Hot <input type="checkbox"/> Cold <input type="checkbox"/> | | | Fire Proofing | 76 mm Yes <input type="checkbox"/> No <input type="checkbox"/> | | |
| DESCRIPTION | Bulk Density kg/m³ | Liquid Holdup vol% | Pressure Drop bar | | | | | | | | | | | | | | | | | | | | | | | |
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| Insulation | 40/50 mm Hot <input type="checkbox"/> Cold <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fire Proofing | 76 mm Yes <input type="checkbox"/> No <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | CONSTRUCTION | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | <table border="1"> <thead> <tr> <th></th> <th>Materials</th> <th>Corrosion Allowance</th> </tr> </thead> <tbody> <tr> <td>Shell:</td> <td>SA-516-60</td> <td>3 mm</td> </tr> <tr> <td>Heads</td> <td>SA-516-60</td> <td>3 mm</td> </tr> <tr> <td>Support</td> <td></td> <td>mm</td> </tr> </tbody> </table> | | | Materials | Corrosion Allowance | Shell: | SA-516-60 | 3 mm | Heads | SA-516-60 | 3 mm | Support | | mm | | | | | | | | | | | | |
| | Materials | Corrosion Allowance | | | | | | | | | | | | | | | | | | | | | | | | |
| Shell: | SA-516-60 | 3 mm | | | | | | | | | | | | | | | | | | | | | | | | |
| Heads | SA-516-60 | 3 mm | | | | | | | | | | | | | | | | | | | | | | | | |
| Support | | mm | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | SPECIAL CONDITIONS | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | Stress Relieve (Process Reason Only): Yes <input type="checkbox"/> No <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | Vessel in Wet Sour Service: Yes <input type="checkbox"/> No <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | Steamout Required: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | |
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FOR RECORD

CLIENT : WVN RUSHD
 PROJECT : PTA & AROMATICS -
 TITLE : AROMATICS
 JOB NO. : 51046
 DOC. NO. : DS-58-C-002 (1/1)

| | | REVISIONS | | | |
|------|-------------|------------|---|---|---|
| MARK | | ◇ | ◇ | ◇ | ◇ |
| APRD | APR | | | | |
| CHKD | APR | | | | |
| MADR | R. Robinson | | | | |
| DATE | Nov 26 '96 | Jan 19 '97 | | | |

UOP
 25 East Algonquin Road - PO Box 5017 - Des Plaines, Illinois 60017-5017 - U.S.A.
VESSELS

PROJECT SPECIFICATION
 560696 - 301 - 1 SHEET 4

| REV | DATE | BY | APP'D | REV | DATE | BY | APP'D |
|-----|---------|--------|-------|-----|------|----|-------|
| 0 | 4/9/95 | | | | | | |
| 1 | 8/21/96 | S. KIK | AK | | | | |

SERVICE TOLUENE COLUMN ITEM NO 58-C-02 C-5802

| | | | |
|---------------------|-------------------------|---------|-------------------|
| Design | INT 3.5 BAR(g) | R203 °C | (*) BY CONTRACTOR |
| Conditions | EXT FULL VACUUM | R175 °C | |
| At Top | Metal Temperature (Min) | 8 °C | |
| Operating | TOP | 123 °C | |
| Conditions | BOTTOM | 175 °C | |
| Radiograph | | NR | |
| Postweld Heat Treat | | NR | |
| Joint Efficiency | | NR X | |

Material Specifications

| | | |
|-------|--------------------------------|-------------------------------|
| Heads | SA516-60 | |
| Shell | SA516-60 | |
| Shell | Thickness Required by Code-in. | Corrosion Allowance in. (Min) |
| | | 3 |
| Heads | J | |

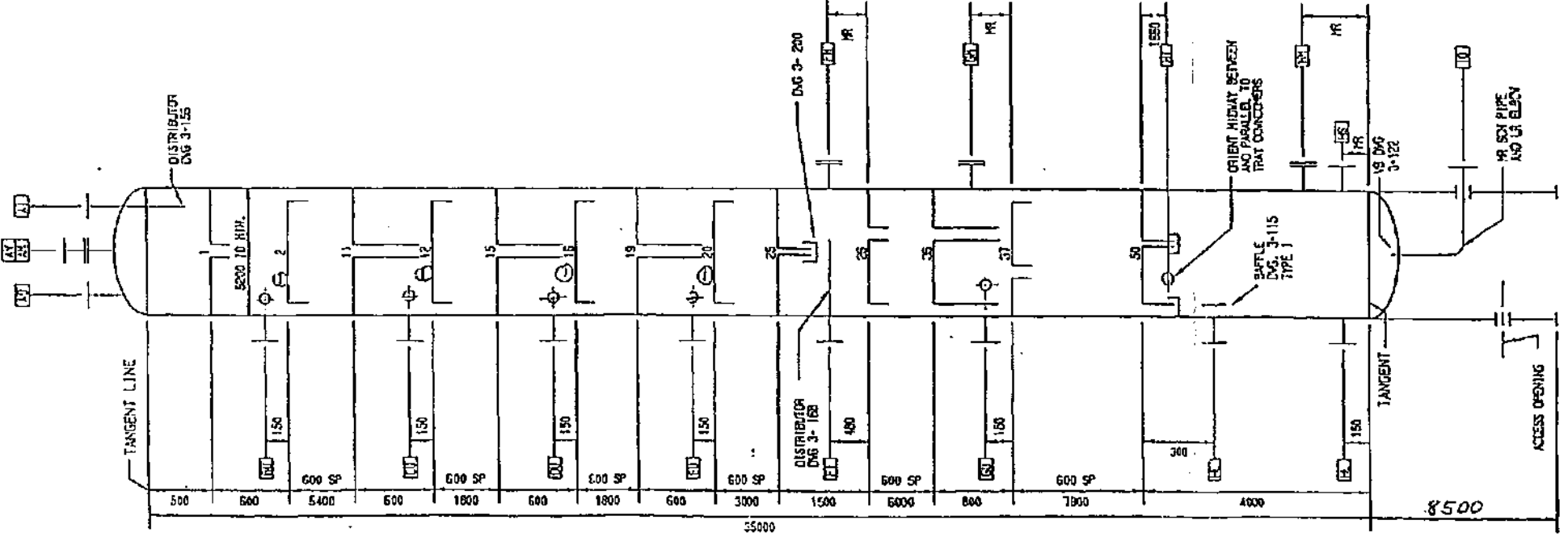
Vessel Heads

| | |
|-----------------------------------|-----------------|
| Top Head | 2:1 ELLIPTICAL |
| Bottom Head | 2:1 ELLIPTICAL |
| Accessories Applied by Fabricator | |
| Ladder & Platform Clips | AS REQUIRED (*) |
| Insulation Clips & Rings | YES |
| Vessel Support | YES |

Nozzles and Manways

| Mark | No | Size Inches | Service |
|------|----|-------------|---------------------|
| AI | 1 | 0 | REFLUX |
| AM | 1 | 24 | HANWAY |
| AO | 1 | 30 | VAPOR OUT (*) |
| AV | 1 | 3 | VENT |
| DU | 2 | 1 | TORIC-T1 10 |
| CU | 2 | 1 | TORIC-T1 10 |
| DU | 2 | 1 | TORIC-T1 10 |
| EU | 2 | 1 | TORIC-T1 10 |
| FI | 1 | 10 | FEED |
| FH | 1 | 24 | HANWAY |
| GH | 1 | 24 | HANWAY |
| GU | 2 | 1 | T1 10 |
| HI | 1 | 46 | NECKLINE IN (*) (C) |
| JL | 2 | 2 | LEVEL |
| JM | 1 | 24 | HANWAY |
| KS | 1 | 3 | STEAMOUT |
| LO | 1 | 20 | BTHS OUT |

Class - ANSI CL150 (*) SURET 2-NOTE A
 Facing - RAISED FACE
 (C) BEVEL FOR WELDING (OPTIONAL)
 Normal Liquid Level = 570 MM ABOVE BOTTOM TANGENT
 Specific Gravity = 0.742
 Delta-P Trays (Total) = 0.41 BAR
 NOZZLES MUST NOT BE LOCATED IN DOWNCOMERS



Drawings Referred to in this Specification
 3-115-2 3-122-0 3-150-1 3-168-2 3-200-2

560696V102

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01


DOCUMENT TITLE:

TX OXYGEN STRIPPER RECEIVER

DOCUMENT NO:

DS-58-DA-503

GN-502 84.10

| | | | | | | | | |
|-----|--------------------|-----|------|------------|-----------|-------------------------------------|--|---|
| | | | | | | ابن رشيد ibn rushid | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA |  CTCI CORPORATION |
| 3 | Revised as Marked | WCC | CMW | <i>YSL</i> | 16-Nov-11 | CERTIFIED | | |
| 2 | Revised as Marked | WCC | CMW | YSL | 11-Aug-11 | PROJ. _____ MGR _____ DATE _____ | | |
| 1 | Issued for Design | WCC | CMW | YSL | 26-Apr-11 | | | |
| 0 | Issue For Approval | WCC | CMW | YSL | 9-Mar-11 | CLIENT _____ DATE _____ | | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | XC32B-58-503 | |

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| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 58-D-03 | 1 THRU 2 OF 2 | 3 | 14-Nov.-2011 |

GN-504 84.10

ابن رشيد سابك
 sabia ibn rushd

 CTCI CORPORATION

TX OXYGEN STRIPPER RECEIVER
DATA SHEET

XC32B-58-503

2 OF 2

DATE
 14-Nov.-2011

REV.

3

ابن رشيد
Ibn Rushd
FLUOR

**HORIZONTAL VESSEL
DATA SHEET**

Contract: 10E0541A01
 Equip. No.: 58-D-03
 Revision: 3 Date: 14-Nov-2011
 Unit: 58 - Benzene Toulene Fract
 P.O. No.:
 Document No. DS-58-DA-503
 Sheet 1 of 2

سابك
sabic

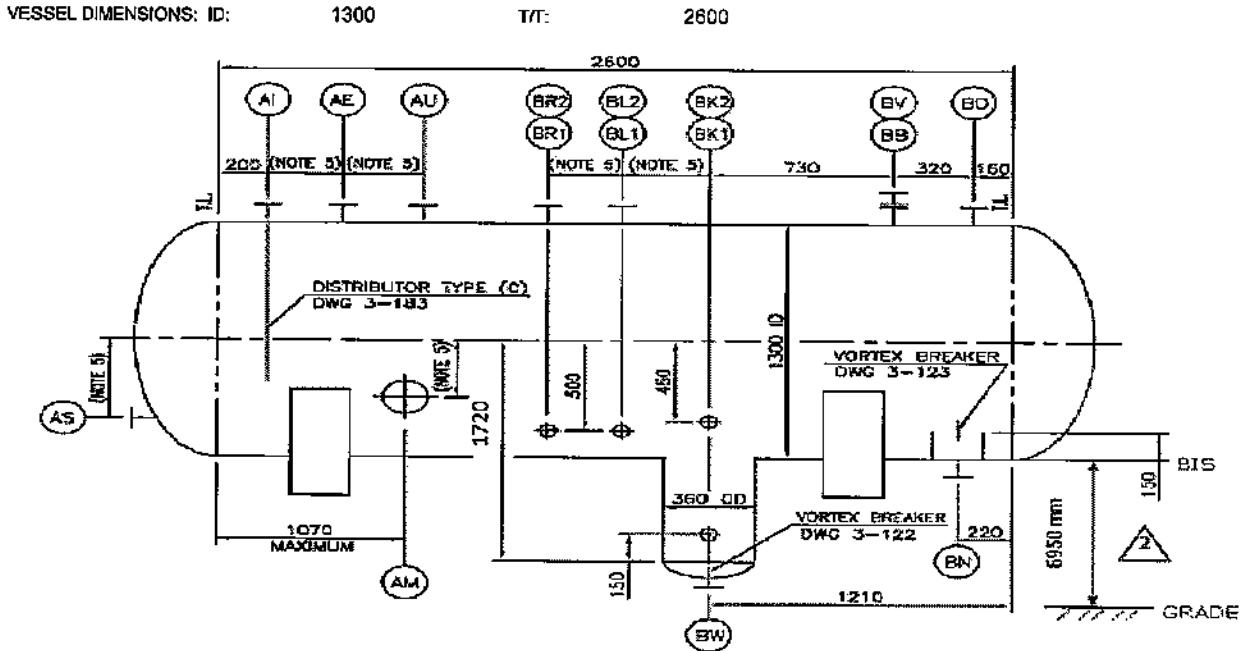


Client: Arabian Industrial Fibers Company (Ibn Rushd)
 Service: TX Oxygen Stripper Receiver

Plant: Benzene Toulene Fract
 Site: Yanbu, Kingdom of Saudi Arabia

REV

DESIGN SKETCH



| DESIGN CONDITIONS | | CONSTRUCTION | | | |
|-----------------------------|-----------------------|---------------------------------------|--------------------|----------------------|--------|
| Pressure: | 7.0 bar(g) | MATERIALS | | CORROSION ALLOWANCE | |
| At: | 120 °C | Shell: | SA-516-70N(K.C.S) | (Note 7) | mm |
| Vacuum: | FV bar(g) | Internals: | C.S. | n/a | mm |
| At: | 120 °C | Lining/Cladding: | n/a | n/a | mm |
| Min. Design Metal Temp: | 8 °C | Head: | SA-516-70N(K.C.S) | (Note 7) | mm |
| At: | MAWP bar(g) | Boot: | SA-516-70N(K.C.S) | (Note 7) | mm |
| Liquid Level: | (Note 4) (Note 14) mm | INTERNALS | | | |
| Specific Gravity of Liquid: | 0.834 | DESCRIPTION | BULK DENSITY kg/m³ | LIQUID HOLDUP Vol. % | ΔP bar |
| OPERATING CONDITIONS | | Packing/Tray: | n/a | n/a | n/a |
| Pressure +: | 3.1 (Note 5) bar(g) | Catalyst: | n/a | n/a | n/a |
| At: | 52 °C | Mist Eliminator: | n/a | n/a | n/a |
| Vacuum -: | bar(g) | NOTES & SPECIAL CONDITIONS | | | |
| At: | °C | Stress Relieve (Process Reason Only): | No | | |
| Low Temperature: | °C | Vessel In Special Service: | No | | |
| At: | bar(g) | Steamout Required: | Yes | | |
| Hydrogen Partial Pressure: | bar(g) | | | | |
| At: | °C | | | | |
| INSULATION | | | | | |
| Type: | n/a | | | | |
| Req'd Thickness: | n/a | | | | |
| Fireproofing: | n/a | | | | |

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ابن رشيد
ibn rushd
FLUOR

**HORIZONTAL VESSEL
DATA SHEET**

Contract: 10E0541A01
Equip. No.: 58-D-03
Revision : 3 Date : 14-Nov.-2011
Unit : 58 - Benzen Toulene Fract
P.O. No. :
Document No. DS-58-DA-503
Sheet : 2 of 2

سابك
sabik



REV

NOZZLE SCHEDULE

| TAG | QTY | SIZE In | PRESSURE RATING | DESCRIPTION | |
|-----|-----|------------|--------------------|-------------------|---|
| AE | 1 | 1-1/2 | 150# RFLWN | EQUALIZING | |
| AI | 1 | 3 | 150# RFLWN | INLET | |
| AM | 1 | 24 | 150# RFLWN | MANWAY W/ DAVIT | |
| AS | 1 | 2 | 150# RFLWN | STEAMOUT(NOTE 12) | 0 |
| AU | 1 | 3 | 300# RFLWN | RELIEF | 3 |
| BB | 1 | 4 | 150# RFLWN | VENTILATION | |
| BK1 | 1 | 2 | 300# RFLWN | LEVEL | |
| BK2 | 1 | 2 | 300# RFLWN | LEVEL | |
| BL1 | 1 | 2 | 300# RFLWN | LEVEL | |
| BL2 | 1 | 2 | 300# RFLWN | LEVEL | |
| BN | 1 | 4 | 150# RFLWN | OUTLET | |
| BR1 | 1 | 1-1/2 | 150# RFLWN | LEVEL ALARM | |
| BR2 | 1 | 1-1/2 | 150# RFLWN | LEVEL ALARM | |
| BO | 1 | 2 | 150# RFLWN | OUTLET | 0 |
| BV | 1 | 2 | 150# RFLWN | VENT | |
| BW | 1 | 2 | 150# RFLWN | OUTLET | |

NOTES:

- One vessel required with mark no. 58-D-03. 0
- Estimated thicknesses listed below are estimate based on the ASME Code requirements and are meant to be used for quotation purposes only. 2
- Dimensions are in millimeter unless otherwise noted.
- Vessel shall have a Normal Liquid Level (NLL) hold-up 20 mm above vessel centerline. HLL : 777 mm, LLL : 563 mm. 0
- The process design is to be checked and revised as necessary by CTCL during detailed design before issuing approved for purchase. 0
- Applicable specifications: IR11-SP-000-A-K007, 22854-SP-000-A-003, 22854-SP-000-A-004, 22854-SP-000-D-001, 22854-SP-000-W-22854-SP-000-W-002, 22854-SP-000-W-003, P01-E07, T01-S01, 3-11.
- Corrosion Allowance (C.A.) shall be as follows:
Main shell/head C.A. = 3.0 mm Boot shell/head C.A. = 6.0 mm
- Vessel and boot heads are 2:1 Elliptical. 0
- Paint coating shall be in accordance with SES-PCS-3.
- Following UOP standards apply: 3-122, 3-123 and 3-183.
- ASME code stamp is required.
- Steamout at 150(232 max.)°C and 3.5(4.1 max.) bar(g) 0
- New vessel, with boot 360 mm OD x 1070 mm. 0
- Boot interface liquid level : HLL : 1032 mm, LLL : 748 mm. 0

| THE ESTIMATED MECHANICAL WEIGHTS | | (kg) | |
|----------------------------------|--|------|---|
| FABRICATED | | 2070 | 2 |
| EMPTY | | 2570 | |
| OPERATING | | 4430 | |
| FULL OF WATER | | 6720 | |
| THE ESTIMATED WALL THICKNESS | | (mm) | |
| SHELL | | 9 | 2 |
| HEADS | | 7 | |

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

RAFFINATE COLUMN RECEIVER DATA SHEET

DOCUMENT NO:

DS-53-DA-505

| | | | | | | | | | |
|-----------|--------------------|-----|------|------------|-----------|----------------------|---|--------------|------------------|
| | | | | | | ابن رشد ibn rushd | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | | CTCI CORPORATION |
| CERTIFIED | | | | | | | | | |
| 2 | Revised As Marked | KCK | CBC | <i>YSC</i> | 11-Aug-11 | PROJ. | | | |
| 1 | Issued For Design | KCK | CBC | YSL | 26-Apr-11 | MGR | _____ | DATE | _____ |
| 0 | Issue For Approval | KCK | CMW | YSL | 9-Mar-11 | CLIENT | _____ | DATE | _____ |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | | XC32B-53-505 | |

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GN-504 84.10

ابن رشد سابق
 ابن رشد سابق



RAFFINATE COLUMN RECEIVER
 DATA SHEET

XC32B-53-505

2 OF 2

DATE
 11-Aug.-2011

REV.

2

CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 53-D-05 | 1 THRU 2 OF 2 | 2 | 11-Aug.-2011 |

Attachment total 1 page.

ابن رشيد
ibn rshid
FLUOR.

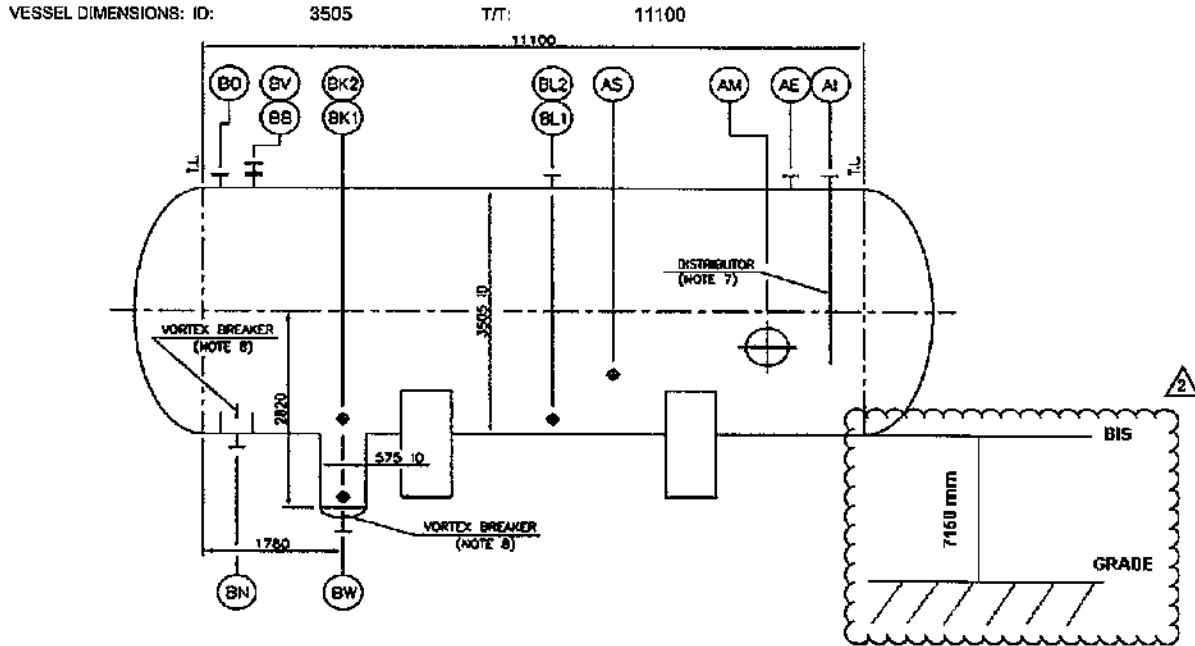
HORIZONTAL VESSEL

Contract: 10E0541A01
Equip. No.: 53-D-05
Revision: 2 Date: 11-Aug.-2011
Unit: 53 - Parex
P.O. No.:
Document No. DS-53-DA-505
Sheet 1 of 2



Client: Arabian Industrial Fibers Company Plant: Parex
Service: Raffinate Column Receiver Site: Yanbu, Kingdom of Saudi Arabia

DESIGN SKETCH



| DESIGN CONDITIONS | | | CONSTRUCTION | | | |
|-----------------------------|-------------|--------|---------------------------------------|-----------------------------------|-------------------------|-----------|
| Pressure: | 4.5 | bar(g) | MATERIALS | | CORROSION ALLOWANCE | |
| At: | 215 | °C | Shell: | SA-516-70 | 3 mm | |
| Vacuum: | FV | bar(g) | Internals: | C.S. | n/a mm | |
| At: | 60 | °C | Lining/Cladding: | n/a | n/a mm | |
| Min. Design Metal Temp: | 9 (Note 11) | °C | Head: | SA-516-70 | 3 mm | |
| At: | MAWP | bar(g) | Boot: | SA-516-70 | 6 mm | |
| Maximum Liquid Level: | (Note 4, 9) | mm | INTERNALS | | | |
| Specific Gravity of Liquid: | 0.826 | | DESCRIPTION | BULK DENSITY kg/m ³ | LIQUID HOLDUP Vol. % | ΔP bar |
| OPERATING CONDITIONS | | | Packing/Tray: | n/a | n/a | n/a |
| Pressure +: | 0.07 | bar(g) | Catalyst: | n/a | n/a | n/a |
| At: | 66 | °C | Mist Eliminator: | n/a | n/a | n/a |
| Vacuum -: | | bar(g) | NOTES & SPECIAL CONDITIONS | | | |
| At: | | °C | Stress Relieve (Process Reason Only): | No | | |
| Low Temperature: | | °C | Vessel In Special Service: | No | | |
| At: | | °C | Steamout Required: | Yes (Design for FV) | | |
| INSULATION | | | | | | |
| Type: | Hot | | | | | |
| Req'd Thickness: | 40 mm | | | | | |
| Fireproofing: | Yes (75 mm) | | | | | |

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| | | | |
|---|---|---|--|
| ابن رشيد ibn rushd FLUOR | HORIZONTAL VESSEL DATA SHEET | Contract: 10E0541A01 Equip. No.: 53-D-05 Revision : 2 Date : 11-Aug.-2011 Unit : 53 - Parex P.O. No. : Document No. DS-53-DA-505 Sheet : 2 of 2 | سابك ctci CTCI CORPORATION |
|---|---|---|--|

| NOZZLE SCHEDULE | TAG | QTY | SIZE in | PRESSURE RATING | DESCRIPTION | REV |
|-----------------|-----|-----|------------|--------------------|--------------------------|-----|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | AE | 1 | 3 | 150# RFWN | EQUALIZING | |
| 4 | AI | 1 | 12 | 150# RFWN | INLET W/ INLET PIPE | |
| 5 | AM | 1 | 20 | 150# RFWN | MANWAY W/ DAVIT | |
| 6 | AS | 1 | 2 | 150# RFWN | STEAMOUT (Note 10) | 0 |
| 7 | BB | 1 | 8 | 150# RFWN | VENTILATION W/ BLIND | |
| 8 | BK1 | 1 | 1-1/2 | 150# RFLWN | LEVEL | |
| 9 | BK2 | 1 | 1-1/2 | 150# RFLWN | LEVEL | |
| 10 | BL1 | 1 | 2 | 300# RFWN | LEVEL - LLS | |
| 11 | BL2 | 1 | 2 | 300# RFWN | LEVEL - LLS | |
| 12 | BN | 1 | 12 | 150# RFWN | OUTLET W/ VORTEX BREAKER | |
| 13 | BO | 1 | 4 | 150# RFWN | VAPOR OUTLET | |
| 14 | BV | 1 | 2 | 150# RFWN | VENT | |
| 15 | BW | 1 | 2 | 150# RFWN | OUTLET W/ VORTEX BREAKER | |
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NOTES:

- 1) This vessel tag number 53-D-05 is an existing vessel in the same service. The only change is higher design pressure.
Existing design condition: 3.9 bar(g) @ 215 °C, new design condition: 4.5 bar(g) @ 215 °C.
- 2) Based on vessel fabricator's calculations and MAWP (MAWP 6.5 bar(g) hot and corroded), the vessel is satisfactory for the higher design pressure. CTCI to verify the available thickness after evaluating maintenance records and performing UT testing and confirm. CTCI to vessel is satisfactory provide necessary ASME code documentation for the repair "R" stamp and new nameplate.
- 3) Dimensions are in millimeter unless otherwise noted.
- 4) Vessel shall have a Normal Liquid Level (NLL) hold-up to vessel centerline. Liquid level: HLL = 2299 mm, LLL = 1201 mm.
- 5) Vessel heads and boot are 2:1 Elliptical.
- 6) For nozzle elevation and orientation refer to vendor certified drawing no. D96-4754101 (Sheet 1 of 8) Rev.4 dated 6/10/97.
- 7) For details of distributor refer to vendor certified drawing no. D96-4754101 (Sheet 4 of 8) Rev.2 dated 4/2/97.
- 8) For details of vortex breaker refer to vendor certified drawing no. D96-4754101 (Sheet 2 of 8) Rev.3 dated 6/10/97.
- 9) Boot interface liquid level: HLL = 987 mm, LLL = 783 mm.
- 10) Steamout at 150 (232 max.) °C and 3.5 (4.1 max.) bar (g).
- 11) The Min. Design Ambient Temperature should be 6 °C.

| | |
|--|--------|
| WEIGHTS ARE BASED ON VENDOR CERTIFIED DRAWING No. D96-4754101 | |
| (SHT. 3 of 8) REV.4 DATED 4/2/97 | |
| EMPTY | 28818 |
| OPERATING | 79618 |
| FULL OF WATER | 151363 |
| THICKNESS ARE BASED ON VENDOR CERTIFIED DRAWING No. D96-4754101 | |
| (SHT. 1 of 8) REV.4 DATED 6/10/97 | |
| SHELL | 13 |
| HEADS | 13 |

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CLIENT : IBN RUSHD
 PROJECT PTA & AROMATICS -
 TITLE : AROMATICS
 JOB NO. : 51046
 DOC. NO. : 05-93-D-0051 1/1

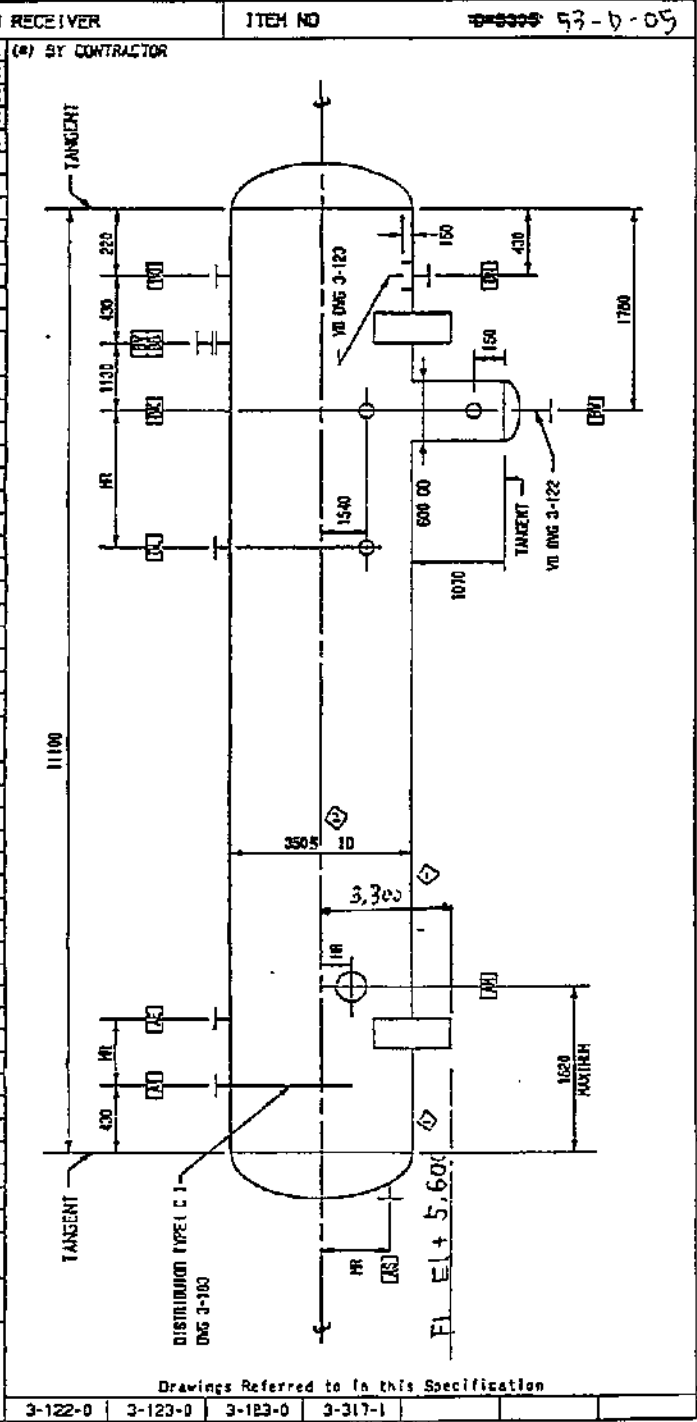
| REVISIONS | | | |
|-----------|-------------|-------------|-------------|
| MARK | | ◇ | ◇ |
| APRD | APR 9/1/96 | | |
| CHKD | | | |
| MADE | K. Nakamura | K. Nakamura | K. Nakamura |
| DATE | Mar. 03 '96 | Dec. 29 '96 | Feb. 03 '97 |

FOR RECORD

| | | | | |
|--|--------------------------|---------|----|-------|
| UOP 25 East Algonquin Road • PO Box 5017 • Des Plaines, Illinois 60017-5017 • U.S.A. | PROJECT SPECIFICATION | | | |
| | 580691 - 301 - 0 SHEET 9 | | | |
| VESSELS | REV | DATE | BY | APP'D |
| | 0 | 6-16-93 | | |

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| | | | | |
|---|--|-------------|-------------------|---------|
| SERVICE | RAFFINATE COLUMN RECEIVER | | ITEM NO | 53-D-05 |
| Design | INT 3.9 BAR (g) | 4215 °C | (*) BY CONTRACTOR | |
| Conditions at Top | EXT FULL VACUUM | 50 °C | | |
| Operating Conditions | Metal Temperature (Min) | 9 °C | | |
| Radiograph | HR | | | |
| Postweld Heat Treat | HR | | | |
| Joint Efficiency | HR X | | | |
| Material Specifications | | | | |
| Heads | SA516-70 | | | |
| Shell | SA516-70 | | | |
| Drop Leg | SA516-70 | | | |
| D.L. Head | SA516-70 | | | |
| Shell | Thickness + Corrosion Required by Allowance Code-mm. mm. (Min) | | | |
| VESSEL | 3 | | | |
| DROP LEG | 6 | | | |
| Vessel Heads | | | | |
| Vessel | 2:1 ELLIPTICAL | | | |
| Drop Leg | 2:1 ELLIPTICAL | | | |
| Accessories Applied by Fabricator | | | | |
| Ladder & Platform Clips | AS REQUIRED (F) | | | |
| Insulation Clips & Rings | YES | | | |
| Vessel Support | YES | | | |
| Nozzles and Manways | | | | |
| Mark | No | Size Inches | Service | |
| AE | 1 | 3 | EQUALIZING | |
| A1 | 1 | 12 | INLET | |
| 4H | 1 | 20 | MANWAY | |
| AS | 1 | 2 | STEAMOUT | |
| BB | 1 | 8 | VENTILATION | |
| BK | 2 | 1 1/2 | LEVEL | |
| BL | 2 | 2 | LEVEL-LLS (2) | |
| BN | 1 | 12 | OUTLET | |
| BD | 1 | 4 | VAPOR OUTLET | |
| BV | 1 | 2 | VENT | |
| BW | 1 | 2 | OUTLET | |
| Class - ANSI CL150 | | | | |
| (2) ANSI CL300 | | | | |
| Facing - RAISED FACE | | | | |
| Normal Liquid Level - VESSEL CENTERLINE | | | | |
| Specific Gravity = 0.832 | | | | |



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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

EXTRACT COLUMN RECEIVER DATA SHEET

DOCUMENT NO:

DS-53-DA-508

GN-502 84.10

| | | | | | | | | |
|-----|--------------------|-----|------|-------|-----------|------------------------|---|------------------|
| | | | | | | ابن رشيد ibn.rushid | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | CTCI CORPORATION |
| | | | | | | CERTIFIED | | |
| 2 | Revised As Marked | KCK | CBC | YSL | 28-Apr-11 | PROJ. | | |
| 1 | Issued For Design | KCK | CBC | YSL | 28-Apr-11 | MGR _____ | DATE _____ | |
| 0 | Issue For Approval | KCK | CBC | YSL | 9-Mar-11 | CLIENT _____ | DATE _____ | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | XC32B-53-508 | |

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GN-504 84.10

ابن رشد سابق
 asbiq ibn رشد



EXTRACT COLUMN RECEIVER
 DATA SHEET

XC32B-53-508

2 OF 2

DATE
 11-Aug-2011

REV.

2

CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 53-D-08 | 1 THRU 2 OF 2 | 2 | 11-Aug-2011 |

Attachment total 1 page.

ابن رشيد
ibn rushid
FLUOR

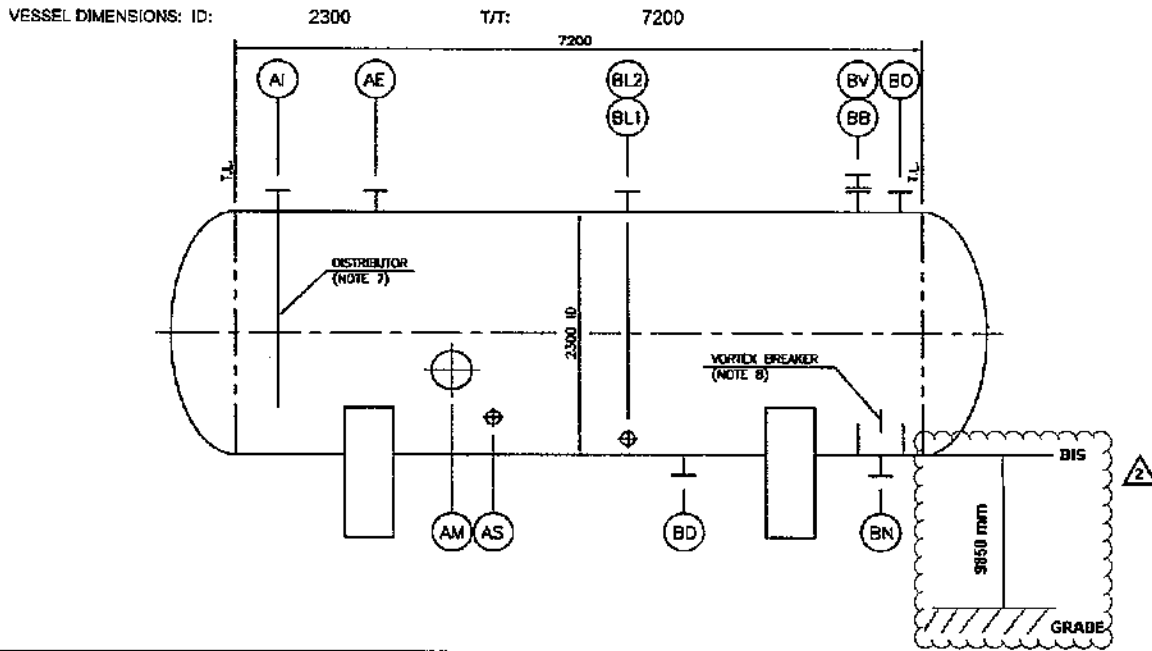
**HORIZONTAL VESSEL
DATA SHEET**

Contract: 10E0541A01
Equip. No.: 53-D-08
Revision: 2 Date: 11-Aug-2011
Unit: 53 - Parex
P.O. No.:
Document No. DS-53-DA-508
Sheet 1 of 2



Client: Arabian Industrial Fibers Company Plant: Parex
Service: Extract Column Receiver Site: Yanbu, Kingdom of Saudi Arabia

DESIGN SKETCH



DESIGN CONDITIONS

| | | |
|-----------------------------|-------------|--------|
| Pressure: | 4.5 | bar(g) |
| At: | 215 | °C |
| Vacuum: | FV | bar(g) |
| At: | 121 | °C |
| Min. Design Metal Temp: | 9 (Note 10) | °C |
| At: | MAWP | bar(g) |
| Maximum Liquid Level: | (Note 4) | mm |
| Specific Gravity of Liquid: | 0.770 | |

CONSTRUCTION

| MATERIALS | | CORROSION ALLOWANCE | |
|------------------|-----------|---------------------|----|
| Shell: | SA-516-70 | 3 | mm |
| Internals: | C.S. | n/a | mm |
| Lining/Cladding: | n/a | n/a | mm |
| Head: | SA-516-70 | 3 | mm |

OPERATING CONDITIONS

| | | |
|----------------------------|------|--------|
| Pressure +: | 0.07 | bar(g) |
| At: | 121 | °C |
| Vacuum -: | | bar(g) |
| At: | | °C |
| Low Temperature: | | °C |
| At: | | bar(g) |
| Hydrogen Partial Pressure: | | bar(a) |
| At: | | °C |

| INTERNALS | | | |
|------------------|-----------------------------------|-------------------------|-----------|
| DESCRIPTION | BULK DENSITY kg/m ³ | LIQUID HOLDUP Vol. % | ΔP bar |
| Packing/Tray: | n/a | n/a | n/a |
| Catalyst: | n/a | n/a | n/a |
| Mist Eliminator: | n/a | n/a | n/a |

NOTES & SPECIAL CONDITIONS

| | |
|---------------------------------------|---------------------|
| Stress Relieve (Process Reason Only): | No |
| Vessel In Special Service: | |
| Steamout Required: | Yes (Design for FV) |

INSULATION

| | |
|------------------|-------------|
| Type: | Hot |
| Req'd Thickness: | 40 mm |
| Fireproofing: | Yes (75 mm) |

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FOR RECORD

CLIENT : IBN RUSHD
 PROJECT PTA & AROMATICS -
 TITLE : AROMATICS
 JOB NO. : 51046
 DOC. NO. : DS-93-D-008 (Y1)

| | | REVISIONS | | | |
|------|--------------------|--------------------|--------------------|---|---|
| MARK | | ① | ② | ③ | ④ |
| APRD | <i>R.A.</i> | <i>T. Lita</i> | <i>T. Lita</i> | | |
| CHKD | <i>[Signature]</i> | <i>[Signature]</i> | <i>[Signature]</i> | | |
| MADE | <i>[Signature]</i> | <i>[Signature]</i> | <i>[Signature]</i> | | |
| DATE | Mar 09 96 | Mar 29 96 | Feb 03 97 | | |

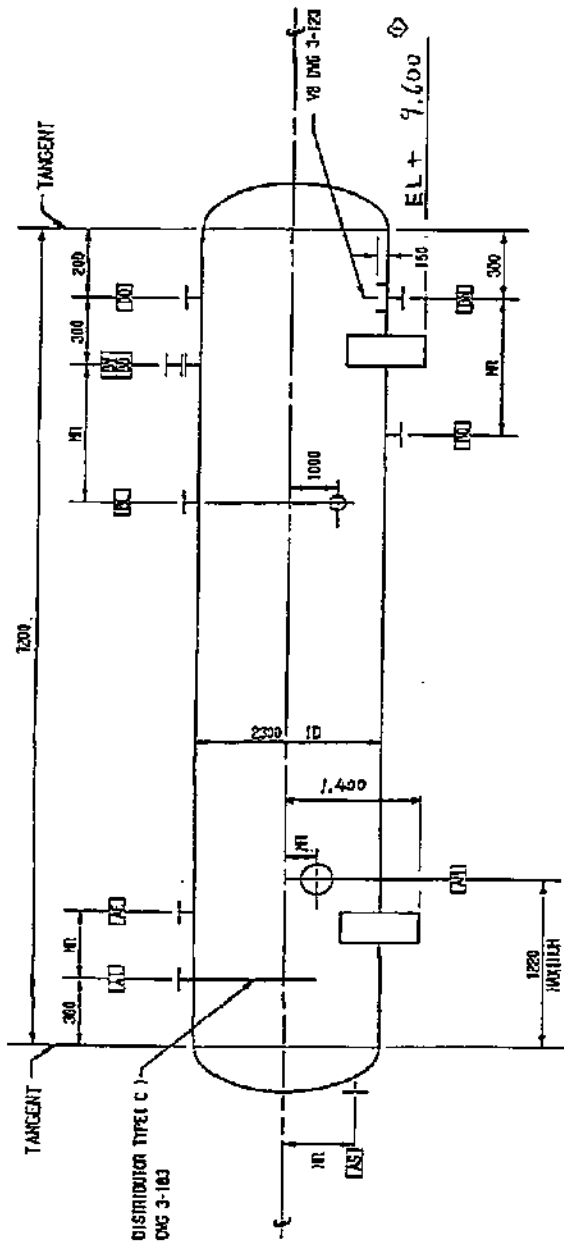
| | | | | | |
|--|---|---------|----|-------|-----|
| UOP 25 East Algonquin Road - PO Box 5017 - Des Plaines, Illinois 60017-5017 - U.S.A. | PROJECT SPECIFICATION 560891 - 301 - 0 SHEET 12 | | | | |
| | REV | DATE | BY | APP'D | REV |
| | 0 | 2-12-95 | | | |

VESSELS

SERVICE: EXTRACT COLUMN RECEIVER ITEM NO: ~~560891~~ 53-D-08

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| | | | |
|---|--------------------------------|-------------------------------|--------------------------|
| Design | | INT 3.9 BAR (g) | ②15 °C (*) BY CONTRACTOR |
| Conditions at Top | | EXT FUEL VACUUM | ②121 °C |
| Operating Conditions | | Metal Temperature (Min) | 9 °C |
| Radiograph | | | MR |
| Postweld Heat Treat | | | MR |
| Joint Efficiency | | | MR 2 - |
| Material Specifications | | | |
| Heads | | SA516-70 | ② |
| Shell | | SA516-70 | |
| Shell | Thickness Required by Code-no. | Corrosion Allowance no. (Min) | |
| | | 3 | |
| Heads | | 3 | |
| Vessel Heads | | | |
| Vessel | 2:1 ELLIPTICAL | | |
| Drop Leg | | | |
| Accessories Applied by Fabricator | | | |
| Ladder & Platform Clips | AS REQUIRED (*) | | |
| Insulation Clips & Rings | YES | | |
| Vessel Support | YES | | |
| Nozzles and Manways | | | |
| Mark No | Size Inches | Service | |
| AE 1 | 3 | EQUALIZING | |
| AI 1 | 10 | INLET | |
| AM 1 | 20 | MANWAY | |
| AS 1 | 2 | STEAMOUT | |
| BS 1 | 6 | VENTILATION | |
| BD 1 | 2 | DRAIN | |
| BL 2 | 2 | LEVEL-LLS (2) | |
| BN 1 | 10 | OUTLET | |
| BD 1 | 3 | OUTLET | |
| BV 1 | 2 | VENT | |
| Class - ANSI CL150 (2) ANSI CL300 | | | |
| Facing - RAISED FACE | | | |
| Normal Liquid Level - VESSEL CENTERLINE | | | |
| Specific Gravity = 0.769 | | | |



| | | | | |
|--|---------|---------|--|--|
| Drawings Referred to in this Specification | | | | |
| 3-123-0 | 3-163-0 | 3-317-1 | | |

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO.10E0541A01

DOCUMENT TITLE:

FINISHING COLUMN RECEIVER DATA SHEET

DOCUMENT NO:

DS-53-DA-510

GN-502 84.10

| | | | | | | | | | |
|-----------|--------------------|-----|------|-------|-----------|------------------------|---|--------------|------------------|
| | | | | | | ابن رشيد ibn.rushid | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | | CTCI CORPORATION |
| CERTIFIED | | | | | | | | | |
| 2 | Revised As Marked | KCK | CBC | YSL | 11-Aug-11 | PROJ. | | | |
| 1 | Issued For Design | KCK | CBC | YSL | 26-Apr-11 | MGR | DATE | | |
| 0 | Issue For Approval | KCK | CBC | YSL | 9-Mar-11 | CLIENT | DATE | | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | | XC32B-53-510 | |

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GN-504 84.10

ابن رشد سابق
 abn.rshd



FINISHING COLUMN RECEIVER
 DATA SHEET

XC32B-53-510

2 OF 2

DATE
 11-Aug-2011

REV.

2

CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 53-D-10 | 1 THRU 2 OF 2 | 2 | 11-Aug-2011 |

Attachment total 1 page.

ابن رشيد
ibn rushid
FLUOR.

HORIZONTAL VESSEL

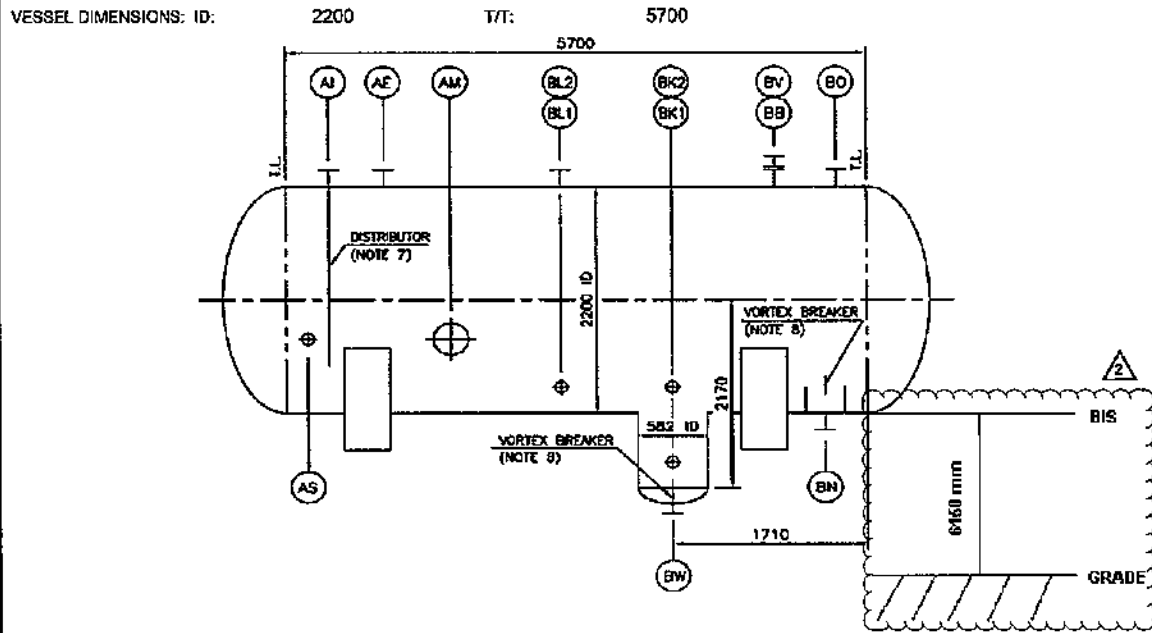
Contract: 10E0541A01
Equip. No.: 53-D-10
Revision: 2 Date: 11-Aug-2011
Unit: 53 - Parex
P.O. No.:
Document No. DS-53-DA-510
Sheet 1 of 2

سابك
sabic

REV


Client: Arablan Industrial Fibers Company Plant: Parex
Service: Finishing Column Receiver Site: Yanbu, Kingdom of Saudi Arabia

DESIGN SKETCH



| DESIGN CONDITIONS | | | CONSTRUCTION | | |
|-----------------------------|-------------|--------|---------------------------------------|-----------------------------------|-------------------------|
| Pressure: | 4.5 | bar(g) | Shell: | SA-516-70 | CORROSION ALLOWANCE |
| At: | 121 | °C | Internals: | C.S. | 3 mm |
| Vacuum: | FV | bar(g) | Lining/Cladding: | n/a | n/a mm |
| At: | 66 | °C | Head: | SA-516-70 | 3 mm |
| Min. Design Metal Temp: | 9 (Note 11) | °C | Boot: | SA-516-70 | 8 mm |
| At: | MAWP | bar(g) | | | |
| Maximum Liquid Level: | (Note 4, 9) | mm | | | |
| Specific Gravity of Liquid: | 0.812 | | | | |
| OPERATING CONDITIONS | | | INTERNALS | | |
| Pressure +: | 0.07 | bar(g) | DESCRIPTION | BULK DENSITY kg/m ³ | LIQUID HOLDUP Vol. % |
| At: | 66 | °C | Packing/Tray: | n/a | n/a |
| Vacuum -: | | bar(g) | Catalyst: | n/a | n/a |
| At: | | °C | Mist Eliminator: | n/a | n/a |
| Low Temperature: | | °C | | | |
| At: | | bar(g) | NOTES & SPECIAL CONDITIONS | | |
| Hydrogen Partial Pressure: | | bar(a) | Stress Relieve (Process Reason Only): | Yes (Boot Head only) | |
| At: | | °C | Vessel In Special Service: | | |
| | | | Steamout Required: | Yes (Design for FV) | |
| INSULATION | | | | | |
| Type: | Hot | | | | |
| Req'd Thickness: | 40 mm | | | | |
| Fireproofing: | Yes (75 mm) | | | | |

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| | | | | | | | |
|--|--|---|-------------------|----------------------------------|---|--|---|
| ابن رشيد ibn rushd FLUOR. | | HORIZONTAL VESSEL DATA SHEET | | | Contract: 10E0541A01 | |  سابك sabik CTCI CORPORATION |
| | | | | | Equip. No.: 53-D-10 | | |
| | | | | | Revision: 2 Date: 11-Aug-2011 | | |
| | | | | | Unit: 53 - Parex | | |
| | | | | | P.O. No.: | | |
| | | Document No.: DS-53-DA-510 | | Sheet: 2 of 2 | | | |
| NOZZLE SCHEDULE | | | | | | | REV |
| | TAG | QTY | SIZE In | PRESSURE RATING | DESCRIPTION | | |
| 3 | AE | 1 | 2 | 150# RFWN | EQUALIZING | | |
| 4 | AI | 1 | 8 | 150# RFWN | INLET W/ INTERNAL PIPE | | |
| 5 | AM | 1 | 20 | 150# RFWN | MANWAY W/ DAVIT | | |
| 6 | AS | 1 | 2 | 150# RFWN | STEAMOUT (Note 10) | | 0 |
| 7 | BB | 1 | 6 | 150# RFWN | VENTILATION W/ BLIND | | |
| 8 | BK1 | 1 | 1-1/2 | 150# RFLWN | LEVEL | | |
| 9 | BK2 | 1 | 1-1/2 | 150# RFLWN | LEVEL | | |
| 10 | BL1 | 1 | 2 | 300# RFWN | LEVEL - LLS | | |
| 11 | BL2 | 1 | 2 | 300# RFWN | LEVEL - LLS | | |
| 12 | BN | 1 | 6 | 150# RFWN | OUTLET W/ VORTEX BREAKER | | |
| 13 | BO | 1 | 3 | 150# RFWN | OUTLET | | |
| 14 | BV | 1 | 2 | 150# RFWN | VENT | | |
| 15 | BW | 1 | 2 | 150# RFWN | OUTLET W/ VORTEX BREAKER | | |
| 16 | | | | | | | |
| 17 | | | | | | | |
| 18 | | | | | | | |
| 19 | | | | | | | |
| 20 | | | | | | | |
| 21 | | | | | | | |
| 22 | | | | | | | |
| 23 | | | | | | | |
| 24 | | | | | | | |
| 25 | | | | | | | |
| 26 | NOTES: | | | | | | |
| 27 | 1) This vessel tag number 53-D-10 is an existing vessel in the same service. The only change is higher design pressure. | | | | | | 0 |
| 28 | Existing design condition: 3.9 bar(g) @ 121 °C, new design condition: 4.5 bar(g) @ 121 °C. | | | | | | 0 |
| 29 | 2) Based on vessel fabricator's calculations and MAWP (MAWP 6.37 bar(g) hot and corroded), the vessel is satisfactory for the higher design pressure. CTCI to verify the available thickness after evaluating maintenance records and performing UT testing and confirm. | | | | | | 0 |
| 30 | CTCI to vessel is satisfactory provide necessary ASME code documentation for the repair "R" stamp and new nameplate. | | | | | | 0 |
| 31 | 3) Dimensions are in millimeter unless otherwise noted. | | | | | | |
| 32 | 4) Vessel shall have a Normal Liquid Level (NLL) hold-up to vessel centerline. Liquid level: HLL = 1466 mm, LLL = 734 mm. | | | | | | 0 |
| 33 | 5) Vessel heads and boot are 2:1 Elliptical. | | | | | | 0 |
| 34 | 6) For nozzle elevation and orientation refer to vendor certified drawing no. DA-7034-28-001 Rev.3 dated 6/30/97. | | | | | | |
| 35 | 7) For details of distributor refer to vendor certified drawing no. DA-7034-28-001 Rev.3 dated 6/30/97. | | | | | | |
| 36 | 8) For details of vortex breaker refer to vendor certified drawing no. DA-7034-28-001 Rev.3 dated 6/30/97. | | | | | | |
| 37 | 9) Boot interface liquid level: HLL = 997 mm, LLL = 783 mm. | | | | | | 0 |
| 38 | 10) Steamout at 150 (232 max.) °C and 3.5 (4.1 max.) bar (g). | | | | | | 0 |
| 39 | 11) The Min. Design Ambient Temperature should be 6 °C. | | | | | | 0 |
| 40 | | | | | | | |
| 41 | | | | | | | |
| 42 | | | | | | | |
| 43 | | | | | | | |
| 44 | | | | | | | |
| 45 | | | | | | | |
| 46 | | | | | | | |
| 47 | | | | | | | |
| 48 | | | | | | | |
| 49 | | | | | | | |
| 50 | | | | | | | |
| 51 | | | | | | | |
| 52 | WEIGHTS ARE BASED ON VENDOR CERTIFIED DRAWING No. DA-7034-28-001 | | | | | | |
| 53 | REV.3 DATED 6/30/97 | | | | | | |
| 54 | EMPTY | | | | 8400 | | |
| 55 | OPERATING | | | | 20600 | | |
| 56 | FULL OF WATER | | | | 35100 | | |
| 57 | THICKNESS ARE BASED ON VENDOR CERTIFIED DRAWING No. DA-7034-28-001 | | | | | | |
| 58 | REV.3 DATED 6/30/97 | | | | | | |
| 59 | SHELL | | | | 12 | | |
| 60 | HEADS | | | | 15 | | |

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CHIYODA CORPORATION
FOR RECORD

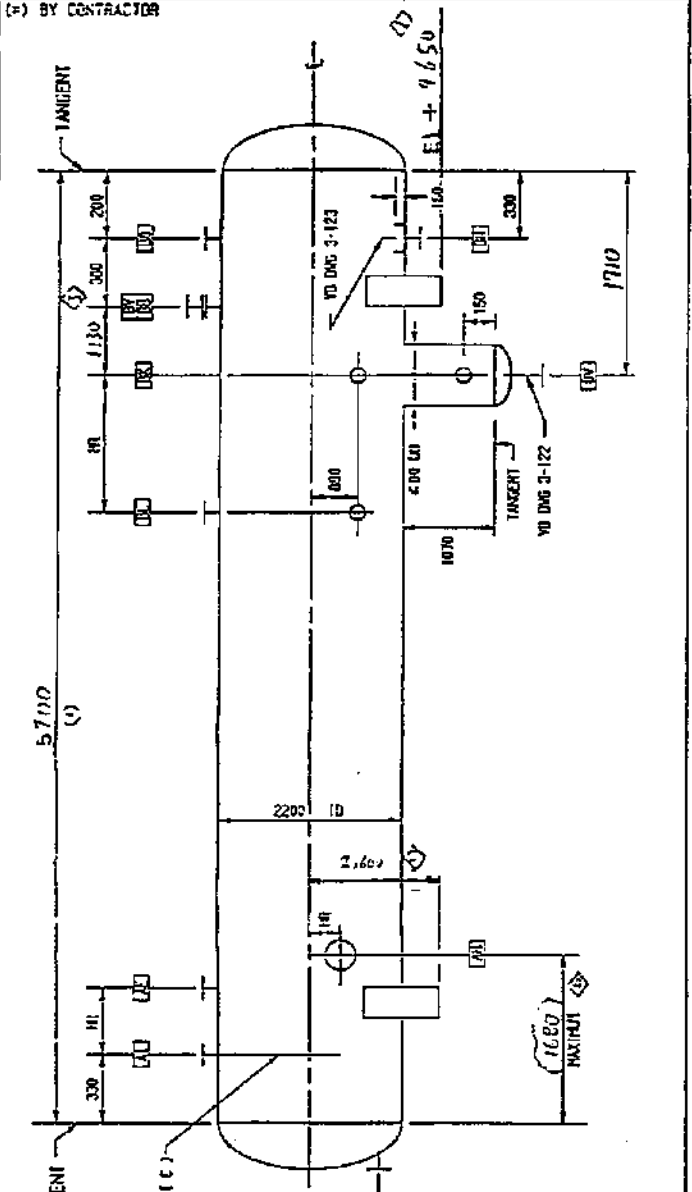
CLIENT : IBN RUSHD
 PROJECT : PTA & AROMATICS -
 TITLE : AROMATICS
 JOB NO. : 51046
 DOC. NO. : DS-53-D-010 (1/1)

| REVISIONS | | | |
|-----------|------------|------------|------------|
| MARK | | | |
| APRD | 7/16 | 7/16 | 7/16 |
| CHKD | | | |
| MADE | | | |
| DATE | APR 08 '96 | APR 08 '96 | APR 08 '96 |

| | | | | |
|--|---|------|-----|-------|
| Uop 25 East Algonquin Road - PO Box 5017 - Des Plaines, Illinois 60017-5017 - U.S.A. | PROJECT SPECIFICATION 550291 - 301 - / SHEET 14 | | | |
| | REV | DATE | BY | APP'D |
| 0 | 16-16-95 | | | |
| 1 | 12-15-95 | AEW | AMW | |

| | | | |
|---------|---------------------------|---------|---------|
| SERVICE | FINISHING COLUMN RECEIVER | ITEM NO | 53-D-10 |
|---------|---------------------------|---------|---------|

| | | | |
|-----------------------------------|-------------------------|---------------------|-------------------|
| Design Conditions | INT 3.9 BAR (g) | 121 °C | (*) BY CONTRACTOR |
| at Top | EXT FULL VACUUM | 8 65 °C | |
| Operating Conditions | Metal Temperature (Max) | 9 °C | |
| | | 66 °C | |
| Radiograph | MR | | |
| Postweld Heat Treat | MR | | |
| Joint Efficiency | MR | | |
| Material Specifications | | | |
| Heads | SASIG-70 | | |
| Shell | SASIG-70 | | |
| Drop Leg | SASIG-70 | | |
| D.L. Head | SASIG-70 | | |
| Shell | Thickness | Corrosion | |
| | Required by Code-mm. | Allowance mm. (Min) | |
| VESSEL | 3 | | |
| DROP LEG | 6 | | |
| Vessel Heads | | | |
| VESSEL | 3 | | |
| DROP LEG | 6 | | |
| Accessories Applied by Fabricator | | | |
| Ladder & Platform Clips | AS REQUIRED (*) | | |
| Insulation Clips & Rings | YES | | |
| Vessel Support | YES | | |
| Nozzles and Manways | | | |
| Mark | No | Size inches | Service |
| AE | 1 | 2 | EQUALIZING |
| AI | 1 | 8 | INLET |
| AM | 1 | 2.0 | MANWAY |
| AS | 1 | 2 | STEAMOUT |
| BB | 1 | 6 | VENTILATION |
| BK | 2 | 1 1/2 | LEVEL |
| BL | 2 | 2 | LEVEL-LLS (2) |
| BN | 1 | 8 | OUTLET |
| BO | 1 | 2 | OUTLET |
| BY | 1 | 2 | VENT |
| BV | 1 | 2 | OUTLET |



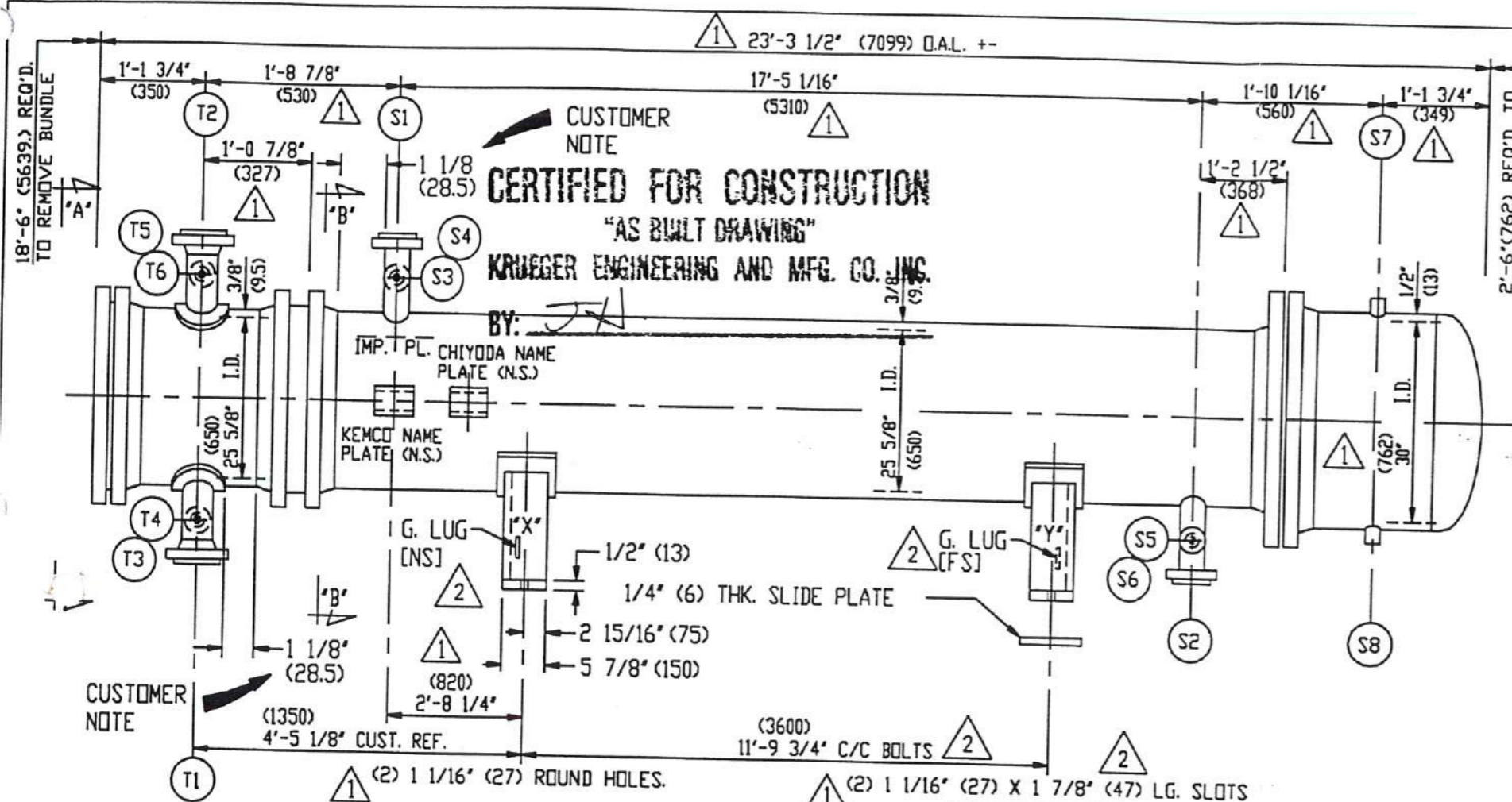
Class - ANSI CL150
 (2) ANSI CL300
 Facing - RAISED FACE
 Normal Liquid Level = VESSEL CENTERLINE
 Specific Gravity = 0.824

Drawings Referred to in this Specification

| | | | |
|---------|---------|---------|---------|
| 3-122-0 | 3-123-0 | 3-183-0 | 3-317-1 |
|---------|---------|---------|---------|

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550291



CUSTOMER NOTE
CERTIFIED FOR CONSTRUCTION
 "AS BUILT DRAWING"
KRUEGER ENGINEERING AND MFG. CO. INC.
 BY: *JH*

| DESIGN DATA | SHELL | TUBE |
|---------------------------|----------------------|--------------------|
| DESIGN PRESSURE P.S.I.G. | 188. (12.9 Bar g) | 160. (11. Bar g) |
| VACUUM PRESSURE | F.V. @ 351°F (177°C) | |
| TEST PRESSURE P.S.I.G. | 294. (20.27 Bar g) | 282. (19.44 Bar g) |
| DESIGN TEMP. Deg.F. | 419. (215.C) | 248. (120.C) |
| MDMT Deg. F. | 48. (9.C) | 48. (9.C) |
| OPER. TEMP. IN/OUT *F*(C) | 350/122 (177/50) | 104/122 (40/50) |
| CORROSION ALLOWANCE | .1250" (3.2) | .1250" (3.2) |
| NUMBER OF PASSES | 1. | 2. |
| FLUID NAME | HYDROCARBON | COOLING WATER |
| RADIOGRAPHY | SPOT | SPOT |
| HEAT TREAT REQUIRED | NO | NO |

ESTIMATED WEIGHTS, LBS.
 DRY: 13000. (5897.Kg) BUNDLE: 6800. (3085.Kg) WET: 17500. (7938.Kg)

SPECIFICATIONS
 ASME CODE SECT. VIII DIV.1, 1995 ED., 1995 ADD. (STAMP YES)
 TEMA CLASS R [7 TH. ED.]
 NATIONAL BOARD REGISTRATION REQUIRED

| MATERIAL | | | |
|---------------------|----------------------|------------------------|------------------------------|
| CHANNEL: | SA-516-70 | CHAN. FLG.: | SA-105N |
| SHELL: | SA-516-70 | SHELL: | SA-105N |
| TUBESHEETS: | SA-516-70N | BOLTING: | SA-193-B7/SA-194-2H |
| BAFFLES: | SA36orEQUAL | FLTG HEAD: | SA-105N/SA-516-70 |
| TUBES: | SA-214 | | |
| (516.) 3/4" (19.05) | O.D. X .0830" (2.11) | (M.V.) X 20'-0" (6096) | LG. |
| TUBE PITCH | 15/16" (23.8) | | SURFACE 1937.SQ.FT. (180.M2) |

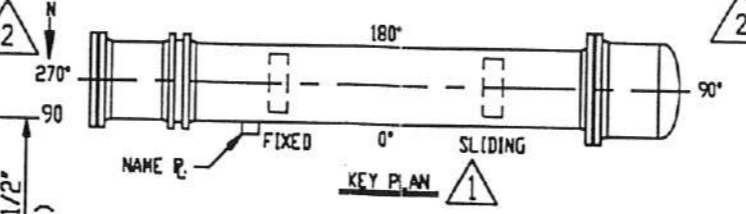
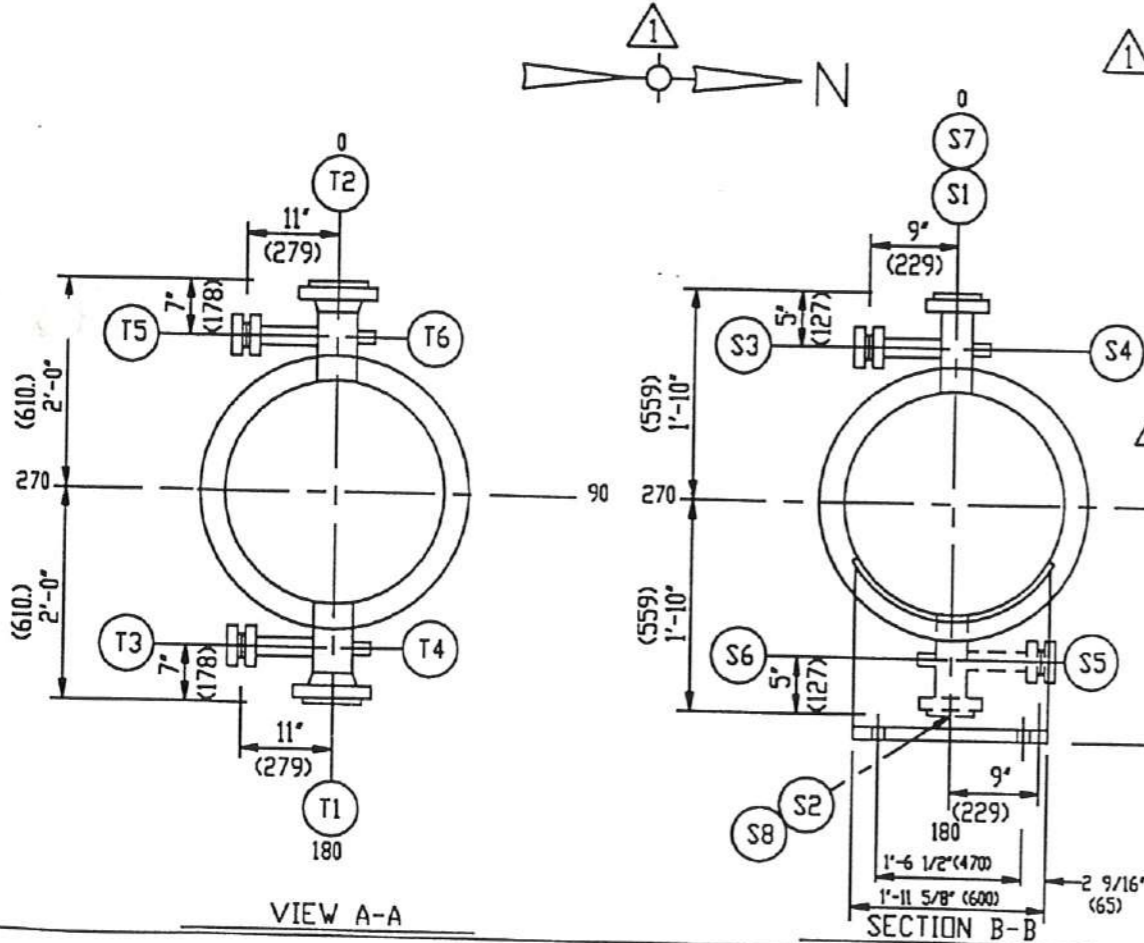
GENERAL NOTES
 ALL BOLT HOLES TO STRADDLE NATURAL CENTER LINES.
 TUBE-TUBESHEET JOINT: ROLLED W/ GROOVES.
 ALL MATERIALS COMPLY WITH UCS 66 (a),(c) & (d)
 INSULATION THK: SHELL = 2" (50) PP; CHANNEL = NONE
 CARBON CONTENT = 0.25% MAX.
 TOLERANCE PER TEMA (7TH. ED.) & UOP STD. SPECS. **2**
 FIREPROOFING: 3" (75) REG. CONCRETE.
 REF. DESIGN & DWG'S: DS-53-E-112; SK-53-E-012; SK-54-L-506-12.
 ALL DIMENSIONS IN () ARE IN METRIC.
 GASKETS: .175" (4.44) THK. 316SS SP. WD. GRAFOIL W/ 316SS INNER RING
 RIB: 3/16" (4.76) THK. 316SS DBL. JKT'D. GRAFOIL
 2 SETS OF SPARE GASKETS REQUIRED + 10% BOLTS/NUTS. (MIN. 2-SETS)
 PAINT: SEE DWG 96-0730-2 FOR PAINT REQUIREMENTS

| NOZZLE SCHEDULE | | | | |
|-----------------|----|-----------------|---------|-------------|
| MK | QT | DESCRIPTION | PROCESS | AUXILIARIES |
| S1 | 1 | 4" 150#RF LWN | INLET | |
| S2 | 1 | 4" 150#RF LWN | OUTLET | |
| T1 | 1 | 8" 150#RF WN | INLET | |
| T2 | 1 | 8" 150#RF WN | OUTLET | |
| S7 | 1 | 3/4" 6000#CPLG. | VENT | W/ PLUG |
| S8 | 1 | 3/4" 6000#CPLG. | DRAIN | W/ PLUG |
| S4 | 2 | 3/4" 6000#CPLG. | P.I. | W/ PLUG |
| S3 | 2 | 1" 150#RF LWN | T.I. | W/ BLIND |
| T4 | 2 | 3/4" 6000#CPLG. | P.I. | W/ PLUG |
| T3 | 2 | 1" 150#RF LWN | T.I. | W/ BLIND |

| | SHELL SIDE | TUBE SIDE |
|----------------------|---|--|
| MWP (HOT & CORRODED) | 194 PSI (13.37 Bar g) LTD BY BODY FLG. | 188 PSI (12.96 Bar g) LTD BY FLTG. HD. FLG. |
| MWP (NEW & COLD) | 196 PSI (13.5 Bar g) LTD BY BODY FLG. | 188 PSI (12.96 Bar g) LTD BY FLTG. HD. FLG. |

CUST: CHIYODA CORPORATION
 (ARABIAN INDUSTRIAL FIBERS CO.)
 PROJECT: IBN - RUSHD AROMATICS PROJECT
 P.O. NO: SAYPOH0027
 ITEM NO: 53-E-12
 SERVICE: DESORBENT SUMP TANK PUMPOUT COOLER

| | |
|---------------------------|-----------------------------|
| CHIYODA | |
| JOB NO. 31046 | IBN RUSHD AROMATICS PROJECT |
| PO NO. SAYPOH0027 | |
| REQ NO. MR-50-E-004 | |
| IDENT NO. 53-E-12-DW-0001 | |
| DATE | |
| DATE | |
| DATE | |

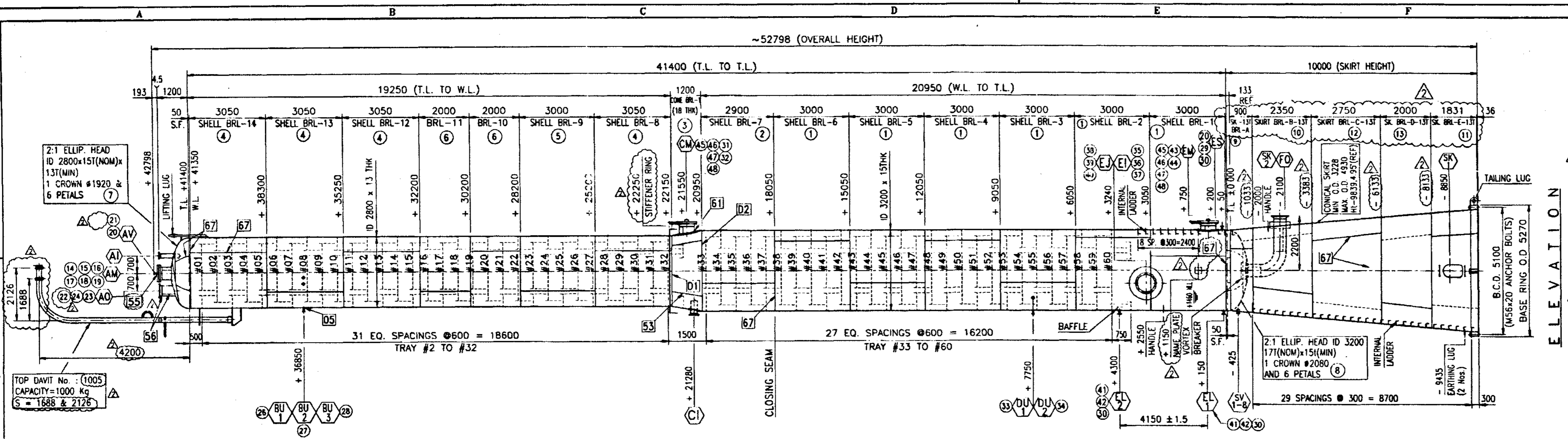


FOR RECORD

| NO. | DATE | REVISIONS |
|-----|---------|--|
| 2 | 1-3-97 | REV. PER CUSTOMER |
| 1 | 3-23-96 | REV. IN ACCORDANCE WITH CUSTOMER COMMENTS. |

| ASSEMBLY AND SPECIFICATIONS FOR ONE 25.625-240 (650-6096) A E S | | | |
|---|--------|--|-----------------------|
| DWN. BY | mrh | KRUEGER ENGR. & MFG. CO. INC HOUSTON, TEXAS | DWG. NO. 96-0730-1 |
| DATE | 7-3-96 | | |
| CKD. BY | JMH | REV. | 2 |

-52798 (OVERALL HEIGHT)



SPARES FOR GASKETS & FASTENERS ARE INCLUDED IN LOM
SA 193 Gr B7/SA 194 Gr 2H
4.5mm THK SS 316 SPIRAL WOUND GRAPHITE FILLED WITH SS 316 INNER
AND SS/CS OUTER CENTERING RING

Table with columns: ITEM NO., QTY, UNIT, DESCRIPTION, LENGTH, WIDTH, THICK, WT. IN Kg., MAT'L, MAT'L CODE, RDA. NO. Includes a list of materials and their specifications.

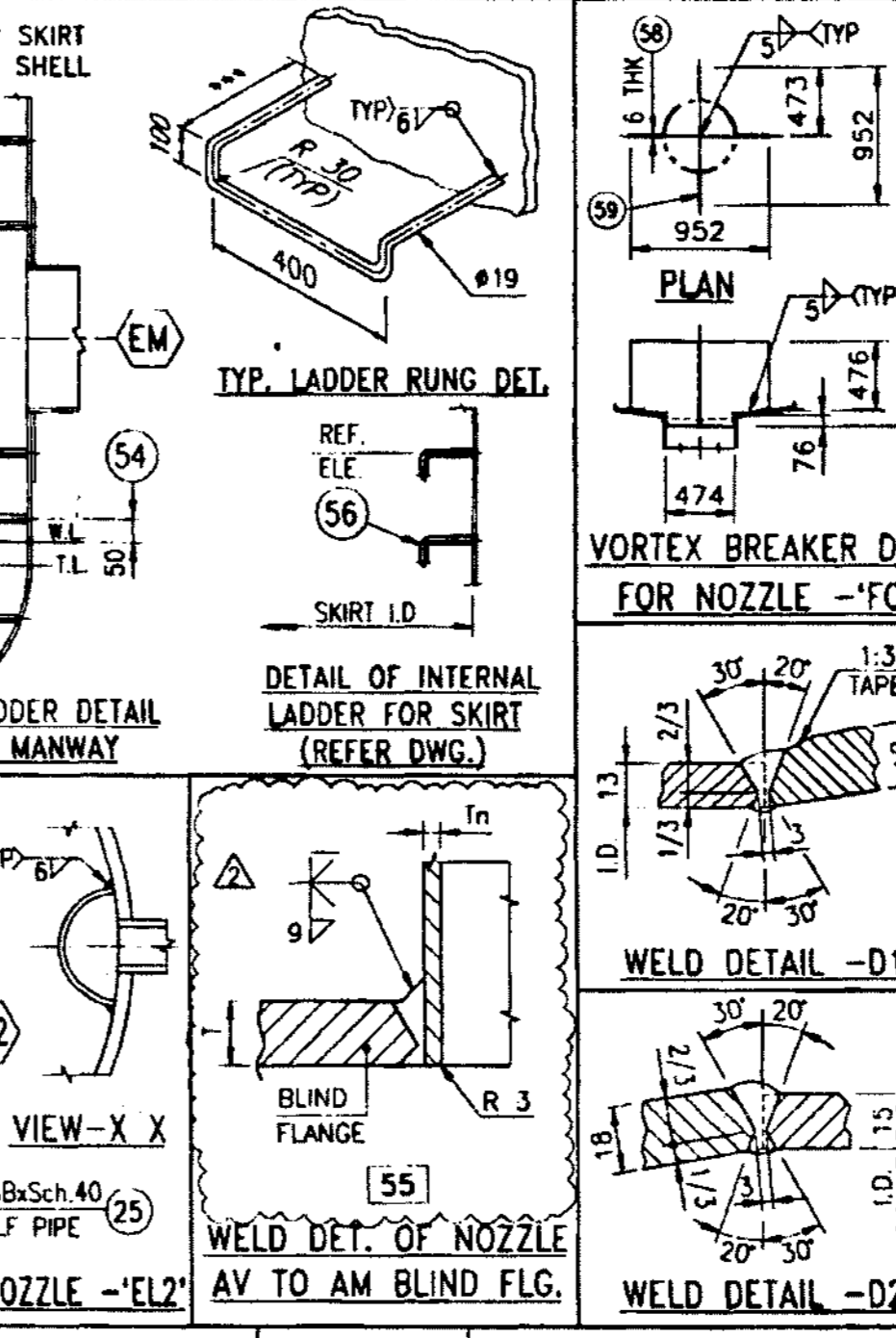
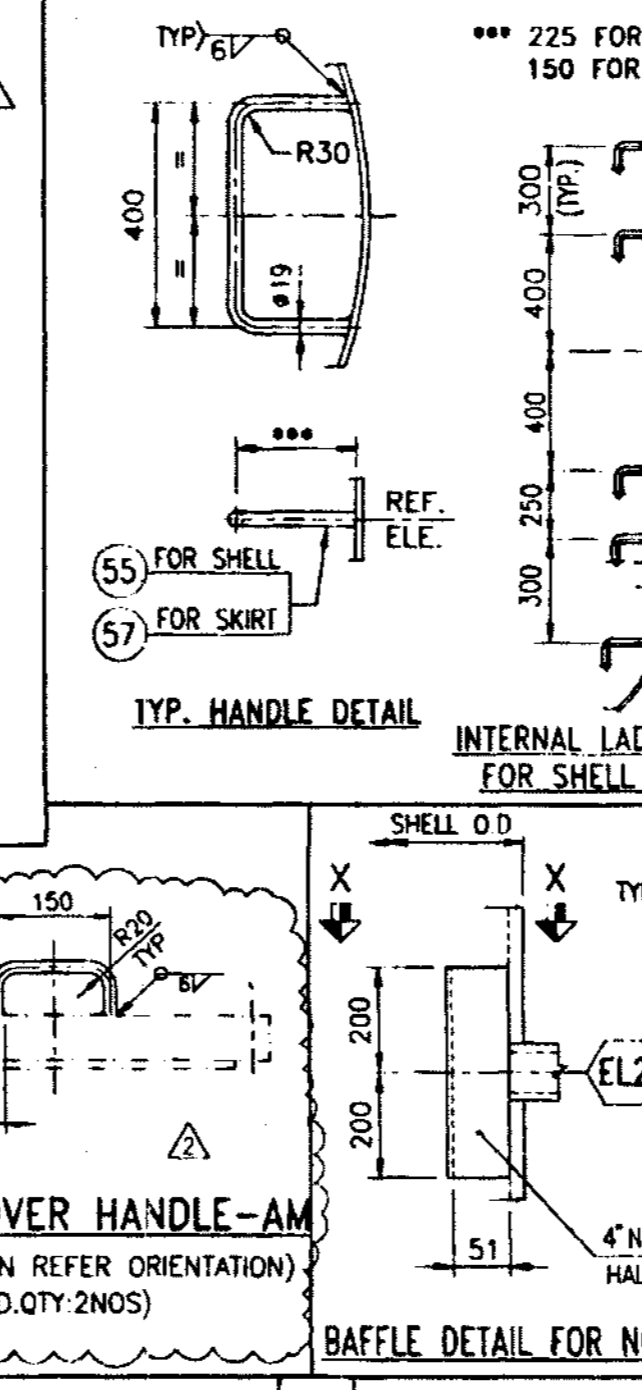
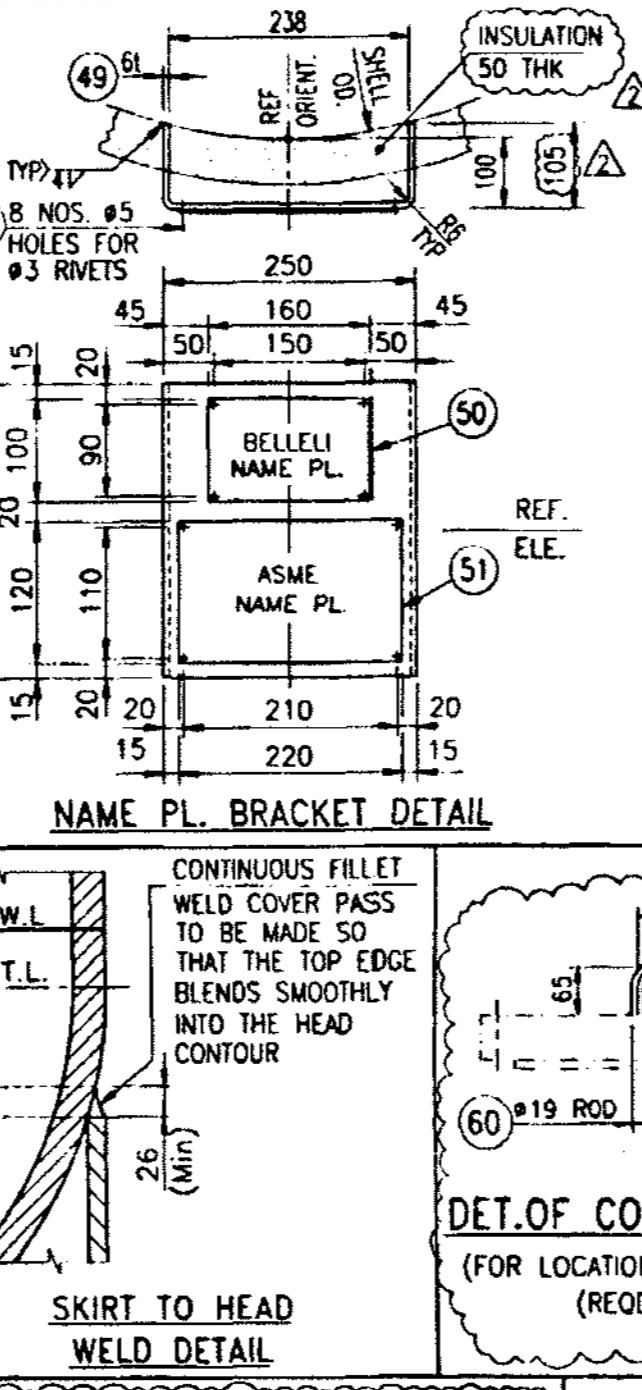
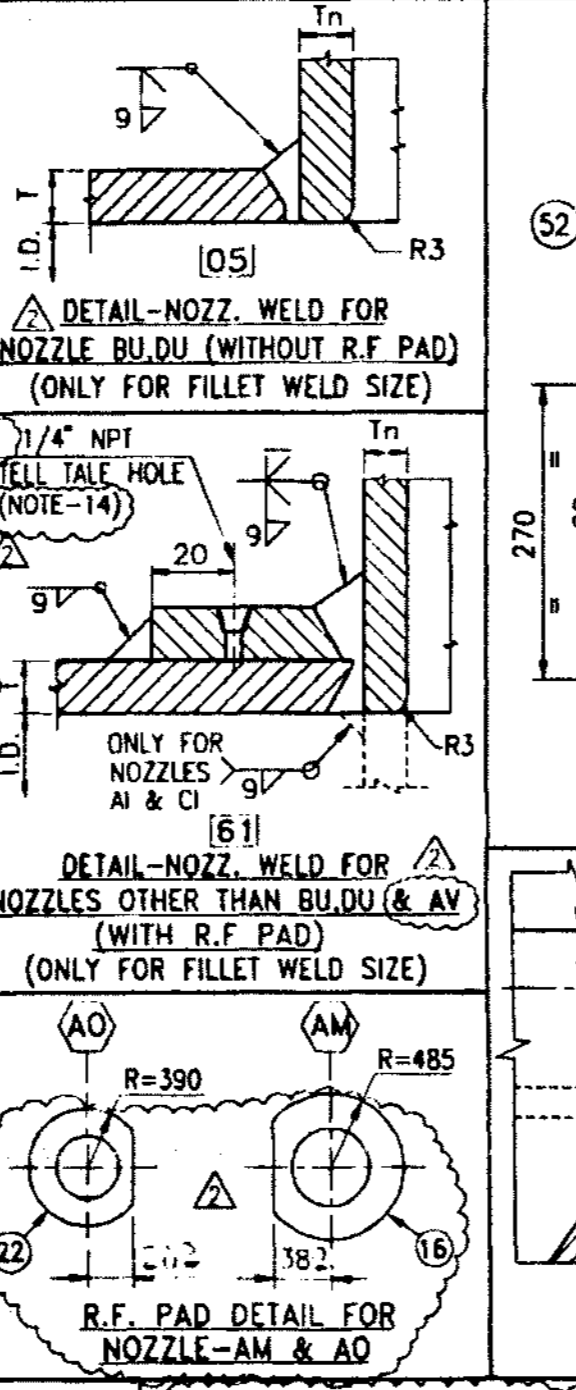
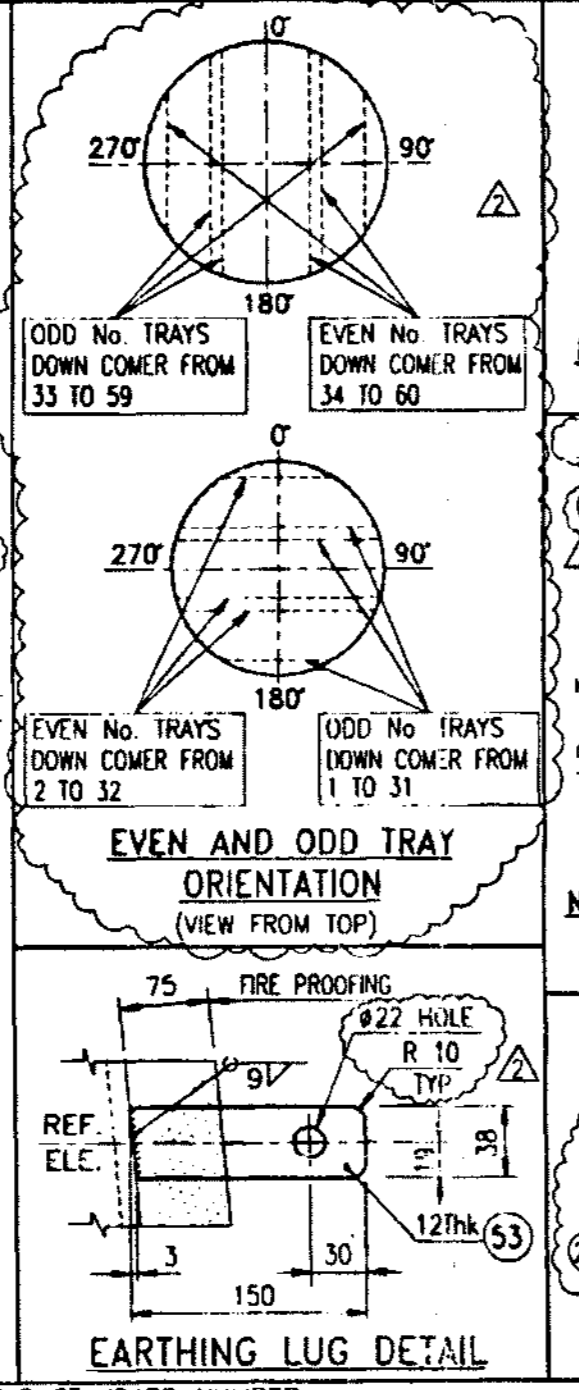
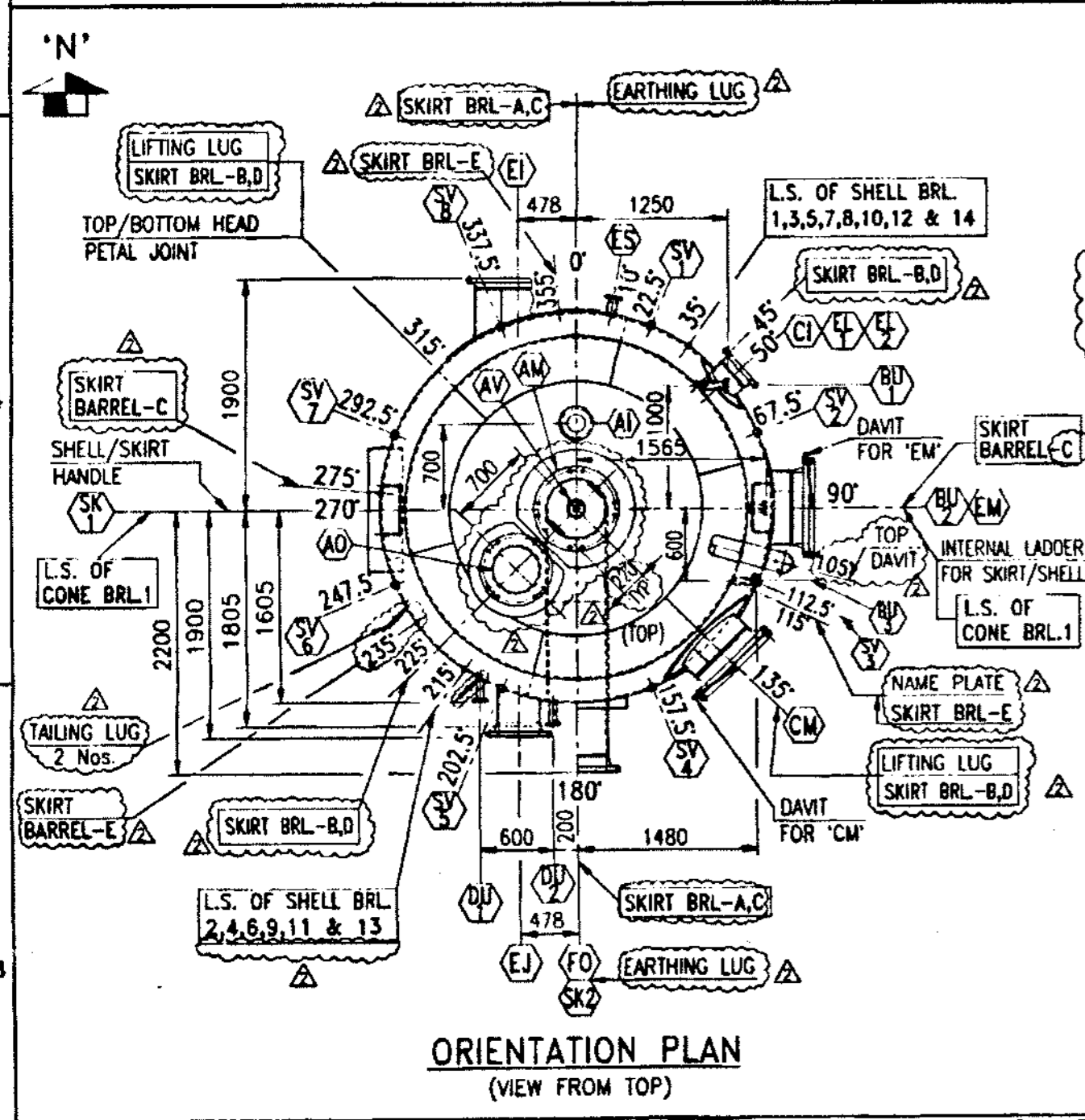


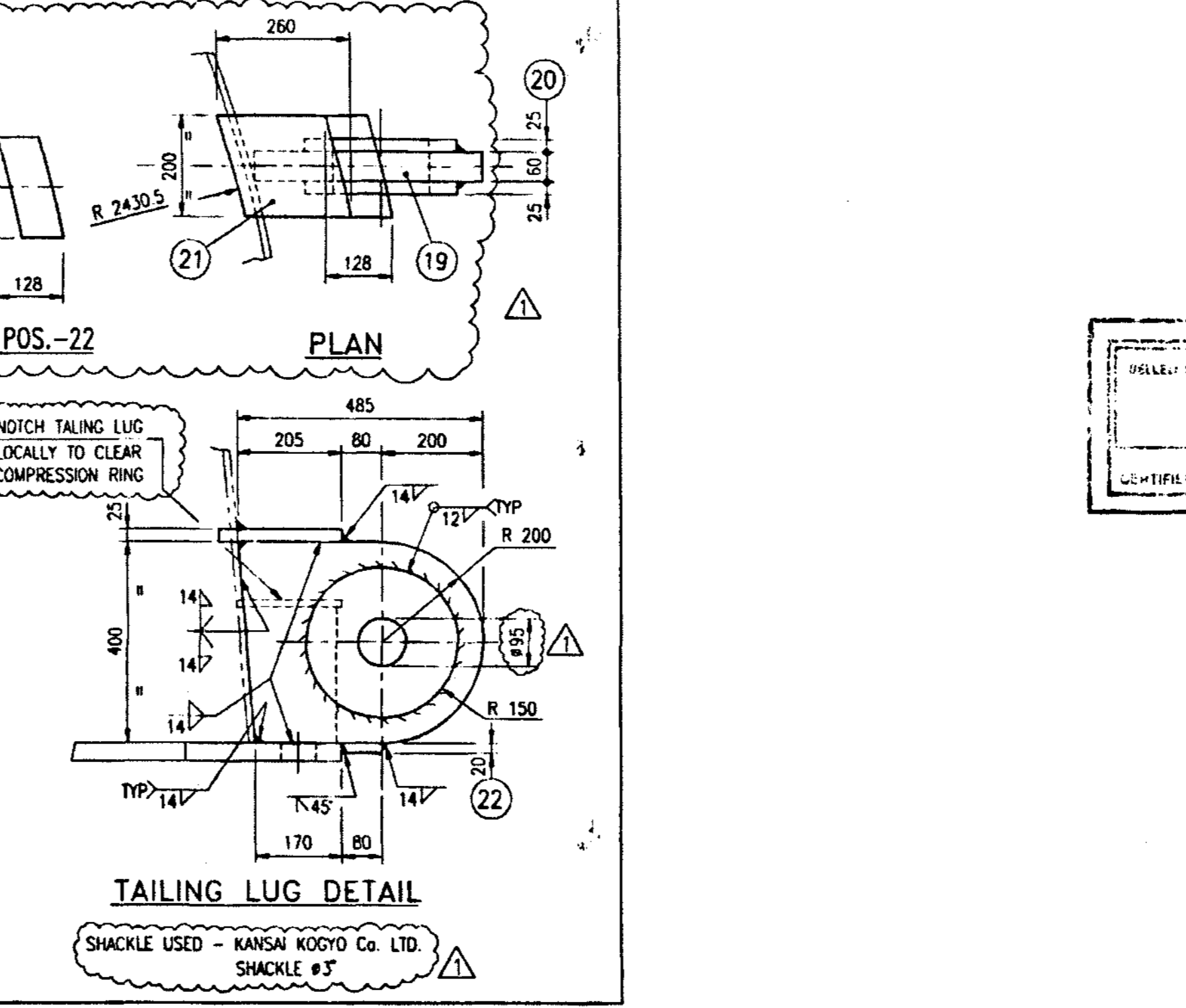
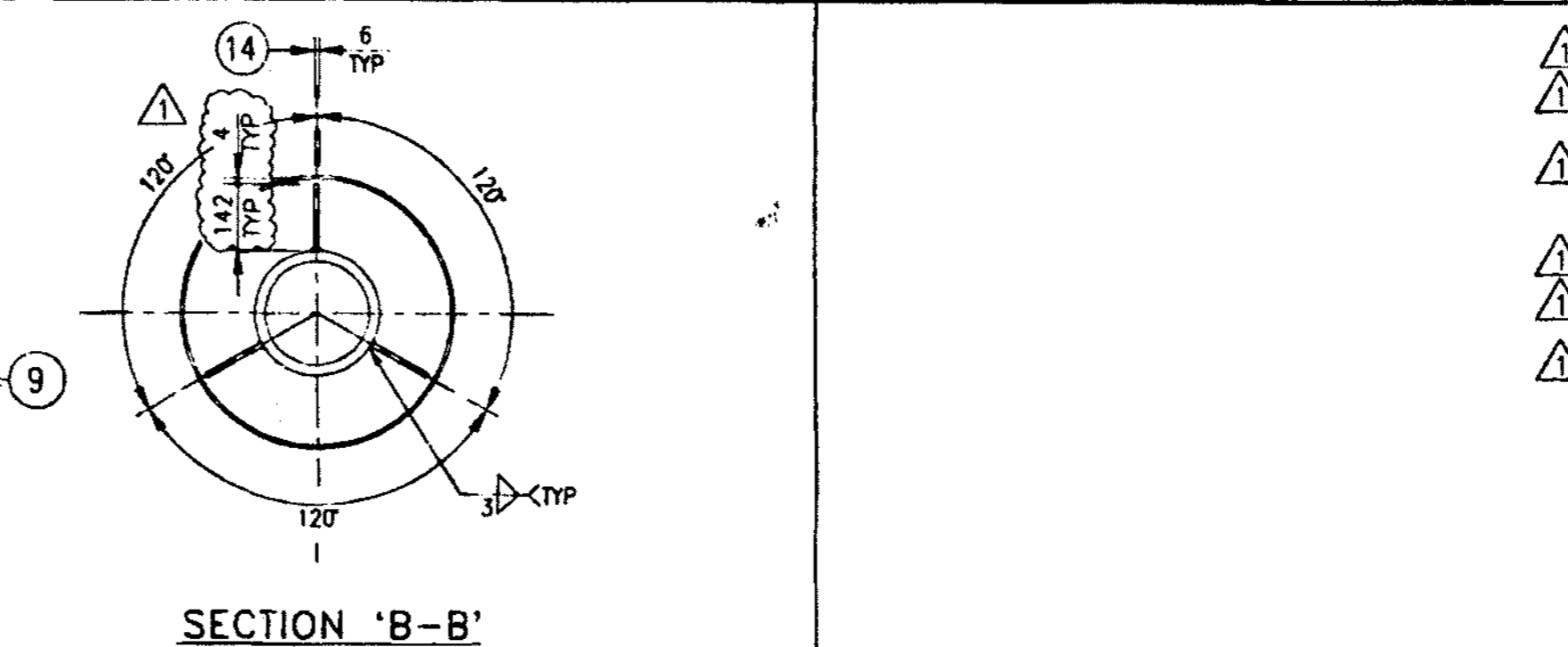
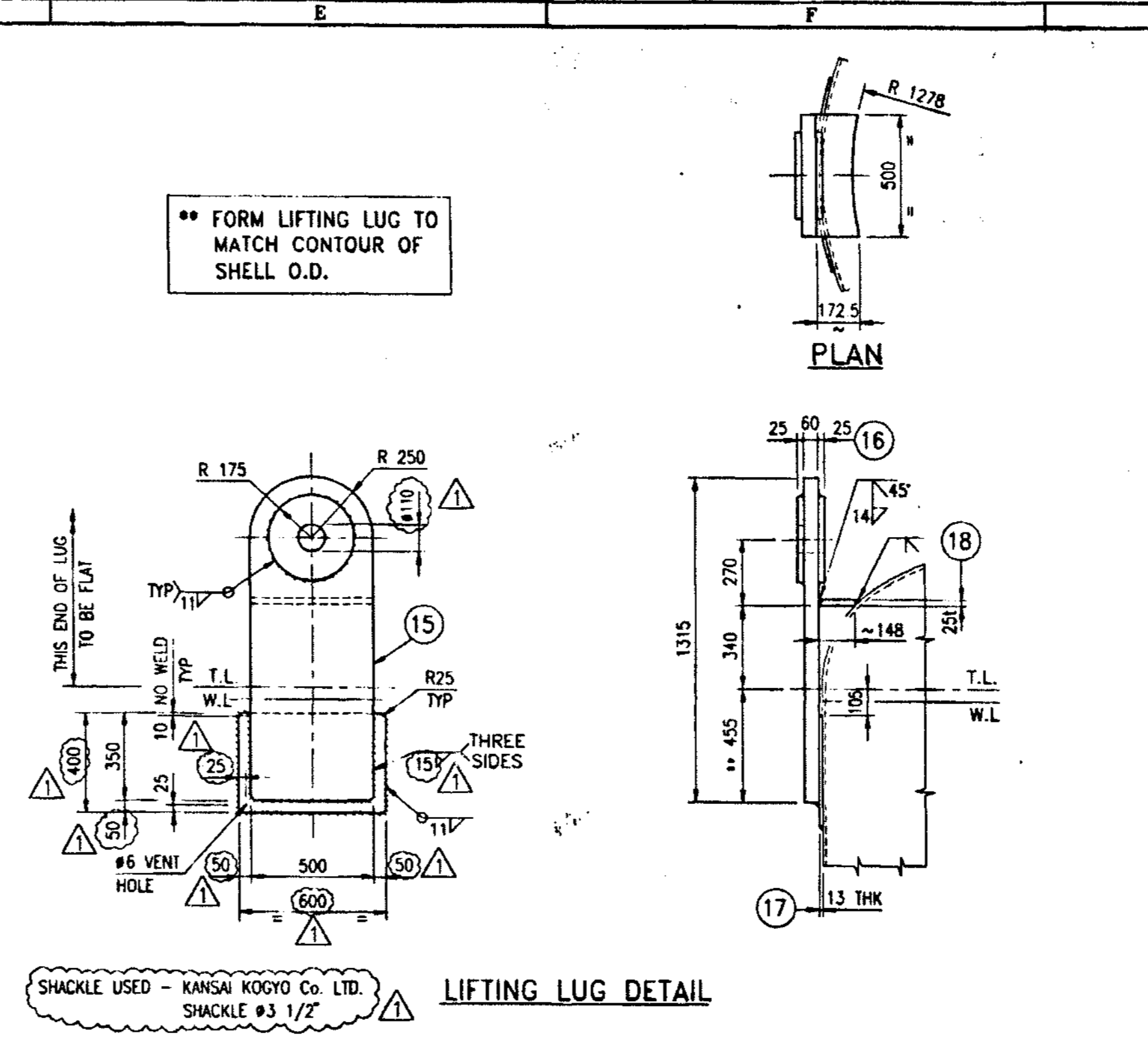
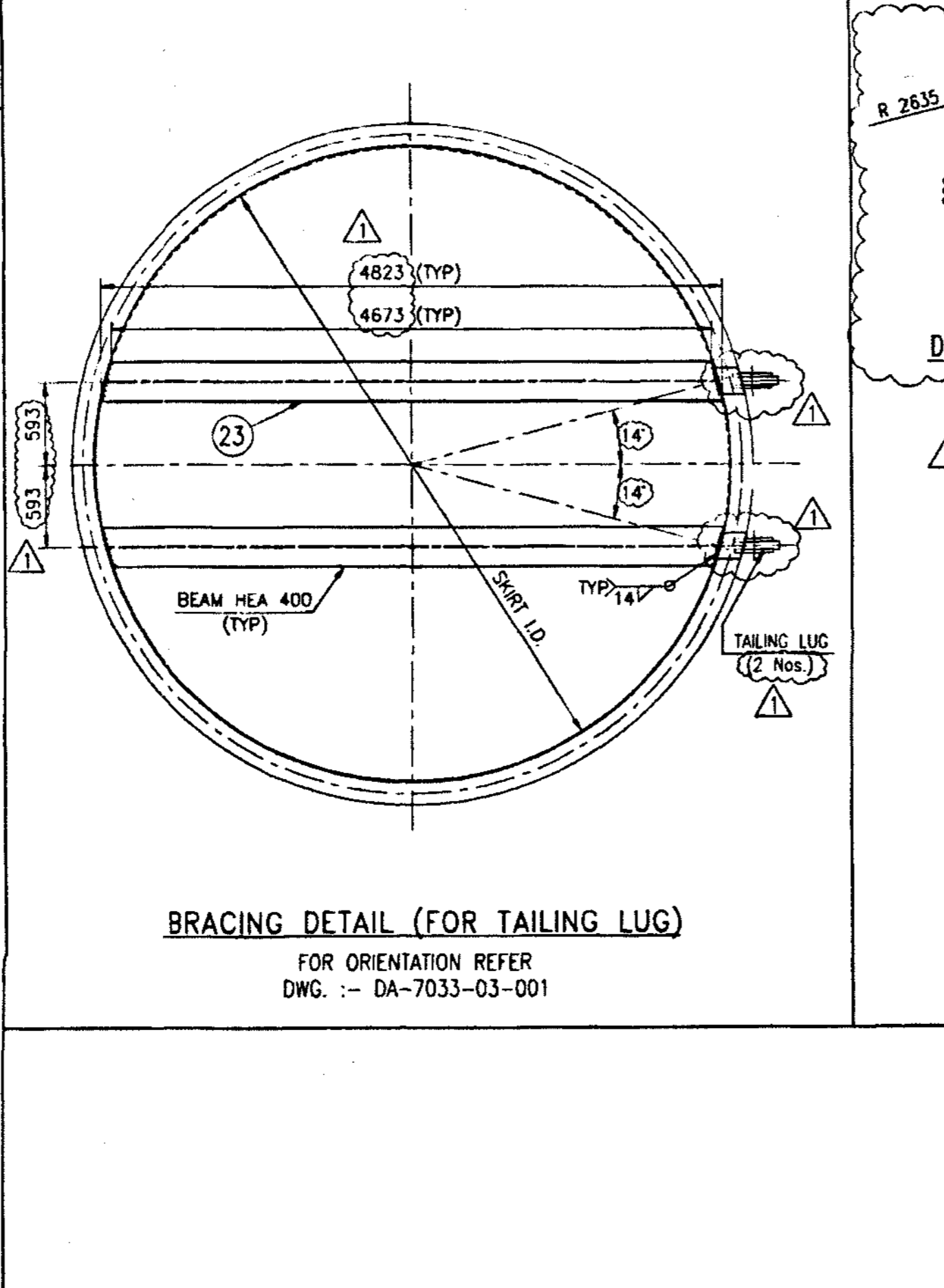
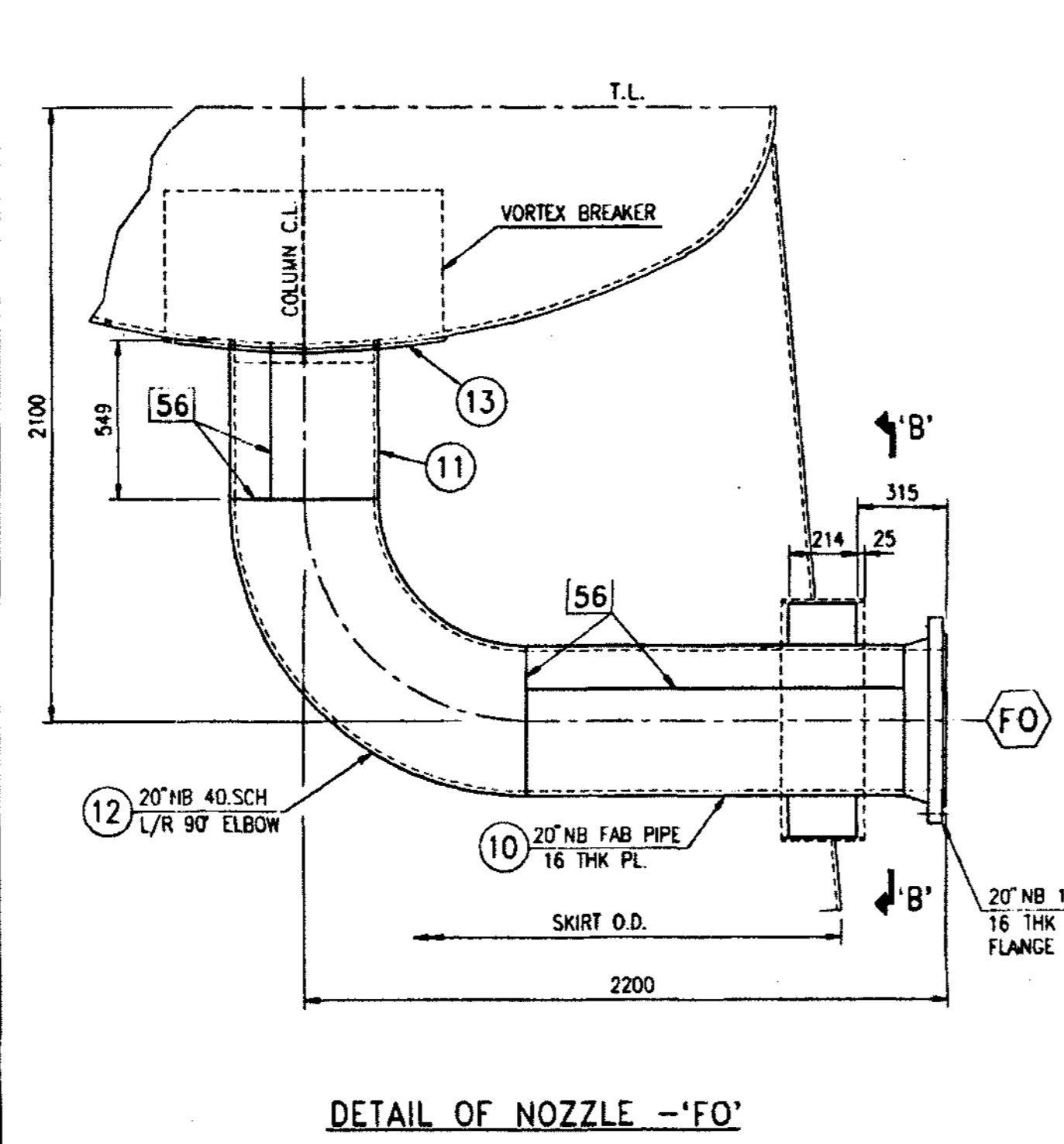
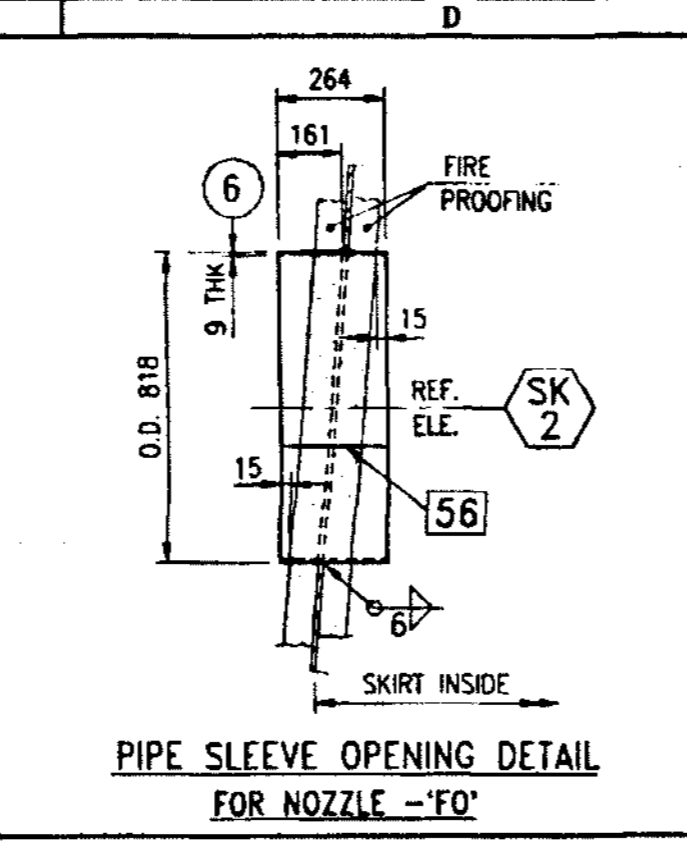
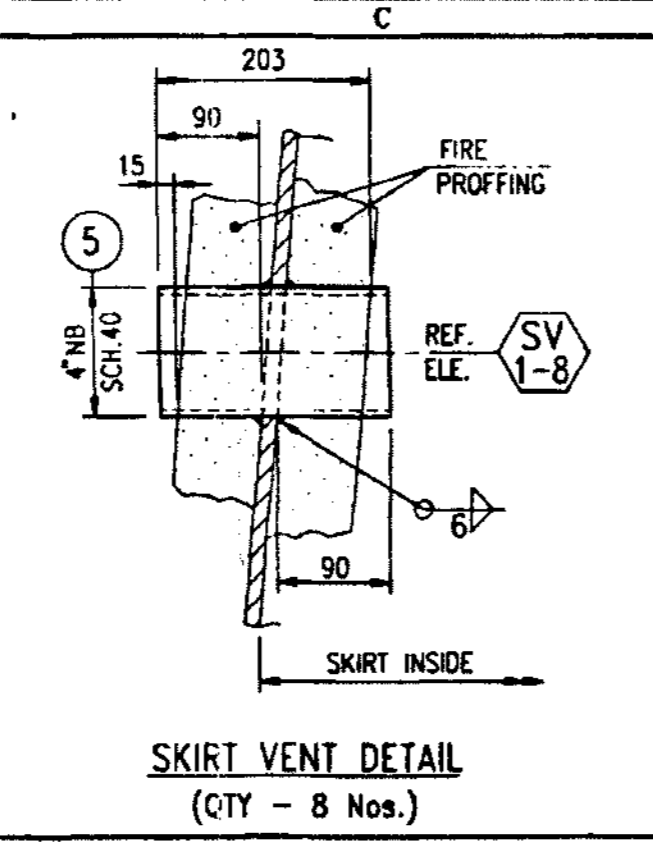
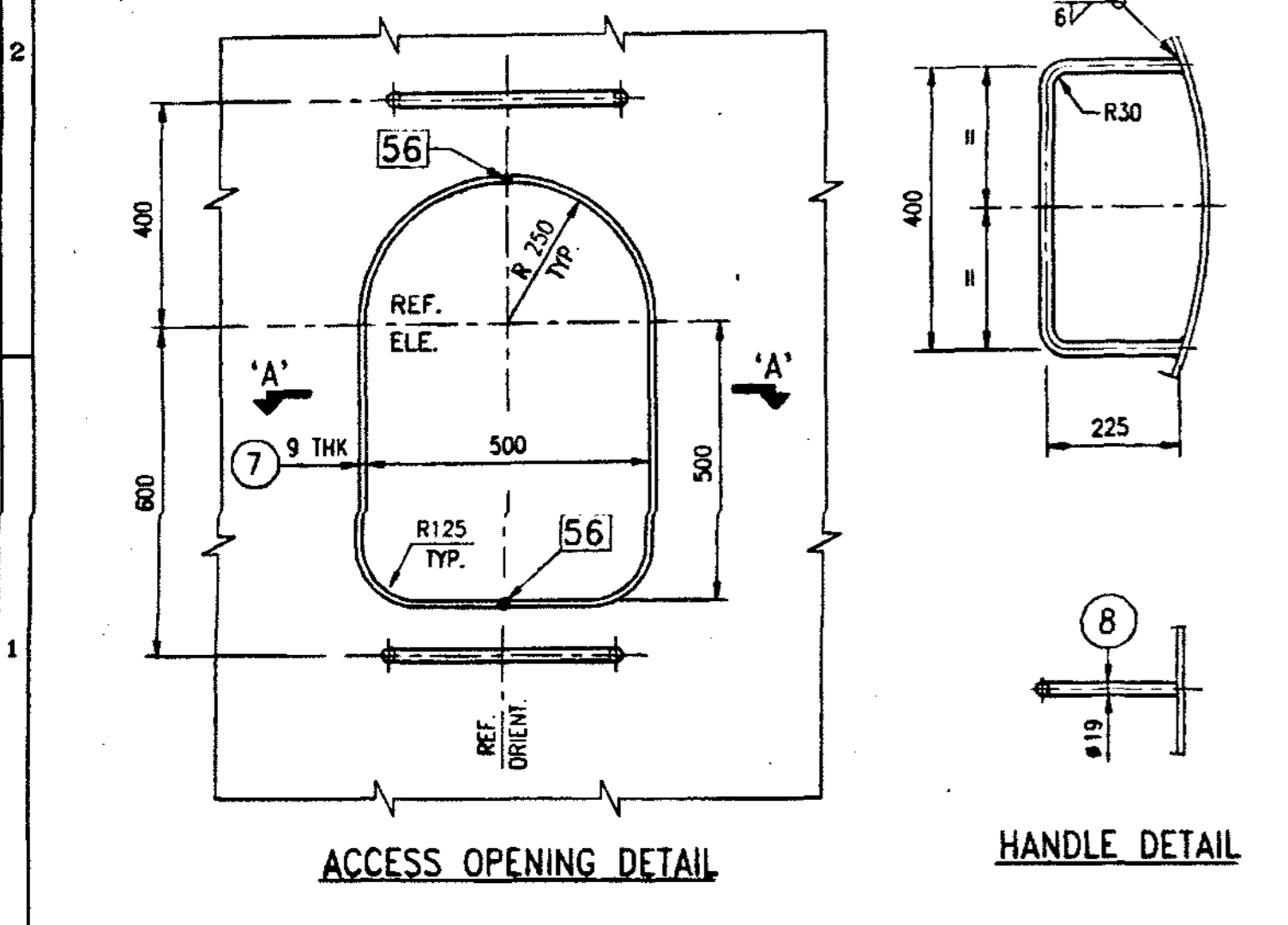
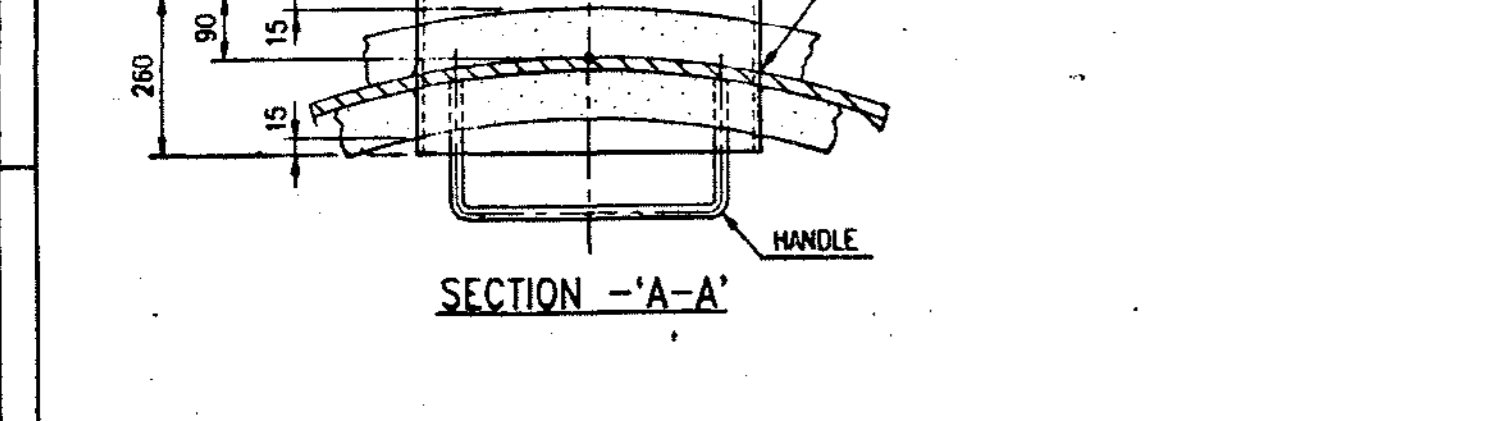
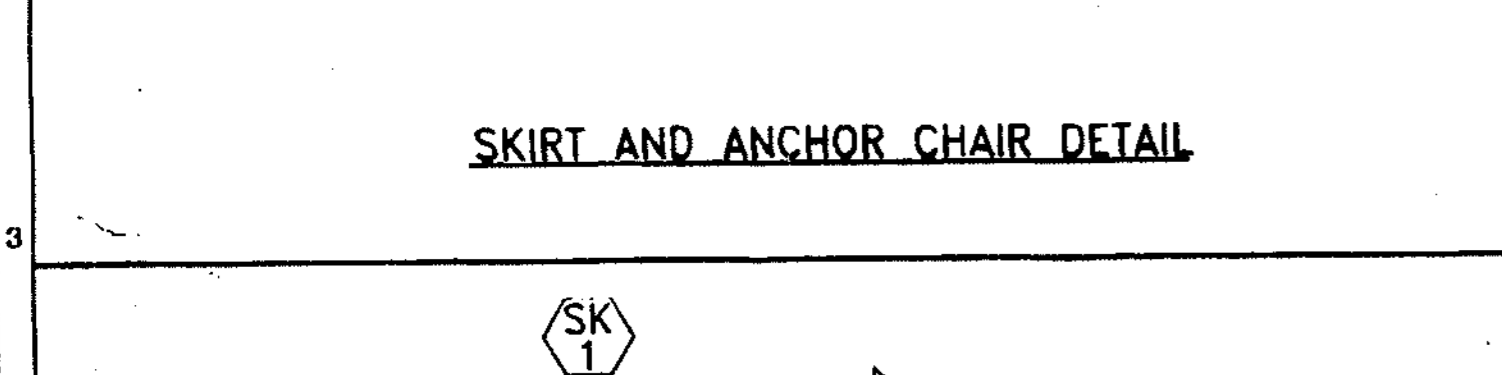
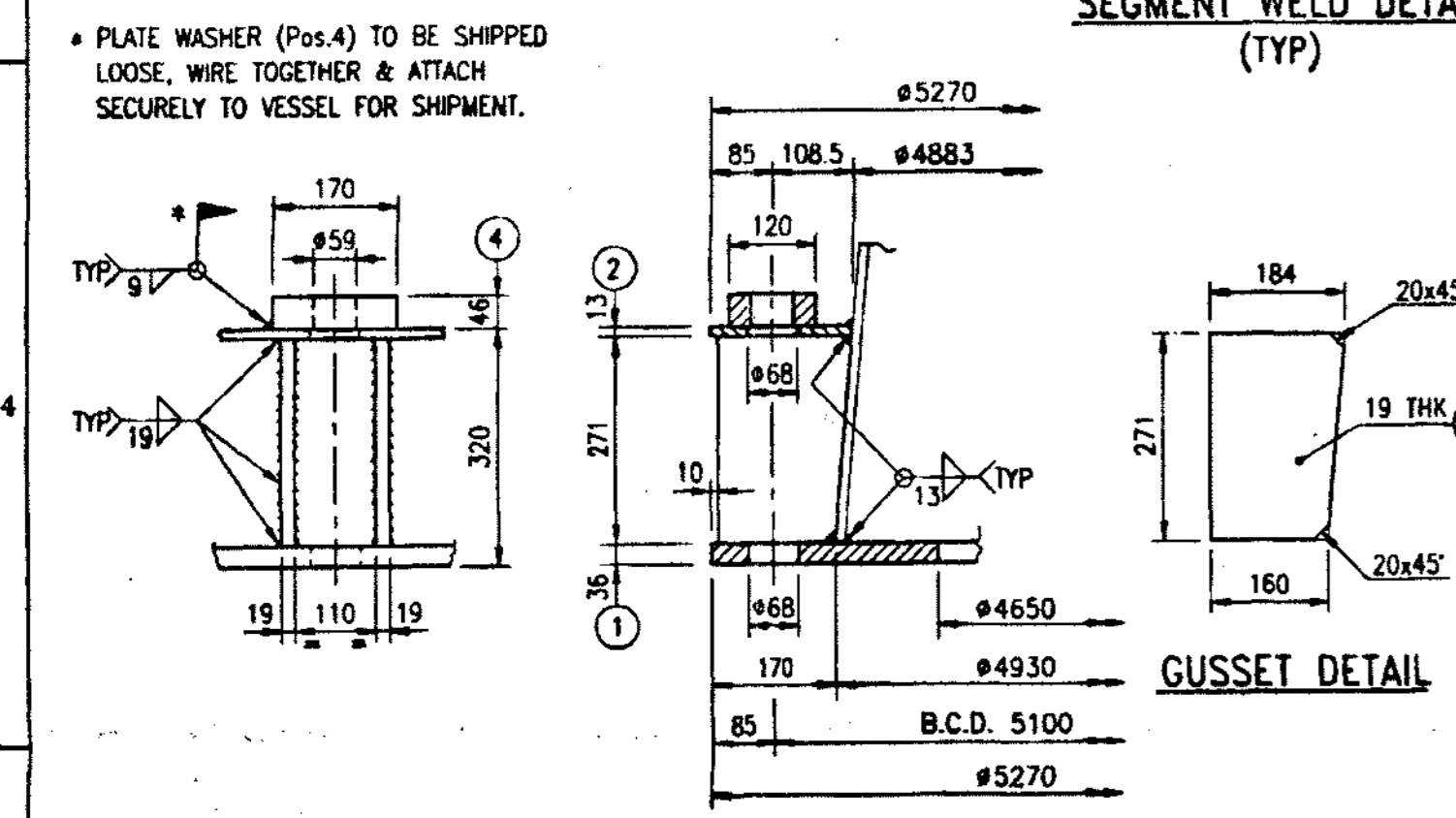
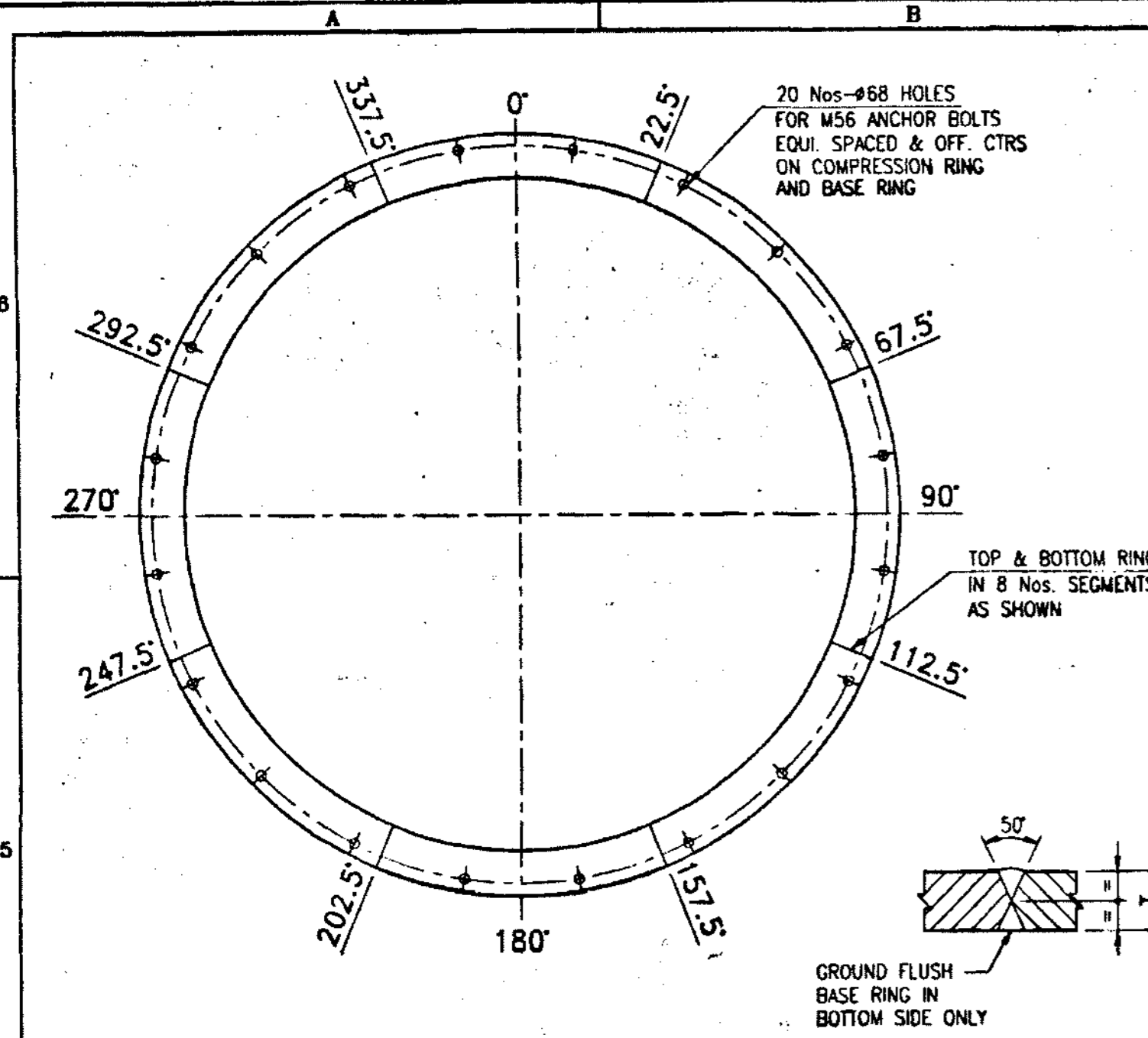
Table with columns: CLIENT'S REF. DWGS. & SPECS, DESCRIPTION. Lists various drawings and specifications related to the vessel.

Table with columns: GENERAL NOTES, MARK, QTY, SIZE, SERVICE, NOZZLE NECK, NOZZ. FLANGE, REINF. PAD. Contains general notes and a nozzle schedule.

Table with columns: NOZZLE SCHEDULE, MARK, QTY, SIZE, SERVICE, NOZZLE NECK, NOZZ. FLANGE, REINF. PAD. Contains a nozzle schedule.

Table with columns: DESIGN DATA, No., DESIGN CONDITIONS, UNITS, VALUES. Contains design data for the vessel.

Complex block containing a list of material, design data, and project information. Includes the company name 'Belleli Saudi' and project details.



LIST OF MATERIAL

TOTAL WT. = 5119.5 Kgs.

| ITEM NO. | QTY | DESCRIPTION | UNIT | LENGTH | WIDTH | THICK | WT. IN KG. | MAT'L | MAT'L CODE | RDA. NO. | |
|----------|-----|---------------------|------|--------|-------|-------|------------|-------|------------------|------------|------------|
| 23 | 2 | BEAM HEA 400 | | 4823 | 0 | 0.0 | 602.0 | S235 | | | |
| 22 | 2 | STIFFENER (SEE DWG) | | 200 | 128 | 20.0 | 7.4 | A36 | 7033001.63 | 703300-001 | |
| 21 | 2 | STIFFENER (SEE DWG) | | 250 | 200 | 25.0 | 10.2 | A36 | 7033001.64 | 703300-001 | |
| 20 | 4 | RING OD300/OD95 | | 0 | 0 | 25.4 | 12.5 | A36 | 7033001.64 | 703300-001 | |
| 19 | 2 | TAILING LUG | | 485 | 400 | 60.0 | 91.4 | A36 | 7033001.69 | 703300-001 | |
| 18 | 2 | STIFFENER | | 500 | 173 | 25.0 | 17.0 | A36 | 7033001.52 | 703300-001 | |
| 17 | 2 | PAD | | 600 | 400 | 13.0 | 25.0 | A36 | 7033001.08 | 703300-001 | |
| 16 | 4 | RING OD350/OD110 | | 0 | 0 | 25.0 | 17.0 | A36 | 7033001.64 | 703300-001 | |
| 15 | 2 | LIFTING LUG | | 1315 | 500 | 60.0 | 309.7 | A36 | 7033001.69 | 703300-001 | |
| 14 | 3 | STIFFENER | | 214 | 142 | 6.0 | 1.5 | A36 | LP060A5172500000 | STOCK | |
| 13 | 1 | RF PAD OD 970x518 | | 0 | 0 | 17.0 | 70.5 | A36 | 7033001.18 | 703300-001 | |
| 12 | 1 | EL 20' -40 LB/90' | | 0 | 0 | 0.0 | 147.0 | A36 | 7033009205 | 703300-090 | |
| 11 | 1 | NOZZLE NECK | | 1546 | 549 | 16.0 | 106.6 | A36 | 7033001.16 | 703300-001 | |
| 10 | 1 | NOZZLE NECK | | 1546 | 1294 | 16.0 | 251.2 | A36 | 7033001.16 | 703300-001 | |
| 9 | 1 | F 20' 150' WWR-16 | | 0 | 0 | 0.0 | 78.0 | A36 | 7033004F23 | 703300-004 | |
| 8 | 2 | HANDLE #19 | | 816 | 0 | 0.0 | 1.8 | A36 | 7033020P01 | 703300-020 | |
| 7 | 1 | ACCESS OPENING | | 2207 | 260 | 9.0 | 40.5 | A36 | 629505A09P06 | STOCK | |
| 6 | 1 | PIPE WAY OPENING | | 2542 | 264 | 9.0 | 47.4 | A36 | 629505A09P06 | STOCK | |
| 5 | 8 | PI # 4' - 40 | | 203 | 0 | 0.0 | 3.3 | A36 | A106GRB | 7033001.19 | 703300-006 |
| 4 | 20 | PLAIN WASHER | | 170 | 120 | 48.0 | 7.4 | A36 | 7033001.67 | 703300-001 | |
| 3 | 40 | GUSSET PLATE | | 271 | 184 | 19.0 | 70 | A36 | 7033001.62 | 703300-001 | |
| 2 | 1 | I.R. OD 5270x4883 | | 0 | 0 | 13.0 | 314.8 | A36 | 7033001.59 | 703300-001 | |
| 03-02 | 1 | I.R. OD 5270x4550 | | 0 | 0 | 13.0 | 314.4 | A36 | 7033001.66 | 703300-001 | |

CHYODA PETROSTAR LTD.
 JOB NO. 54001 | REGD. MEMBERS PROJECT
 PO NO. SAY-POPO002
 REO NO. MR-50-C-003
 IDENT NO. 54001-DW-0002

BELLELI SAUDI
 HEAVY INDUSTRIES LTD. | المملكة العربية السعودية
 AL-JUBAIL KINGDOM OF SAUDI ARABIA | الجبيل

SAY-POPO002 | ARABIAN INDUSTRIAL FIBRES COMPANY (IBN RUSHD.)
 PTA & AROMATICS PROJECT - AROMATICS
 DEHEPTANIZER (54-C-01)

DETAIL DRAWING

SCALE: 1 : 40

CUSTOMER: CHYODA/IBN RUSHD. ORDER: SAY-POPO002

APPROVED FOR CONSTRUCTION BY: A.K.BANERJEE DATE: 10/10/96

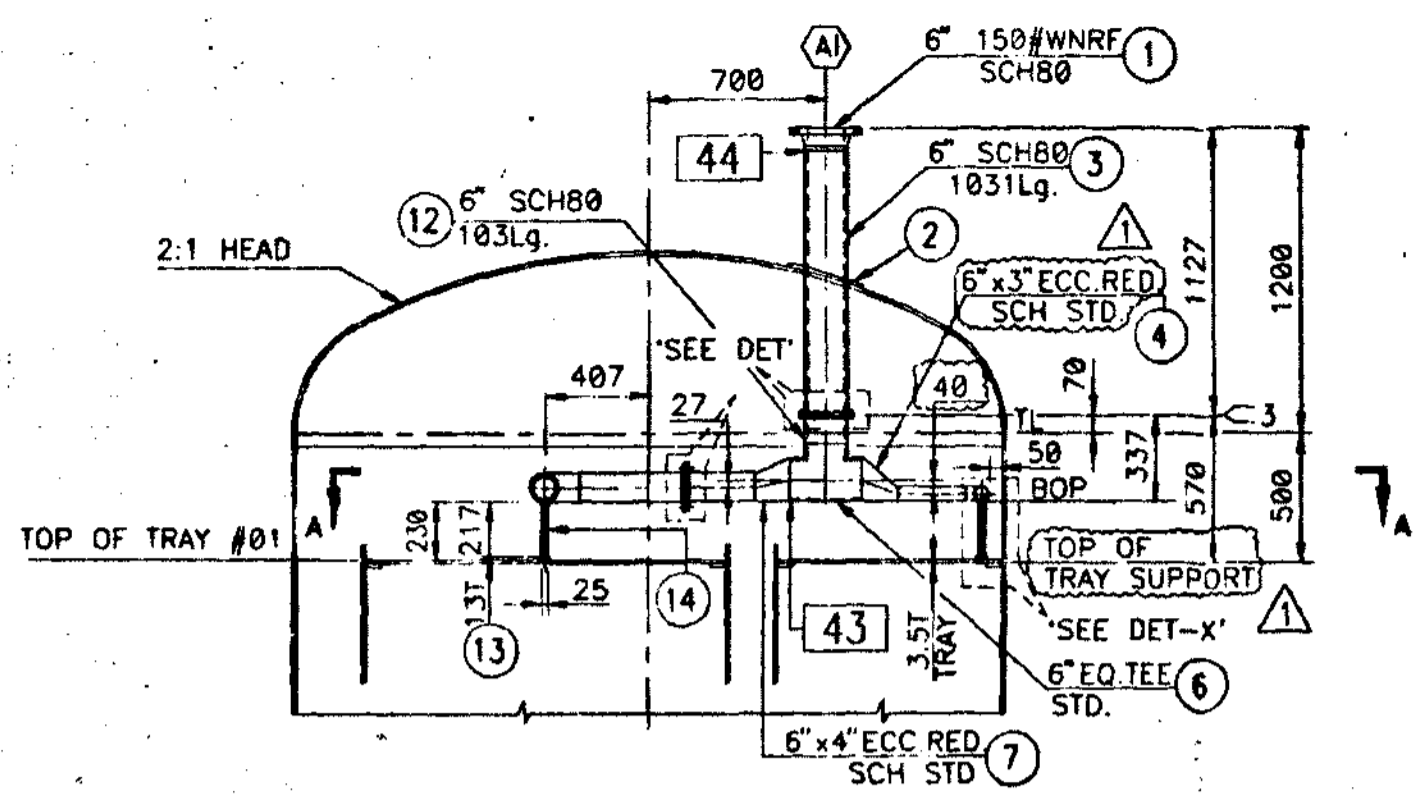
REVISIONS:
 1 01.03.97 REVISED AS PER CLIENT'S COMMENTS AND ISSUED FOR CONSTRUCTION
 0 10.10.96 ISSUED FOR APPROVAL

DRAWN: CHK'D: APP'D:

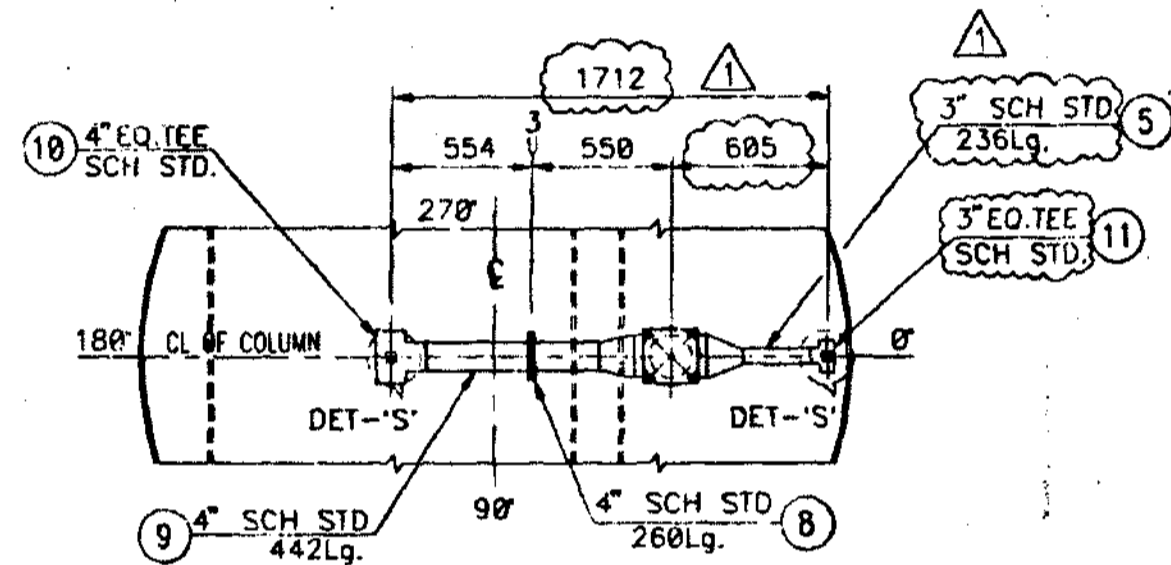
THIS DRAWING IS NOT TO BE REPRODUCED IN WHOLE OR PART NOR EMPLOYED FOR ANY PURPOSE OTHER THAN SPECIFICALLY PERMITTED IN WRITING BY BELLELI SAUDI HEAVY IND. LTD.

DRAWING NO. DA-7033-03-002 | 1

FILE NAME: 70330302

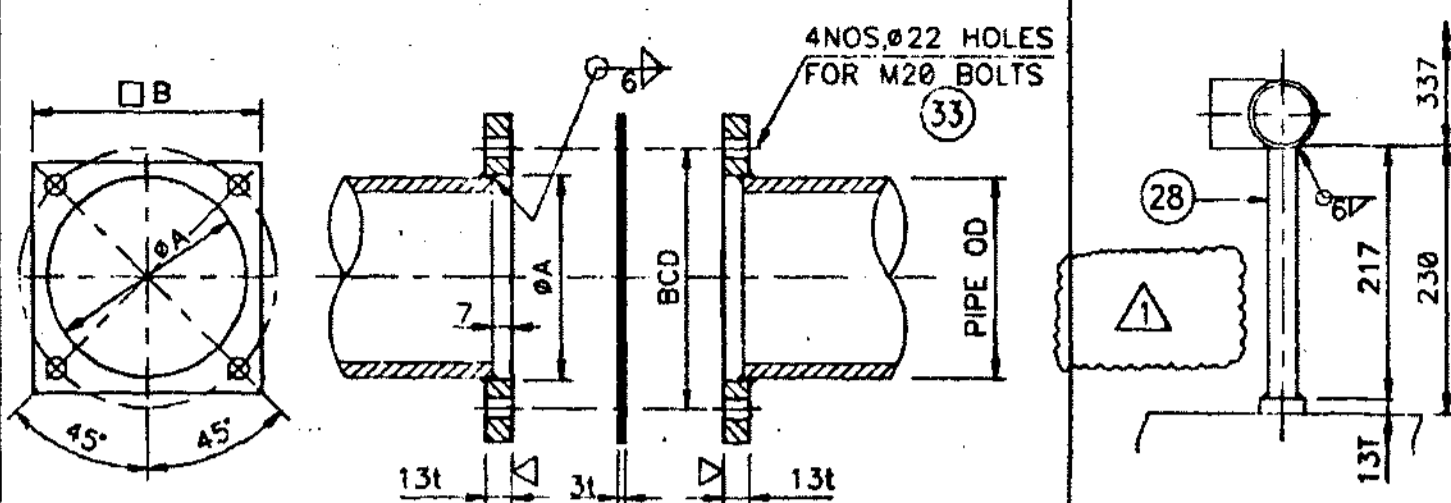


ELEVATION-NOZZLE-AI



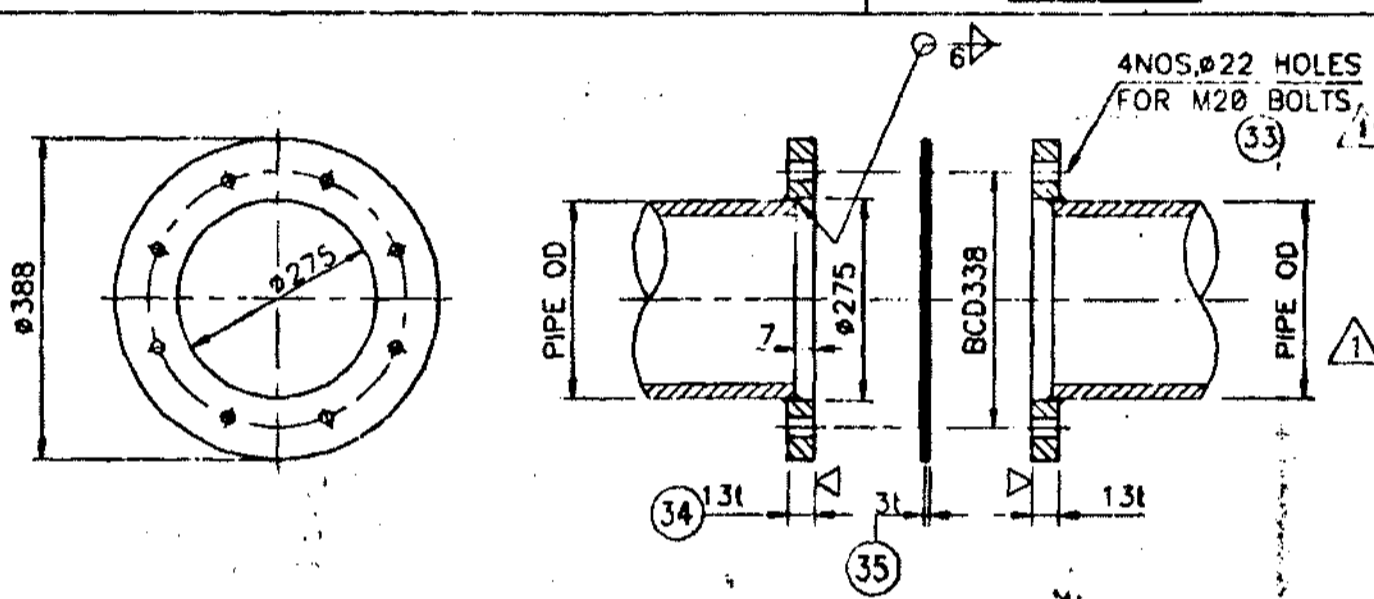
SECTION-AA

DETAIL-NOZZLE-AI



| PIPE SIZE | φA | □'B' | BCD | POS No. |
|-----------|-----|------|-----|-----------|
| 4" | 116 | 177 | 179 | (29) (30) |
| 6" | 170 | 215 | 233 | (31) (32) |

DETAIL - PLATE FLANGE-AI

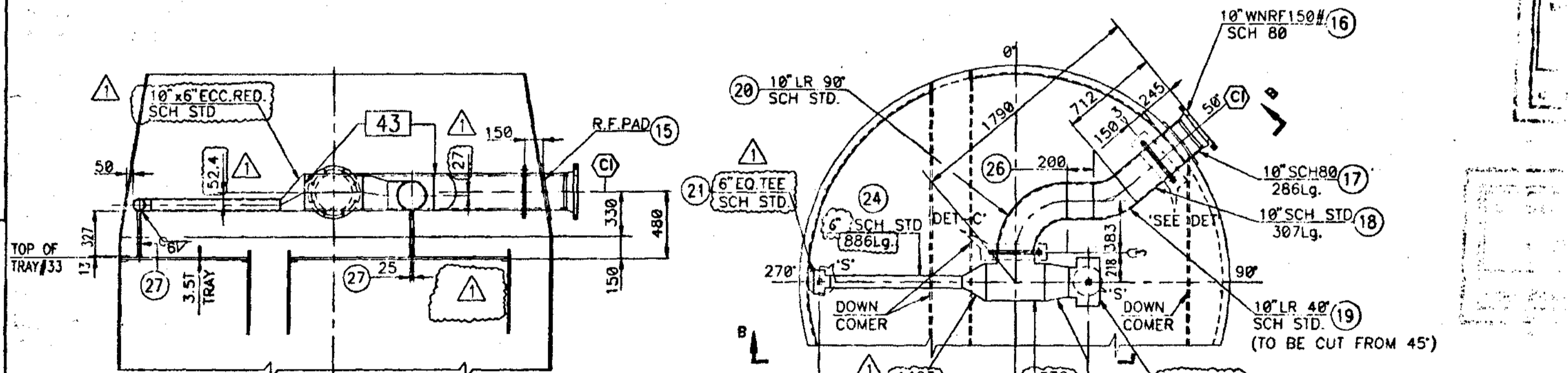


DETAIL - PLATE FLANGE-CI

TOTAL WT. = 476.5 Kgs.

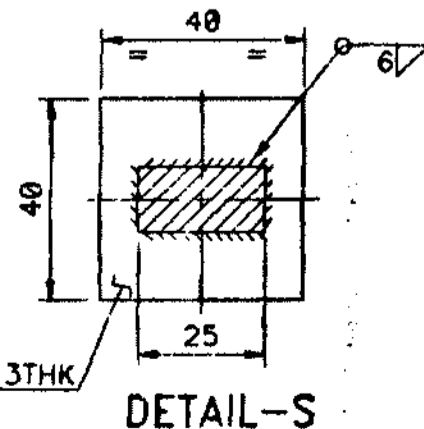
| ITEM POS. NO. | POS FOR ONE FAM. | DESCRIPTION | LENGTH | WIDTH | THICK | WT. IN Kg. | MAT'L | MAT'L CODE | RDA. NO. |
|---------------|------------------|------------------|--------|-------|-------|------------|----------------|-------------|------------|
| 36 | 1 | TEE 10" STD | 0 | 0 | 0.0 | 41.3 | SA234WPB | 7033409C11 | 703300-009 |
| 35 | 2 | CK 388/375/37 | 0 | 0 | 0.0 | 0.2 | GRAFOIL | | |
| 34 | 4 | RING 388/275/161 | 0 | 0 | 0.0 | 6.0 | SA516G70 | 7033401L16 | 703300-001 |
| 33 | 24 | B+INT M20 | 60 | 0 | 0.0 | 0.1 | SA193B7/SA192M | 06502020080 | STOCK |
| 32 | 1 | CK (SEE DWG) | 0 | 0 | 3.0 | 0.0 | GRAFOIL | | |
| 31 | 2 | PLATE FLG.-N | 215 | 215 | 16.0 | 6.2 | SA516G70 | 7033401L16 | 703300-001 |
| 30 | 1 | CK (SEE DWG) | 0 | 0 | 3.0 | 0.0 | GRAFOIL | | |
| 29 | 2 | PLATE FLG.-N | 177 | 177 | 16.0 | 4.4 | SA516G70 | 7033401L16 | 703300-001 |
| 28 | 1 | BAR SUPPORT | 217 | 25 | 13.0 | 0.5 | SA516G70 | 7033401L05 | 703300-001 |
| 27 | 2 | BAR SUPPORT | 327 | 25 | 13.0 | 0.8 | SA516G70 | 7033401L05 | 703300-001 |
| 26 | 1 | PI 10" STD-CI | 200 | 0 | 0.0 | 12.1 | SA106GB | | |
| 25 | 1 | ER 10/6" STD | 0 | 0 | 0.0 | 10.4 | SA234WPB | | |
| 24 | 1 | PI 6" STD-CI | 885 | 0 | 0.0 | 25.0 | SA106GB | | |
| 23 | 1 | ER 10/8" STD | 0 | 0 | 0.0 | 10.7 | SA234WPB | | |
| 22 | 1 | TEE 8" STD | 0 | 0 | 0.0 | 27.2 | SA234WPB | | |
| 21 | 1 | TEE 6" STD | 0 | 0 | 0.0 | 14.9 | SA234WPB | | |
| 20 | 1 | E 10" STD LR90 | 0 | 0 | 0.0 | 76.0 | SA234WPB | | |
| 19 | 1 | E 10" STD LR45 | 0 | 0 | 0.0 | 38.0 | SA234WPB | | |
| 18 | 1 | PI 10" STD-CI | 307 | 0 | 0.0 | 18.0 | SA106GB | | |
| 17 | 1 | PI 10" 90-CI | 266 | 0 | 0.0 | 3.0 | SA106GB | 7033406T08 | 703300-006 |
| 16 | 1 | F-10" 150#WNRF80 | 0 | 0 | 0.0 | 25.0 | SA105 | 7033404F11 | 703300-004 |
| 15 | 1 | RP 510/283/161 | 0 | 0 | 0.0 | 14.4 | SA516G70N | 7033401L16 | 703300-001 |
| 14 | 1 | BAR SUPPORT | 217 | 25 | 13.0 | 0.6 | SA516G70 | 7033401L05 | 703300-001 |
| 13 | 4 | WEAR PLATE | 40 | 40 | 13.0 | 0.2 | SA516G70 | 7033401L05 | 703300-001 |
| 12 | 1 | PI 6" STD-M | 103 | 0 | 0.0 | 2.9 | SA106GB | | |
| 11 | 1 | TEE 5" STD | 0 | 0 | 0.0 | 3.8 | SA234WPB | | |
| 10 | 1 | TEE 4" STD | 0 | 0 | 0.0 | 4.1 | SA234WPB | | |
| 9 | 1 | PI 4" STD-M | 442 | 0 | 0.0 | 7.0 | SA106GB | 6355406T03 | STOCK |
| 8 | 1 | PI 4" STD-M | 260 | 0 | 0.0 | 4.2 | SA106GB | 6355406T03 | STOCK |
| 7 | 1 | ER 6" 4" STD | 0 | 0 | 0.0 | 4.0 | SA234WPB | | |
| 6 | 1 | TEE 6" STD | 0 | 0 | 0.0 | 16.5 | SA234WPB | 7033409C09 | 703300-009 |
| 5 | 1 | PI 3" STD-M | 238 | 0 | 0.0 | 2.7 | SA106GB | | |
| 4 | 1 | ER 6" 3" STD | 0 | 0 | 0.0 | 3.8 | SA234WPB | | |
| 3 | 1 | PI 6" 88-N | 1031 | 0 | 0.0 | 44.0 | SA106GB | 7033406T05 | 703300-006 |
| 2 | 1 | RP 300/178/13T | 0 | 0 | 0.0 | 5.0 | SA516G70N | 7033401L05 | 703300-001 |
| 03-05 | 1 | F-6" 150#WNRF80 | 0 | 0 | 0.0 | 11.0 | SA105 | 7033404F08 | 703300-004 |

LIST OF MATERIAL



SECTION-BB

DETAIL-NOZZLE-CI



DETAIL-S

CHIYODA PETROSTAR LTD.
 JOB NO. 54001 IBN RUSHD AROMATICS PROJECT
 PO NO. SAY-POP0002
 REQ NO. MR-50-C-003
 IDENT NO. 54C01-DW-0005
 AS BUILT
 DATE Mar.08'97
 PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER.

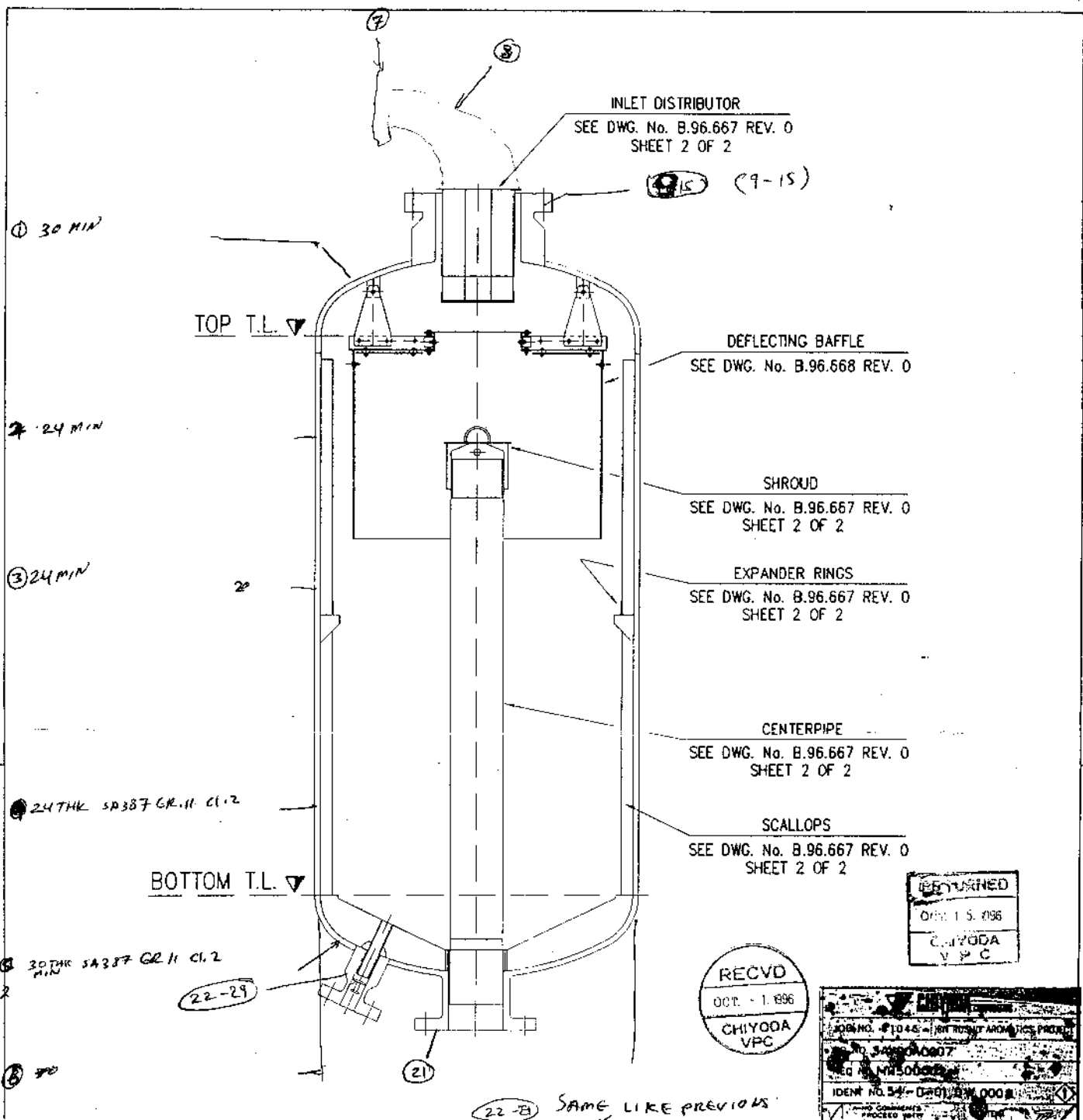
| REV. | DATE | DESCRIPTION | DRAWN | CHK'D | APP'D |
|------|---------|---|----------|---------------|-------|
| 1 | 8.3.97 | REVISED AS PER CLIENT'S COMMENTS & ISSUED FOR CONSTRUCTION. | Rama rad | YOGESH HAIDER | |
| 0 | 19.2.97 | ISSUED FOR APPROVAL | Rama rad | YOGESH HAIDER | AKB |

SCALE: 1 : 30
 CLIENT: CHIYODA/IBN RUSHD.
 ORDER: SAY-POP0002
 APPROVED FOR CONSTRUCTION BY: AKB
 DATE: 8/2/97

BELLELI SAUDI بيليلي السعودية
 HEAVY INDUSTRIES LTD.
 AL-JUBAIL, KINGDOM OF SAUDI ARABIA
 ARABIAN INDUSTRIAL FIBRES COMPANY (IBN RUSHD.)
 PTA & AROMATICS PROJECT - AROMATICS
 DEHEPTANIZER (54-C-01)

| DETAIL OF INTERNALS | DRAWING NO. | REV. |
|---------------------|----------------|------|
| | DA-7033-03-005 | 1 |

812007



RECEIVED
OCT 15 1996
CHIYODA
VPC

RECVD
OCT - 1 1996
CHIYODA
VPC

JOB NO. F1044 - INTRINSIC AMMONIUM NITRATE
REG. NO. SA 500007
IDENT. NO. 54-D-01/1000000

NO COMMENTS TO BE PROCESSED
FABRICATION
PROCEED WITH FABRICATION
COMMENTS TO BE CONSIDERED

PURCHASER'S PERMISSION TO PROCEED OR REVISION TAKEN ON THESE PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITY OR LIABILITY UNDER PURCHASE ORDER

DATE Oct 9 1996

MAT
BUFFLE PLT SA 240 TP 321 AU PLT
ALL NUTS A 194 GR 3
ALL SCREW A 193 GR 16

MAT. ⑧ - ELBOST
⑩ ⑪ ⑫ ⑬ ⑭ SA 387 GR.11. Cl.2 PLT ALPLT
⑮ SA 182 F 11 Cl.3 FLG
⑯ ⑰ SA 336 F 11 Cl.3 FLG

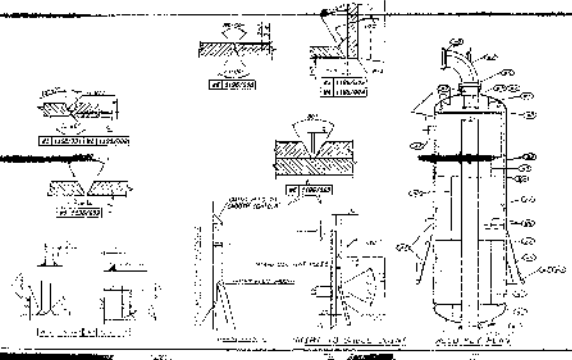
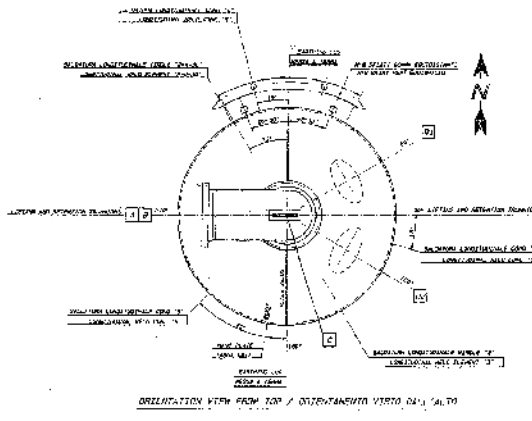
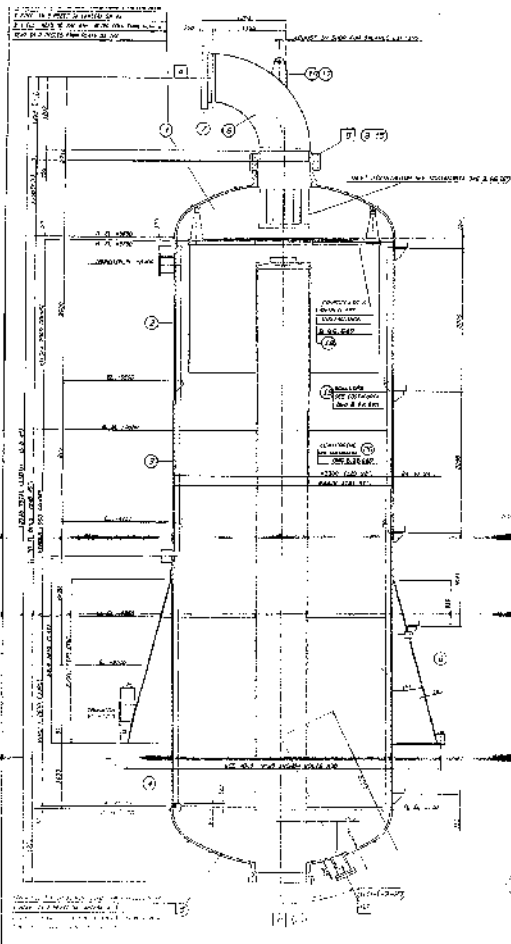
(9-15) GASKT SS 304 NON ASBESTOS WITH SS 304
BOLT SA 193 B16
NUT SA 194 GR 4
INLET DIST (LATER)

| | | | |
|------------------------------|--|---|------------|
| Commitments - Customer | | JOB - 11/96/1 | Cod. Anag. |
| OFFICINE LUIGI RESTA S.p.A. | | NF - 4839 | 1146200 |
| Via Orsini N. Your order No. | | F 696/96 DTD 10/06/96 | Pos. Arch |
| Destinazione | | YANBU - KINGDOM OF SAUDI ARABIA | 0667300 |
| | | MILANO - ITALY Via Grazioli 30 tel. (02) 66.20.20.66 (centr.) telefax 331262 MCO I - Milano località (02) 66.20.20.99 | |
| Scale - Scale | | Comm. MCO N. - MCO Job No. 983/605028/0/96 | |
| Dis. Rev. | | Cod. | |
| Cant. 1/1 | | Dis. N. - Dwg No | |
| Tura Date | | 8.96.667 | |
| 11.1.1996 | | Rev. 1 | |
| | | Foglio 1 of 2 | |

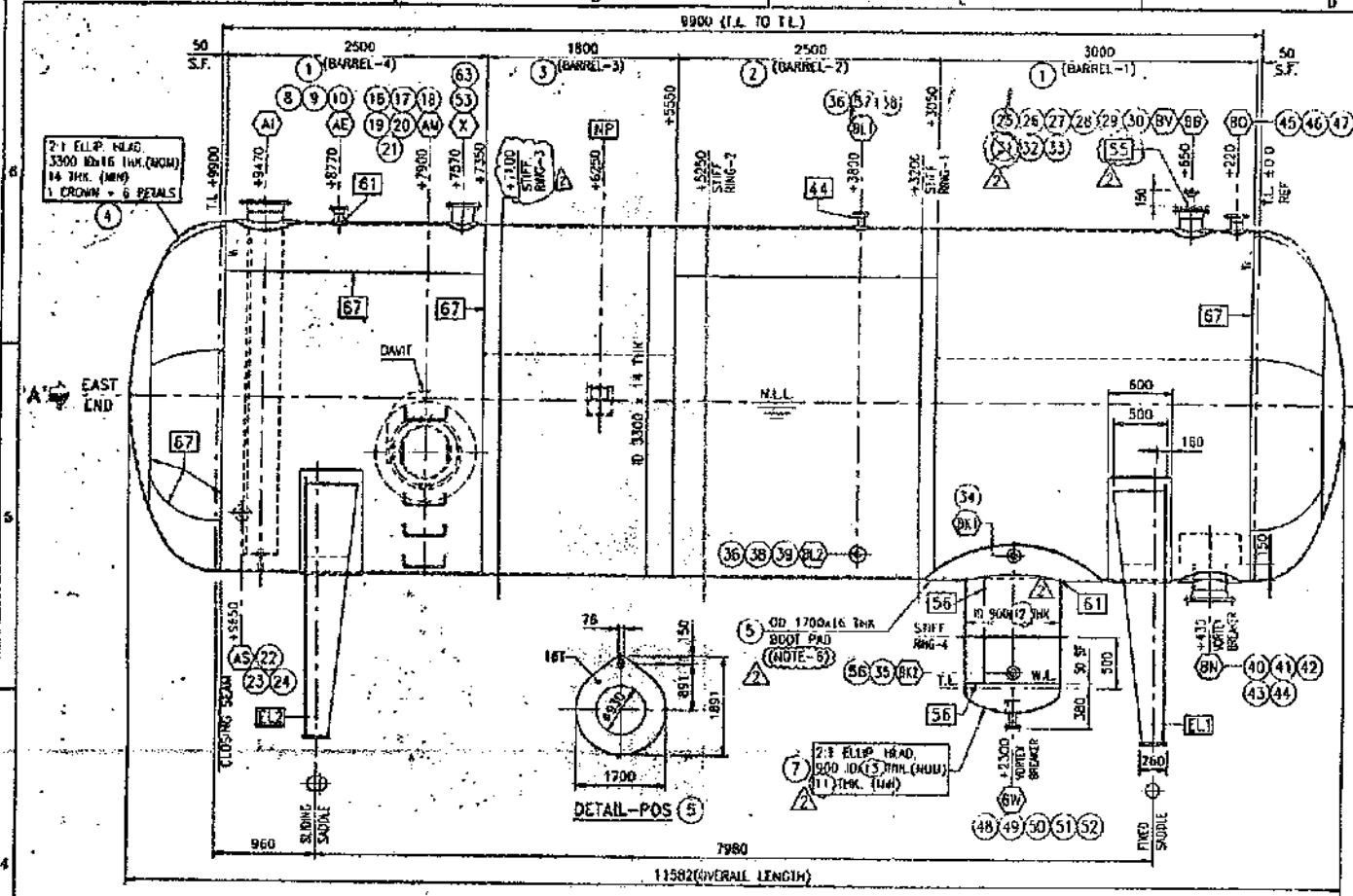
KEY FOR DRAWINGS
FOR ISOMAR REACTOR
△ ITEM 54-D-01

| Rev. | Data | Description | Dis. Dr. | Cont. Ch. |
|------|---------|-----------------------------------|----------|-----------|
| 1 | AUG 96 | MODIFIED AS MARKED | R.F. | |
| 0 | JULY 96 | ISSUED FOR JOB No 983/605028/0/96 | C.M. | |

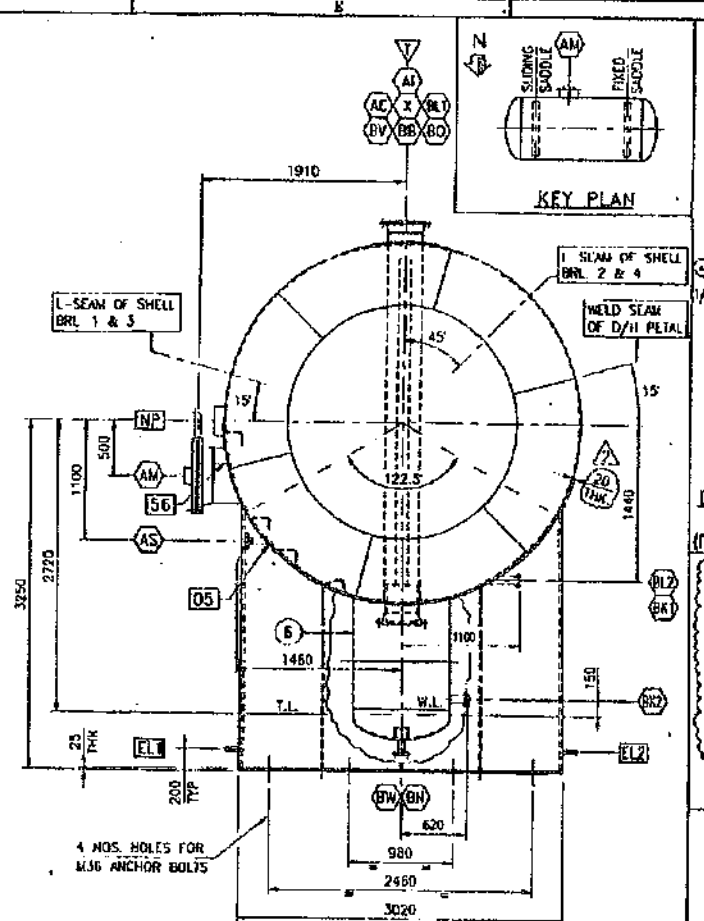
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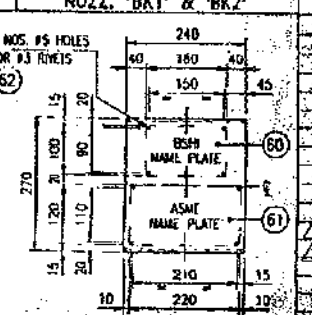
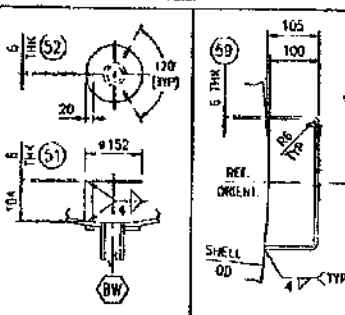
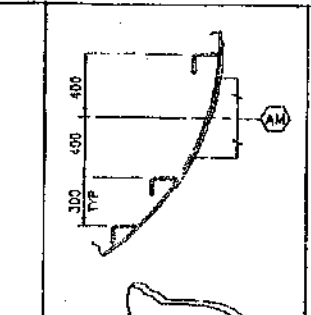
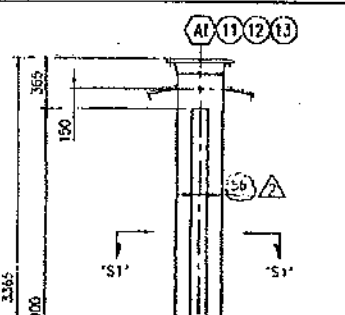
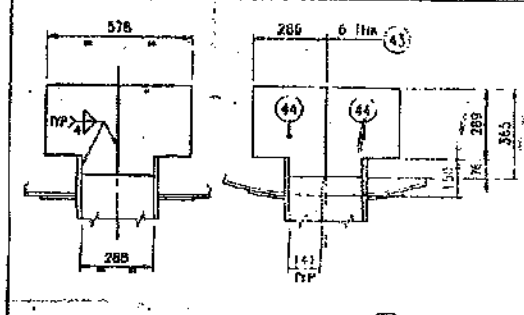
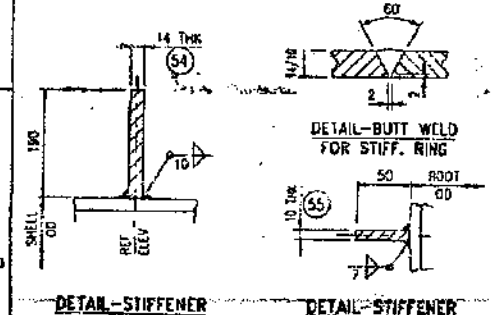
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ELEVATION



VIEW FROM 'A'



BELLELI REFERENCE DRAWINGS

| DA-7034-42-002 | DETAILS DRAWING |
|----------------|---------------------|
| DA-7034-42-003 | FORMED HEAD - SHELL |
| DA-7034-42-004 | FORMED HEAD - BOOT |
| DA-7034-42-005 | BSSH NAME PLATE |
| DA-7034-42-006 | ASME NAME PLATE |
| DA-7034-42-007 | EXTERNAL CLIPS |
| DA-7034-00-001 | DAVIT ARRANGEMENT |
| ST-7034-42-001 | FINISH REQUIREMENTS |
| OO-7034-42-001 | SHIPPING DRAWING |

GENERAL NOTES

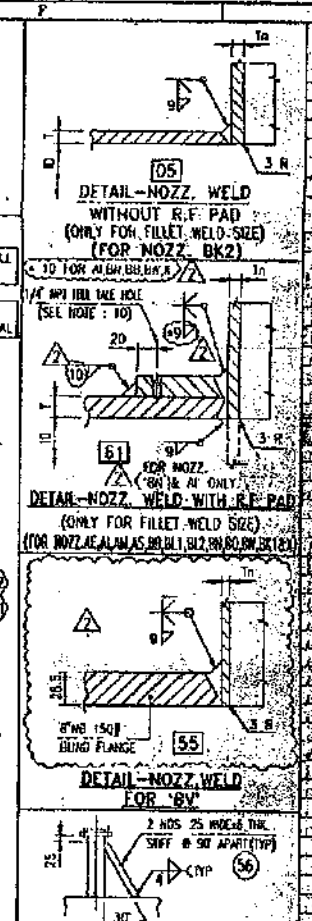
- FOR CARBON AND CARBON MANGANESE STEEL, THE CARBON CONTENT SHALL BE LIMITED TO 0.25% MAXIMUM.
- THE LONGITUDINAL WELD SEAMS OF NOZZLES INSTALLED HORIZONTALLY SHALL BE POSITIONED ABOVE CENTER LINE.
- HEAD SEAMS SHALL BE FULLY RADIOGRAPHED, HEAD TO SHELL SEAM SHALL BE SPOT RADIOGRAPHED PER UW-11(c)(5)(b). OTHER SEAMS SHALL BE SPOT RADIOGRAPHED PER UW-11(b).
- THE LONGITUDINAL BUTT WELD OF NOZZLES FABRICATED FROM PLATE SHALL BE 100% RADIOGRAPHED.
- MARK INDICATES THE BSSH WELD STANDARD NUMBER.
- MARK INDICATES THE POSITION NUMBER WITH REFERENCE TO LIST OF MATERIAL.
- MARK INDICATES THE NOZZLE MARK NUMBER.
- SHOP HYD. TEST GASKETS - (1) BLINDED NOZZLES WILL HAVE JOB GASKETS. (2) ALL OTHER NOZZLES WILL HAVE CAF GASKET.
- SPARE PARTS - ITEMS COMMISHIONING/STARTUP OPERATIONAL SHOP HYD. TEST GASKETS 200% 100% 100% FASTENERS (TORXMIN 2 SETS) FOR (MIN. 2 SETS) NOT REQUIRED.
- QTY OF SPARES FOR GASKETS AND FASTENERS ARE INCLUDED IN LIST OF MATERIALS.
- ALL BOLTS & NUTS SHALL BE OF ONE SIZE UP TO & INCLUDING 1" SIZE & 8mm ABOVE 1" SIZE. FLANGES UP TO & INCLUDING 24" SHALL BE AS PER ANSI B16.5 & THE FLANGE FACE FINISH SHALL BE 3.2 TO 6.3 MICROMETER.
- DELETED.
- MINIMUM TEMPERATURE OF HYDROTEST WATER SHALL BE 17°C AND THE TEST PRESSURE SHALL BE HELD FOR HALF AN HOUR PER INCH OF THICKNESS WITH ONE HOUR MINIMUM. EACH REINFORCING PAD OR SEGMENT THEREOF SHALL BE PROVIDED WITH ONE (1) NO. FOR NOZZLES 18" AND ABOVE (1) NO. APART 1/4" NPT. TELL TALE HOLES AS PER ANSI B1.20.1. ALL R.F. PAD WELDS SHALL BE TESTED TO 15 PSI MINIMUM WITH AIR & SOAPY BUBBLE TEST.
- A PERMANENT REFERENCE WORKLINE FOR VERTICAL VESSELS BOTTOM 1/4" LINE SHALL BE PUNCHMARKED AROUND THE VESSEL PERIMETER AT 0.30, 1.80 & 2.70' AND HORIZONTAL VESSELS CENTER LINE SHALL BE PUNCHMARKED ON BOTH SIDE SURFACES OF SHEET NEAR THE HEAD. THE VESSEL SHALL BE THOROUGHLY CLEANED INSIDE & OUTSIDE AND SHALL BE FREE OF ALL DIRT, WELD ROD STUBS & LOOSE FOREIGN MATERIALS ETC.
- ALL REMOVABLE INTERNALS SHALL PASS THROUGH THE NEAREST MANHOLE.
- WELD SEAMS COULD UNDER WISE ATTACHMENTS SHALL BE GROUNDED SMOOTH & RADIOGRAPHED FOR A DISTANCE OF 150MM BEYOND THE ATTACHMENT WELD.
- ALL NOZZLES AND MANWAY THAT DO NOT EXTEND INTO THE VESSEL SHALL BE FINISHED FLUSH WITH THE INSIDE & THE INNER EDGE SHALL BE ROUNDED OFF TO A 1mm SHARP RADIUS.
- NOZZLE POSITIONS ON VESSEL ELEVATIONS ARE CONVENTIONAL FOR TRUE LOCATION. SEE NOZZLE ORIENTATION PLAN.
- NOZZLE PROJECTION IS FROM CENTER LINE OF VESSEL TO GASKET FACE OF FLANGE UNLESS SPECIFIED OTHERWISE.
- ALL FLANGE BOLT HOLES SHALL STRADDLE VERTICAL AND/OR NORTH SOUTH CENTER LINES UNLESS SHOWN OTHERWISE.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

NOZZLE SCHEDULE

| MARK | QTY | SIZE | SERVICE | NOZZLE NECK | NOZZ. FLANGE | REF. PAD |
|------|-----|------|---------|-------------|--------------|----------|
| X | 1 | 8" | RELIEF | 206.4 | - | 27.0 |
| BW | 1 | 2" | SEE DRG | 60.3 | XXS | 11.07 |
| BV | 1 | 2" | SEE DRG | 60.3 | 180 | 8.74 |
| BO | 1 | 4" | 1815 | 114.3 | 120 | 11.15 |
| BN | 1 | 12" | 1865 | 323.0 | 80 | 17.48 |
| BL2 | 1 | 2" | BL DRG | 60.3 | 160 | 8.74 |
| BL1 | 1 | 2" | 1815 | 60.3 | 160 | 8.74 |
| BK2 | 1 | 1/2" | SEE DRG | 66.7 | - | 14.3 |
| BK1 | 1 | 1/2" | SEE DRG | 66.7 | - | 14.3 |
| BS | 1 | 8" | 1865 | 219.1 | 80 | 12.7 |
| AS | 1 | 2" | SEE DRG | 60.3 | 180 | 8.74 |
| AM | 1 | 20" | SEE DRG | 508.0 | PLT | 12 |
| AL | 1 | 12" | 1865 | 323.0 | 80 | 17.48 |
| AE | 1 | 3" | 1815 | 88.9 | 160 | 11.15 |

DESIGN DATA

| NO. | DESIGN CONDITIONS | UNITS | VALUES |
|-----|--------------------------------------|--------|---------------------------------|
| 1. | DESIGN PRESSURE | bar(g) | 121.0/B2.0 |
| 2. | OPERATING TEMPERATURE | °C | 5.8/FV |
| 3. | OPERATING PRESSURE | bar(g) | 62.0 |
| 4. | MINIMUM DESIGN METAL TEMPERATURE | °C | 9.0 |
| 5. | CHARPY IMPACT TEST | NO | NO |
| 6. | ULTRASONIC EXAMINATION | NO | NO |
| 7. | POST WELD HEAT TREATMENT | NO | NO |
| 8. | JOINT EFFICIENCY (SHELL/HEAD) | % | 85/100 |
| 9. | RADIOGRAPHY (SHELL/HEAD) | --- | RH AS PER UW-116(b) SEE NOTE 19 |
| 10. | CORROSION ALLOWANCE | mm | 3.0 (6.0 FOR BODY) |
| 11. | M.A.W.P. AT DESIGN TEMPERATURE | bar(g) | 6.67 (LIMITED BY SHELL) |
| 12. | M.A.W.P. (NEW & COLD) | bar(g) | 6.66 (LIMITED BY SHELL) |
| 13. | FIELD HYDROTEST PRESSURE (CORROSION) | bar(g) | 10.0 |
| 14. | SHOP HYDROTEST PRESSURE (HOR) | bar(g) | 12.54 (AT TOP) |
| 15. | OPERATING TEMPERATURE | °C | 62.0 |
| 16. | DESIGN TEMPERATURE (INT/EXT) | °C | 121.0/B2.0 |
| 17. | DESIGN PRESSURE (INT/EXT) | bar(g) | 5.8/FV |



KEY PLAN

DETAIL-NOZZ. WELD WITHOUT R.F. PAD

DETAIL-NOZZ. WELD WITH R.F. PAD

DETAIL-NOZZ. WELD FOR 'BY'

DETAIL-STIFFENER FOR NOZZ. 'BK1' & 'BK2'

| TOTAL WT. = (17004.9 Kgs.) | | | | | | | | | |
|----------------------------|---------------------|-----|------|----------|--------|------------|-----|------|----------|
| NO. | DESCRIPTION | QTY | UNIT | WT. (Kg) | MAT'L | CODE | QTY | UNIT | WT. (Kg) |
| 1 | FORMED HEAD - SHELL | 1 | PC | 12080 | SA106C | 703300-001 | | | |
| 2 | FORMED HEAD - BOOT | 1 | PC | 64900 | SA106C | 703300-001 | | | |
| 3 | BSSH NAME PLATE | 1 | PL | 21000 | SA106C | 703300-001 | | | |
| 4 | ASME NAME PLATE | 1 | PL | 2408 | SA106C | 703300-001 | | | |
| 5 | EXTERNAL CLIPS | 1 | CL | 2408 | SA106C | 703300-001 | | | |
| 6 | DAVIT ARRANGEMENT | 1 | AS | 2408 | SA106C | 703300-001 | | | |
| 7 | FINISH REQUIREMENTS | 1 | SR | 2408 | SA106C | 703300-001 | | | |
| 8 | SHIPPING DRAWING | 1 | DR | 2408 | SA106C | 703300-001 | | | |
| 9 | RELIEF | 1 | NOZ | 206.4 | SA106C | 703300-001 | | | |
| 10 | SEE DRG | 1 | NOZ | 60.3 | SA106C | 703300-001 | | | |
| 11 | SEE DRG | 1 | NOZ | 60.3 | SA106C | 703300-001 | | | |
| 12 | SEE DRG | 1 | NOZ | 114.3 | SA106C | 703300-001 | | | |
| 13 | SEE DRG | 1 | NOZ | 323.0 | SA106C | 703300-001 | | | |
| 14 | SEE DRG | 1 | NOZ | 60.3 | SA106C | 703300-001 | | | |
| 15 | SEE DRG | 1 | NOZ | 60.3 | SA106C | 703300-001 | | | |
| 16 | SEE DRG | 1 | NOZ | 66.7 | SA106C | 703300-001 | | | |
| 17 | SEE DRG | 1 | NOZ | 66.7 | SA106C | 703300-001 | | | |
| 18 | SEE DRG | 1 | NOZ | 219.1 | SA106C | 703300-001 | | | |
| 19 | SEE DRG | 1 | NOZ | 60.3 | SA106C | 703300-001 | | | |
| 20 | SEE DRG | 1 | NOZ | 508.0 | SA106C | 703300-001 | | | |
| 21 | SEE DRG | 1 | NOZ | 323.0 | SA106C | 703300-001 | | | |
| 22 | SEE DRG | 1 | NOZ | 88.9 | SA106C | 703300-001 | | | |

LIST OF MATERIAL

| NO. | DESCRIPTION | QTY | UNIT | WT. (Kg) | MAT'L | CODE | QTY | UNIT | WT. (Kg) |
|-----|---------------------|-----|------|----------|--------|------------|-----|------|----------|
| 1 | FORMED HEAD - SHELL | 1 | PC | 12080 | SA106C | 703300-001 | | | |
| 2 | FORMED HEAD - BOOT | 1 | PC | 64900 | SA106C | 703300-001 | | | |
| 3 | BSSH NAME PLATE | 1 | PL | 21000 | SA106C | 703300-001 | | | |
| 4 | ASME NAME PLATE | 1 | PL | 2408 | SA106C | 703300-001 | | | |
| 5 | EXTERNAL CLIPS | 1 | CL | 2408 | SA106C | 703300-001 | | | |
| 6 | DAVIT ARRANGEMENT | 1 | AS | 2408 | SA106C | 703300-001 | | | |
| 7 | FINISH REQUIREMENTS | 1 | SR | 2408 | SA106C | 703300-001 | | | |
| 8 | SHIPPING DRAWING | 1 | DR | 2408 | SA106C | 703300-001 | | | |
| 9 | RELIEF | 1 | NOZ | 206.4 | SA106C | 703300-001 | | | |
| 10 | SEE DRG | 1 | NOZ | 60.3 | SA106C | 703300-001 | | | |
| 11 | SEE DRG | 1 | NOZ | 60.3 | SA106C | 703300-001 | | | |
| 12 | SEE DRG | 1 | NOZ | 114.3 | SA106C | 703300-001 | | | |
| 13 | SEE DRG | 1 | NOZ | 323.0 | SA106C | 703300-001 | | | |
| 14 | SEE DRG | 1 | NOZ | 60.3 | SA106C | 703300-001 | | | |
| 15 | SEE DRG | 1 | NOZ | 60.3 | SA106C | 703300-001 | | | |
| 16 | SEE DRG | 1 | NOZ | 66.7 | SA106C | 703300-001 | | | |
| 17 | SEE DRG | 1 | NOZ | 66.7 | SA106C | 703300-001 | | | |
| 18 | SEE DRG | 1 | NOZ | 219.1 | SA106C | 703300-001 | | | |
| 19 | SEE DRG | 1 | NOZ | 60.3 | SA106C | 703300-001 | | | |
| 20 | SEE DRG | 1 | NOZ | 508.0 | SA106C | 703300-001 | | | |
| 21 | SEE DRG | 1 | NOZ | 323.0 | SA106C | 703300-001 | | | |
| 22 | SEE DRG | 1 | NOZ | 88.9 | SA106C | 703300-001 | | | |

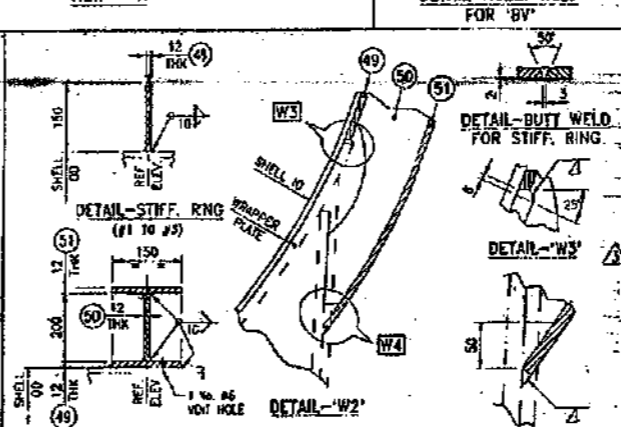
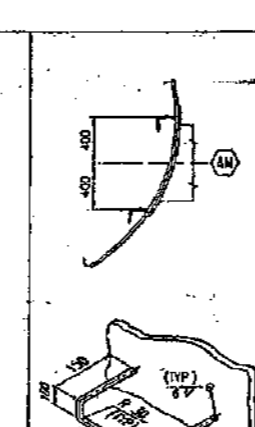
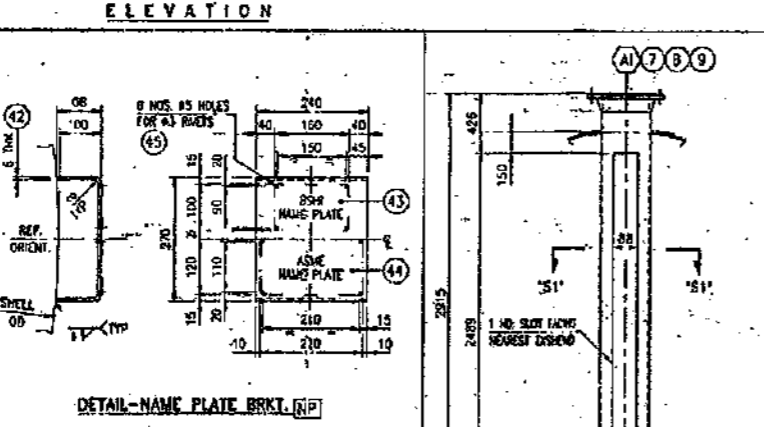
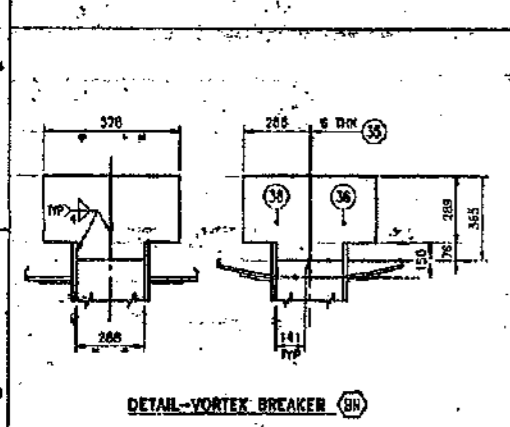
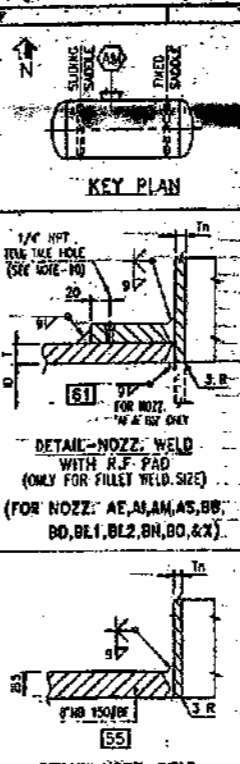
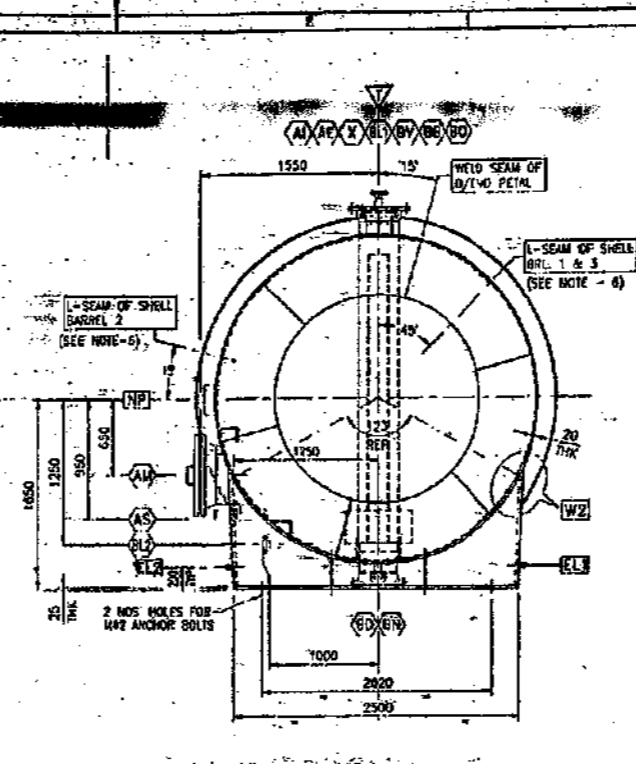
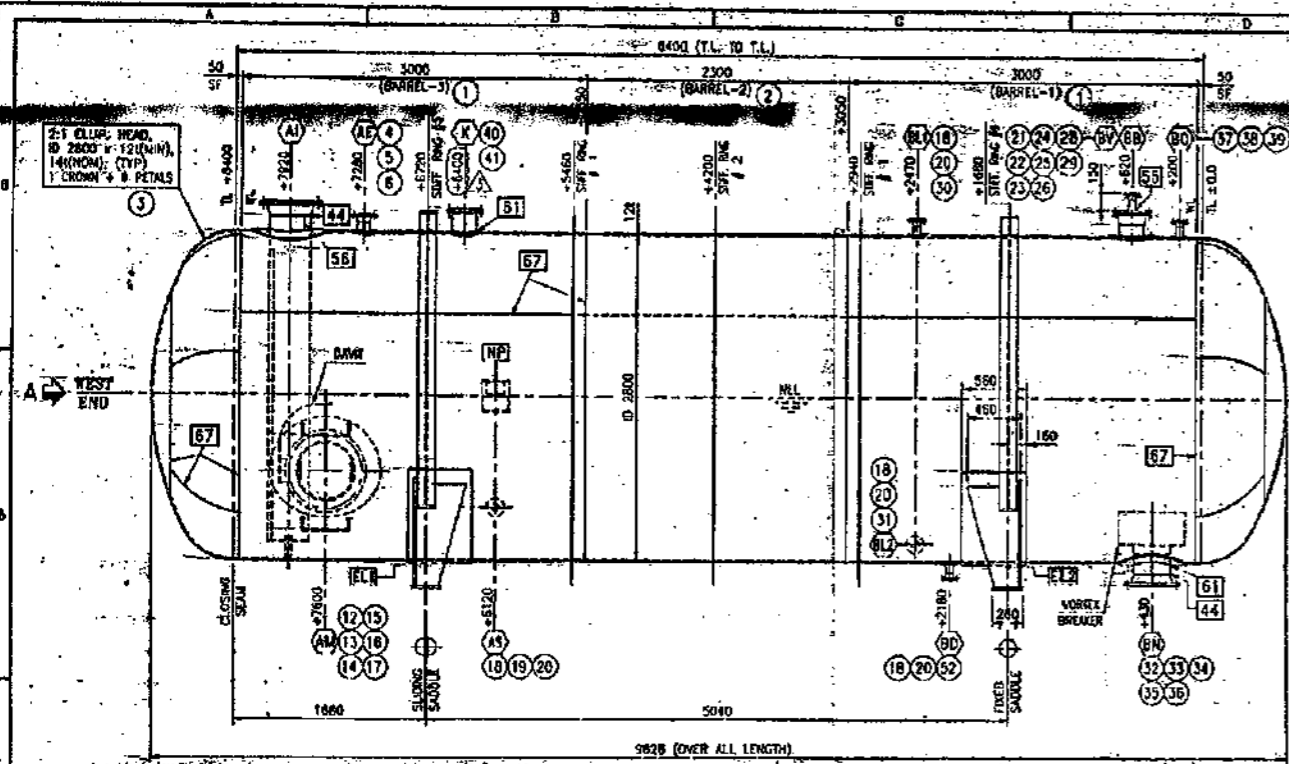
CLIENT'S REF. DWGS. & SPECS.

GENERAL NOTES

NOZZLE SCHEDULE

DESIGN DATA

LIST OF MATERIAL



BELLELI REFERENCE DRAWINGS

| | |
|----------------|---------------------|
| DA-7034-43-002 | DETAIL DRAWING |
| DA-7034-43-003 | FORMED HEAD |
| DA-7034-43-004 | BUSH NAME PLATE |
| DA-7034-43-005 | ASME NAME PLATE |
| DA-7034-43-006 | EXTERNAL CLIPS |
| DA-7034-43-007 | DAWG ARRANGEMENT |
| SY-7034-43-001 | FINISH REQUIREMENTS |
| DD-7034-00-001 | SHIPPING DRAWING |

GENERAL NOTES

1. V - DENOTES IDP
2. THE CARBON AND CARBON MANGANESE STEEL THE CARBON CONTENT SHALL BE LIMITED TO 0.25% MAXIMUM
3. THE LONGITUDINAL WELD SEAMS OF NOZZLES INSTALLED HORIZONTALLY SHALL BE POSITIONED ABOVE CENTER LINE
4. HEAD SEAMS SHALL BE FULLY RADIOGRAPHED, HEAD TO SHELL SEAMS SHALL BE SPOT RADIOGRAPHED PER DW-11(2)(B) OTHER SEAMS SHALL BE SPOT RADIOGRAPHED PER DW-11(1)(C)
5. THE LONGITUDINAL BUTT WELD OF NOZZLES FABRICATED FROM PLATE SHALL BE 100% RADIOGRAPHED
6. MARK INDICATES THE BSH WELD STANDARD NUMBER
7. LINE INDICATES THE POSITION NUMBER WITH REFERENCE TO LIST OF MATERIAL
8. MARK INDICATES THE NOZZLE MARK NUMBER
9. SHOP WELD TEST GASKETS - () BUNDLED NOZZLES WILL HAVE JOB GASKETS () ALL OTHER NOZZLES WILL HAVE CAP GASKETS
10. SPARE PARTS - ITEMS COMMISSIONING/STARTUP OPERATIONAL SHOP HND. TEST GASKETS 200% 100% PASTERERS 100MIN. 2 SETS 100MIN. 2 SETS) NOT REQUIRED CITY OF SPARES FOR GASKETS AND PASTERERS ARE INCLUDED IN LIST OF MATERIALS
11. ALL BOLTS & NUTS SHALL BE OF UNIC SERIES U100 & INCLUDING 1" SIZE & 80MM ABOVE 1" SIZE
12. FLANGES U100 & INCLUDING 24" & SHALL BE AS PER ANSI B16.5 & THE FLANGE FACE FINISH SHALL BE 3.2 TO 6.3 MICROMETER.
13. - DELETED -
14. MINIMUM TEMPERATURE OF HIGHEST WATER SHALL BE 17°C AND THE TEST PRESSURE SHALL BE HELD FOR HALF AN HOUR PER INCH OF THICKNESS WITH ONE HOUR MINIMUM EACH REINFORCING PAD OR SEAM THEREOF SHALL BE PROVIDED WITH ONE (1) INCH FOR NOZZLES 16" AND ABOVE & (2) INCH FOR 17" TO 15", SEE TNC HOLE AS PER ANSI B16.5. ALL RT PAD WELDS SHALL BE TESTED TO 15 PSIG. MINIMUM WITH AIR & SOAPY BUBBLE TEST.
15. A PERMANENT REFERENCE WORKLINE FOR VERTICAL VESSELS BOTTOM TAN LINE SHALL BE PUNCHMARKED AROUND THE VESSEL PERIMETER AT 0.90, 0.80 & 270 AND HORIZONTAL VESSELS CENTER LINE SHALL BE PUNCHMARKED ON BOTH SIDE SURFACES OF SHELL NEAR THE HEAD.
16. THE VESSEL SHALL BE THOROUGHLY CLEANED INSIDE & OUTSIDE AND SHALL BE FREE OF ALL DIRT, WELD ROD SLAGS & GROSS FOREIGN MATTER (E.T.C.)
17. ALL REMOVABLE INTERNALS SHALL PASS THROUGH THE NEAREST MANHOLE & WELD SEAMS COMING UNDER THIS ATTACHMENTS SHALL BE ROUND SMOOTH & RADIOGRAPHED FOR A DISTANCE 3" (76MM) BEYOND THE ATTACHMENT WIDTH
18. ALL NOZZLES AND MANWAY SHALL NOT EXTEND INTO THE VESSEL SHALL BE FINISHED FLUSH WITH THE INSIDE & THE OUTSIDE SHALL BE ROUNDED OFF TO A MIN. 3mm RADIUS.
19. NOZZLE POSITIONS ON VESSEL C/WAIONS ARE CONVENTIONAL FOR TRUE LOCATION
20. NOZZLE PROJECTION IS FROM CENTER LINE OF VESSEL TO GASKET FACE OF FLANGE UNLESS SPECIFIED OTHERWISE
21. ALL FLANGE BOLT HOLES SHALL BE RADIAL VERTICAL AND/OR HORIZONTAL TO CENTER LINES UNLESS SHOWN OTHERWISE
22. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED

NOZZLE SCHEDULE

| NO. | QTY | SIZE | SERVICE | NOZZLE NECK | NOZZ. FLANGE | RELIN. PAD |
|-------|-----|------|-------------------------|-------------|--------------|-------------------|
| X 1 | 610 | 1050 | RELIEF | 208.4 | 270 | LNWRP 3000 500 12 |
| BY 1 | 2 | 360 | VENT | 60.3 | 160 | LNWRP 1500 150 12 |
| BO 1 | 3 | 360 | BLANKETING | 88.9 | 160 | LNWRP 1500 150 12 |
| BN 1 | 12 | 365 | OUTLET W/VB | 322.9 | 160 | LNWRP 1500 610 12 |
| BLZ 1 | 2 | 360 | LEVEL | 60.3 | 160 | LNWRP 1500 150 12 |
| DL 1 | 2 | 360 | LEVEL | 60.3 | 160 | LNWRP 1500 150 12 |
| BD 1 | 2 | 365 | DRAIN | 60.3 | 160 | LNWRP 1500 150 12 |
| BB 1 | 1 | 360 | VENTILATION W/BLIND FLG | 219.1 | 80 | LNWRP 1500 440 12 |
| AS 1 | 2 | 360 | SIPHON | 60.3 | 160 | LNWRP 1500 150 12 |
| AM 1 | 20 | 360 | SEALING | 508.0 | PLT 1200 | LNWRP 1500 9.0 12 |
| AI 1 | 14 | 360 | BULLET W/RT PIPE | 355.5 | PLT 1200 | LNWRP 1500 660 12 |
| AE 1 | 4 | 360 | EQUALIZING | 114.3 | 120 11.3 | LNWRP 1500 210 12 |

DESIGN DATA

| NO. | DESIGN CONDITION'S | UNITS | VALUES |
|-----|--------------------------------------|----------------|------------------------------------|
| 25. | DESIGN CODE | | ASME SEC VIII DIV.1 1985 EDITION |
| 26. | SERVICE | | TOLUENE COLUMN RECEIVER |
| 27. | VOLUME | m ³ | 57.50 |
| 28. | FIREPROOFING | NO | |
| 29. | INSULATION | mm | 40-HOT (BY OTHERS) |
| 30. | SPECIFIC GRAVITY | g / cc | 0.779 |
| 31. | OPERATING FLUID | | HYDROCARBON |
| 32. | INSPECTION AUTHORITY | | CLENT/ABS |
| 33. | WIND SPEED/EXPOSURE CATEGORY | km/hr | 175°C |
| 34. | EARTHQUAKE DESIGN | | ASCE-7-08 ZONE 1 |
| 35. | MINIMUM DESIGN METAL TEMPERATURE | °C | 9 |
| 36. | CHAMPI IMPACT TEST | NO | |
| 37. | ULTRASONIC EXAMINATE | NO | |
| 38. | POST WELD HEAT TREATMENT | NO | |
| 39. | JOINT EFFICIENCY (S-CL/HEAD) | % | 85/105 |
| 40. | RADIOGRAPHY (S-CL/HEAD) | | RT AS PER DW-11(1)(C) SEE NOTE 7/9 |
| 41. | CORROSION ALLOWANCES | mm | 3.2 |
| 42. | M.A.W.P AT DESIGN TEMPERATURE | barG | 6.50 (LIMITED BY SHELL) |
| 43. | M.A.W.P (HEW & COLD) | barG | 6.75 (LIMITED BY SHELL) |
| 44. | FIELD HYDROTEST PRESSURE (CORROSION) | barG | 5.7 |
| 45. | SHOP HYDROTEST PRESSURE (HOR) | barG | 12.94 (AT TOP) |
| 46. | OPERATING TEMPERATURE | °C | 115 |
| 47. | OPERATING PRESSURE | barG | 0.77 |
| 48. | DESIGN TEMPERATURE (INT/EXT) | °C | 114/113 |
| 49. | DESIGN PRESSURE (INT/EXT) | barG | 3.6/FULL VACUUM |

LIST OF MATERIAL

| NO. | DESCRIPTION | LENGTH | WIDTH | THICKNESS | WT. IN Kg. | MAT'L | MAT'L CODE | NDA. NO. |
|-----|-------------|--------|-------|-----------|------------|--------|------------|------------|
| 1 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 2 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 3 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 4 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 5 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 6 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 7 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 8 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 9 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 10 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 11 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 12 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 13 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 14 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 15 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 16 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 17 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 18 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 19 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 20 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 21 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 22 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 23 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 24 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 25 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 26 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 27 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 28 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 29 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 30 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 31 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 32 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 33 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 34 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 35 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 36 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 37 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 38 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 39 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |
| 40 | PL 100-80 | 100 | 0 | 11 | 11 | SA106B | 103300101 | 103300-001 |

BELLELI SAUDI HEAVY INDUSTRIES LTD. AS BUILT

CERTIFIED BY: _____

REVISIONS

| REV. | DATE | DESCRIPTION | DRAWN | CHK'D | APP'D |
|------|----------|--|-------|-------|-------|
| 3 | 01.09.97 | REVISED AS MARKED Δ & AS BUILT. | | | |
| 2 | 15.10.97 | REVISED AS MARKED Δ AS PER CLIENT'S COMMENTS | | | |
| 1 | 11.11.96 | DWG. GENERALLY REVISED & ISSUED FOR CONSTRUCTION | | | |
| 0 | 05.08.95 | ISSUED FOR APPROVAL & INTERNAL COMMENTS | | | |

NO. REQUIRED : 1 UNIT

SCALE 1:30

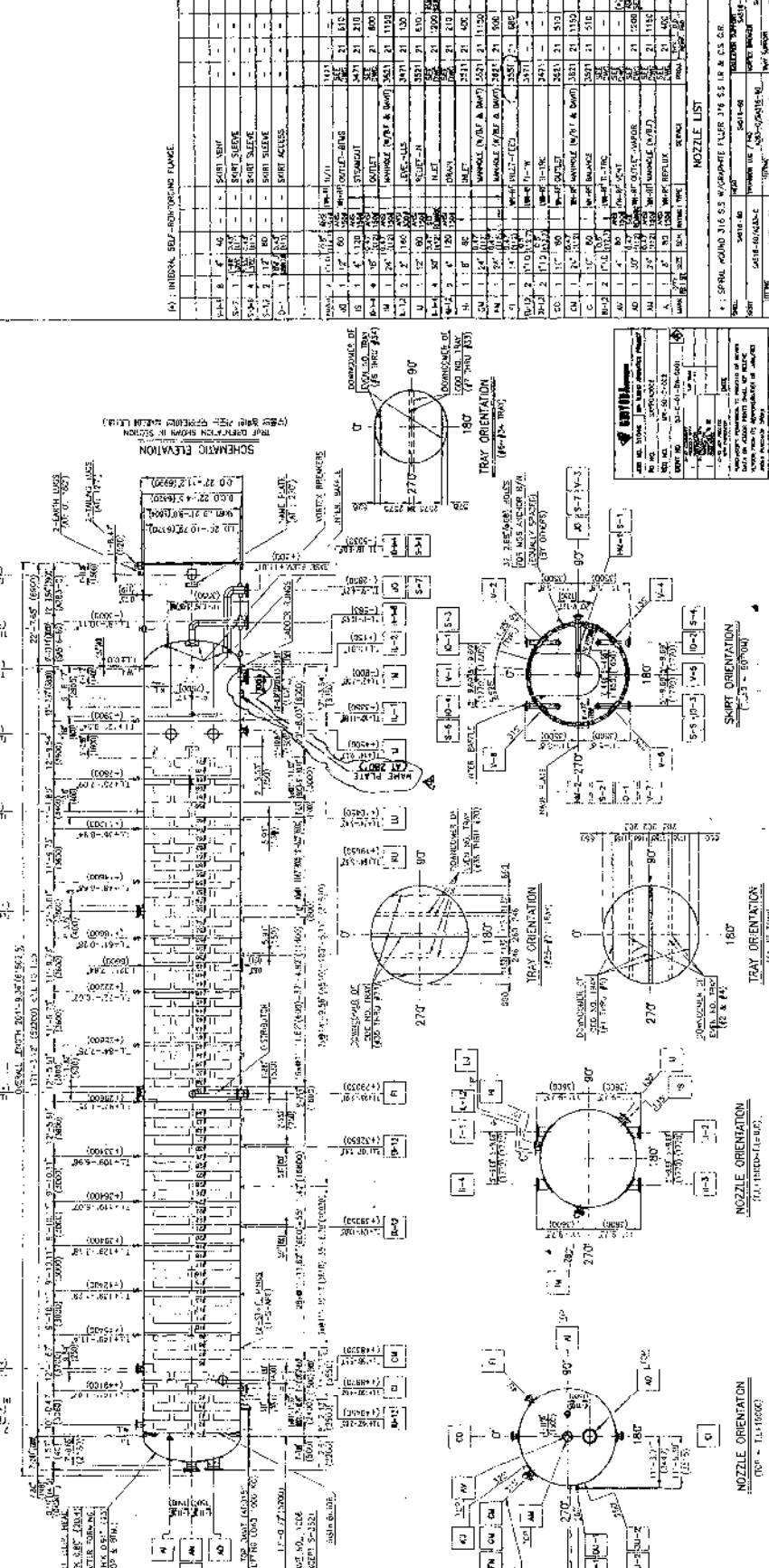
BELLELI SAUDI HEAVY INDUSTRIES LTD.
HEAVY INDUSTRIES LTD.
AL-KHARJ, KINGDOM OF SAUDI ARABIA

CLIENT: CHYODA/IBN RUSHD
ARABIAN INDUSTRIAL FIBRES COMPANY (IBN RUSHD)
PTA & AROMATICS PROJECT - AROMATICS
TOLUENE COLUMN RECEIVER (50000000)

APPROVED FOR CONSTRUCTION BY: _____
DATE 16.10.94

DRAWING NO. OA-7034-43-001 3

| REV. | DATE | REASON FOR REVISION | BY | CHK. | APP. |
|------|------|----------------------------|----|------|------|
| 1 | | NOZZLE REVISIONS AS MARKED | | | |
| 2 | | NOZZLE REVISIONS AS MARKED | | | |
| 3 | | NOZZLE REVISIONS AS MARKED | | | |
| 4 | | NOZZLE REVISIONS AS MARKED | | | |
| 5 | | NOZZLE REVISIONS AS MARKED | | | |
| 6 | | NOZZLE REVISIONS AS MARKED | | | |
| 7 | | NOZZLE REVISIONS AS MARKED | | | |
| 8 | | NOZZLE REVISIONS AS MARKED | | | |
| 9 | | NOZZLE REVISIONS AS MARKED | | | |
| 10 | | NOZZLE REVISIONS AS MARKED | | | |



NOZZLE LIST

1. SPOT WELD 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

3. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

4. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

5. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

6. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

7. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

8. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

9. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

10. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

AS BUILT MATERIAL SPECIFICATION

1. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

2. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

3. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

4. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

5. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

6. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

7. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

8. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

9. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

10. 200# 1" W.P.M. 316 S.S. COMPARTMENT TUBES 178 515 610 4. 2. S.S.

DESIGN DATA

1. DESIGN PRESSURE: 100 PSIG

2. DESIGN TEMPERATURE: 300°F

3. MATERIAL: 316 S.S.

4. NOZZLE DESIGN: ASME VIII DIV. 1

5. TRAY DESIGN: ASME VIII DIV. 1

6. SHIRT DESIGN: ASME VIII DIV. 1

7. WELDING: SMAW

8. SURFACE FINISH: 320 RA

9. PAINT: EPOXY

10. INSULATION: 1" POLYURETHANE

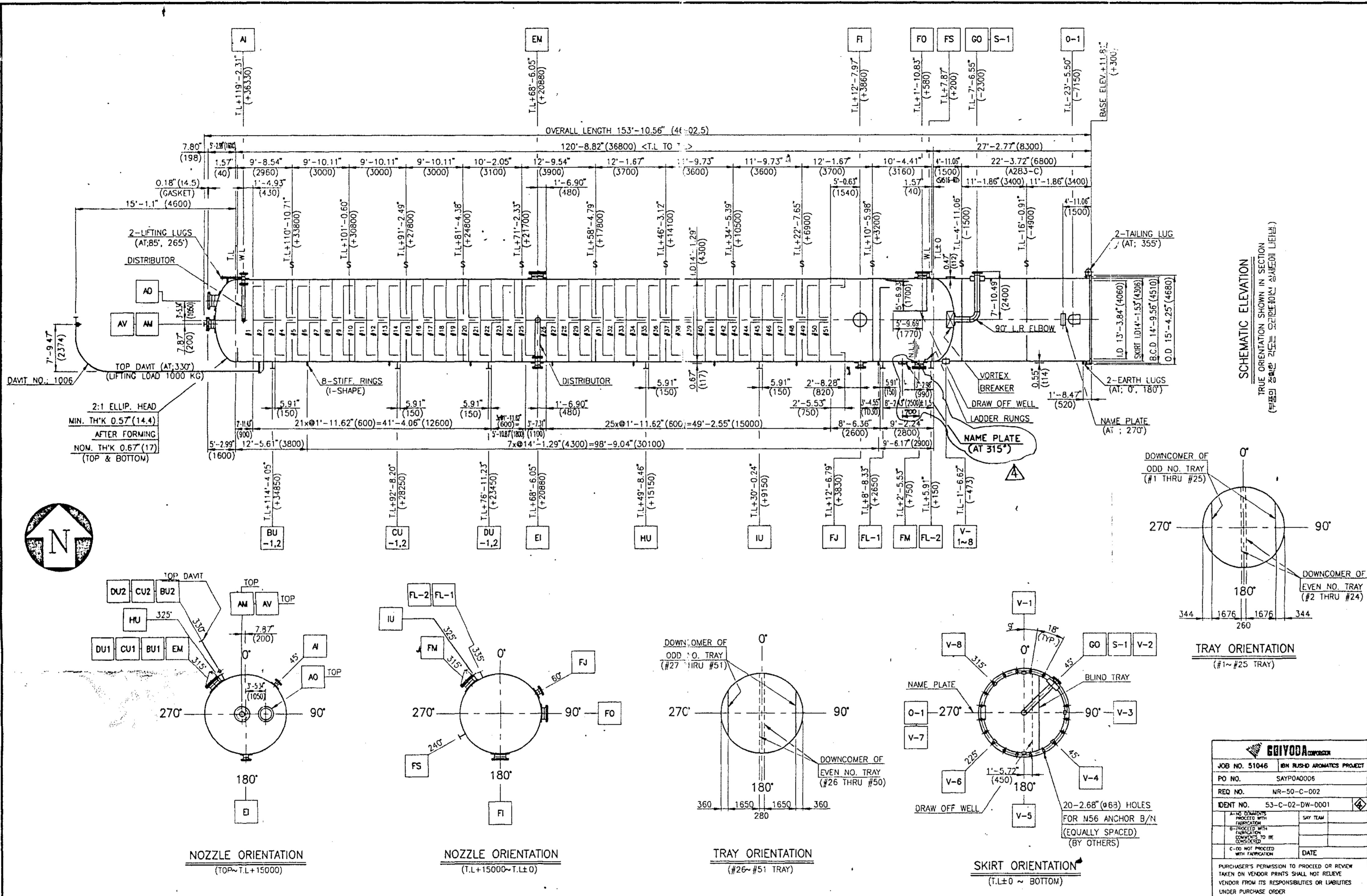
HYUNDAI

HYUNDAI HEAVY INDUSTRIES CO., LTD.

SUNGWON-PO-DONG, YONGIN-CITY, KYONGGI-DO, KOREA

TEL: 82-31-260-2000 FAX: 82-31-260-3000

E-MAIL: HYUNDAI@HYUNDAI.CO.KR



| REV | DATE | REASON FOR REVISION | DWN | CHK | APP |
|-----|-----------|---------------------|----------|----------|---------|
| 1 | '96.7.2 | REVISED AS MARKED | D.C.KWAG | G.Y.SHIN | D.H.WON |
| 2 | '96.8.19 | REVISED AS MARKED | D.C.KWAG | G.Y.SHIN | D.H.WON |
| 3 | '96.11.20 | REVISED AS MARKED | | | |
| 4 | '96.11.20 | REVISED AS MARKED | | | |

(*) : INTEGRAL SELF-REINFORCING FLANGE.

| MARK | QTY | SIZE | SCH. | RATING | TYPE | SERVICE | PROJ. | THK | REMARK |
|--------|-----|---------|------|--------|------|--------------------------------|----------|-----|--------|
| V-1~8 | 8 | 4" | 40 | - | - | SKIRT VENT | - | - | - |
| S-1 | 1 | 1'-6.5" | 80 | (11) | - | SKIRT SLEEVE | - | - | - |
| O-1 | 1 | 1'-6.5" | 80 | (11) | - | SKIRT ACCESS | - | - | - |
| HU/1U | 2 | 1" I.D. | 150# | (12.9) | ANSI | LMN-RF TI-TI | 2317 | - | - |
| GO | 1 | 10" | 80 | 150# | ANSI | WN-RF OUTLET | 2317 | 17 | 510 |
| FS | 1 | 2" | 160 | 150# | ANSI | WN-RF STEAMOUT | 2317 | 17 | 150 |
| FO | 1 | 18" | 0.47 | (112) | ANSI | WN-RF OUTLET | 2417 | 17 | 870 |
| FM | 1 | 24" | 0.47 | (112) | ANSI | WN-RF MANHOLE (W/B.F. & DAWT) | 2467 | 17 | 1150 |
| FL-1,2 | 2 | 2" | 160 | 300# | ANSI | WN-RF LEVEL- LLS | 2317 | 17 | 130 |
| FJ | 1 | 10" | 80 | 150# | ANSI | WN-RF EQUALIZING | 2367 | 17 | 510 |
| FI | 1 | 34" | 0.47 | (112) | ANSI | WN-RF INLET | 2467 | 17 | 1300 |
| EM | 1 | 24" | 0.57 | (112) | ANSI | WN-RF MAN-HOLE (W/B.F. & DAWT) | 2467 | 17 | 1150 |
| EI | 1 | 10" | 80 | 150# | ANSI | WN-RF INLET | 2367 | 17 | 510 |
| DU-1,2 | 2 | 1" I.D. | 0.57 | (12.7) | ANSI | LMN-RF TI-TW | 2317 | - | - |
| DU-1,2 | 2 | 1" I.D. | 0.57 | (12.7) | ANSI | LMN-RF TI-TRC | 2317 | - | - |
| BU-1,2 | 2 | 1" I.D. | 0.57 | (12.7) | ANSI | LMN-RF TI-TRC | 2317 | - | - |
| AV | 1 | 2" | 160 | 150# | ANSI | FN-RF VENT | SEE DWG. | - | (*) |
| AD | 1 | 24" | 0.47 | (112) | ANSI | WN-RF OUTLET | SEE DWG. | 17 | 1150 |
| AM | 1 | 24" | 0.47 | (112) | ANSI | WN-RF MANHOLE (W/B.F.) | SEE DWG. | 17 | 1150 |
| AI | 1 | 6" | 80 | 150# | ANSI | WN-RF INLET | 2367 | 17 | 300 |

NOZZLE LIST

* : SPIRAL WOUND 316 S.S W/GRAPHITE FILLER 316 S.S I.R. & C.S. O.R.

| EXTERNAL | INTERNAL | DESCRIPTION | STANDARD |
|-------------------|--------------------|-----------------|-----------------|
| SKIRT | INSULATION SUPPORT | SAS16-60 | SAS16-60/A283-C |
| SKIRT | LIFTING LUG / PAD | SAS16-60/A283-C | A283-C/SAS16-60 |
| SKIRT | VORTEX BREAKER | SAS16-60/A283-C | SAS16-60 |
| TRAY SUPPORT | TRAY SUPPORT | SAS16-60 | SAS16-60 |
| MANHOLE NECK | MANHOLE NECK | SAS16-60 | SAS16-60 |
| NAME PLATE/BRAKET | NAME PLATE/BRAKET | SAS16-60 | SAS16-60 |
| EARTH LUG | EARTH LUG | 304 S.S/A283-C | 304 S.S |
| INTERNAL RUNG | INTERNAL RUNG | A36 | A36 |
| ANCHOR BOLT/NUIT | ANCHOR BOLT/NUIT | A307-B/A563-A | A307-B/A563-A |

GENERAL NOTES

- ALL DIMENSIONS ARE IN FEET-INCH UNIT WITH METRIC UNIT IN PARENTHESES UNLESS OTHERWISE NOTED. <EXCEPT NOZZLE LIST> METRIC UNIT SHALL BE USED FOR FABRICATION. (단 모든 단위는 FT-INCH ()로 mm로, <NOZZLE LIST는 제외> 단위로 ()로 mm로 사용한다.)
- NOZZLE PROJECTIONS ON SHELL ARE REFERRED FROM CENTER LINE OF VESSEL TO RAISED FACE OF FLANGE. (노즐의 돌출 높이는 용기의 중심선에서 플랜지의 높이를 기준한다.)
- ALL BOLT HOLES SHALL BE STRADDLED TO VERTICAL OR 0°-180°, 90°-270° CENTER LINE OF VESSEL. (모든 볼트 구멍은 용기의 중심선에서 0-180, 90-270도 대칭이어야 한다.)
- ALL SHARP CORNERS SHALL BE GROUND FINISHED RADIUS 2-3mm UNLESS OTHERWISE NOTED. (EXCEPT INSIDE EDGE OF NOZZLE SPECIFIED IN DETAIL DWG.) (모든 날카로운 모서리는 2-3mm의 반경을 가진 둥근 모서리로 처리해야 한다. (NOZZLE INSIDE EDGE는 DETAIL DWG에 지정된 경우를 제외한다.))
- THE GASKET CONTACT SURFACE OF ALL FLANGE THAT REQUIRE SPIRAL-WOUND GASKETS SHALL BE MACHINED FINISH 125 Ra~250 Ra. (모든 나선형 가스켓을 요구하는 모든 플랜지의 가스켓 면은 125 Ra ~ 250 Ra로 가공되어야 한다.)
- EACH REINFORCING PAD SHALL BE PROVIDED WITH 1/4 INCH NPT TELL-TALE HOLE DRILLED AND TAPPED WITH ANCHOR BOLT TAPERED PIPE END AND DRILLED AFTER WELDING. (모든 보강 패드는 1/4인치 NPT 텔테일 홀이 뚫려 있고 앵커 볼트와 테퍼 파이프 끝이 용접 후 뚫려 있어야 하며, 용접 후 뚫어야 한다.)
- EACH REINFORCING PADS SHALL HAVE A MINIMUM OF ONE TELL TALE HOLE EXCEPT THAT PADS FOR NOZZLES GREATER THAN 16 INCH NPS SHALL HAVE A MINIMUM 2 HOLES AND NOZZLE IN EXCESS OF 36 INCH NPS SHALL HAVE 4 HOLES. (모든 보강 패드는 최소 1개의 텔테일 홀을 가져야 하며, 노즐이 16인치 NPS보다 크거나 노즐이 36인치 NPS보다 크면 2개 또는 4개의 텔테일 홀이 있어야 한다.)
- AIR-SOAP BUBBLE TEST OF REINFORCING PADS SHALL BE TESTED AT 1.0 BAR.G.(1.02 KG/CM².G) PRESSURE BEFORE HYDROSTATIC TEST. (보강 패드의 방풍 시험은 1.0 BAR.G.(1.02 KG/CM².G) 압력으로 수압 시험 전 실시한다.)
- STRUCTURAL ATTACHMENT WELDS SHALL CLEAR SEAM WELDS BY AT LEAST ONE-PLATE THICKNESS. IF OVERLAP IS UNAVOIDABLE, COVERED SEAM SHALL BE GROUND FLUSH AND 100% RADIOGRAPHICALLY EXAMINED BEFORE ATTACHMENT IS WELDED ON. (구조적 부착 용접은 이음 용접보다 최소 한 판 두께 이상이어야 하며, 겹치기가 불가피한 경우 이음 용접은 평면과 100% 방사선 검사 후 용접해야 한다.)
- PAINTING SPECIFICATION NO. : 22854-SP-000-X-001
- FOR DETAIL NDE, SEE INSPECTION & TEST PLAN (DOC NO. J-631-6H05-02) (자세한 비파괴 검사는 검사 계획서 (J-631-6H05-02)를 참조한다.)
- TRAY ELEVATIONS ARE TOP OF TRAY SUPPORT RING. (모든 트레이 높이는 트레이 지지 링의 상면 기준이다.)

APPLICABLE SPECIFICATION & STANDARD

| NO. | DESCRIPTION | STD. DWG NO. | NO. | DESCRIPTION | STD. DWG NO. |
|-----|--|--------------|-----|-----------------------------|--------------|
| 7 | EARTH PIECE | DR-50-DB-018 | 13 | TRAPS | 3-280-0 |
| 6 | ANSI 150, 300 AND 600 MANHOLE DAWT AND HINGE | DR-50-DB-013 | 12 | DISTRIBUTORS | 3-150-3 |
| 5 | FLANGED NOZZLE | DR-50-DB-011 | 11 | DRAW OF WELLS FOR REBOILERS | 3-274-1 |
| 4 | INTERNAL LADDER FOR VESSEL | DR-50-DB-010 | 10 | DISTRIBUTORS | 3-162-1 |
| 3 | DAWT | DR-50-DB-007 | 9 | VORTEX BREAKERS | 3-122-0 |
| 2 | LIFTING LUG FOR VERTICAL VESSEL | DR-50-DB-008 | 8 | NAME PLATE | DR-50-DB-017 |
| 1 | SKIRT AND BASE BLOCK FOR VERTICAL VESSEL | DR-50-DB-001 | | | |

DESIGN DATA

| ITEM | VALUE | UNIT |
|-------------------------------|---------------------|--------------|
| ELUTION WT LB (KG) | 239859 (108800) | |
| DIFFY WT LB (KG) | 452601 (205300) | |
| OPERATING WT LB (KG) | 714065 (323900) | |
| HYDRO-TEST WT LB (KG) | 1791887 (812800) | |
| PRODUCTION TEST | NO | |
| PROCESS FLUID | HYDROCARBON | |
| WIND SPEED | 19618.4 (892.2) | MPH (M/S) |
| WIND PRESSURE | 77.68 (34.723) | PSF (N/M²) |
| SEISMIC FACTOR | ASCE7-AR1000 ZONE 1 | |
| SEISMIC INTENSITY | II | |
| RADIOGRAPHIC TEST | HEAD TO HEAD FULL | |
| SPOT | SPOT | |
| SHELL EFFICIENCY | 0.85 | |
| HEAD | 1.0 | |
| HYDRO-TEST PRESSURE | 100.18 (2.25) | PSIG (BAR.G) |
| OPERATING PRESSURE | 136.82 (3.04) | PSIG (BAR.G) |
| ASME SEC. VIII DIV.1 1995 ED. | | |

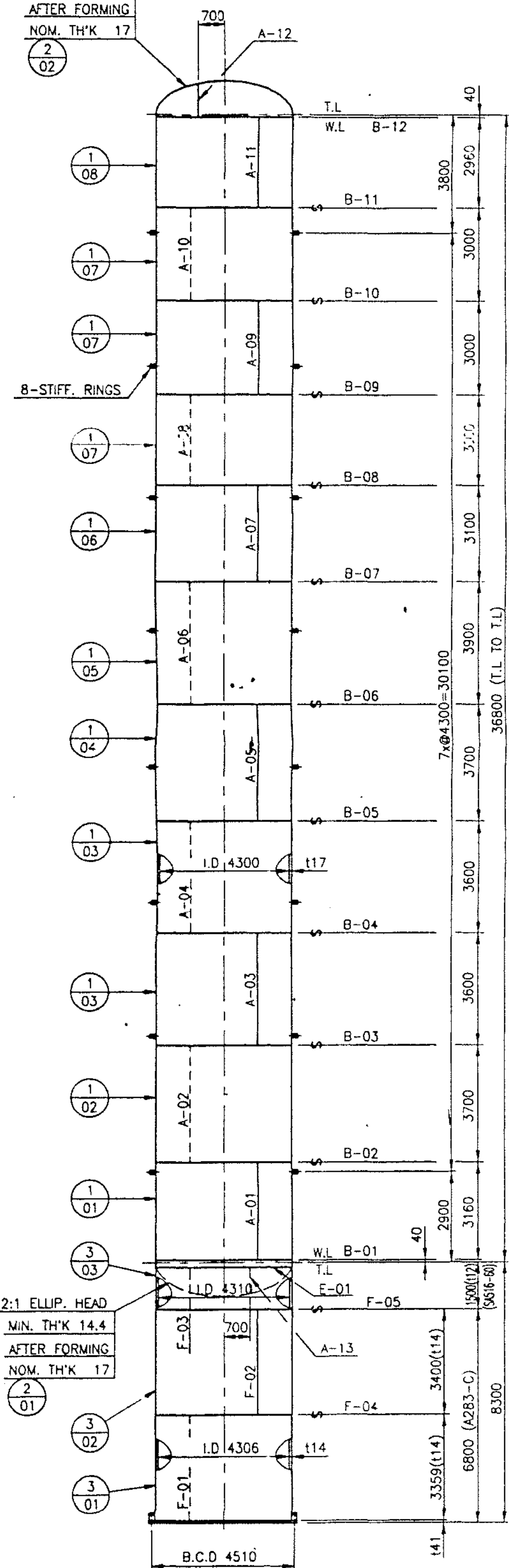
MATERIAL SPECIFICATION

| ITEM NO. | DESCRIPTION | STANDARD |
|----------|--------------------|-----------------|
| 1 | SKIRT | SAS16-60 |
| 2 | HEAD | SAS16-60 |
| 3 | INSULATION SUPPORT | SAS16-60/A283-C |
| 4 | LIFTING LUG / PAD | A283-C/SAS16-60 |
| 5 | VORTEX BREAKER | SAS16-60 |
| 6 | TRAY SUPPORT | SAS16-60 |
| 7 | MANHOLE NECK | SAS16-60 |
| 8 | NAME PLATE/BRAKET | SAS16-60 |
| 9 | EARTH LUG | 304 S.S/A283-C |
| 10 | INTERNAL RUNG | A36 |
| 11 | ANCHOR BOLT/NUIT | A307-B/A563-A |

INDUSTRIAL PLANT DIVISION ULSAN KOREA

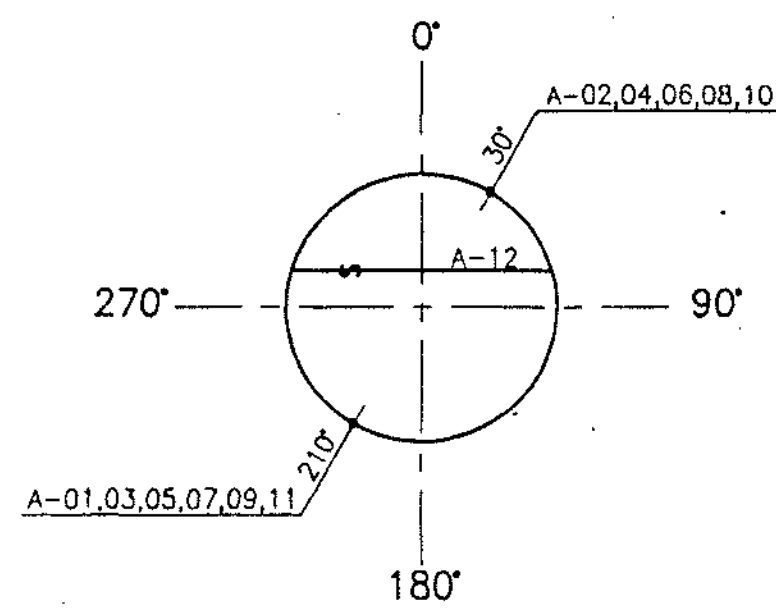
HYUNDAI HEAVY INDUSTRIES CO., LTD.

2:1 ELLIP. HEAD
MIN. TH'K 14.4
AFTER FORMING
NOM. TH'K 17
2
02

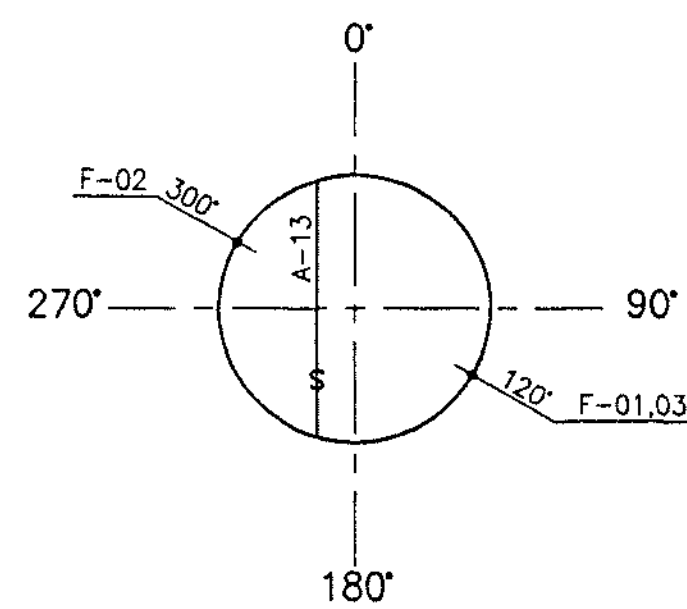


SCHMATIC ELEVATION

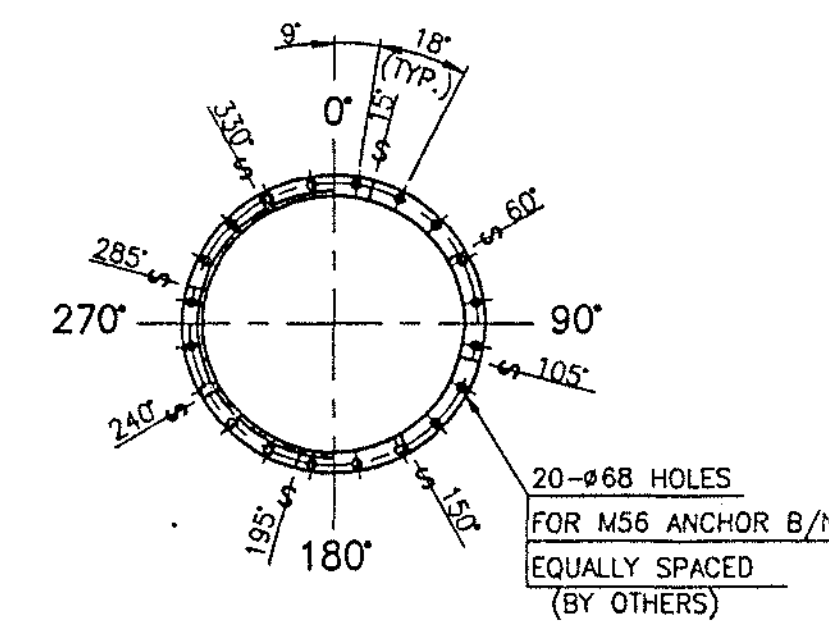
TRUE ORIENTATION SHOWN IN SECTION
(부품의 정확한 각도는 양면도에서 상세도에 나타냄.)



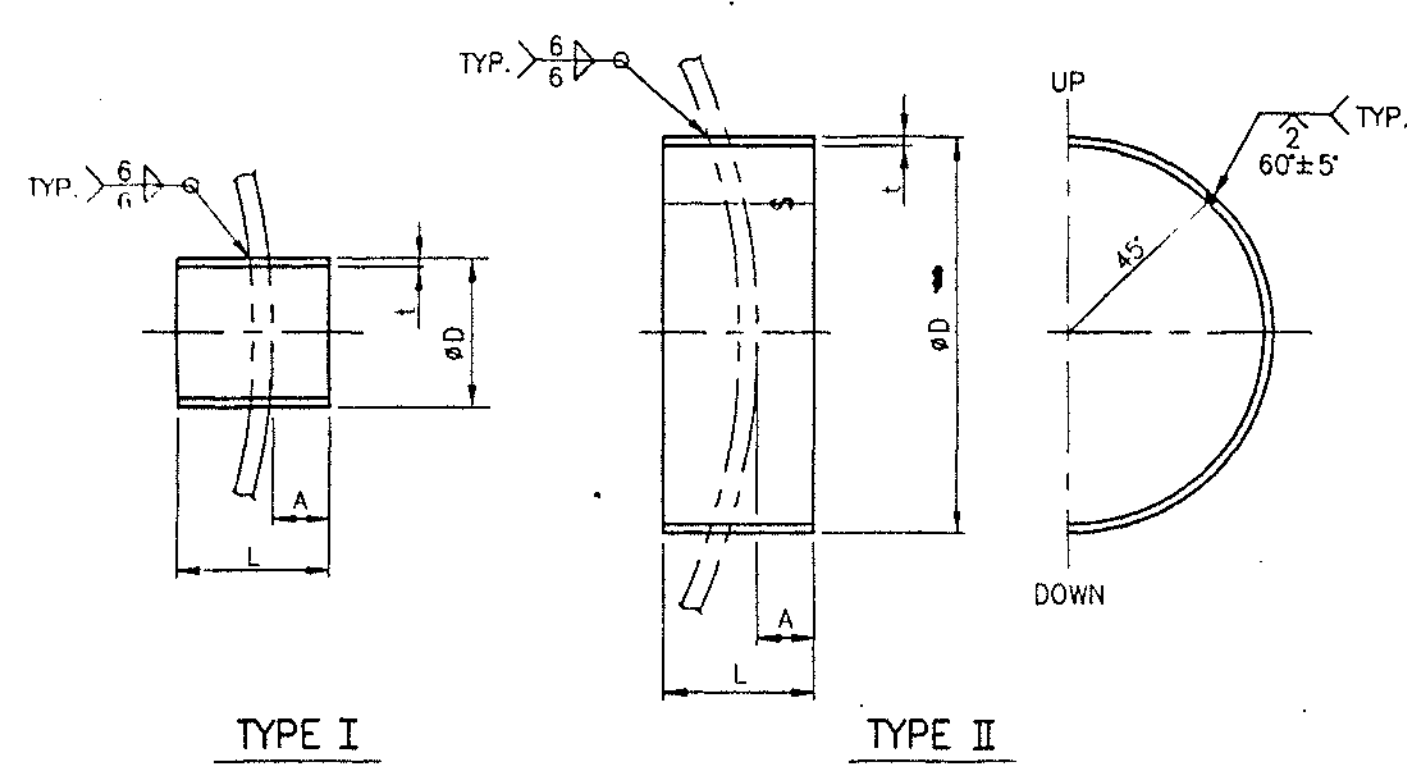
SEAM ORIENTATION
(TOP HEAD & SHELL)



SEAM ORIENTATION
(BOTTOM HEAD & SKIRT)



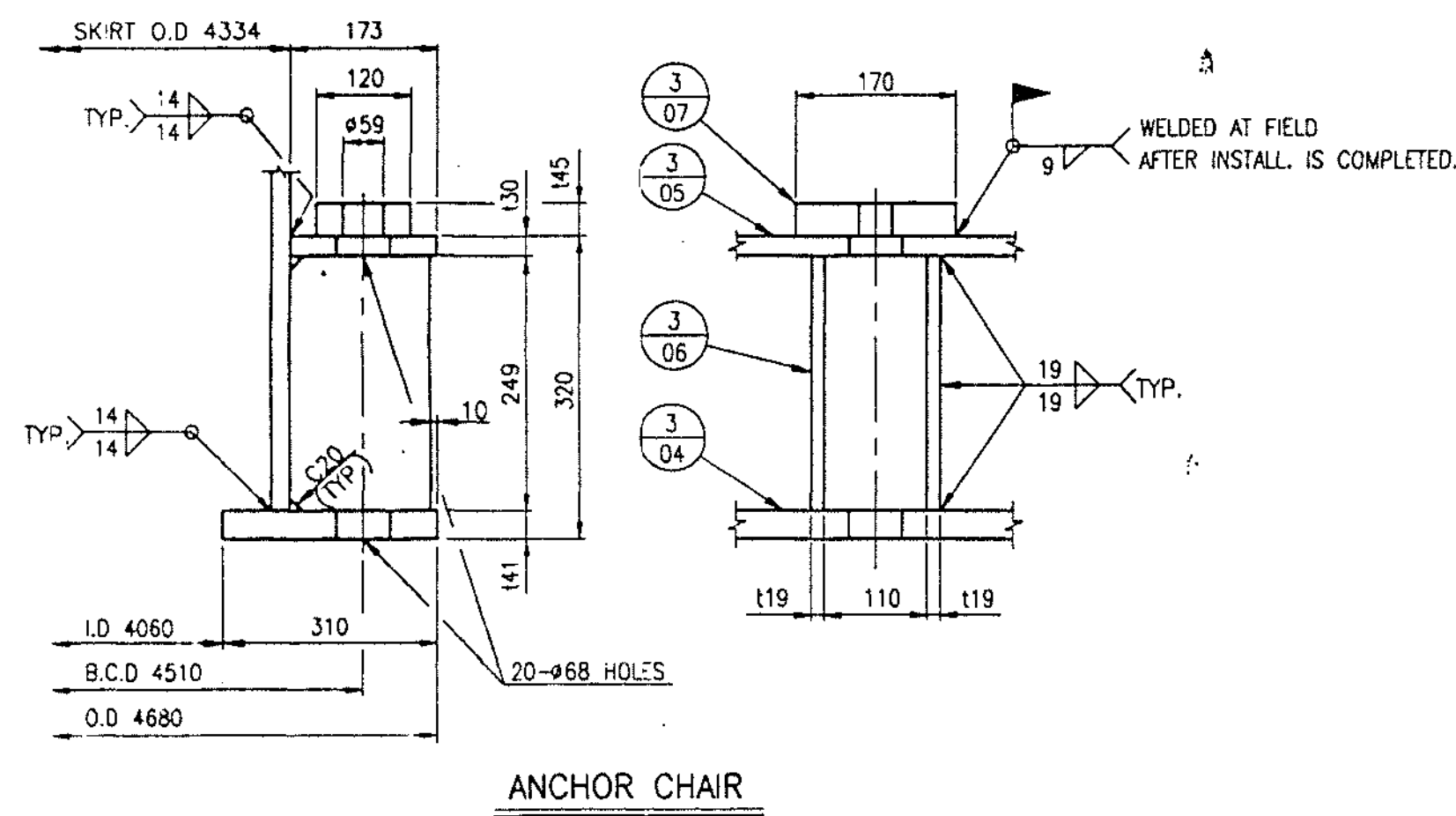
COMP. RING & BASE ORIENTATION



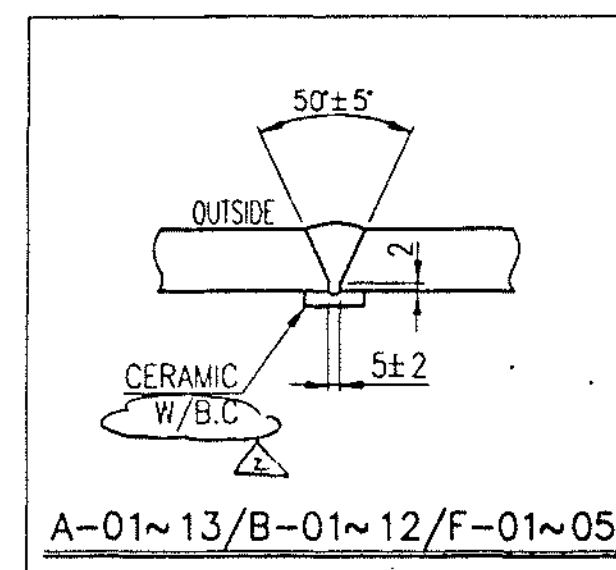
TYPE I

TYPE II

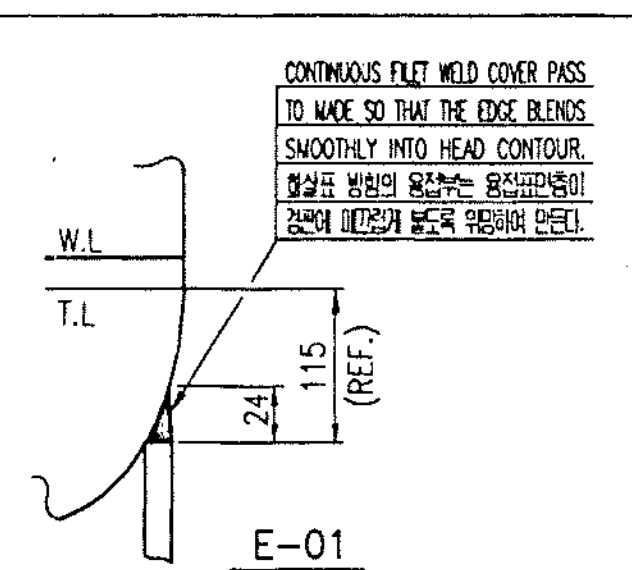
| MARK | PART NO. | PART NAME | DIMENSIONS | | | | TYPE | QTY | REMARKS |
|-------|----------|--------------|------------|-----|----|-----|------|-----|---------|
| | | | φD | t | A | L | | | |
| V-1~B | 3 08 | SKIRT VENT | 114.3 | 6.0 | 90 | 193 | I | 8 | 4"xS/40 |
| O-1 | 3 09 | SKIRT ACCESS | 522 | 11 | 90 | 210 | III | 1 | |
| S-1 | 3 10 | SKIRT SLEEVE | 492 | 11 | 90 | 208 | II | 1 | |



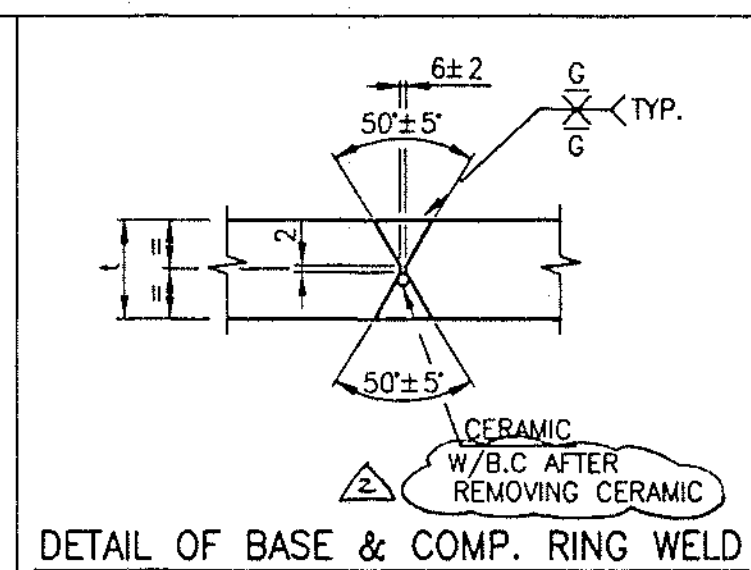
ANCHOR CHAIR



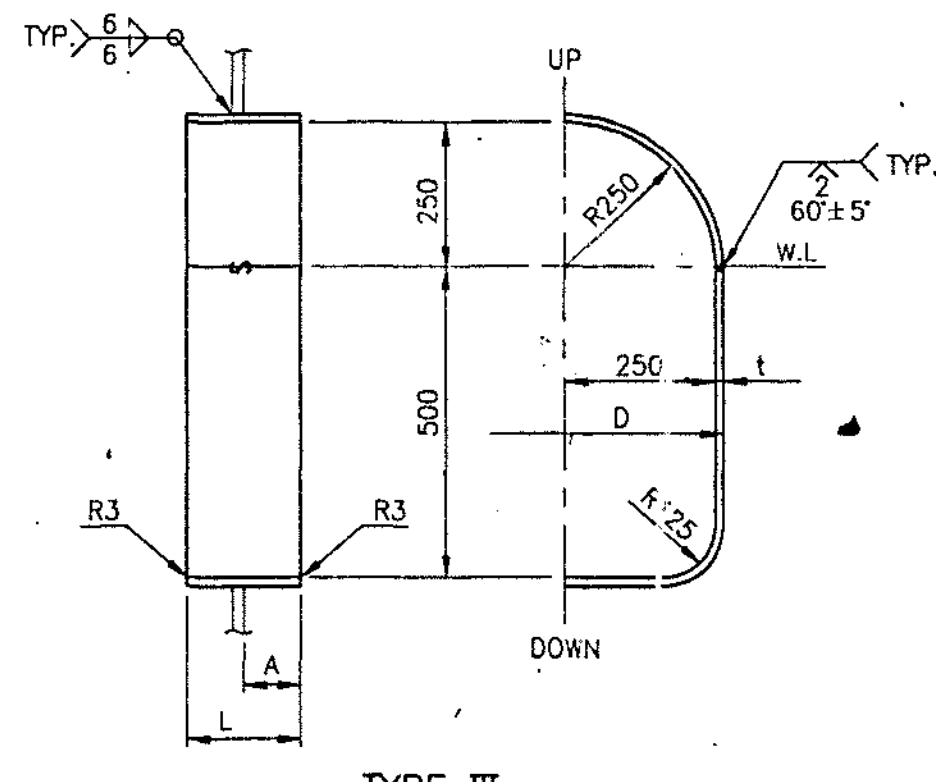
A-01~13/B-01~12/F-01~05



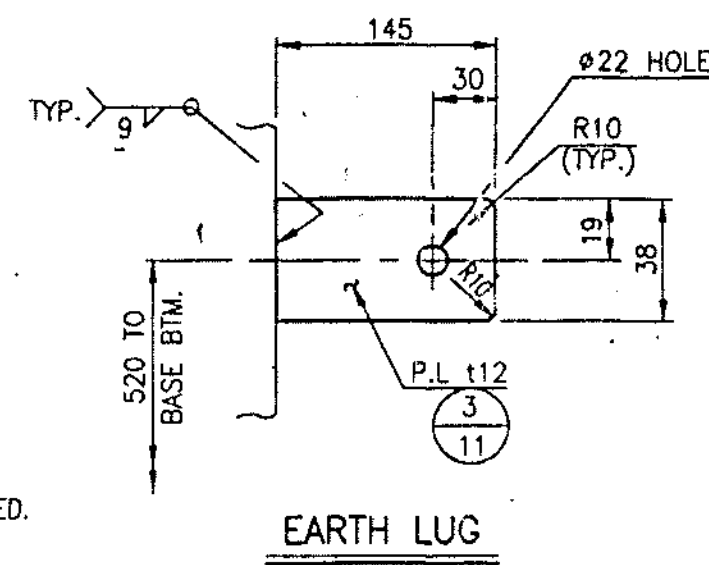
E-01



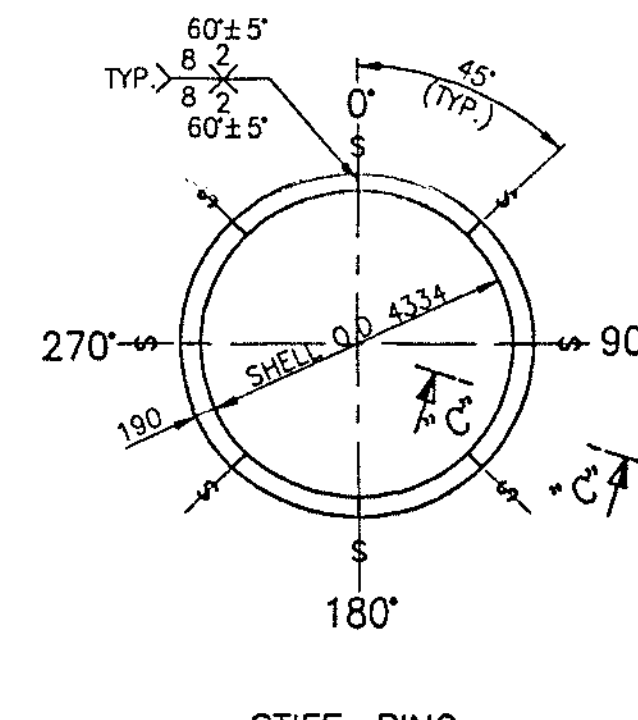
DETAIL OF BASE & COMP. RING WELD



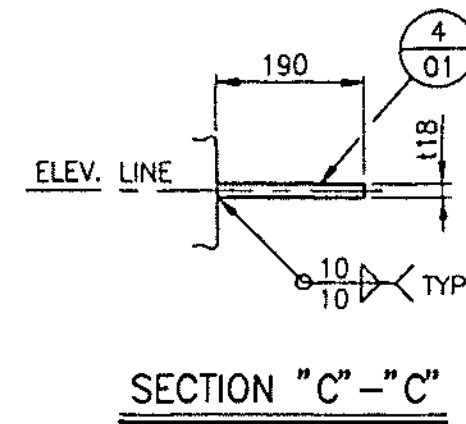
TYPE III



EARTH LUG



STIFF RING



SECTION "C" - "C"

T.W = 89500 KG

| N°K | DATE | REASON FOR REVISION | DWN | CHK | APP |
|-----|----------|---------------------|----------|----------|---------|
| △ | '96,7,18 | REVISED AS MARKED | D.C.KWAG | G.Y.SHIN | D.H.WON |
| △ | '96,9,20 | REVISED AS MARKED | | | |
| △ | | | | | |

| MARK | QTY | PART NAME | MATERIALS | DIMENSIONS | QTY PER SET | WEIGHT (KG) | REMARKS |
|------|-----|------------------|-----------|---------------------|-------------|-------------|---------|
| 4 01 | 8 | STIFF RING | SA516-60 | t18x1.D4334xO.D4714 | 8 | 3053 | 8 SECT |
| 3 11 | 2 | EARTH LUG | 304 S.S | t12x38x145 | 2 | 1 | |
| 10 | 1 | SKIRT SLEEVE | A283-C | t11x208x1511 | 1 | 28 | |
| 09 | 1 | SKIRT ACCESS | A283-C | t11x210x2213 | 1 | 41 | |
| 08 | 8 | SKIRT VENT | A53-B | 4"xS/40-193L | 8 | 25 | |
| 07 | 20 | WASHER PLATE | A283-C | t45x120x170 | 20 | 144 | |
| 06 | 40 | GUSSET PLATE | A283-C | t19x163x249 | 40 | 242 | |
| 05 | 1 | COMP. RING PLATE | A283-C | t30x1.D4334xO.D4680 | 1 | 577 | 8 SECT |
| 04 | 1 | BASE RING PLATE | A283-C | t41x1.D4060xO.D4680 | 1 | 1370 | 8 SECT |
| 03 | 1 | SKIRT PLATE | SA516-60 | t12x1385x13578 | 1 | 1772 | |
| 02 | 1 | SKIRT PLATE | A283-C | t14x3400x13572 | 1 | 5072 | |
| 3 01 | 1 | SKIRT PLATE | A283-C | t14x3359x13572 | 1 | 5010 | |
| 2 02 | 1 | 2:1 ELLIP. HEAD | SA516-60 | t17x1.D4300, SF40 | 1 | 2853 | 2 SECT |
| 2 01 | 1 | 2:1 ELLIP. HEAD | SA516-60 | t17x1.D4300, SF40 | 1 | 2853 | 2 SECT |
| 1 08 | 1 | SHELL PLATE | SA516-60 | t17x2960x13562 | 1 | 5357 | |
| 07 | 3 | | | t17x3000x13562 | 3 | 16289 | |
| 06 | 1 | | | t17x3100x13562 | 1 | 5611 | |
| 05 | 1 | | | t17x3900x13562 | 1 | 7059 | |
| 04 | 1 | | | t17x3700x13562 | 1 | 6696 | |
| 03 | 2 | | | t17x3600x13562 | 2 | 13031 | |
| 02 | 1 | | | t17x3700x13562 | 1 | 6696 | |
| 1 01 | 1 | SHELL PLATE | SA516-60 | t17x3160x13562 | 1 | 5720 | |

| BILL OF MATERIALS | | | |
|------------------------|-------------------|-------------------------------------|---|
| JOB NO. | 51046 | CUSTOMER | SET(S) |
| P/O NO. | SAYPOA0006 | ARABIAN INDUSTRIAL FIBERS CO., LTD. | 1 |
| W/C SIDE NO. | PV-97-03B | | |
| DWN | D.C.KWAG '96,5,21 | PROJECT | IBN RUSHD PTA & AROMATICS PROJECT-AROMATICS |
| DES | Y.S.JUNG '96,5,23 | TITLE | EXTRACT COLUMN |
| CHK | G.Y.SHIN '96,5,27 | | 53-C-02 |
| APP | D.H.WON '96,5,28 | | DETAIL OF BODY |
| THIRD ANGLE PROJECTION | NONE | SCALE | REF. DWG. NO. 6T069-0502 |

GHYODA

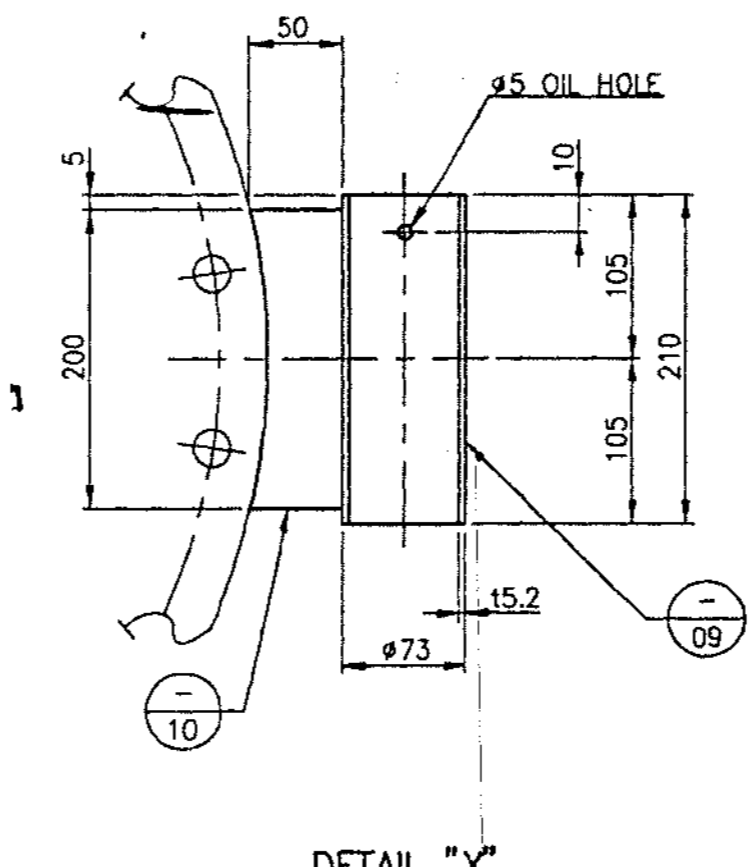
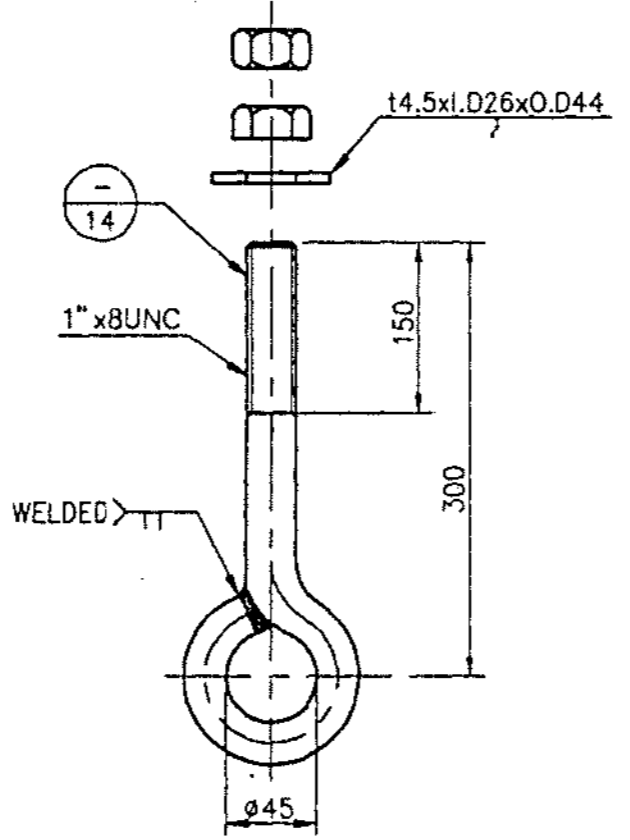
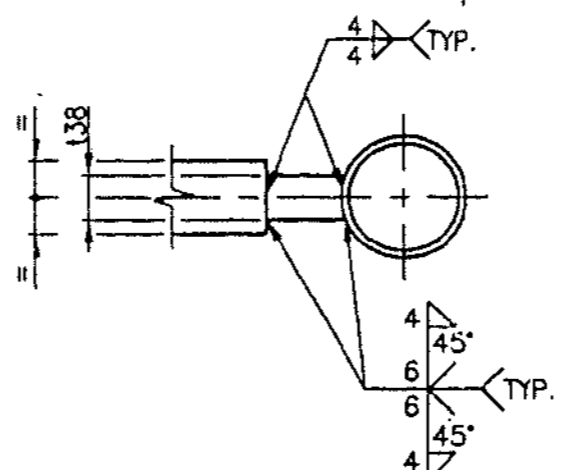
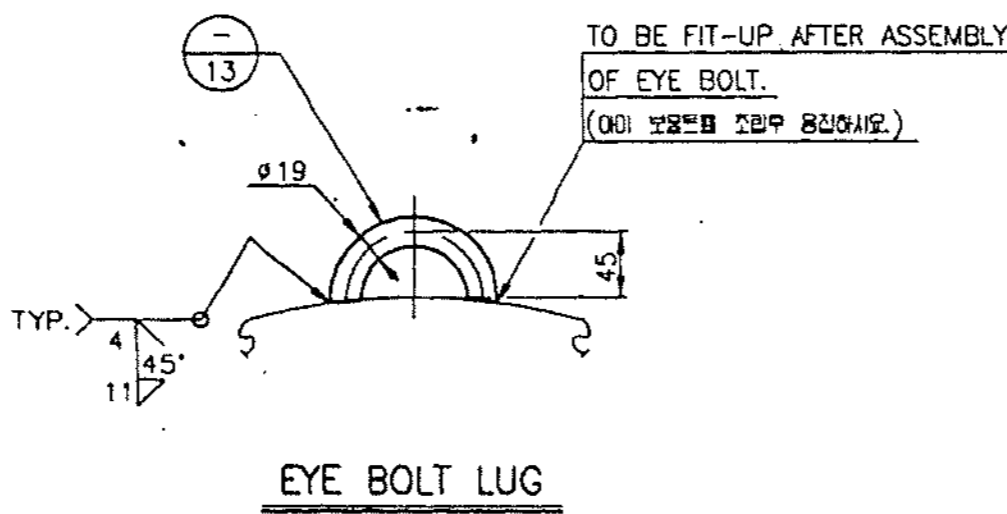
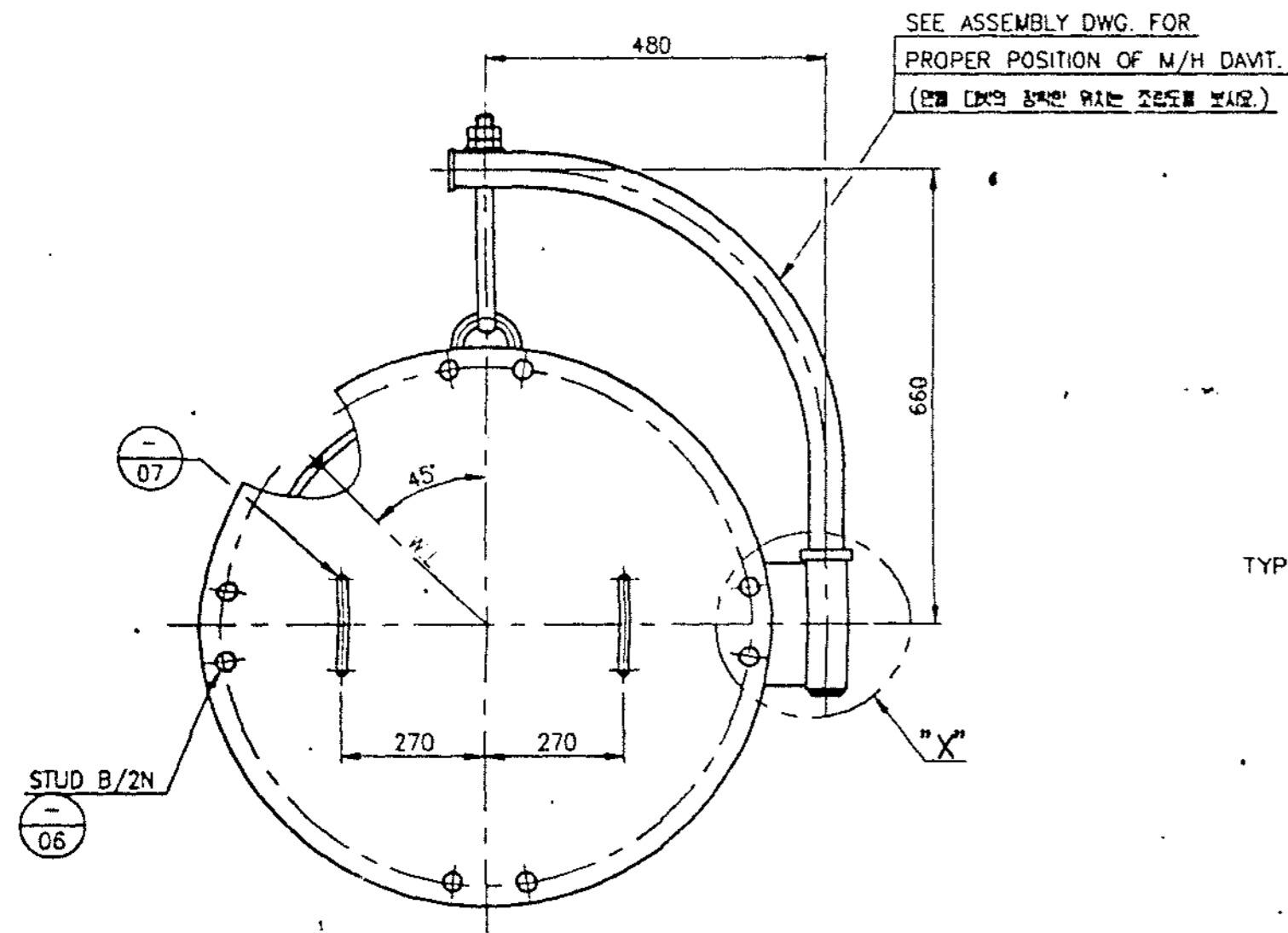
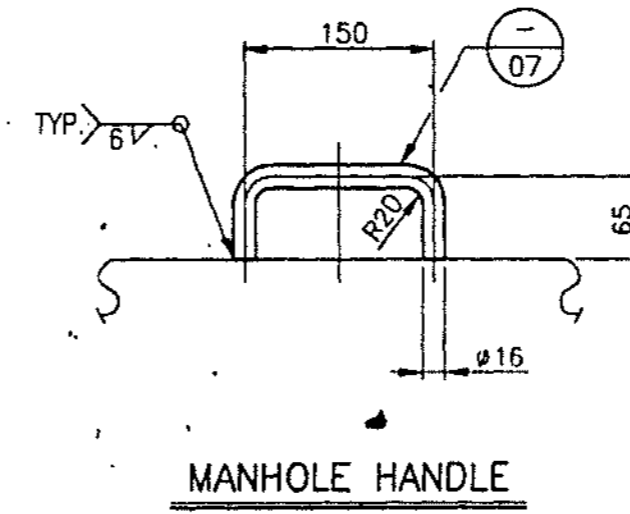
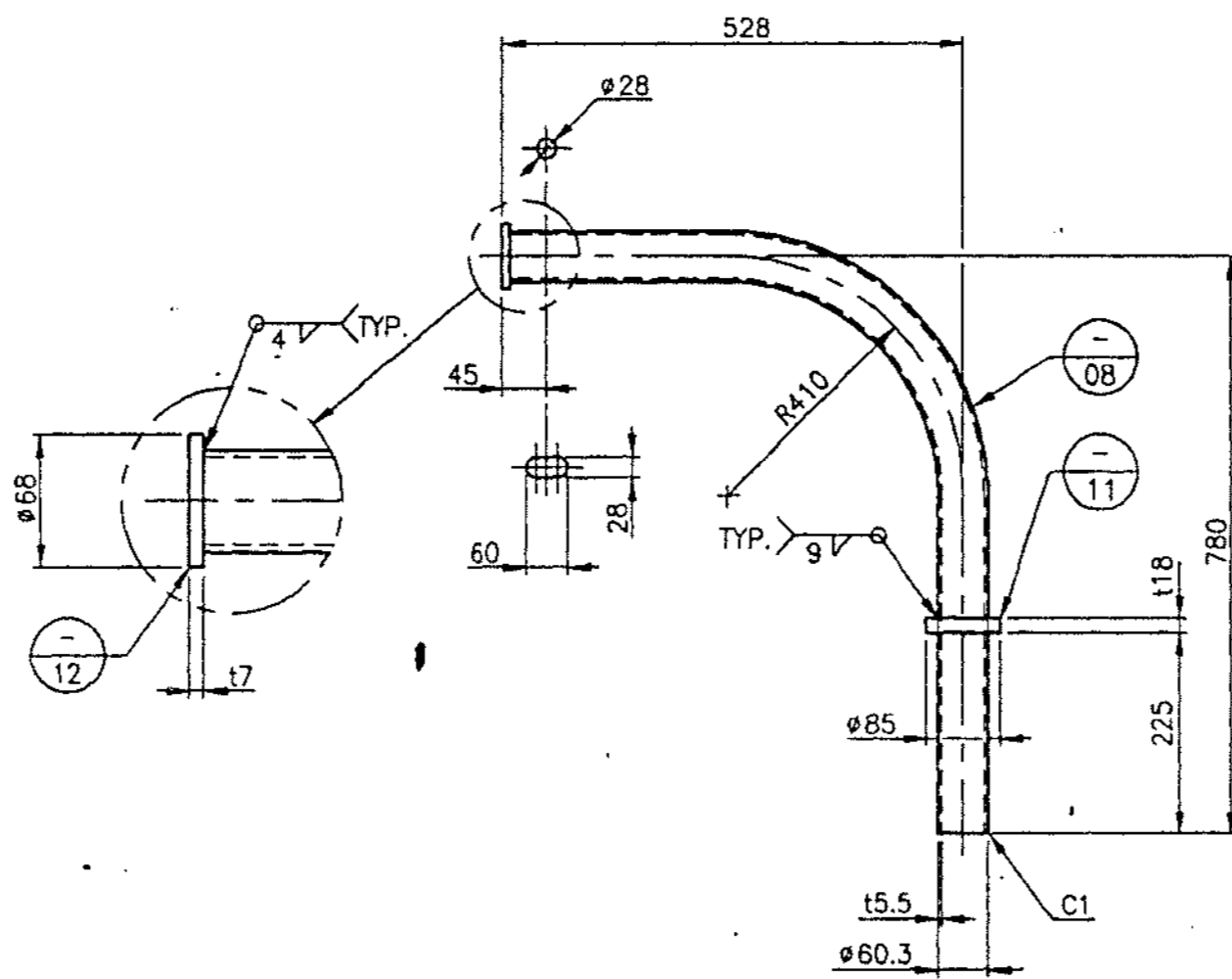
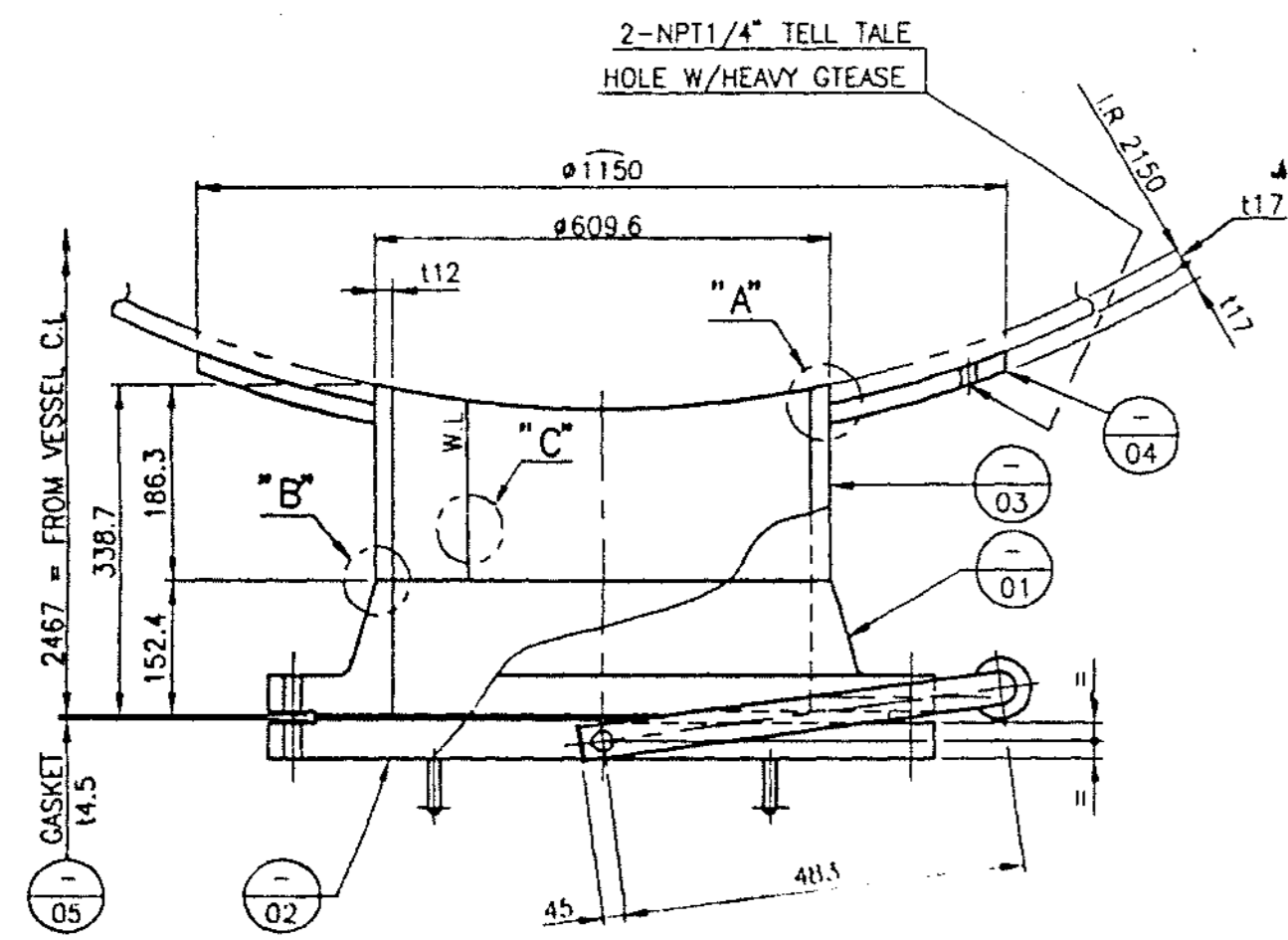
JOB NO. 51046 IBN RUSHD AROMATICS PROJECT
 PO NO. SAYPOA0006
 REQ NO. MR-50-C-002
 IDENT NO. 53-C-02-DW-0002

DATE _____

PURCHASER'S PERMISSION TO PROCEED OR REVIEW
 CHECK ON VENDOR PRINTS SHALL NOT RELIEVE
 VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES
 UNDER PURCHASE ORDER

INDUSTRIAL PLANT DIVISION
 ULSAN KOREA

HYUNDAI
 HEAVY INDUSTRIES CO., LTD.



MANHOLE ASSEMBLY

EYE BOLT LUG

DETAIL "X"

EYE BOLT / 2NUT / WASHER

- NOTE :
- GASKET : SPIRAL WOUND 316 S.S W/GRAPHITE FILLER 316 S.S I.R & C.S O.R.
 - W.P.S NO. F-0101-101 OR F-0101-301 SHALL BE APPLIED TO ALL WELDS EXCEPT AB & C JOINTS UNLESS OTHERWISE NOTED.
(모든 용접은 AB & C JOINT를 제외한 모든 용접은 F-0101-101 또는 F-0101-301 용접을 사용한다.)

T.W = 983 KG

| EM | FM | NO. | PART NAME | MATERIALS | DIMENSIONS | QTY | WEIGHT (KG) | REMARKS |
|----|----|-----|------------------|-------------------|--------------------|------|-------------|-----------|
| | | 14 | EYE B/2N/W | A193-B7/A194-2H | 1"x8UNC-300L | 2SET | 4 | |
| | | 13 | EYE BOLT LUG | A36 | φ19x145L | 2 | 1 | |
| | | 12 | END PLATE | A283-C | 17x968 | 2 | - | |
| | | 11 | SUP'T RING PLATE | A283-C | 118x1.D63x0.D85 | 2 | 1 | |
| | | 10 | SUPPORT PLATE | A283-C | 138x50x200 | 2 | 6 | |
| | | 09 | SLEEVE PIPE | A53-B | 2+1/2"x5/40-210L | 2 | 4 | |
| | | 08 | DAVIT PIPE | A53-B | 2"xS/80-1126L | 2 | 18 | |
| | | 07 | HANDLE | A36 | φ16x280L | 4 | 2 | |
| | | 06 | STUD B/2N | SA193-B7/SA194-2H | 1+1/4"x8UNC-200L | 4 | 70 | |
| | | 05 | GASKET | SEE NOTE 1 | 24"x14.5, 150# | 2 | 6 | |
| | | 04 | REINF. PAD | SA516-60 | 117x1.D624x0.D1150 | 2 | 196 | |
| | | 03 | NOZZLE NECK | SA516-60 | 112x187x1877 | 2 | 66 | |
| | | 02 | BLD-RF FLANGE | SA105 | 24", 150# | 2 | 373 | HWG B16.5 |
| | | 01 | WN-RF FLANGE | SA105 | 24"x1.D585.6, 150# | 2 | 236 | HWG B16.5 |

BILL OF MATERIALS

JOB NO. 51046 CUSTOMER ARABIAN INDUSTRIAL FIBERS CO., LTD.

P/O NO. SAYPOAD006

REV. NO. PV-97-038

PROJECT IBN RUSHD PTA & AROMATICS PROJECT-AROMATICS

TITLE EXTRACT COLUMN

53-C-02

DETAIL OF MANHOLE

SCALE 1:1

REV. 0

6T069-0503

GHYDA COMPANY

JOB NO. 51046 IBN RUSHD AROMATICS PROJECT

PO NO. SAYPOAD006

REQ NO. NR-50-C-002

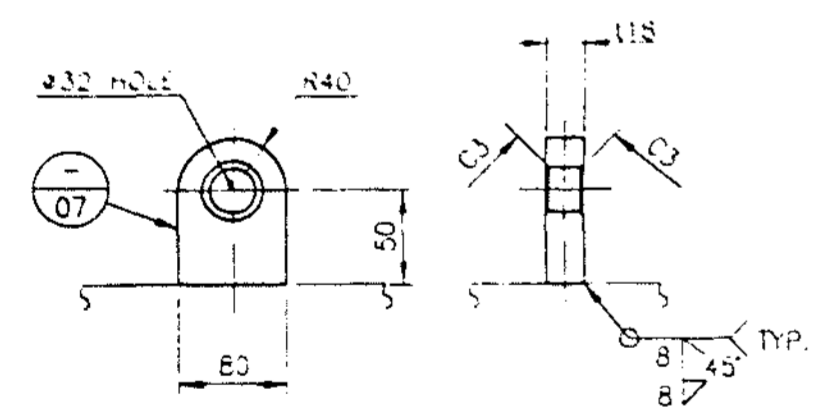
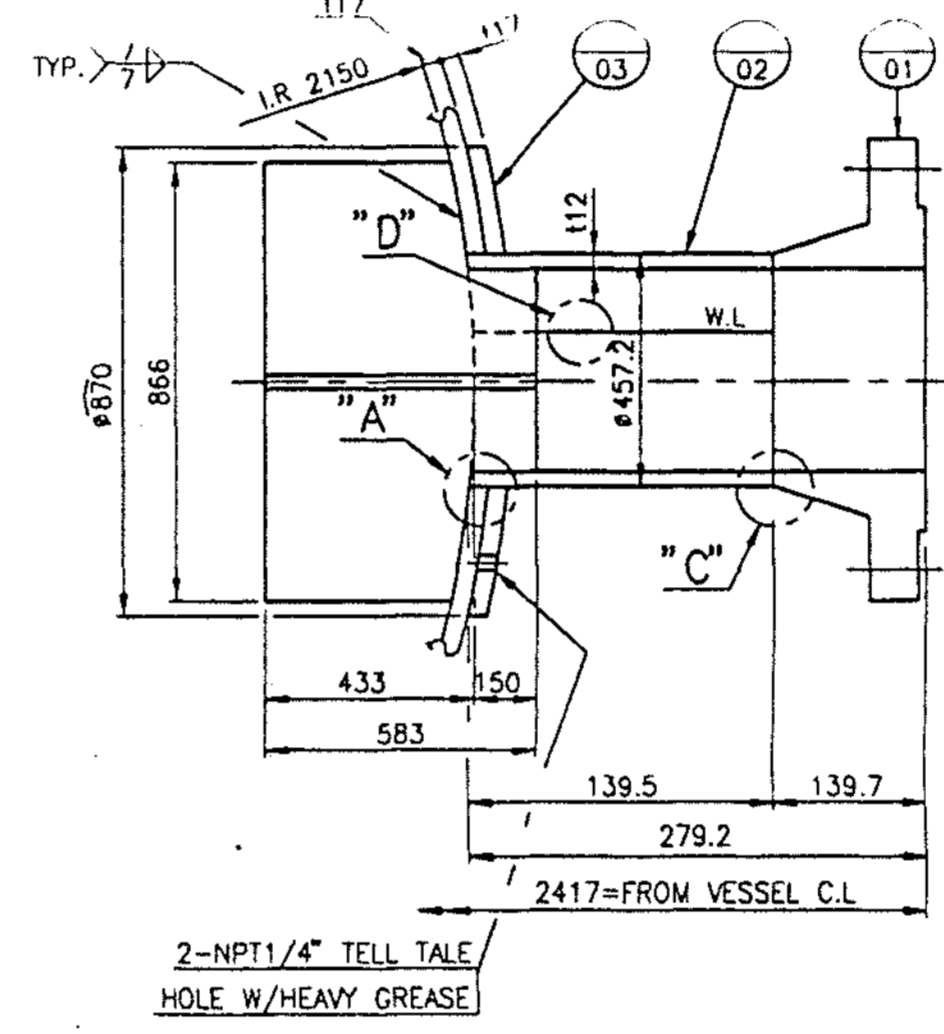
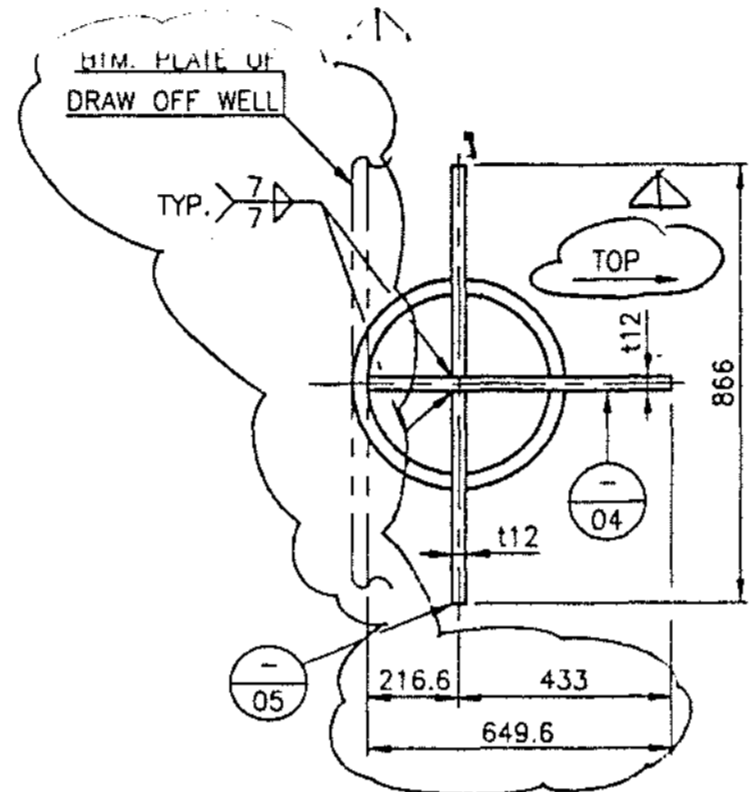
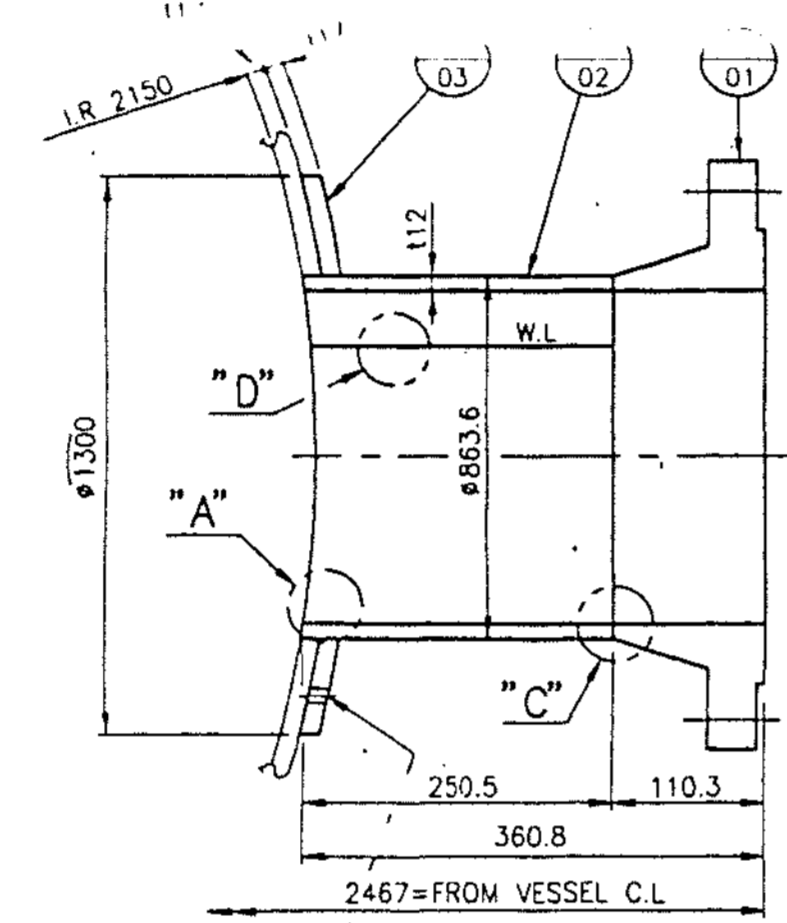
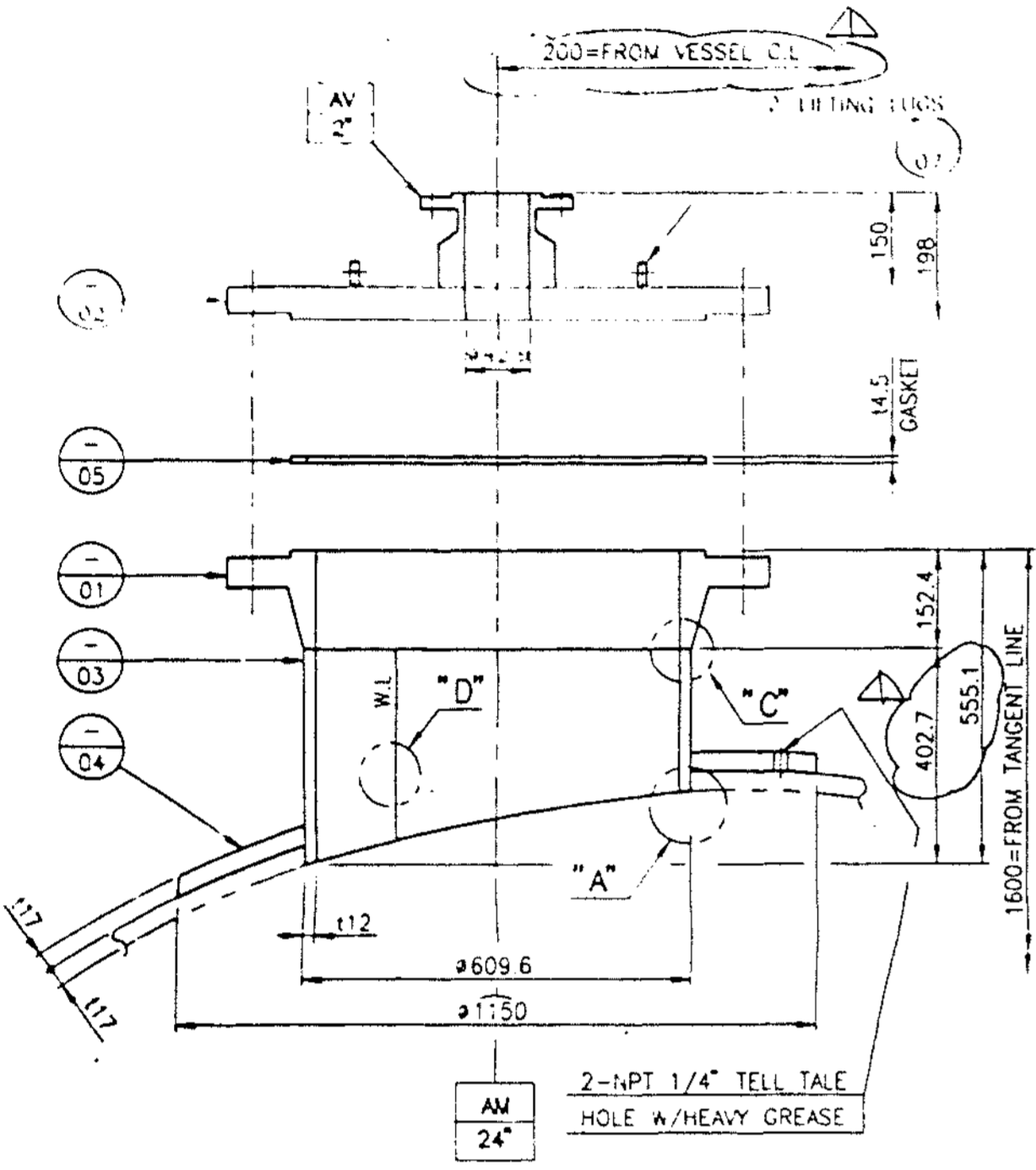
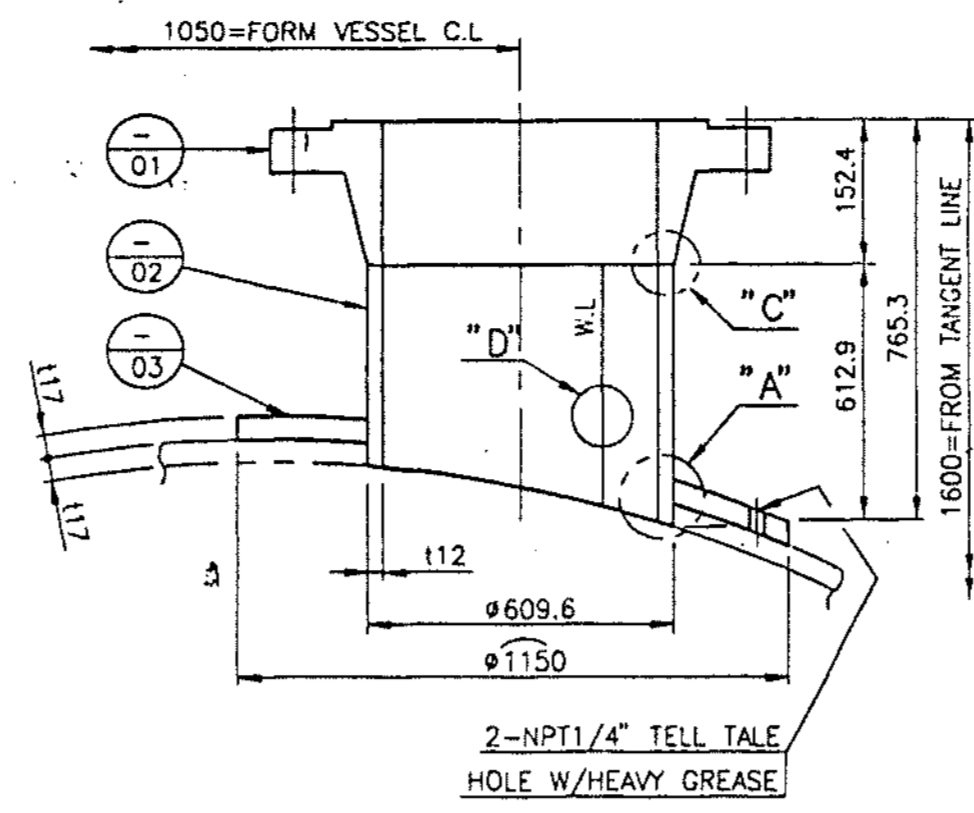
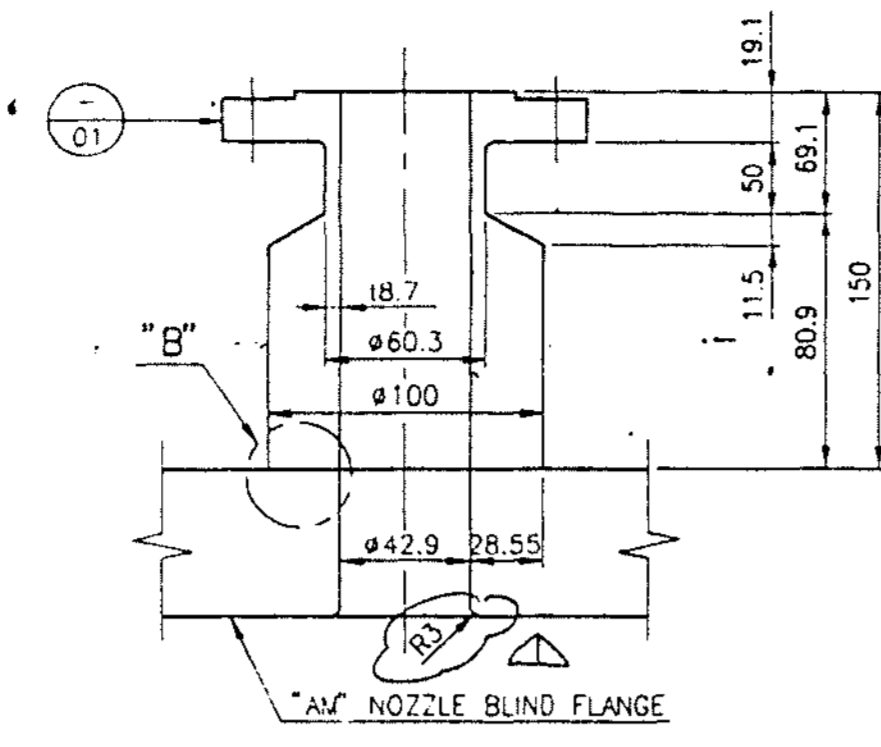
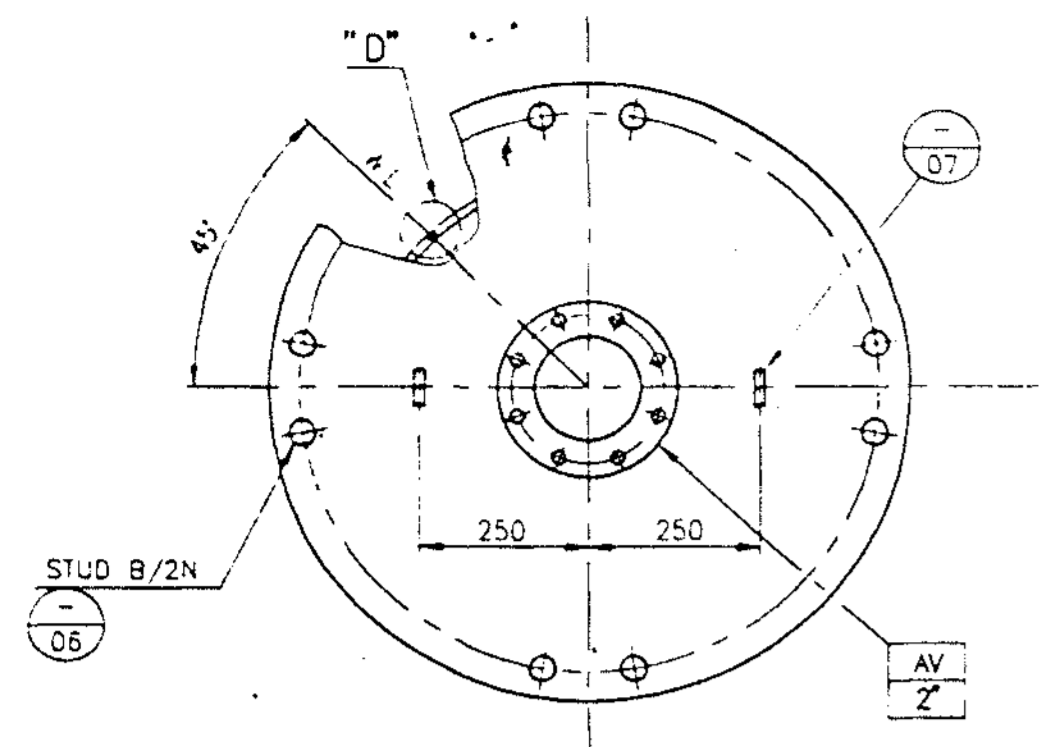
IDENT NO. 53-C-02-DW-0003

DATE

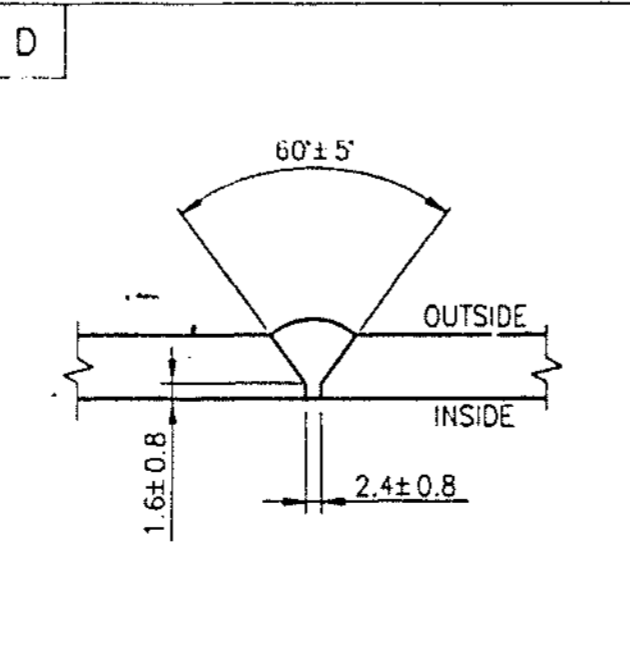
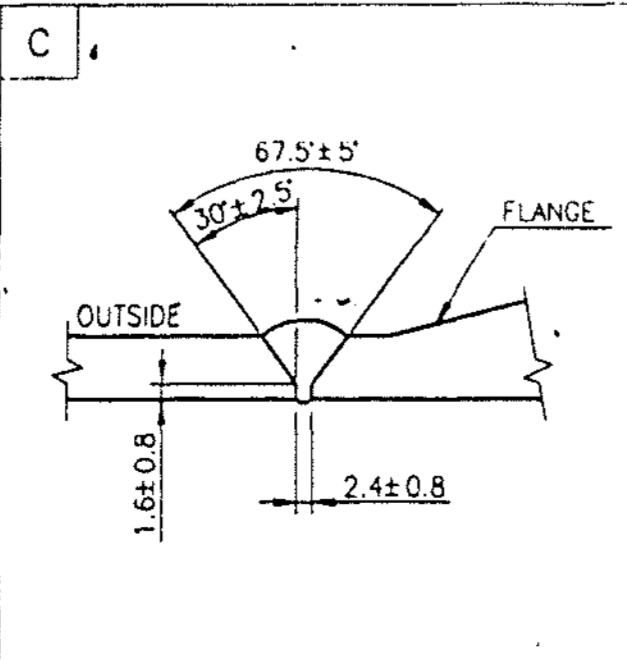
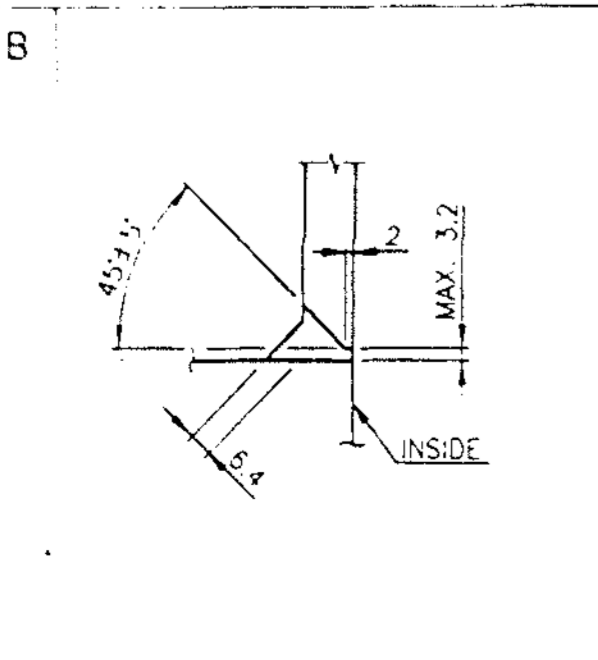
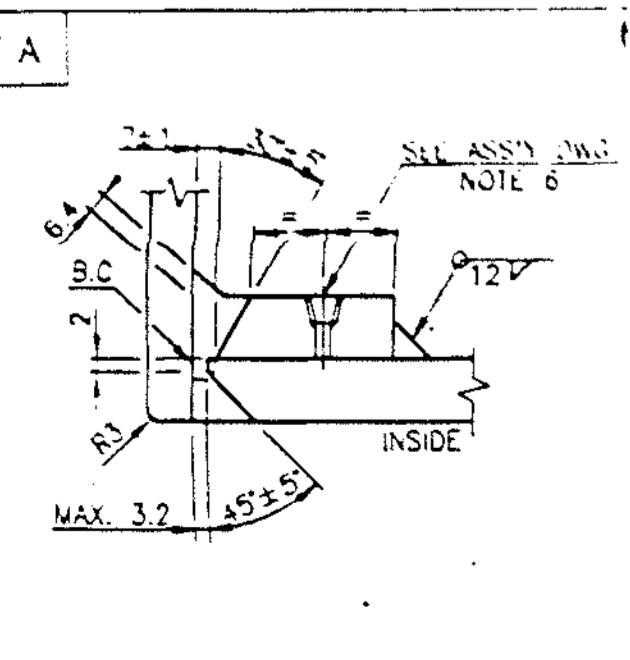
PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER

INDUSTRIAL PLANT DIVISION ULSAN KOREA

HYUNDAI HEAVY INDUSTRIES CO., LTD.



LIFTING LUG



| W/K | DATE | REASON FOR REVISION | Dwn | Crk | APP |
|-----|--------|---------------------|-----|-----|-----|
| △ | 7/9/16 | REVISED AS MARKED | | | |
| △ | | | | | |
| △ | | | | | |

NOTE
1. GASKET MATERIAL : SPIRAL WOUND 316 S.S w/GRAPHITE FILLER
316 S.S I.R & C.S O.R.

T.W = 1346 KG

| FO | NO | PART NAME | MATERIALS | DIMENSIONS | QTY | REMARKS |
|----|----|----------------|------------------|------------------------|-------|---------|
| FO | 05 | VORTEX BREAKER | SA516-60 | t12x427x583 | 2 | 47 |
| FO | 04 | VORTEX BREAKER | SA516-60 | t12x583x650 | 1 | 36 |
| FO | 03 | REINF. PAD | SA516-60 | t17x1.D471x0.D870 | 1 | 56 |
| FO | 02 | NOZZLE NECK | SA516-60 | t12x140x1399 | 1 | 19 |
| FO | 01 | WN-RF FLANGE | SA105 | 18"xl.D433.2, 150# | 1 | 71 |
| FI | 03 | REINF. PAD | SA516-60 | t17xl.D878x0.D1300 | 1 | 97 |
| FI | 02 | NOZZLE NECK | SA516-60 | t12x251x2675 | 1 | 64 |
| FI | 01 | WN-RF FLANGE | SA105 | 34"xl.D839.6, 150# | 1 | 116 |
| AV | 01 | FN-RF FLANGE | SA105 | 2"xl.D42.9x0.D100-150# | 1 | 7 |
| AO | 03 | REINF. PAD | SA516-60 | t17xl.D624x0.D1150 | 1 | 98 |
| AO | 02 | NECK PLATE | SA516-60 | t12x613x1877 | 1 | 108 |
| AO | 01 | WN-RF FLANGE | SA105 | 24"xl.D585.6, 150# | 1 | 118 |
| AM | 07 | LIFTING LUG | SA516-60 | t18x80x90 | 2 | 2 |
| ↑ | 06 | STUD B/2N | SA193-B/SA194-2H | 1+1/4"xBUN-200L | ROSET | 33 |
| | 05 | GASKET | SEE NOTE 1 | 24"xl4.5, 150# RF | | - |
| | 04 | REINF. PAD | SA516-60 | t17xl.D624x0.D1150 | | 98 |
| | 03 | NOZZLE NECK | SA516-60 | t12(403)x1877 | | 71 |
| ↑ | 02 | BLD-RF FLANGE | SA105 | 24", 150# | | 187 |
| AM | 01 | WN-RF FLANGE | SA105 | 24"xl.D585.6, 150# | | 118 |

| BILL OF MATERIALS | | | |
|-------------------|------------------|----------|---|
| JOB NO. | 51046 | CUSTOMER | IBN RUSHD AROMATICS PROJECT |
| P/O NO. | SAYPOA0006 | CUSTOMER | ARABIAN INDUSTRIAL FIBERS CO., LTD. |
| W/C SIDE NO. | PV-97-038 | | |
| DWN | D.C.KWAG '96,7,5 | PROJECT | IBN RUSHD PTA & AROMATICS PROJECT-AROMATICS |
| DES | Y.S.JUNG '96,7,8 | TITLE | EXTRACT COLUMN |
| CHK | G.Y.SHIN '96,7,9 | | 53-C-02 |
| APP | D.H.WON '96,7,10 | | DETAIL OF NOZZLE (1/2) |
| DWG NO. | 6T069-0505 | SCALE | NONE |
| REV. | | | |

CHIYODA

JOB NO. 51046 IBN RUSHD AROMATICS PROJECT
PO NO. SAYPOA0006
REQ NO. MR-50-C-002
IDENT NO. 53-C-02-DW-0005

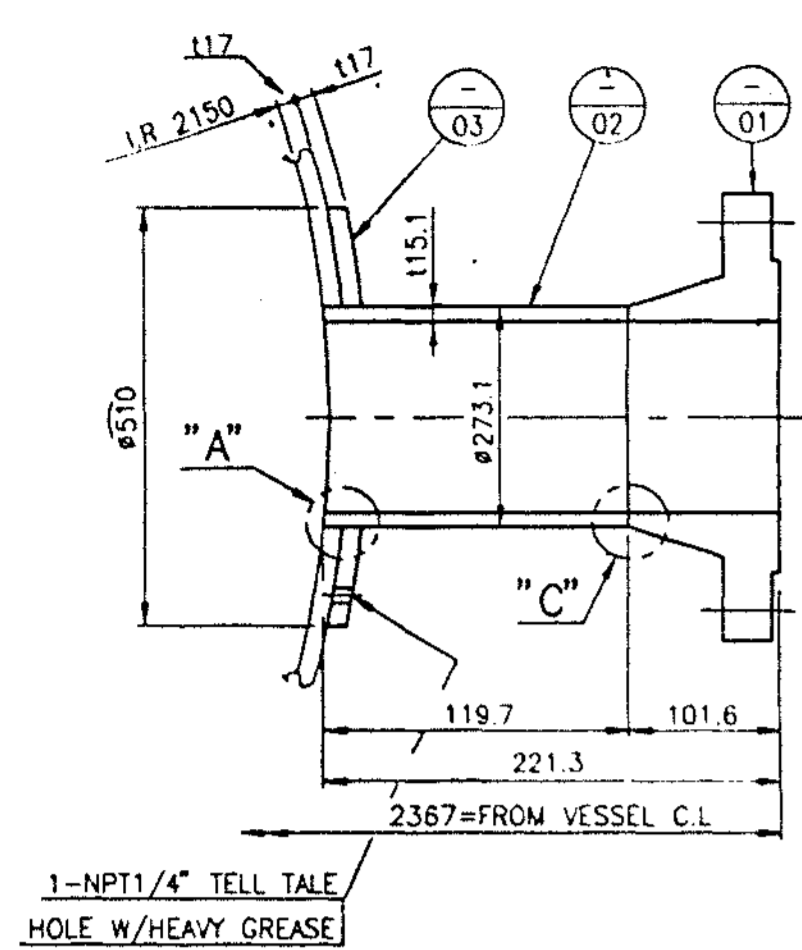
DATE

PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER

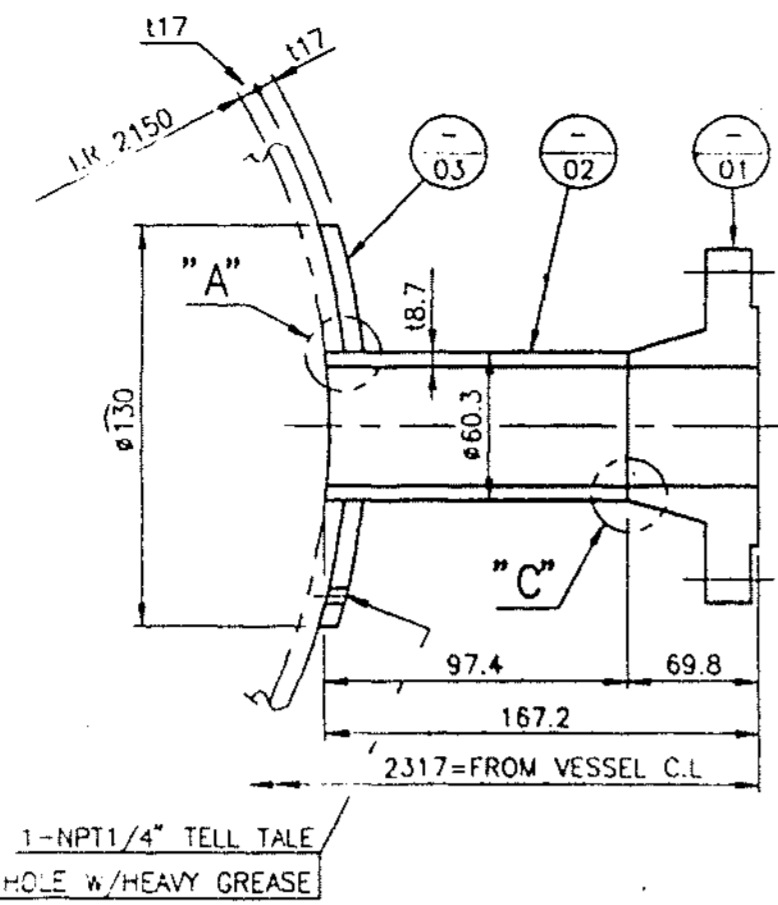
INDUSTRIAL PLANT DIVISION ULSAN KOREA

HYUNDAI HEAVY INDUSTRIES CO., LTD.

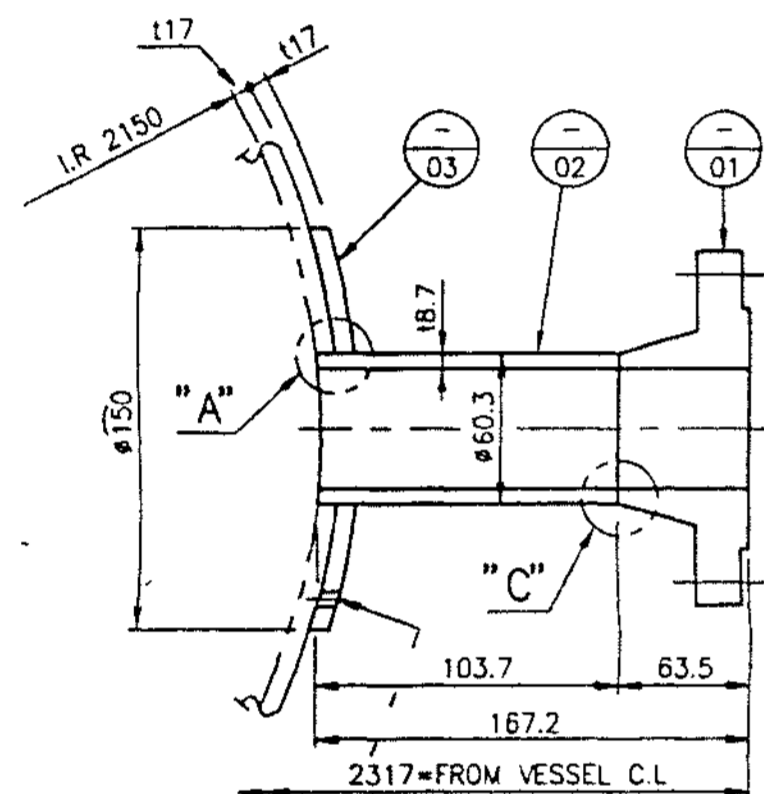
현대중공업주식회사 프린트 사업본부



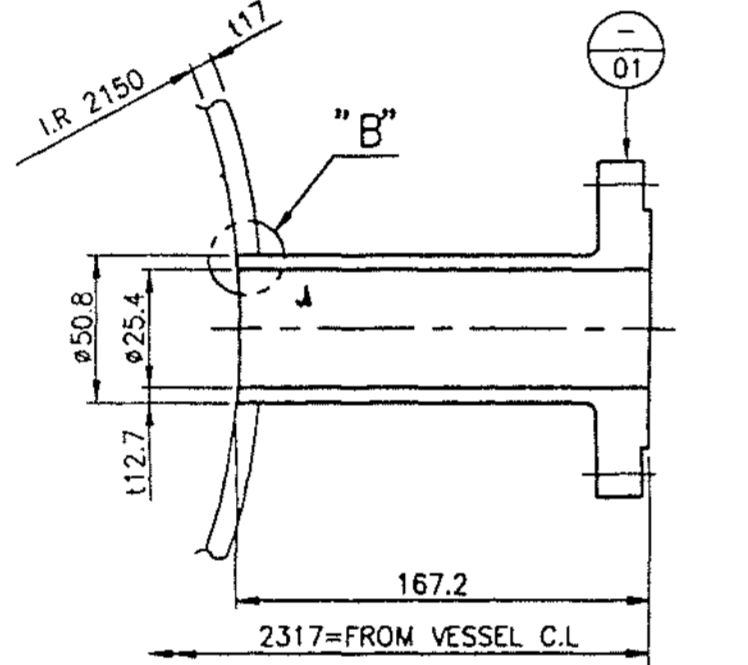
NOZZLE FJ
10"



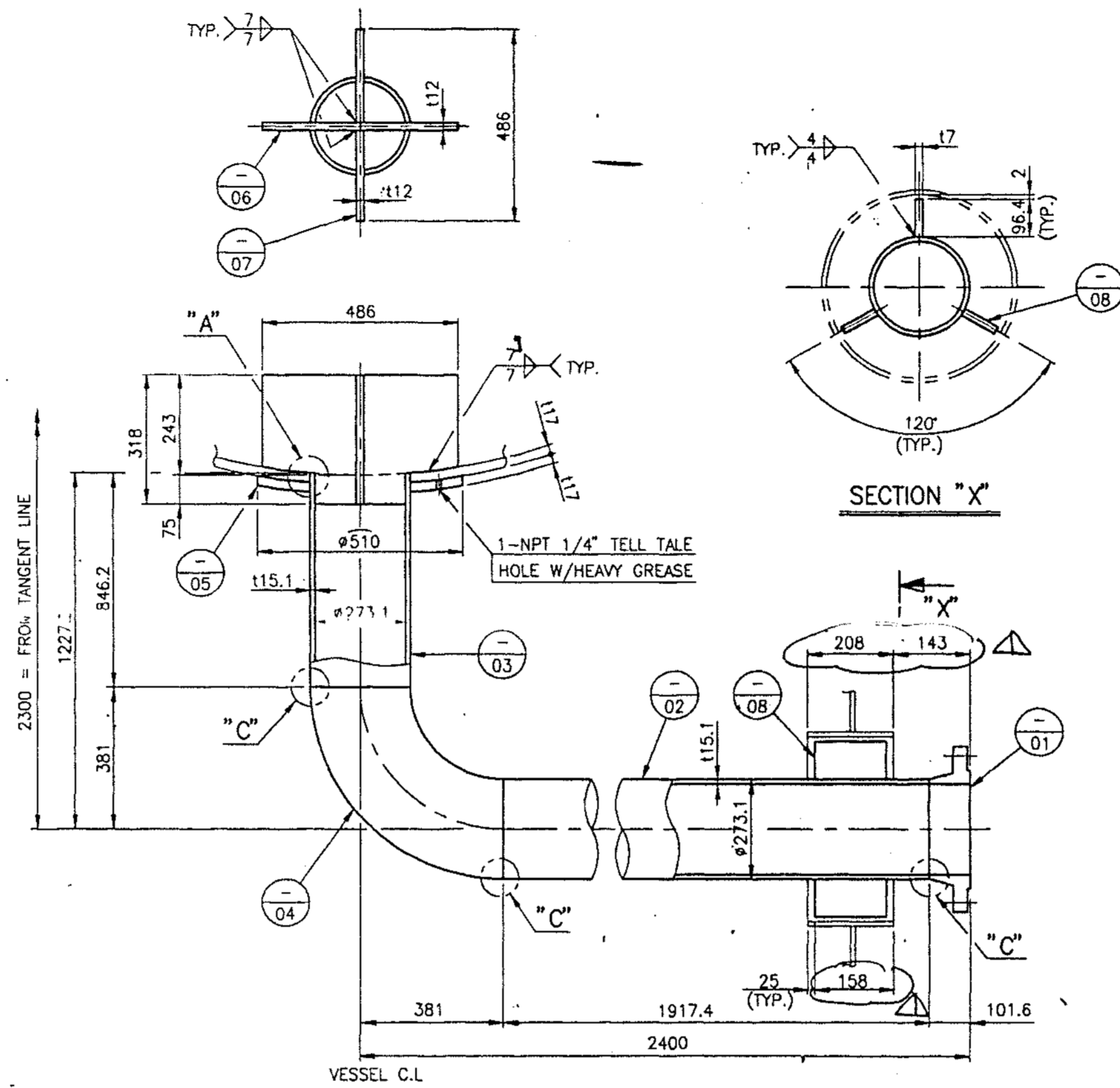
NOZZLE FL-1
2" FL-2
2"



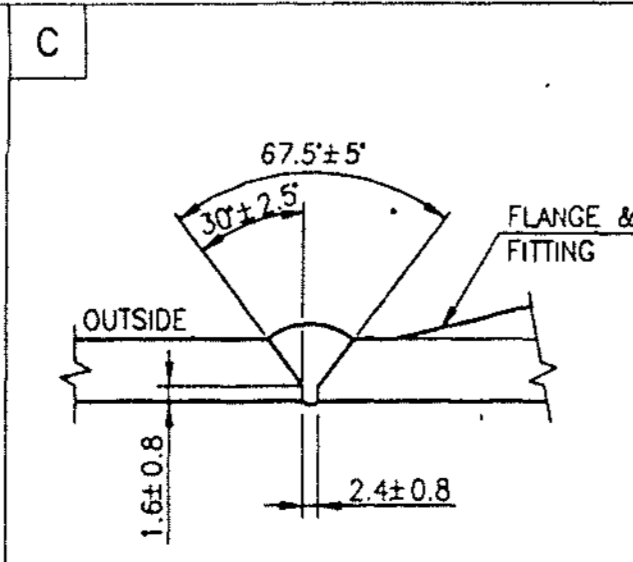
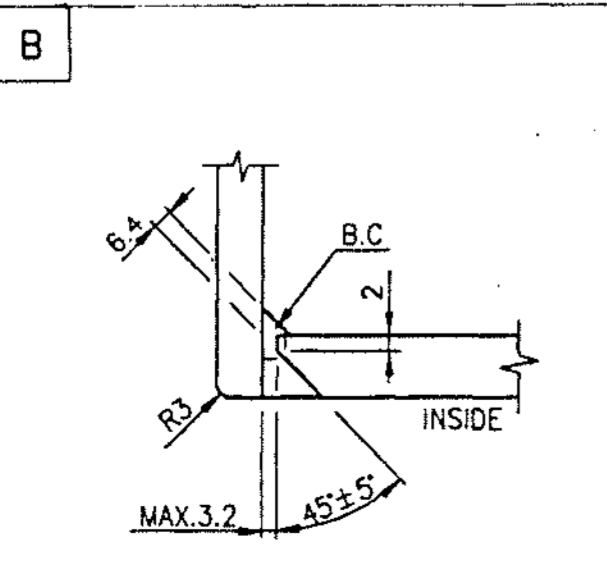
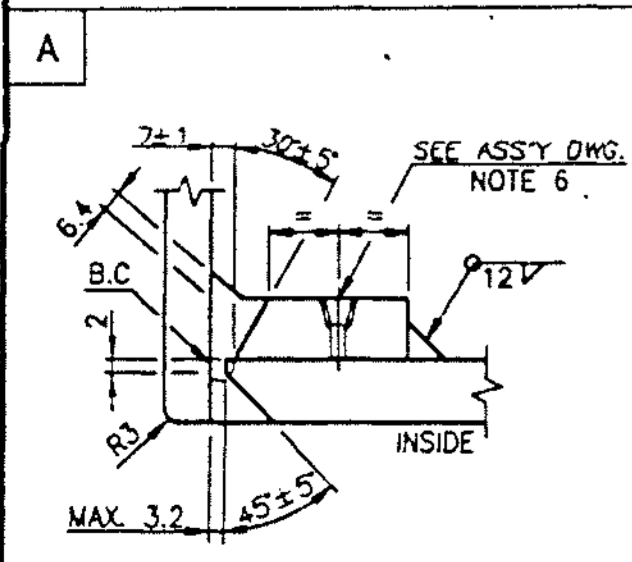
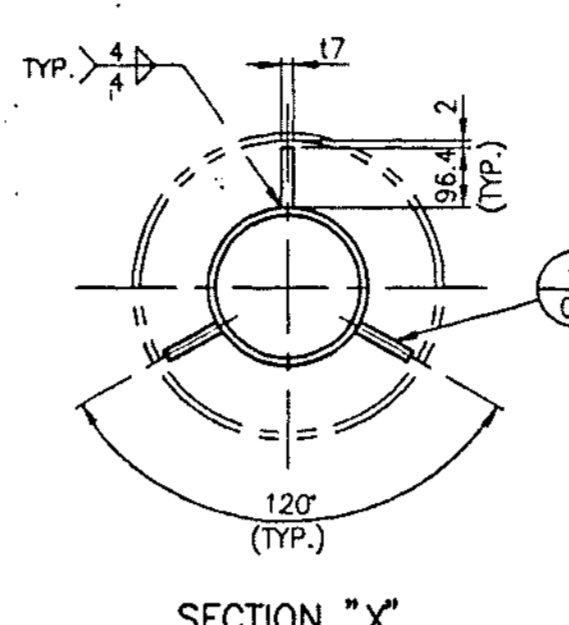
NOZZLE FS
2"



NOZZLE BU-1
1" CU-1
1" DU-1
1" HU
1" IU
1"



NOZZLE GO
10"



| M/K | DATE | REASON FOR REVISION | DWN | CHK | APP |
|-----|--------|---------------------|-----|-----|--------------|
| △ | 7/9/16 | REVISED AS MARKED | | | Chun AS (Un) |
| △ | | | | | |
| △ | | | | | |

T.W = 491 KG

| NO. | QTY | PART NO. | PART NAME | MATERIALS | DIMENSIONS | WEIGHT (KG) | REMARKS |
|-----------|-----|-----------|----------------|-----------|-----------------------|-------------|------------|
| FJ 03 | 1 | SA516-60 | REINF. PAD | SA516-60 | t17x1.D287x0.D510 | 19 | |
| FJ 02 | 1 | SA106-B | NOZZLE NECK | SA106-B | 10"xS/80-120L | 12 | |
| FJ 01 | 1 | SA105 | WN-RF FLANGE | SA105 | 10"xS/80, 150# | 25 | ANSI B16.5 |
| GO 08 | 3 | A283-C | SUPPORT PLATE | A283-C | t7x97x158 | 3 | |
| 07 | 2 | SA516-60 | VORTEX BRACKER | SA516-60 | t12x237x318 | 14 | |
| 06 | 1 | SA516-60 | VORTEX BRACKER | SA516-60 | t12x318x486 | 15 | |
| 05 | 1 | SA516-60 | REINF. PAD | SA516-60 | t17x1.D287x0.D510 | 19 | |
| 04 | 1 | SA234-WPB | 90° L/R ELBOW | SA234-WPB | 10"xS/80, B.W | 61 | |
| 03 | 1 | SA106-B | NOZZLE NECK | SA106-B | 10"xS/80-846L | 81 | |
| 02 | 1 | SA106-B | NOZZLE NECK | SA106-B | 10"xS/80-1917L | 184 | |
| GO 01 | 1 | SA105 | WN-RF FLANGE | SA105 | 10"xS/80, 150# | 25 | ANSI B16.5 |
| FS 03 | 1 | SA516-60 | REINF. PAD | SA516-60 | t17x1.D74x0.D150 | 2 | |
| FS 02 | 1 | SA106-B | NOZZLE NECK | SA106-B | 2"xS/160-104L | 2 | |
| FS 01 | 1 | SA105 | WN-RF FLANGE | SA105 | 2"xS/160, 150# | 3 | ANSI B16.5 |
| FL 1,2 03 | 2 | SA516-60 | REINF. PAD | SA516-60 | t17x1.D74x0.D130 | 3 | |
| FL 1,2 02 | 2 | SA106-B | NOZZLE NECK | SA106-B | 2"xS/160-97L | 3 | |
| FL 1,2 01 | 2 | SA105 | WN-RF FLANGE | SA105 | 2"xS/160, 300# | 8 | ANSI B16.5 |
| FL 1,2 01 | 8 | SA105 | LWN-RF FLANGE | SA105 | 1"x1.D25.4-167L, 150# | 12 | ANSI B16.5 |

| BILL OF MATERIALS | | | |
|---|-------------------------------------|------------------------------------|--|
| JOB NO. | CUSTOMER | SET(S) | |
| 51046 | ARABIAN INDUSTRIAL FIBERS CO., LTD. | 1 | |
| PO NO. | SAYPOA0006 | | |
| REQ. NO. | MR-50-C-002 | | |
| IDENT. NO. | 53-C-02-DW-0006 | | |
| DATE | | | |
| PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER | | | |
| INDUSTRIAL PLANT DIVISION ULSAN KOREA | | HYUNDAI HEAVY INDUSTRIES CO., LTD. | |

CHIYODA COMPANY

JOB NO. 51046 IBN RUSHD AROMATICS PROJECT

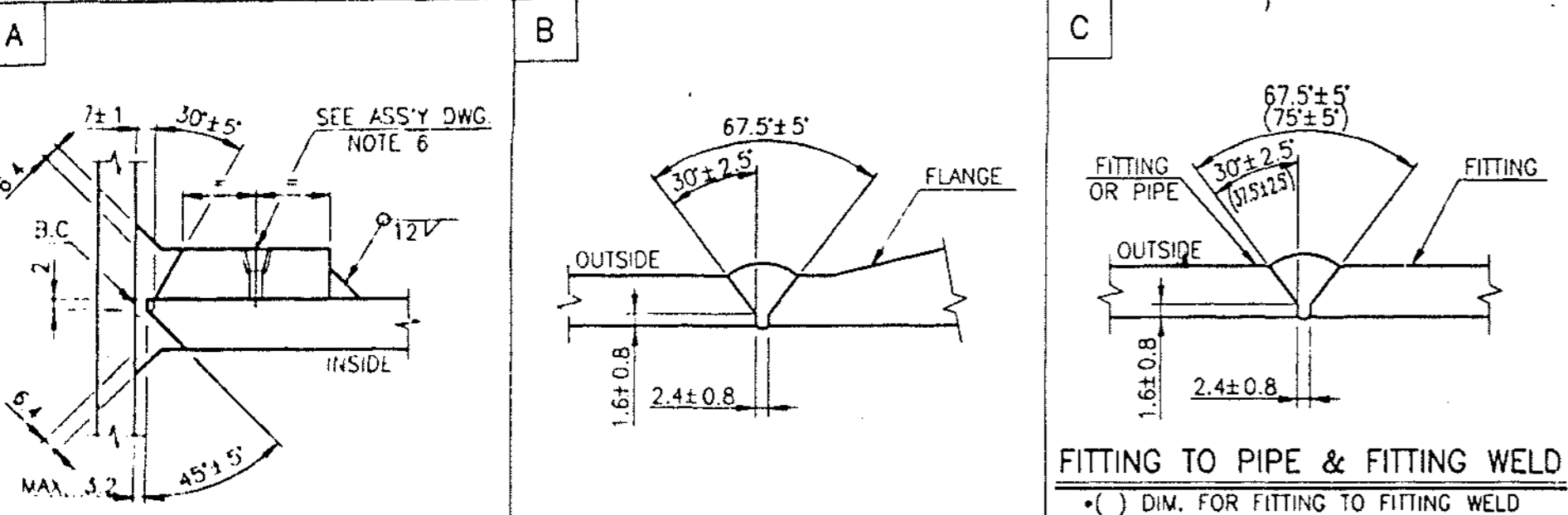
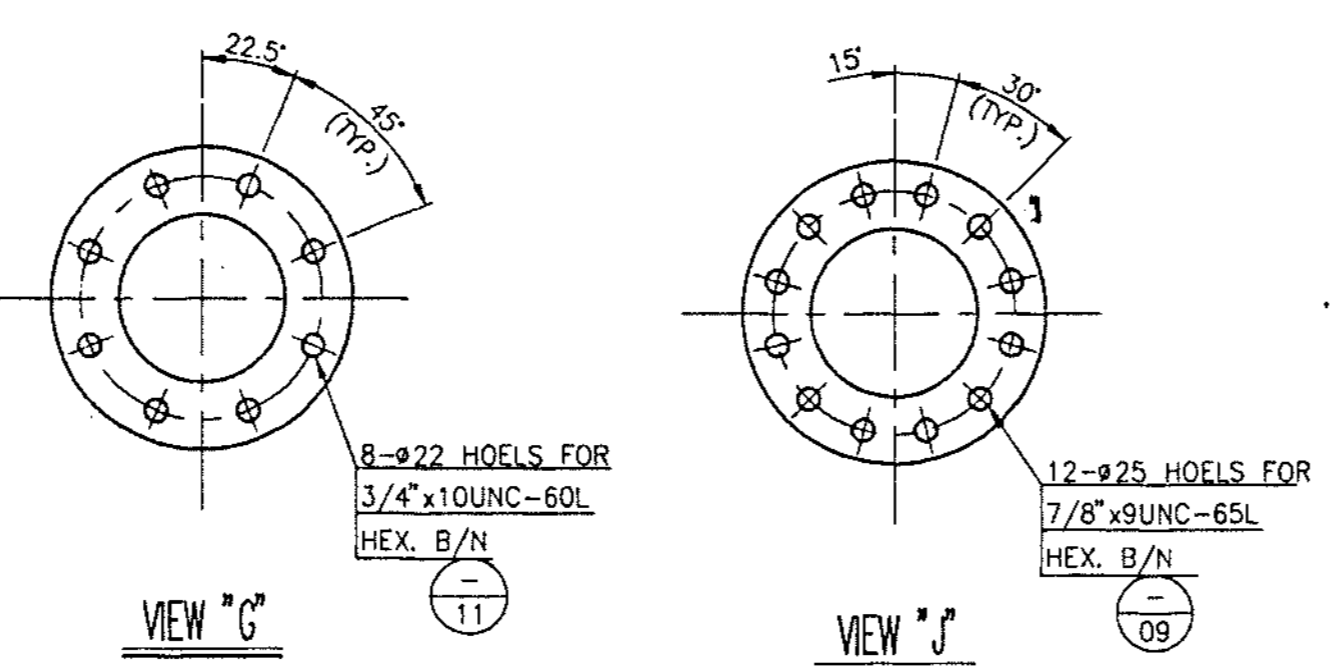
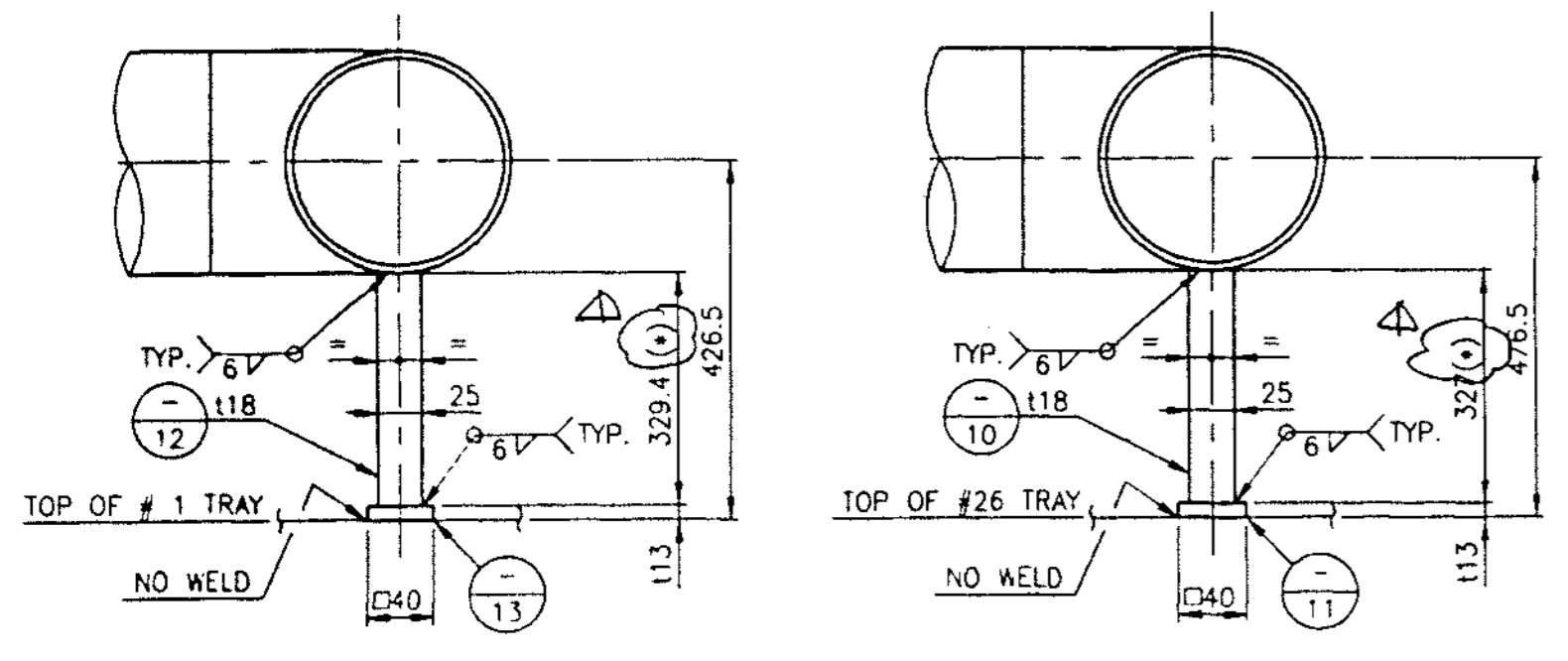
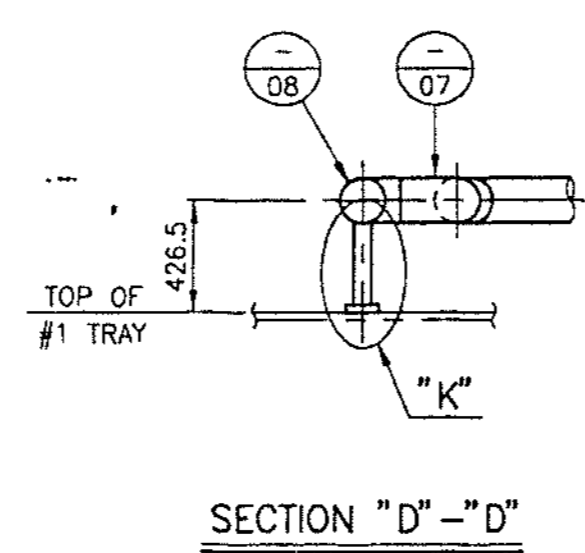
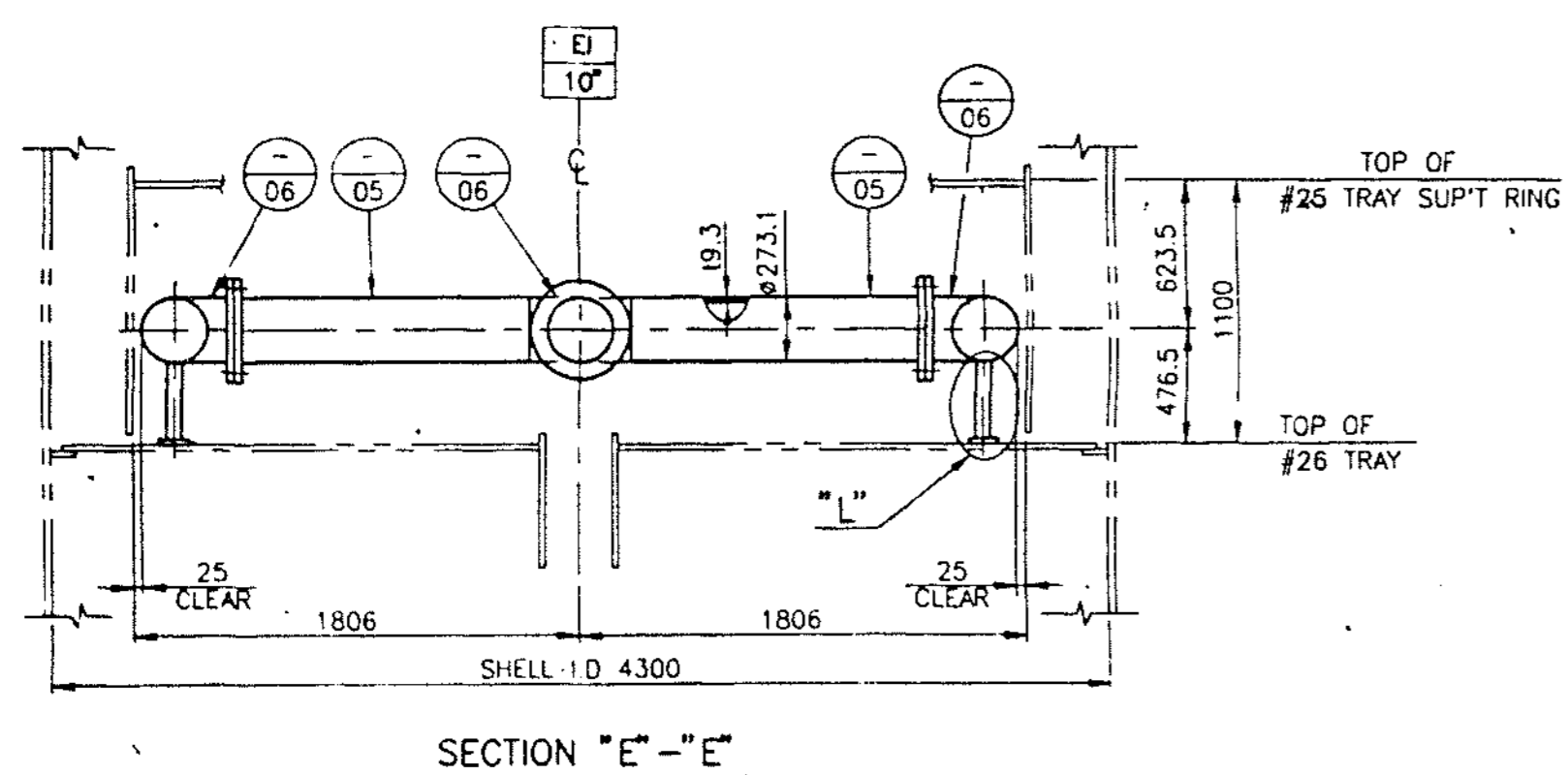
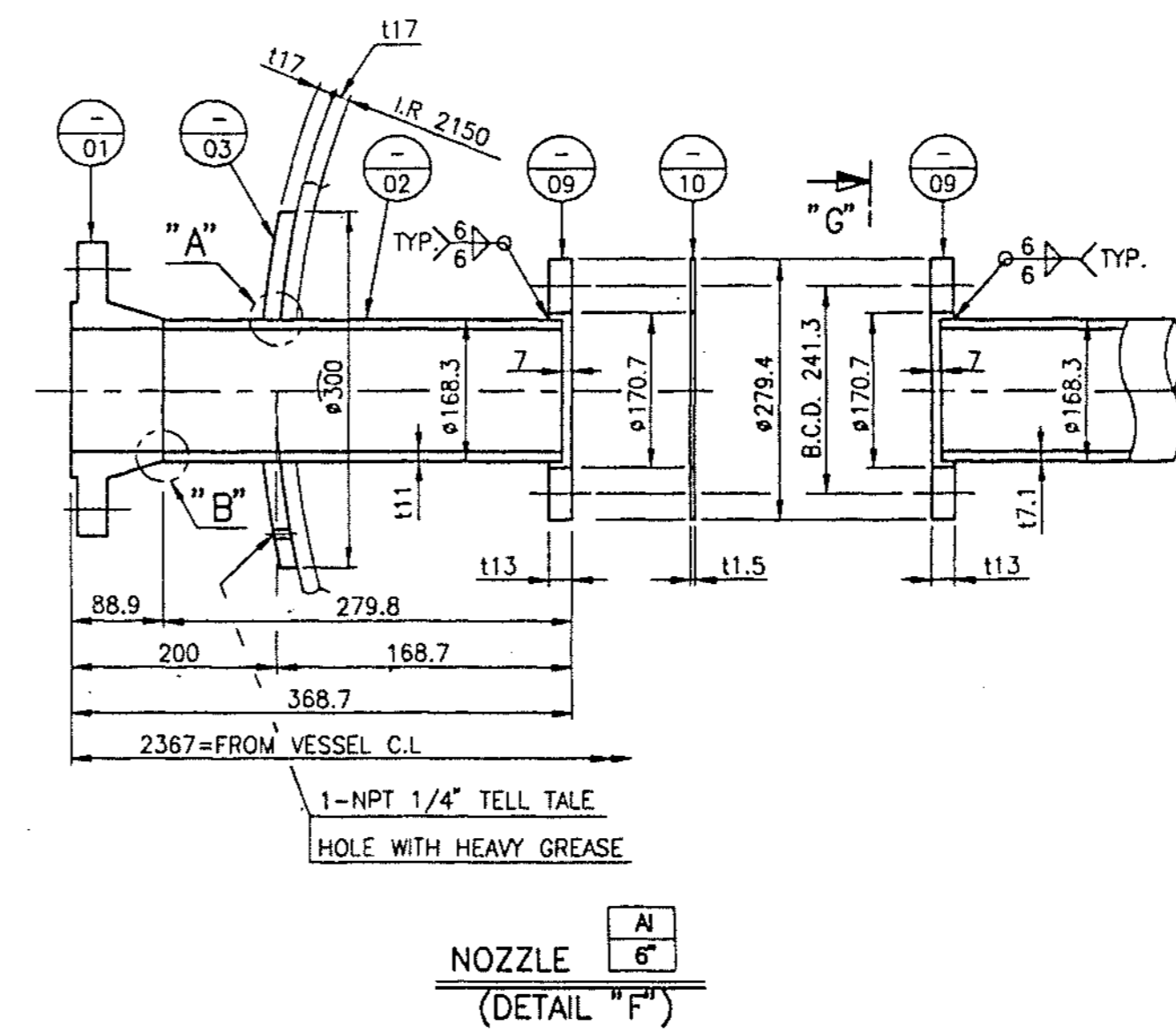
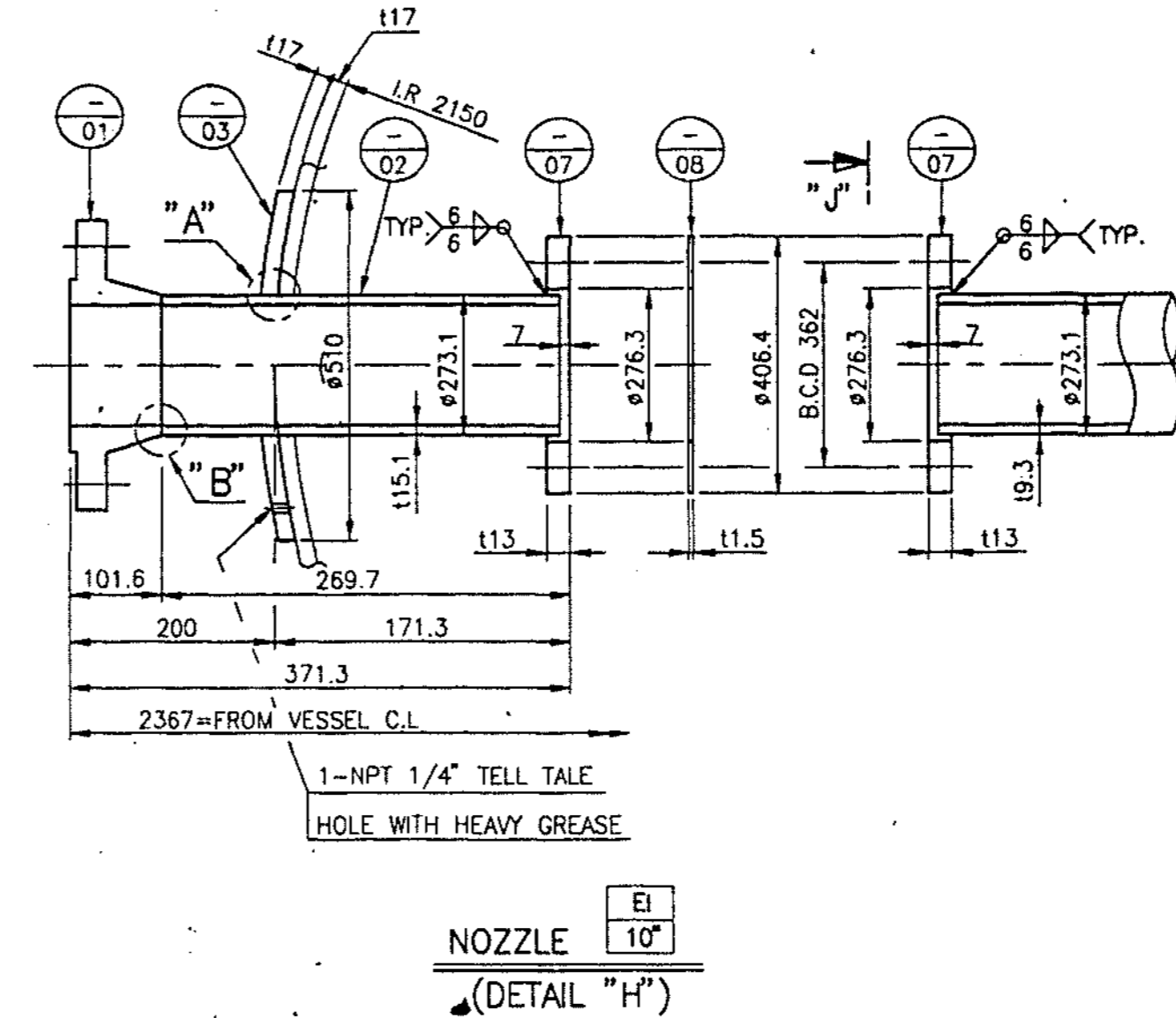
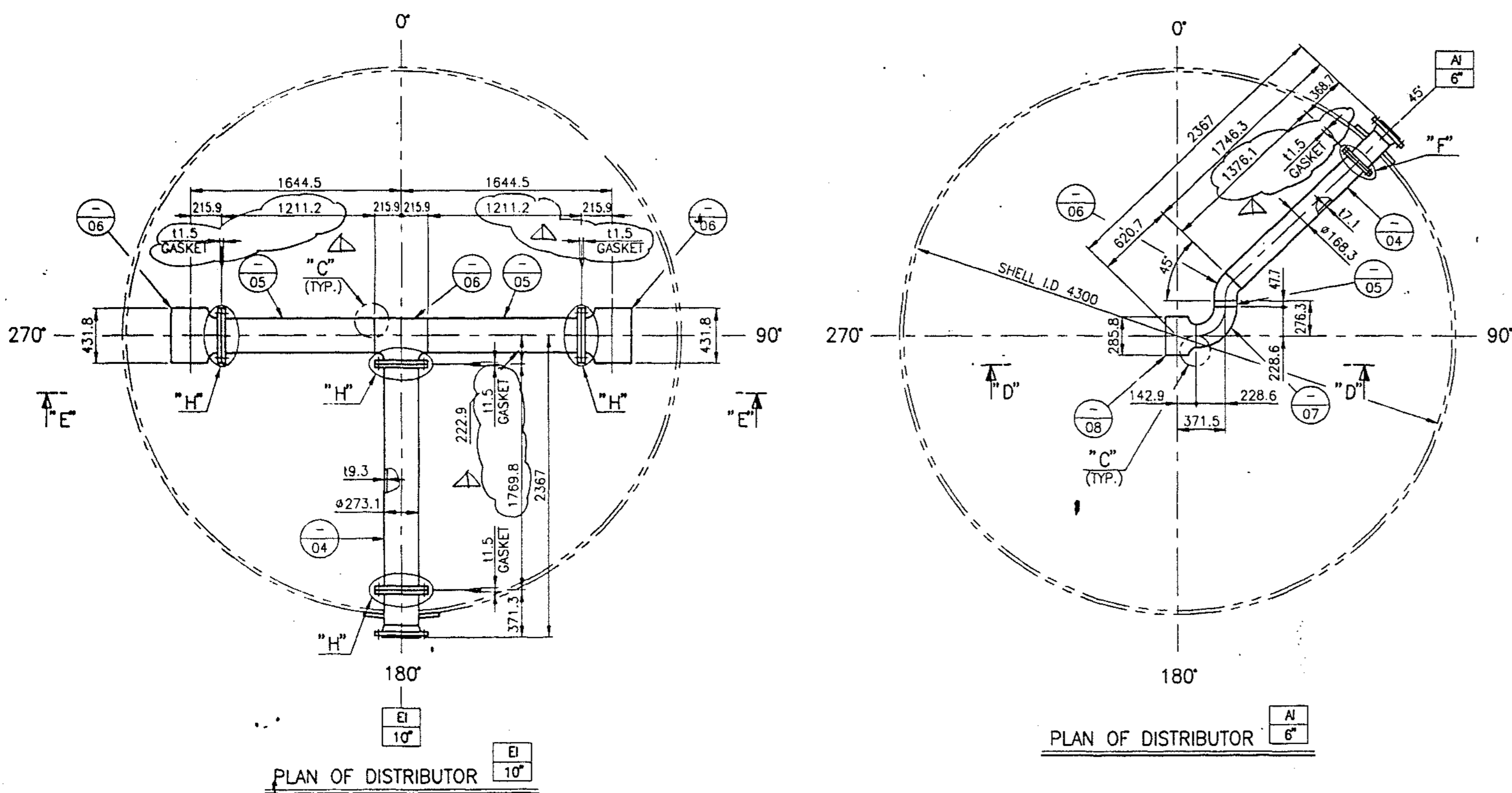
PO NO. SAYPOA0006

REQ. NO. MR-50-C-002

IDENT. NO. 53-C-02-DW-0006

DATE

PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER



| M/K | DATE | REASON FOR REVISION | DWN | CHK | APP |
|-----|--------|---------------------|-----|-----|-----|
| △ | 7/8/90 | REVISED AS MARKED | | | |

NOTE :
1. TRIAL FIT-UP AT SHOP WITHOUT TRAY TO SUIT FOR ACTUAL WORKS.
(실제 SITE 조립시 정확도를 위하여 SHOP 에서 가조립 실시함)

T.W = 640 KG

| NO. | DESCRIPTION | MATERIAL | QTY | REMARKS |
|-------|---------------|--|-----|--------------------|
| EI 11 | WEAR PLATE | A283-C t13x □40 | 2 | 1 |
| 10 | SUPPORT PLATE | A283-C t18x25x327 | 2 | 2 (ADJUST AT SHOP) |
| 09 | HEX. B/N | A193-BB/A194-B 7/8"x9UNC-65L | 48 | 23 (BSET) |
| 08 | GASKET | CERAMIC FIBER SHEET t1.5x1.D276xO.D406 | 4 | - |
| 07 | PLATE FLANGE | A283-C t13x1.D276xO.D406 | 8 | 57 |
| 06 | TEE | A234-WPB 10"x10"xS/40,B.W | 3 | 117 |
| 05 | INT. PIPE | SA106-B 10"xS/40-1204L | 2 | 146 |
| 04 | INT. PIPE | SA106-B 10"xS/40-1756L | 1 | 107 |
| 03 | REINF. PAD | SA516-60 t17x1.D287xO.D510 | 1 | 19 |
| 02 | NOZZLE NECK | SA106-B 10"xS/80-270L | 1 | 25 |
| EI 01 | WN-RF FLANGE | SA 105 10"xS/80, 150# | 1 | 25 (MS B16.5) |
| AI 13 | WEAR PLATE | A283-C t13x □40 | 2 | 1 |
| 12 | SUPPORT PLATE | A283-C t18x25x329 | 2 | 2 (ADJUST AT SHOP) |
| 11 | HEX. B/N | A193-BB/A194-B 3/4"x10UNC-60L | 8 | 2 |
| 10 | GASKET | CERAMIC FIBER SHEET t1.5x1.D171xO.D279 | 1 | - |
| 09 | PLATE FLANGE | A283-C t13x1.D171xO.D279 | 2 | 8 |
| 08 | TEE | A234-WPB 6"x6"xS/40, B.W | 1 | 16 |
| 07 | 90° L.R ELBOW | A234-WPB 6"xS/40, B.W | 1 | 12 |
| 06 | 45° L.R ELBOW | A234-WPB 6"xS/40, B.W | 1 | 6 |
| 05 | INT. PIPE | SA106-B 6"xS/40-48L | 1 | 2 |
| 04 | INT. PIPE | SA106-B 6"xS/40-1369L | 1 | 39 |
| 03 | REINF. PAD | SA516-60 t17x1.D182xO.D300 | 1 | 6 |
| 02 | NOZZLE NECK | SA106-B 6"xS/80-273L | 1 | 12 |
| AI 01 | WN-RF FLANGE | SA 105 6"xS/80, 150# | 1 | 11 (MS B16.5) |

BILL OF MATERIALS

| | | | |
|---------------------------------------|-------------------|-------------------------------------|---|
| JOB NO. | 51046 | CUSTOMER | SET(S) |
| P/O NO. | SAYPOA0006 | ARABIAN INDUSTRIAL FIBERS CO., LTD. | 1 |
| W/C SER. NO. | PV-97-038 | | |
| DWN | D.C.KWAG '96,7,11 | PROJECT | IBN RUSHO PTA & AROMATICS PROJECT-AROMATICS |
| DES | Y.S.JUNG '96,7,15 | TITLE | EXTRACT COLUMN |
| CHK | G.Y.SHIN '96,7,18 | | 53-C-02 |
| APP | D.H.WON '96,7,18 | | DETAIL OF DISTRIBUTOR |
| THIRD ANGLE PROJECTION | SCALE | REF. DWG. NO. | DWG. NO. 6T069-0507 |
| INDUSTRIAL PLANT DIVISION ULSAN KOREA | | | |

INDUSTRIAL PLANT DIVISION ULSAN KOREA
HYUNDAI HEAVY INDUSTRIES CO., LTD.
현대중공업주식회사 프랜즈 사업본부

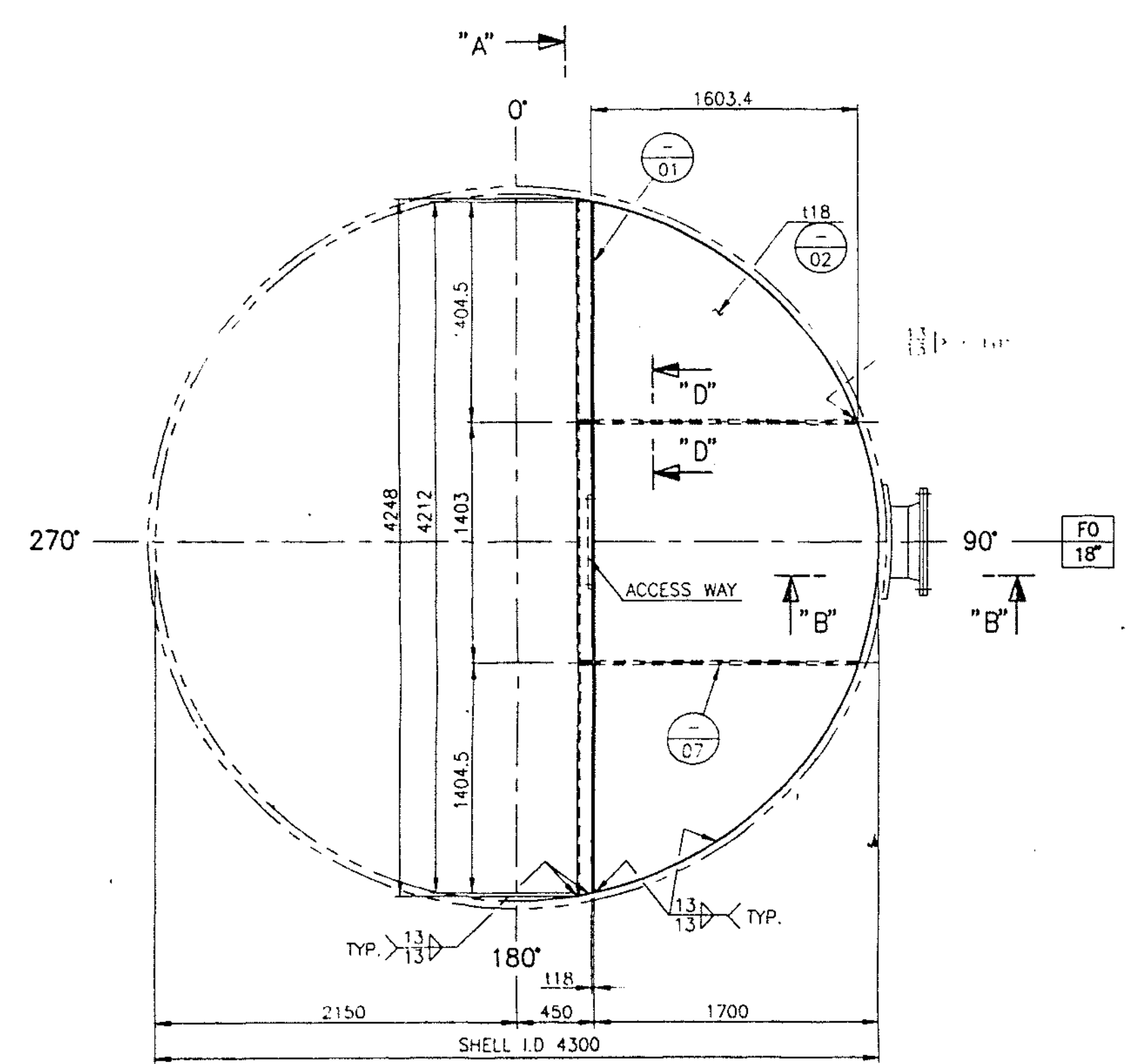
SHYODA CORPORATION

JOB NO. 51046 IBN RUSHO AROMATICS PROJECT
PO NO. SAYPOA0006
REQ NO. MR-50-C-002
IDENT NO. 53-C-02-DW-0007

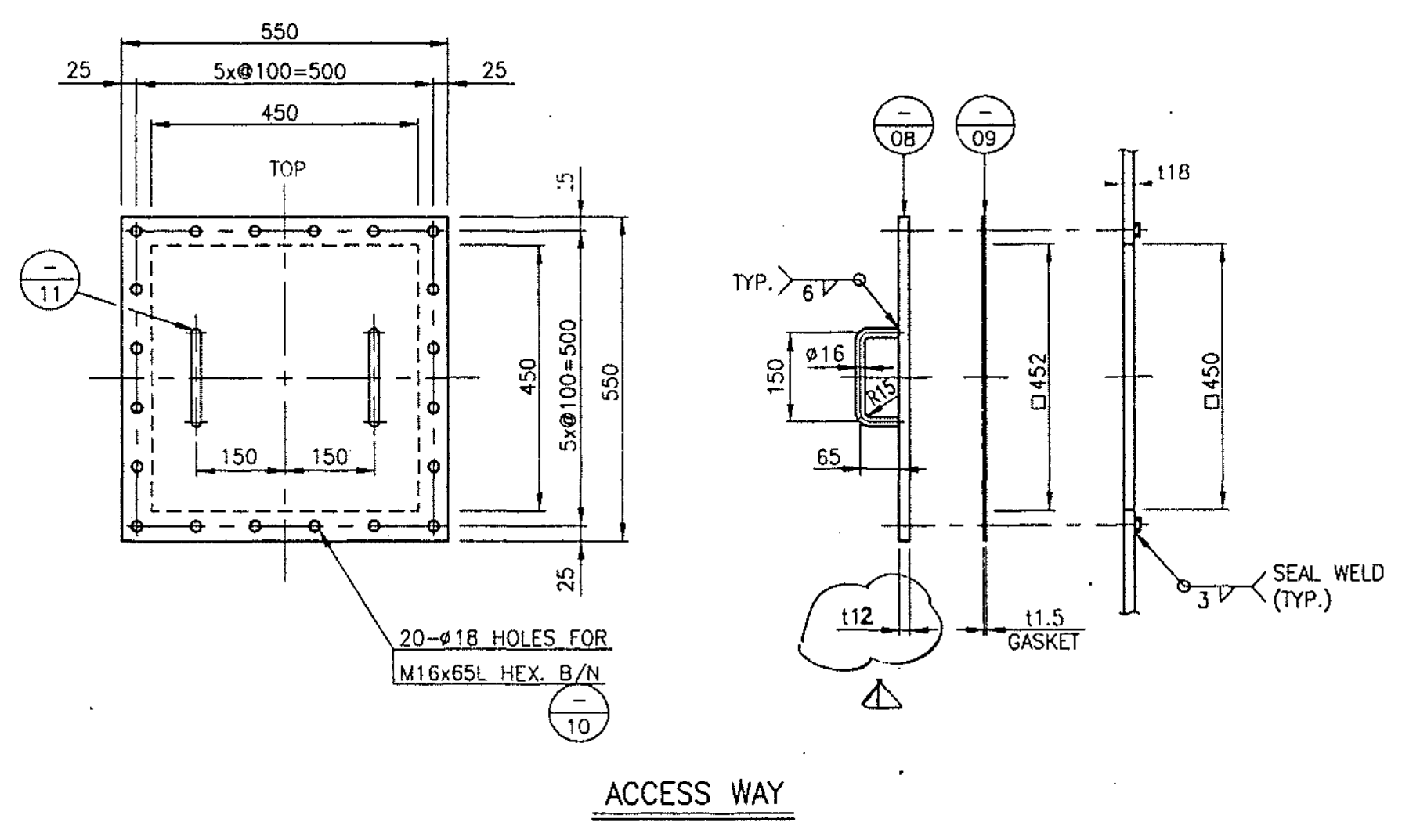
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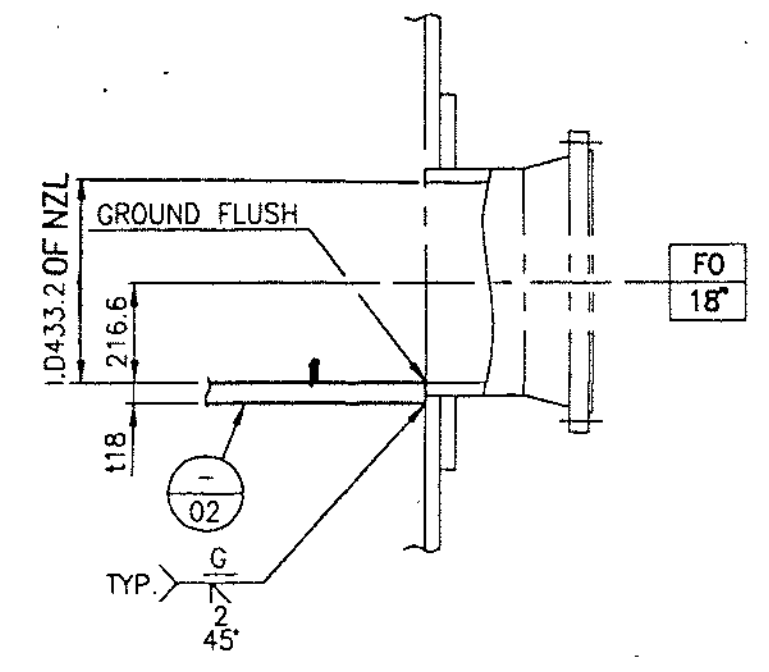
| N/K | DATE | REASON FOR REVISION | DWN | CHK | APP |
|-----|------|---------------------|-----|-----|-----|
| △ | 9/11 | REVISED AS MARKED | | | |
| △ | | | | | |
| △ | | | | | |



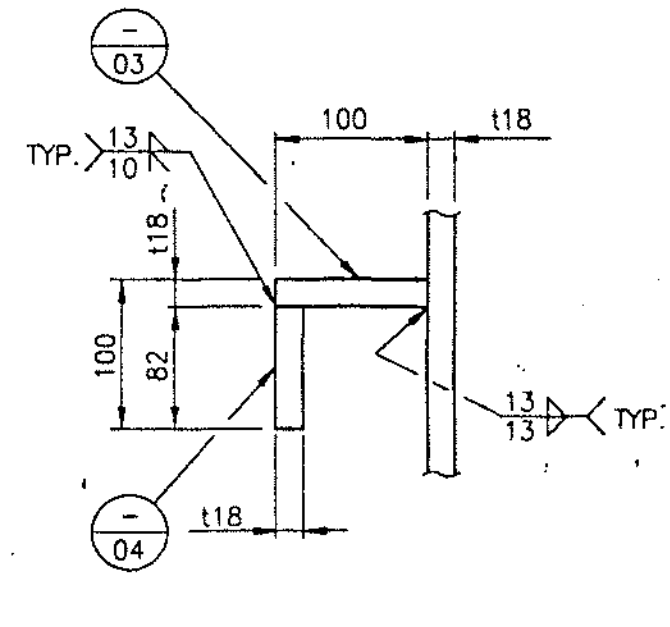
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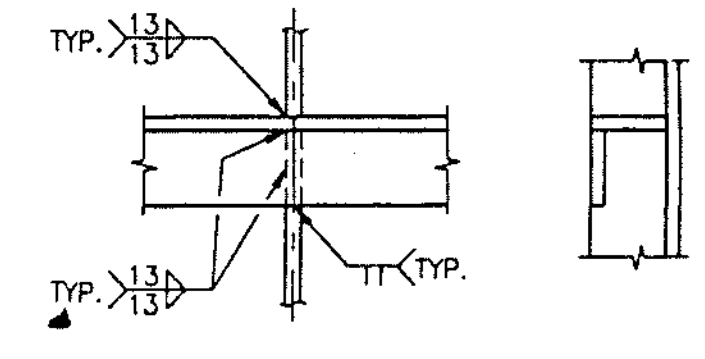
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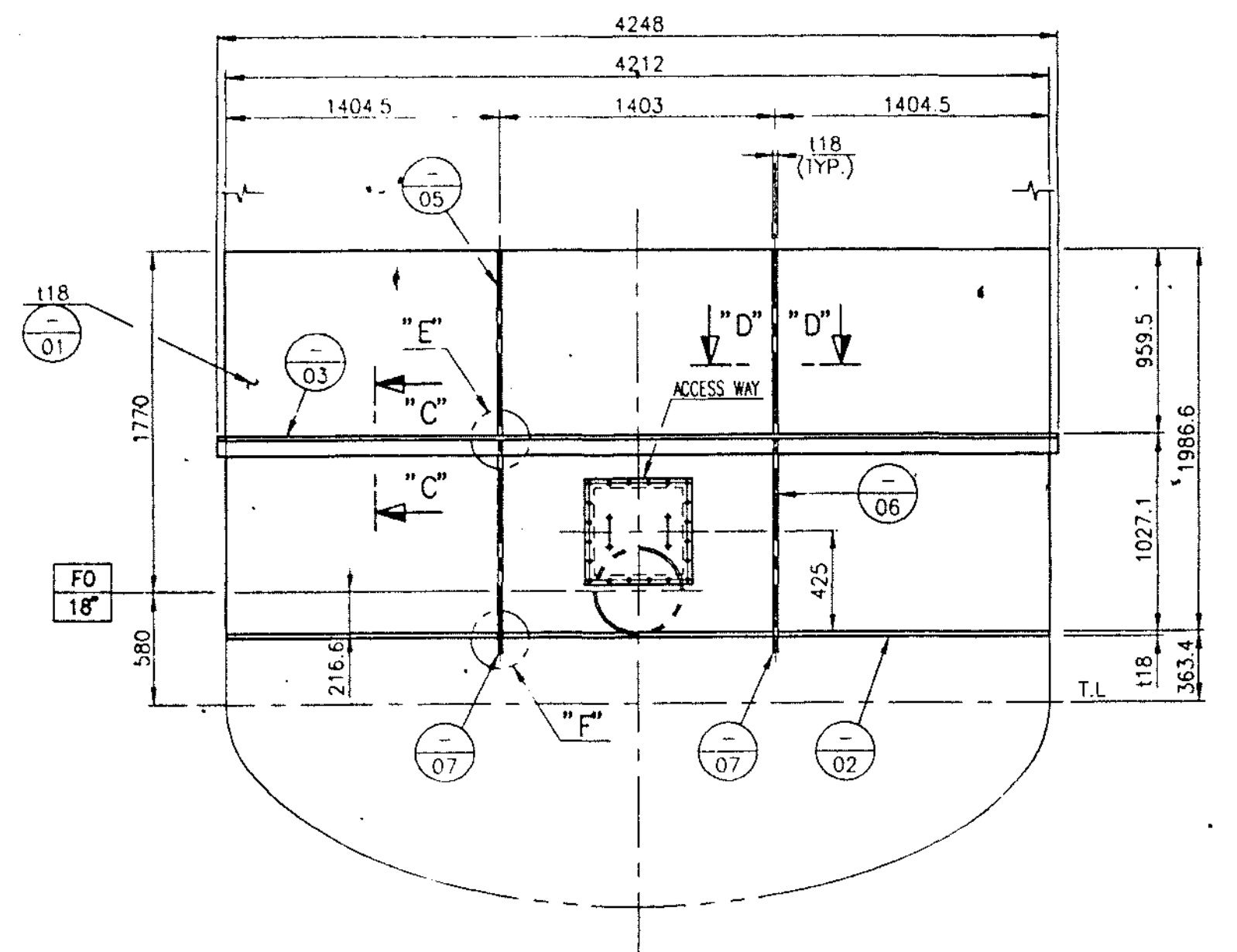
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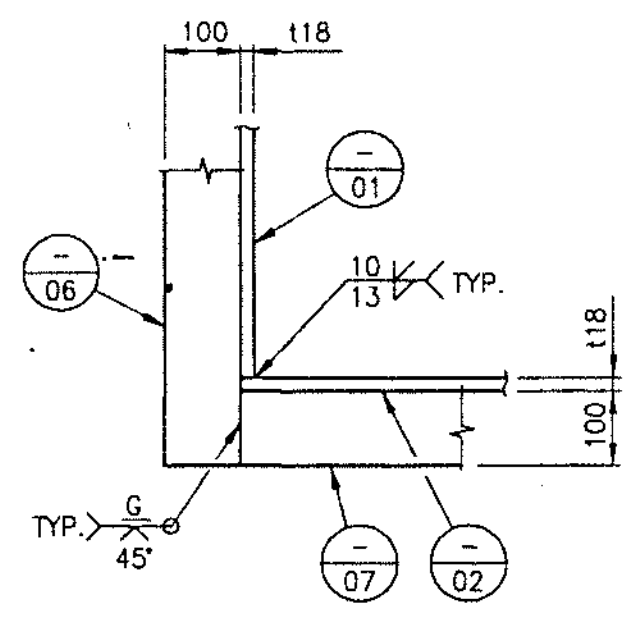
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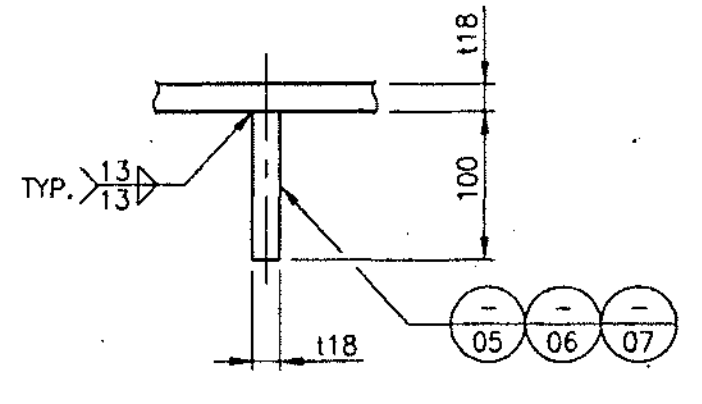
DETAIL "E"



SECTION "A" - "A"



DETAIL "F"



SECTION "D" - "D"

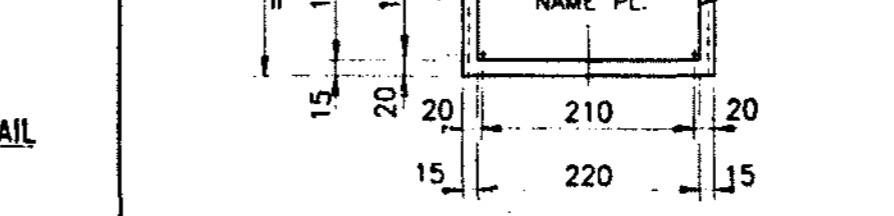
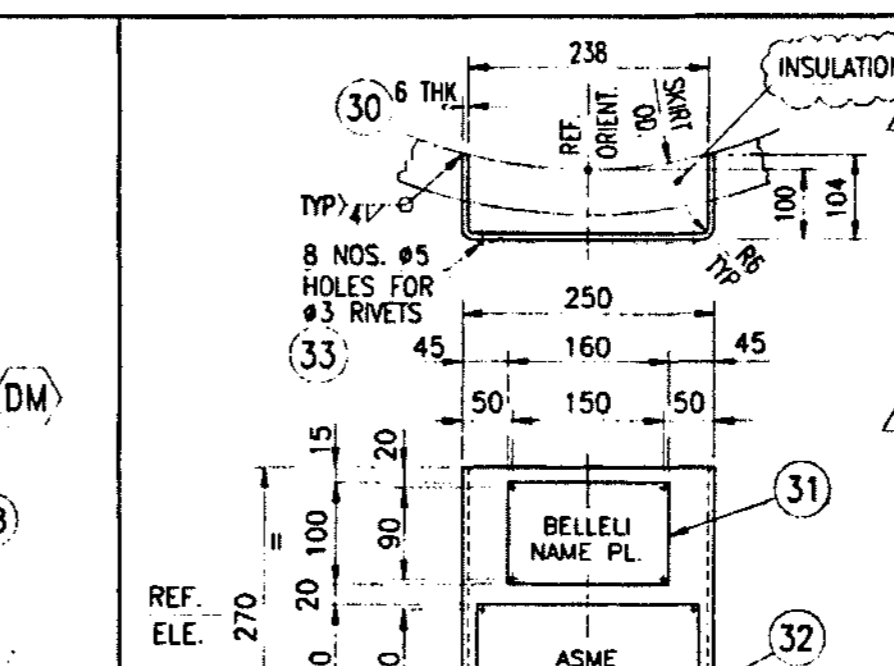
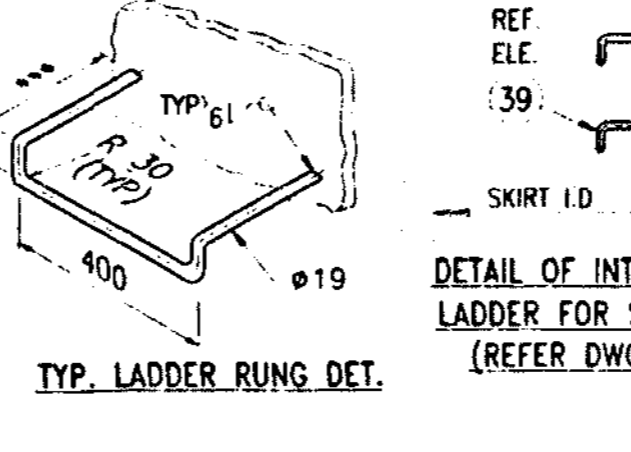
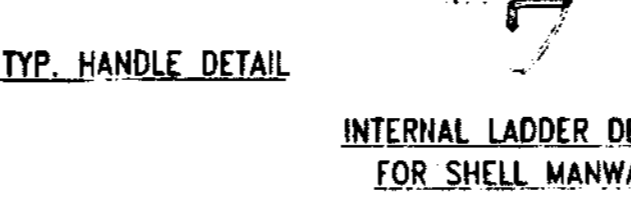
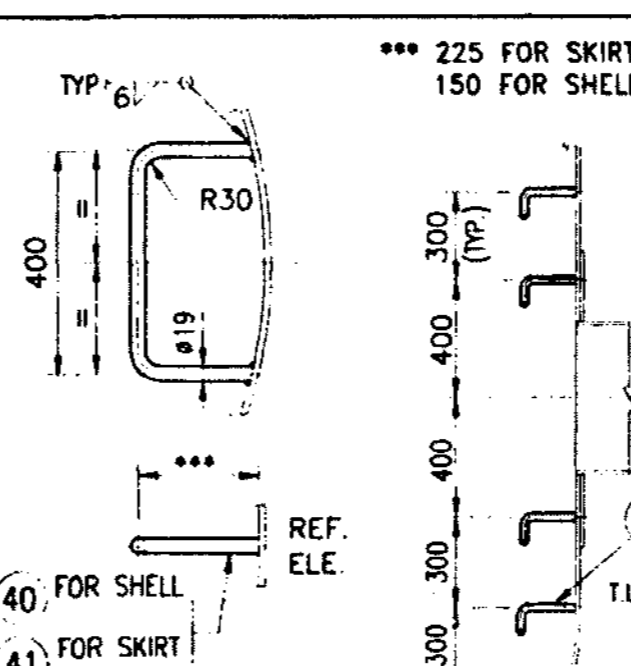
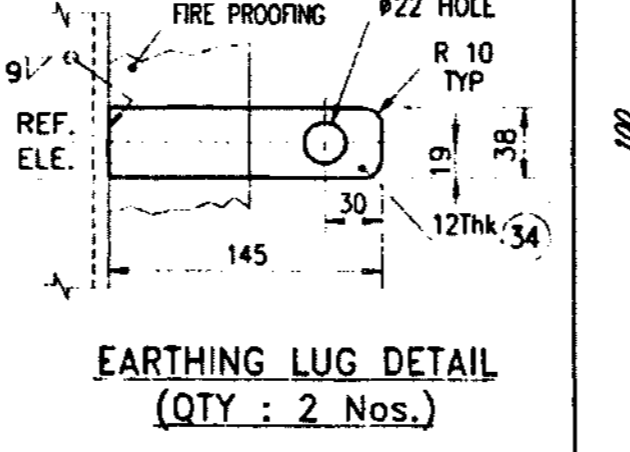
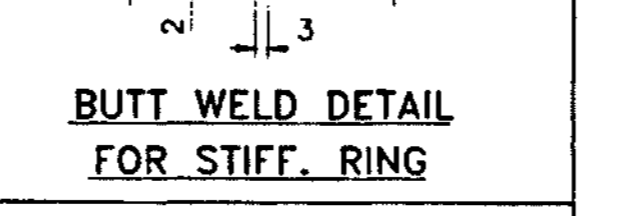
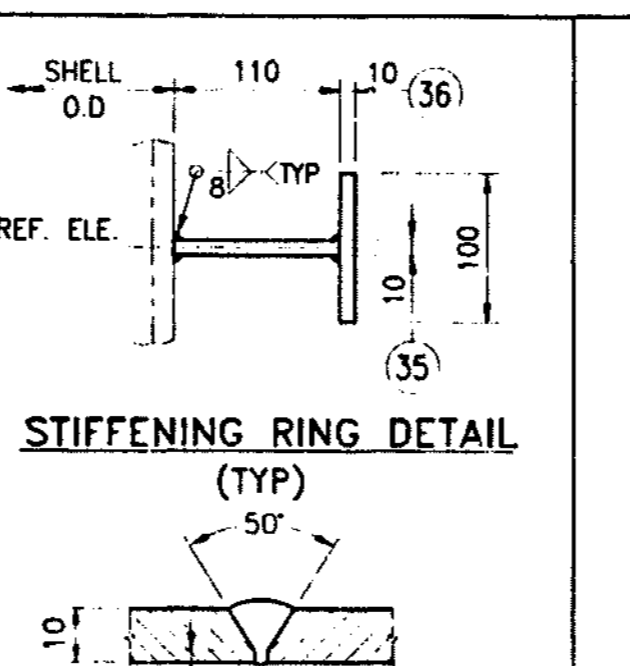
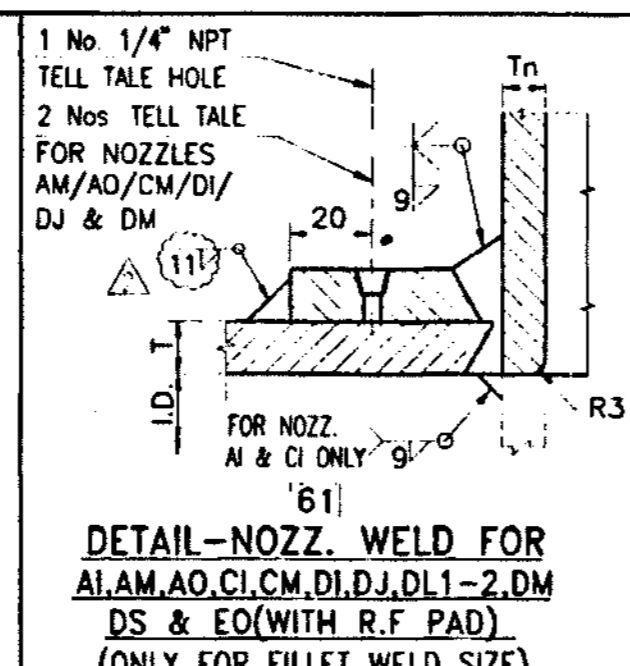
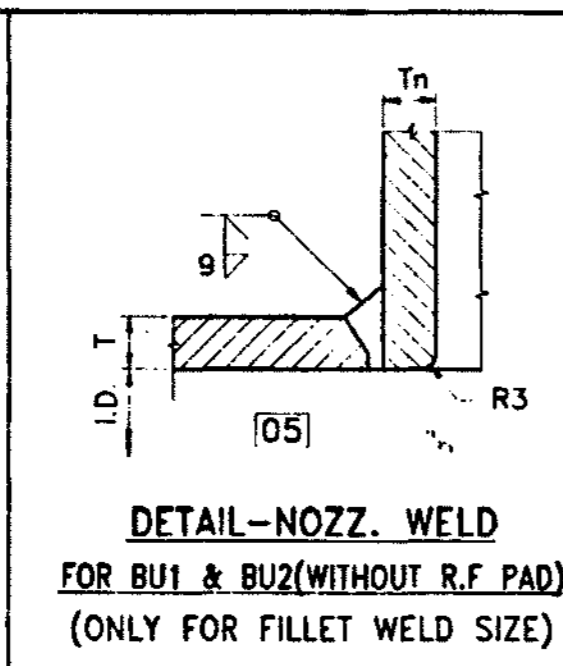
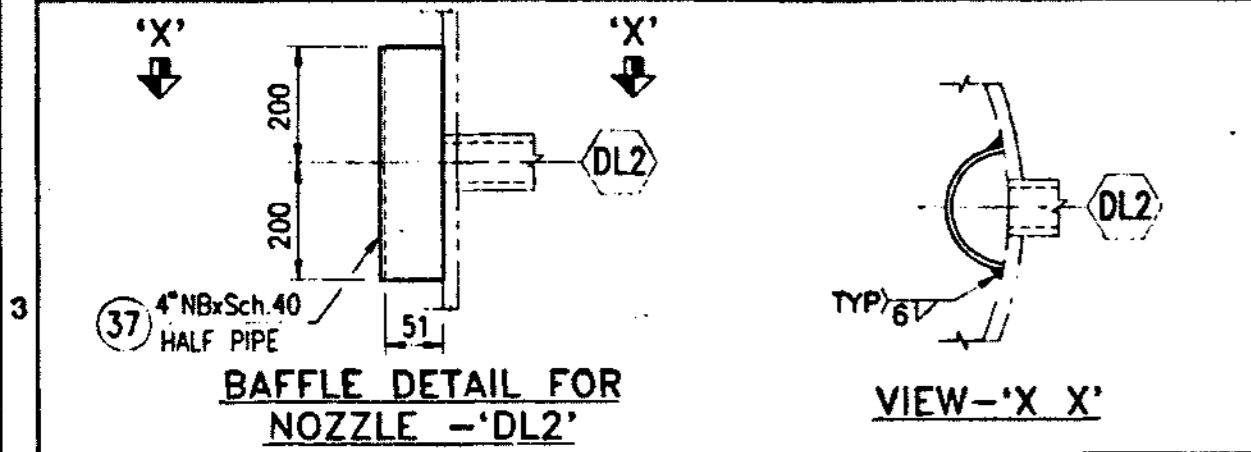
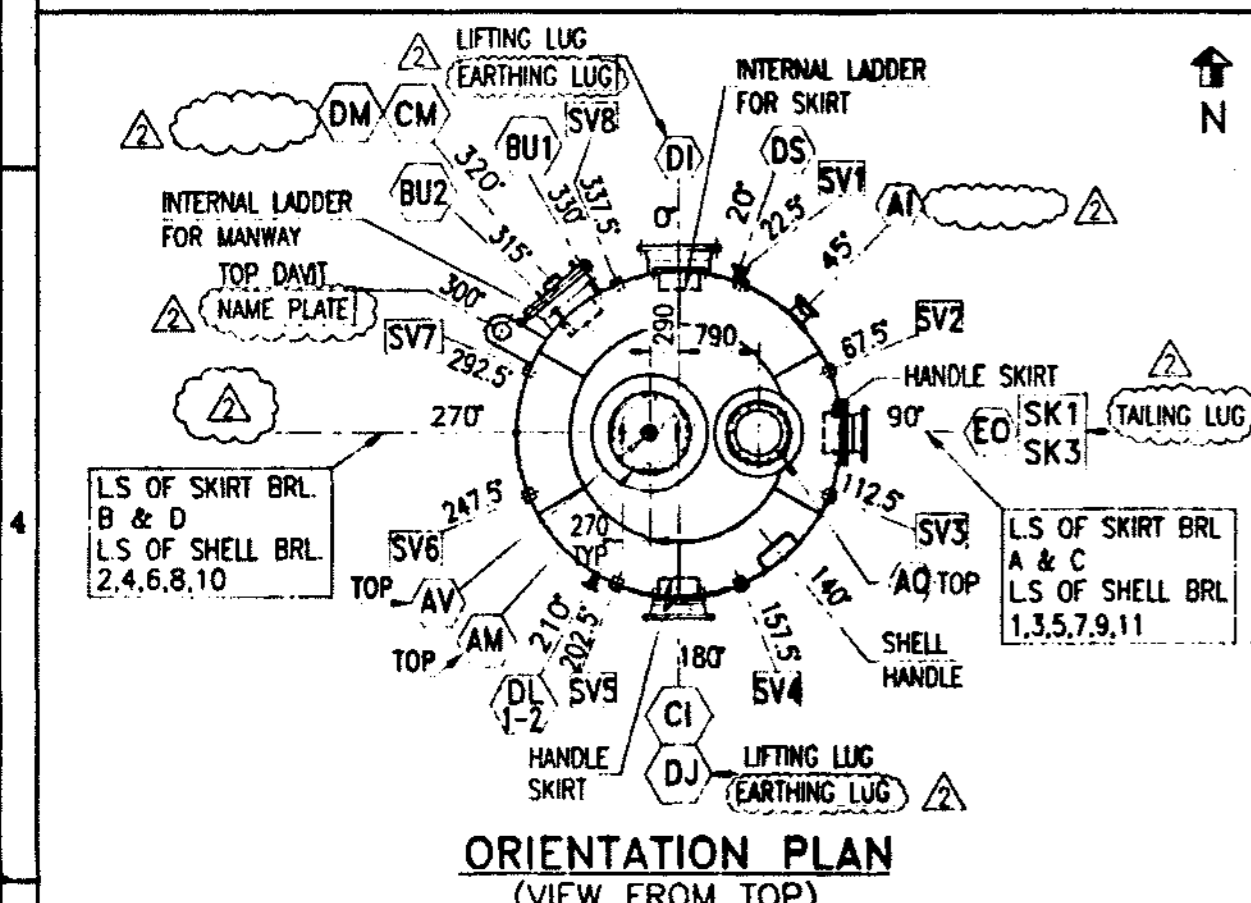
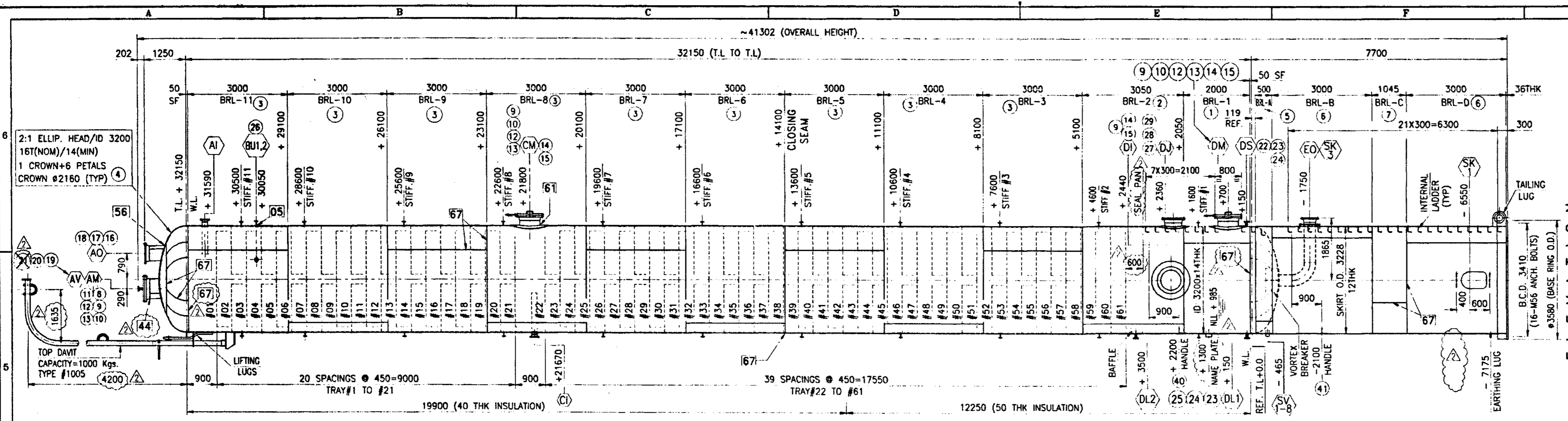
T.W = 2449 KG

| PART NO. | PART NAME | MATERIALS | DIMENSIONS | QTY PER SET | WEIGHT (KG) | REMARKS |
|----------|-----------------------|---------------------|------------------|-------------|-------------|---------|
| - 11 | HANDLE | A36 | φ16x280L | 2 | 1 | |
| - 10 | HEX. B/N | A193-B8/A194-B | M16x65L | 20 | - | |
| - 09 | GASKET | CERAMIC FIBER SHEET | t1.5x φ452x φ550 | 1 | - | |
| - 08 | COVER PLATE | SAS16-60 | (t12) φ550 | 1 | 29 | △ |
| - 07 | STIFF. PLATE | | t18x100x1603 | 2 | 45 | |
| - 06 | STIFF. PLATE | | t18x100x1127 | 2 | 32 | |
| - 05 | STIFF. PLATE | | t18x100x960 | 2 | 27 | |
| - 04 | HORIZON. STIFF. PLATE | | t18x82x4248 | 1 | 49 | |
| - 03 | HORIZON. STIFF. PLATE | | t18x100x4248 | 1 | 60 | |
| - 02 | BTM. BAFFLE PLATE | | t18x1718x4212 | 1 | 1023 | |
| - 01 | INT. BAFFLE PLATE | SAS16-60 | t18x1987x4212 | 1 | 1183 | |

| BILL OF MATERIALS | | | |
|------------------------------|----------------|-------------------------------------|---|
| JOB NO. | 5T045 | CUSTOMER | SEI(S) |
| P/O NO. | SAYPOA0006 | ARABIAN INDUSTRIAL FIBERS CO., LTD. | 1 |
| MFG. SER. NO. | PV-97-038 | | |
| DWR | Y.S. JUNG 9/8 | PROJECT | IBN RUSHO PTA & AROMATICS PROJECT-AROMATICS |
| DES | M.H.S. 8/9 | TITLE | EXTRACT COLUMN |
| CHK | G.J. SWIN 8/12 | | 53-C-02 |
| APP | D.H. WOO 8/16 | | DETAIL OF INTERNAL |
| THIRD ANGLE PROJECTION SCALE | NONE | REF. DWG. NO. | DWG. NO. 6T069-0510 |

CHIYODA
 JOB NO. 51048 IBN RUSHO AROMATICS PROJECT
 PO NO. SAYPOA0006
 REQ NO. NR-50-C-002
 IDENT NO. 53-C-02-DW-0010
 ALSO CONSULT PROJECTS WITH FABRICATOR WITH FABRICATION DIMENSIONS TO BE CONSIDERED
 C-DO NOT PROCEED WITH FABRICATION
 DATE _____
 PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER

INDUSTRIAL PLANT DIVISION ULSAN KOREA
HYUNDAI HEAVY INDUSTRIES CO., LTD.
 현대중공업주식회사 플랜트 사업본부



| | |
|----------------|--|
| DA-7033-01-002 | DETAILS DRAWING |
| DA-7033-01-003 | FORMED HEAD - TOP & BOTTOM |
| DA-7033-01-004 | DETAIL OF INTERNALS |
| DA-7034-00-002 | DAVIT ARRANGEMENT |
| DA-7033-01-006 | TOP DAVIT |
| DA-7033-01-007 | BELLELI NAME PLATE |
| DA-7033-01-008 | ASME NAME PLATE |
| DA-7033-01-009 | TRAY SUPPORT DETAIL (6 SHEETS) |
| DA-7033-01-010 | CLIPS FOR PLATFORM/LADDERS (2 SHTS) |
| DA-7033-01-011 | CLIPS FOR INSUL. FIRE PROOFING & PIPE SUPP |
| ST-7033-01-001 | FINISH REQUIREMENTS |
| DO-7033-01-001 | SHIPPING & TESTING ARRANGEMENT |

MARK INDICATES THE BSHI WELD STANDARD NUMBER.
MARK INDICATES THE POSITION NUMBER WITH REFERENCE TO LIST OF MATERIAL
MARK INDICATES THE NOZZLE MARK NUMBER.

SHOP HYD. TEST GASKETS: () BLENDED NOZZLES WILL HAVE JOB GASKETS.
() ALL OTHER NOZZLES WILL HAVE CAF GASKET.

SPARE PARTS: ITEMS COMMISSIONING/STARTUP OPERATIONAL SHOP HYD. TEST

ALL BOLTS & NUTS SHALL BE OF UNC SERIES UPTO & INCLUDING 1" SIZE & BUN ABOVE 1" SIZE.

FLANGES UP TO & INCLUDING 24" NB SHALL BE AS PER ANSI B16.5 & THE FLANGE FACE FINISH SHALL BE 3.2 TO 6.3 MICROMETER.

DELETED

MINIMUM TEMPERATURE OF HYDROTEST WATER SHALL BE 17°C AND THE TEST PRESSURE SHALL BE HELD FOR HALF AN HOUR PER INCH OF THICKNESS WITH ONE HOUR MINIMUM.

EACH REINFORCING PAD OR SEGMENT THEREOF SHALL BE PROVIDED WITH ONE No. (TWO Nos FOR NOZZLES 16" NB AND ABOVE @ 180° APART) 1/4" NPT, TELL TALE HOLE AS PER ANSI B1.20.1. ALL R.F. PAD WELDS SHALL BE TESTED TO 15 P_{sig} MINIMUM WITH AIR & SOAPY BUBBLE TEST. A PERMANENT REFERENCE WORKLINE FOR VERTICAL VESSELS BOTTOM TAN LINE SHALL BE PUNCHMARKED AROUND THE VESSEL PERIMETER AT 0.90, 1.80 & 2.70' HORIZONTAL VESSELS, CENTER LEVEL SHALL BE PUNCHMARKED ON BOTH SIDE SURFACES OF SHELL NEAR THE HEAD.

TRAY SUPPORT RINGS CROSSING THE LONG SEAM OF SHELL BARRELS SHALL BE CONTINUOUSLY WELDED ALSO ON THE LONG SEAM AFTER FLUSH GRINDING THE PARTICULAR PORTION.

TRAYS WHICH ARE FREE ISSUE SUPPLY AND INSTALLED AT SITE BY CHYODA.

ALL TRAY ELEVATIONS ARE SHOWN TO TOP OF SUPPORT RINGS.

THE VESSEL SHALL BE THOROUGHLY CLEANED INSIDE & OUTSIDE AND SHALL BE FREE OF ALL DIRT, WELD ROD STUBS & LOOSE FOREIGN MATERIALS ETC.

ALL REMOVABLE INTERNALS SHALL PASS THROUGH THE NEAREST MANHOLE.

LONGITUDINAL SEAM OF FABRICATED NOZZLES FROM PLATE SHALL BE 100% RADIOGRAPHED.

WELD SEAMS COMING UNDER MISC. ATTACHMENTS SHALL BE GROUND SMOOTH & RADIOGRAPHED FOR A DISTANCE OF 150mm BEYOND THE ATTACHMENT WELD.

ALL NOZZLES AND MANWAY THAT DO NOT EXTEND INTO THE VESSEL SHALL BE FINISHED FLUSH WITH THE INSIDE & THE INNER EDGE SHALL BE ROUNDED OFF TO A MIN. 3mm RADIUS.

NOZZLE POSITIONS ON VESSEL ELEVATIONS ARE CONVENTIONAL FOR TRUE LOCATION SEE NOZZLE ORIENTATION PLAN.

NOZZLE PROJECTION IS FROM CENTER LINE OF VESSEL TO GASKET FACE OF FLANGE UNLESS SPECIFIED OTHERWISE.

ALL FLANGE BOLT HOLES SHALL STRADDLE VERTICAL AND/OR NORTH SOUTH CENTER LINES UNLESS SHOWN OTHERWISE.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

| | |
|-----|---|
| 22. | HEAD SEAMS SHALL BE FULLY RADIOGRAPHED, HEAD TO SHELL SEAM SHALL BE SPOT RADIOGRAPHED PER LW 11 (a) 5(b) OTHER SEAMS (INCLUDING SKIRT MAIN SEAMS) SHALL BE SPOT RADIOGRAPHED PER LW 11(b) |
| 23. | FABRICATION WEIGHT EXCLUDES WEIGHT OF PLATFORMS, LADDERS, INSULATION, FIREPROOFING & TRAYS. |
| 24. | ERECTION WEIGHT INCLUDES WEIGHT OF PLATFORMS, LADDERS, INSULATION/PIPING AND EXCLUDES THE WEIGHT OF TRAYS, FIREPROOFING. |
| 25. | FOR CARBON AND CARBON MANGANESE STEEL THE CARBON CONTENT SHALL BE LIMITED TO 0.25% MAXIMUM. |
| 26. | THE LONGITUDINAL WELD SEAMS OF NOZZLES INSTALLED HORIZONTALLY SHALL BE POSITIONED ABOVE CENTER LINE. |

| MARK | QTY | SIZE | SERVICE | O.D. | SCH. THK | TYPE | RATING | INS. | O.D. THK | |
|-------|-----|-------|---------|-------|----------|-------|--------|------|----------|----|
| SK3 | 1 | 620 | - | 628.0 | PLT | 9.00 | | | | |
| SK1 | 1 | SE | DM | 610.0 | PLT | 12.0 | | | | |
| SVI-8 | 8 | 4" | - | 114.3 | 40 | 6.02 | | | | |
| EO | 1 | 14" | SEE DWG | 356 | PLT | 12.0 | WNRF | 150# | 680 | 16 |
| DM | 1 | 2" | 1765 | 60.3 | 160 | 8.74 | WNRF | 150# | 150 | 14 |
| DS | 1 | 24" | 1915 | 610.0 | PLT | 12.0 | WNRF | 150# | 1150 | 14 |
| DL1,2 | 2 | 2" | 1765 | 60.3 | 160 | 8.74 | WNRF | 300# | 150 | 14 |
| DJ | 1 | 20" | 1865 | 508.0 | PLT | 12.0 | WNRF | 150# | 970 | 14 |
| CI | 1 | 24" | 1915 | 610.0 | PLT | 12.0 | WNRF | 150# | 1150 | 14 |
| DI | 1 | 24" | 1915 | 610.0 | PLT | 12.0 | WNRF | 150# | 1150 | 14 |
| CI | 1 | 4" | 1765 | 114.3 | 120 | 11.13 | WNRF | 150# | 210 | 14 |
| BU1,2 | 2 | 1" ID | 1765 | 50.8 | - | 12.7 | LWNRF | 150# | 300 | 14 |
| AV | 1 | 2" | SEE DWG | 60.3 | 160 | 8.74 | WNRF | 150# | | |
| AO | 1 | 18" | SEE DWG | 457.0 | PLT | 12.0 | WNRF | 150# | 870 | 16 |
| AM | 1 | 24" | SEE DWG | 610.0 | PLT | 12.0 | WNRF | 150# | 1150 | 16 |
| AI | 1 | 6" | 1815 | 168.3 | 80 | 10.97 | WNRF | 150# | 300 | 14 |

| | | | |
|-----|-------------------------------------|----------------|-----------------------------------|
| No. | DESIGN CONDITIONS | UNITS | VALUES |
| 33. | FABRICATION WEIGHT | Kg | ~63100 (SEE NOTE-23) |
| 32. | FULL OF WATER WEIGHT (AT SITE) | Kg | 397603 |
| 31. | OPERATING WEIGHT | Kg | 163603 |
| 30. | ERECTION WEIGHT | Kg | 72719 (SEE NOTE-24) |
| 29. | MANUFACTURER'S SERIAL No. | | 2361 |
| 28. | MANUFACTURER'S JOB NUMBER | | 7033-01 |
| 27. | MANUFACTURER'S NAME | | BELLELI SAUDI HEAVY IND. LTD. |
| 26. | CODE STAMP | | YES |
| 25. | DESIGN CODE | | ASME SEC VIII DIV. 1 1995 EDITION |
| 24. | SERVICE | | FINISHING COLUMN |
| 23. | VOLUME | m ³ | 272 |
| 22. | FIREPROOFING (BY OTHERS) | mm | 75 (BOTH SIDES OF SKIRT) |
| 21. | INSULATION (BY OTHERS) TOP/BOTTOM | mm | 40/50 |
| 20. | SPECIFIC GRAVITY | | 0.726 |
| 19. | OPERATING FLUID | | HYDRO CARBON |
| 18. | INSPECTION AUTHORITY | | CLIENT/BSHI/ABS |
| 17. | WIND SPEED/EXPOSURE CATEGORY | km/hr | 125/C |
| 16. | EARTHQUAKE DESIGN | | ASCE-7.88 ZONE 1 |
| 15. | MINIMUM DESIGN METAL TEMPERATURE | °C | 9 |
| 14. | CHARPY IMPACT TEST | | NO (EXEMPTED AS PER UG 20) |
| 13. | ULTRASONIC EXAMINATION | | NO |
| 12. | POST WELD HEAT TREATMENT | | NO |
| 11. | JOINT EFFICIENCY (SHELL/HEAD) | % | 85 / 100 |
| 10. | RADIOGRAPHY (SHELL/HEAD) | | SPOT (RT)/FULL (SEE NOTE-22) |
| 9. | CORROSION ALLOWANCE (SUPPORT) | mm | 3 (1.6) |
| 8. | M.A.W.P. AT DESIGN TEMPERATURE | barG | 7 (LIMITED BY SHELL) |
| 7. | M.A.P. (NEW & COLD) | barG | 8.93 (LIMITED BY SHELL) |
| 6. | FIELD HYDROTEST PRESSURE (CORRODED) | barG | 5.25 (AT TOP) |
| 5. | SHOP HYDROTEST PRESSURE (HQR) | barG | 13.08 (AT TOP) |
| 4. | OPERATING TEMPERATURE (TOP/BTM) | °C | 124/166 |
| 3. | OPERATING PRESSURE (TOP/BTM) | bar (obs) | |
| 2. | DESIGN TEMPERATURE (INT/EXT) | °C | 194/166 |
| 1. | DESIGN PRESSURE (INT/EXT) | barG | 3.5/FULL VACUUM |

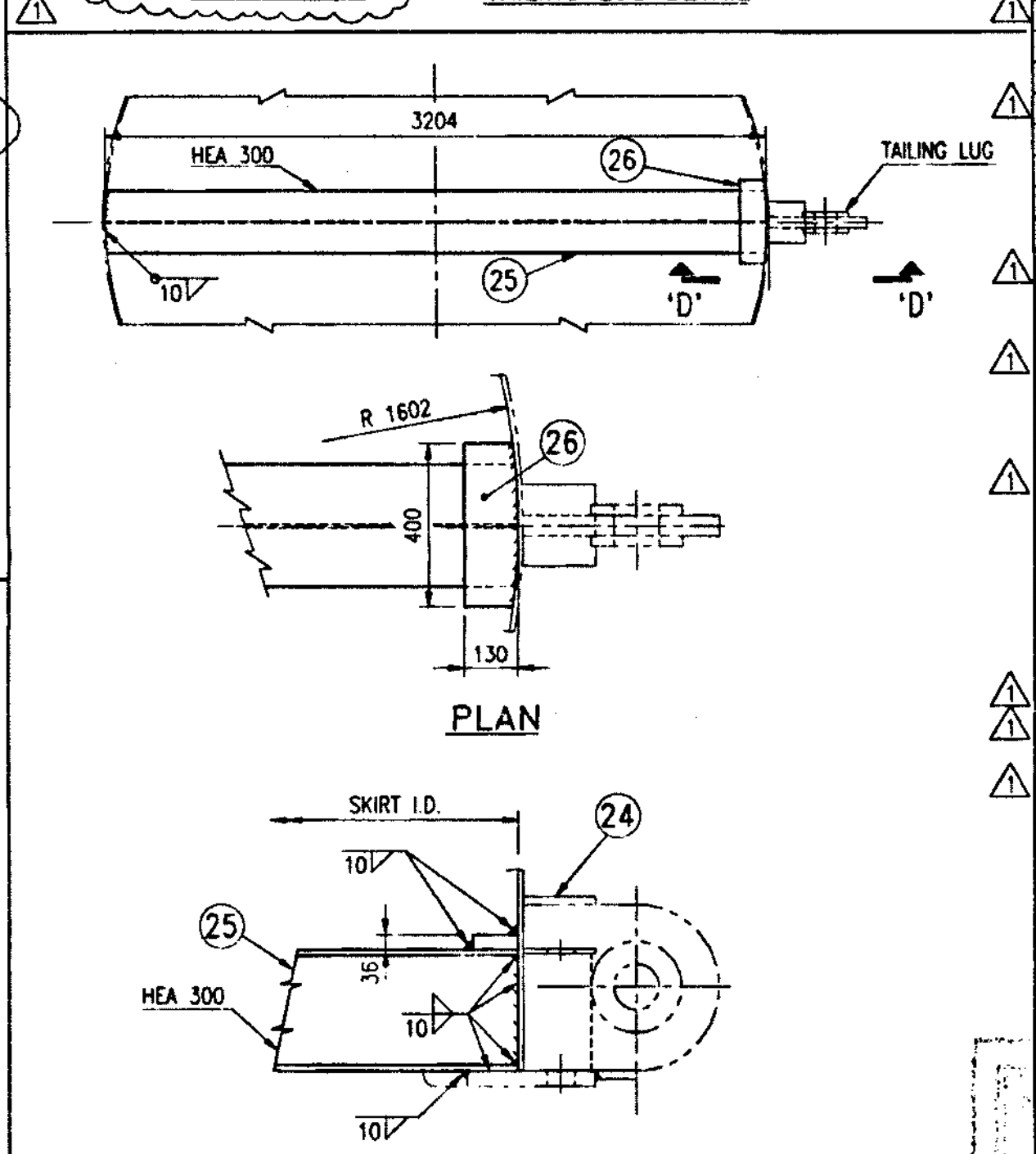
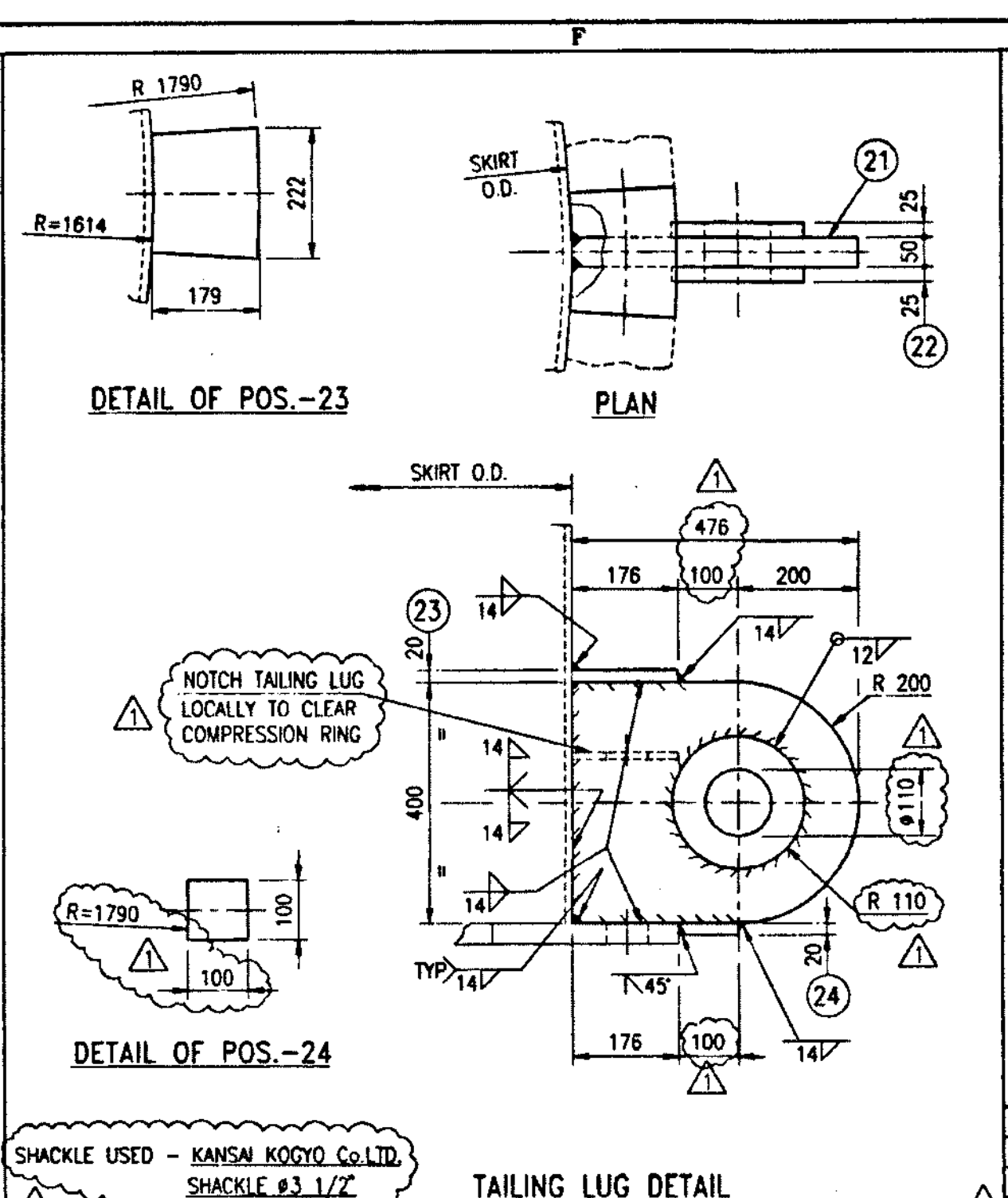
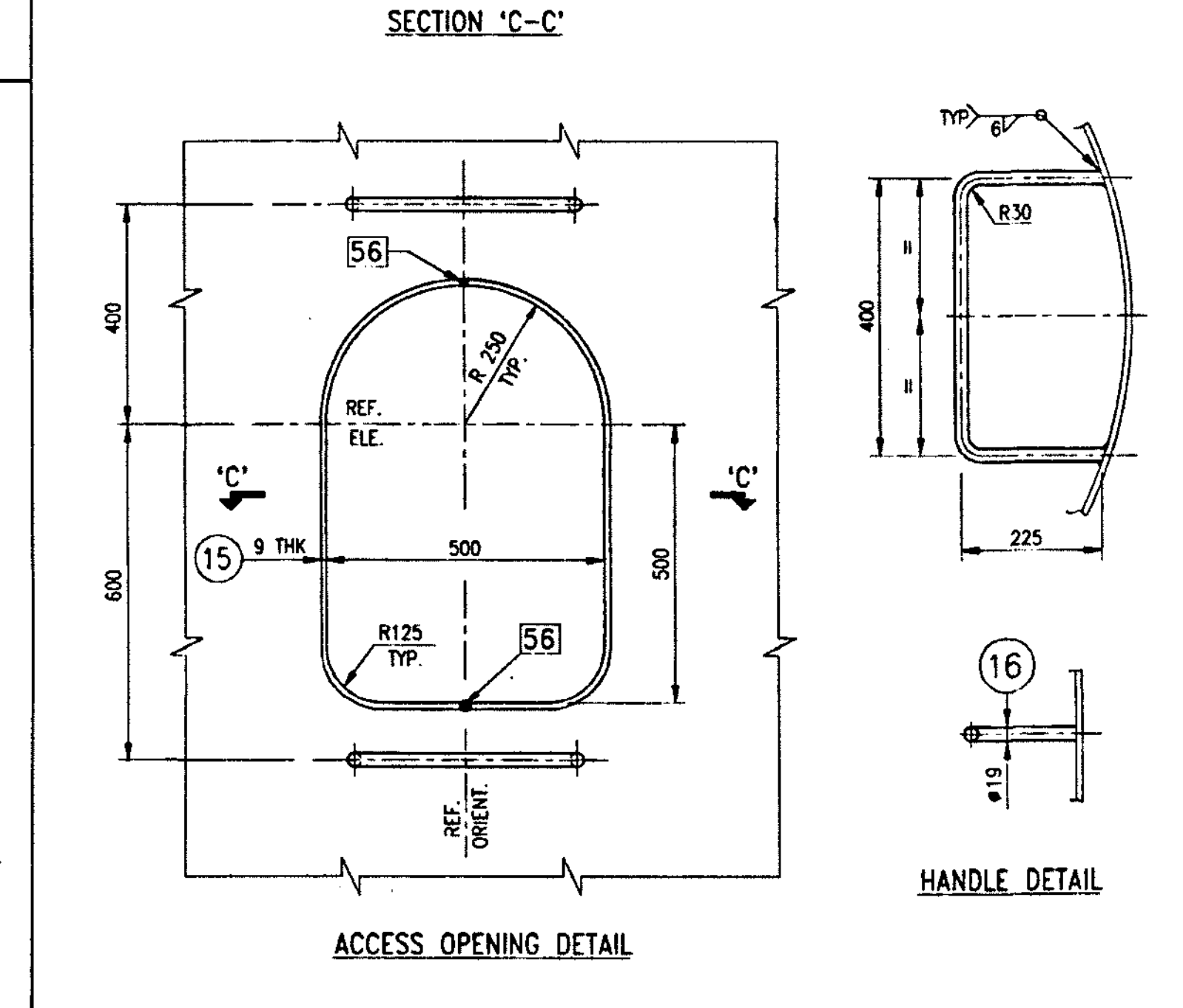
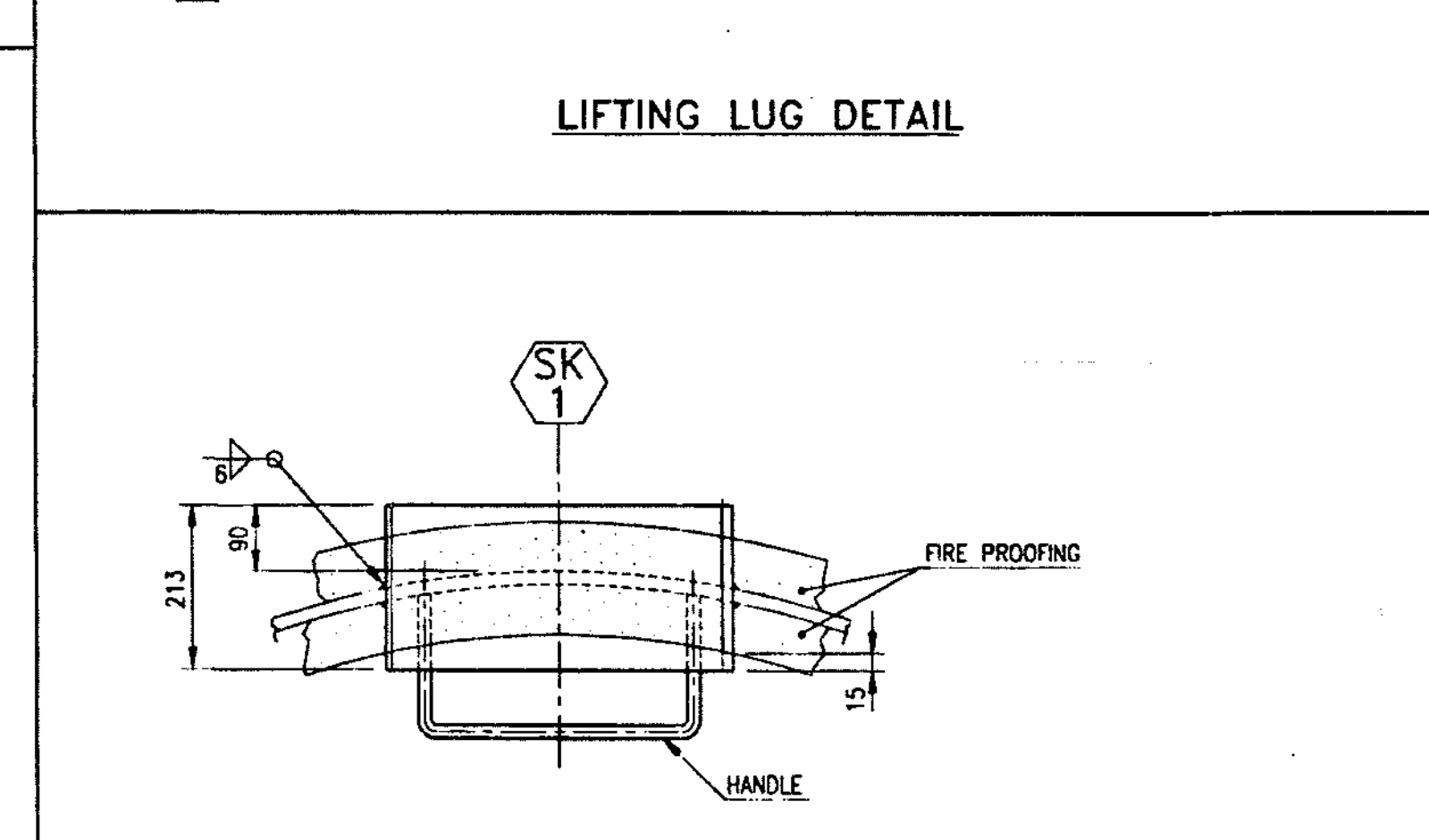
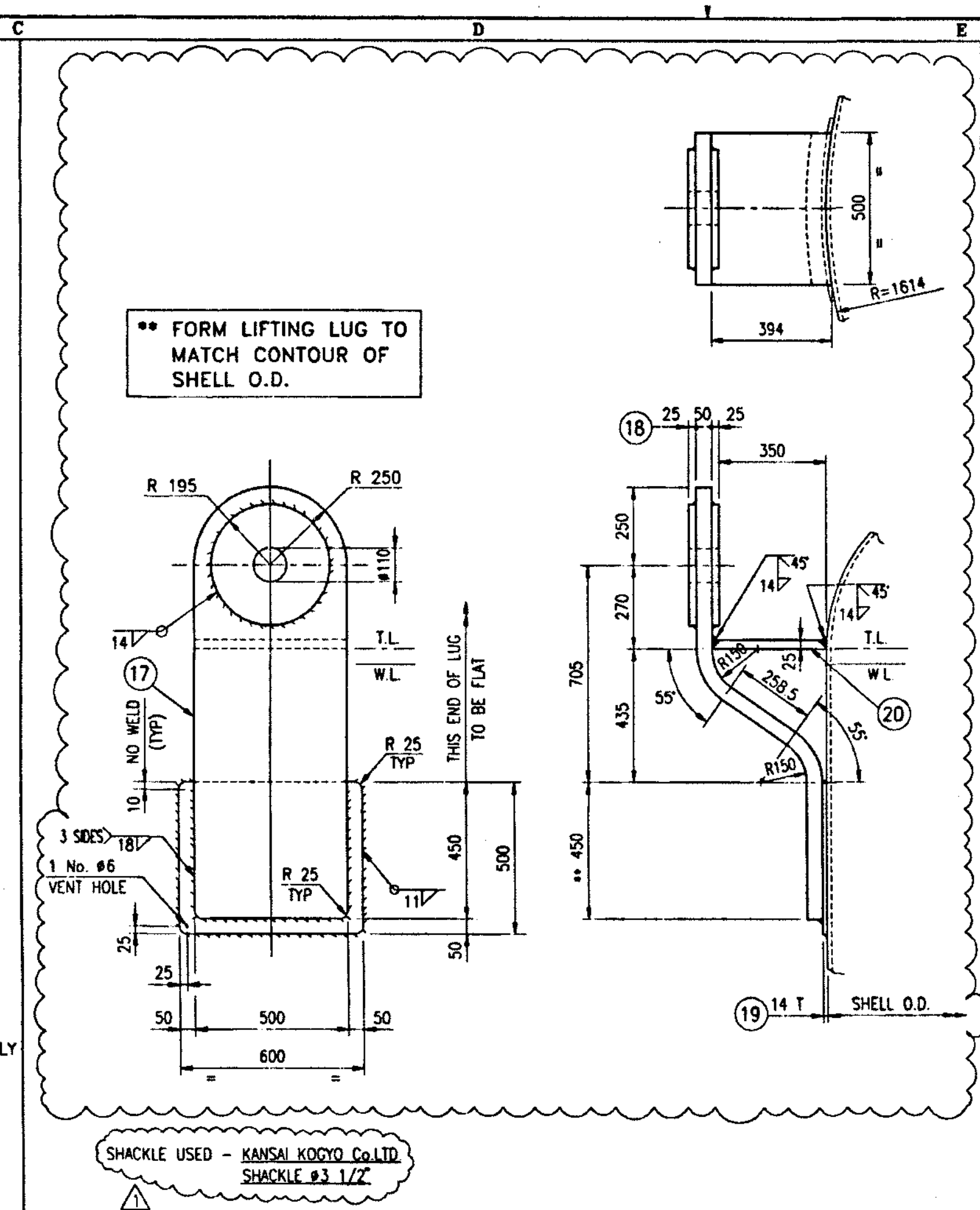
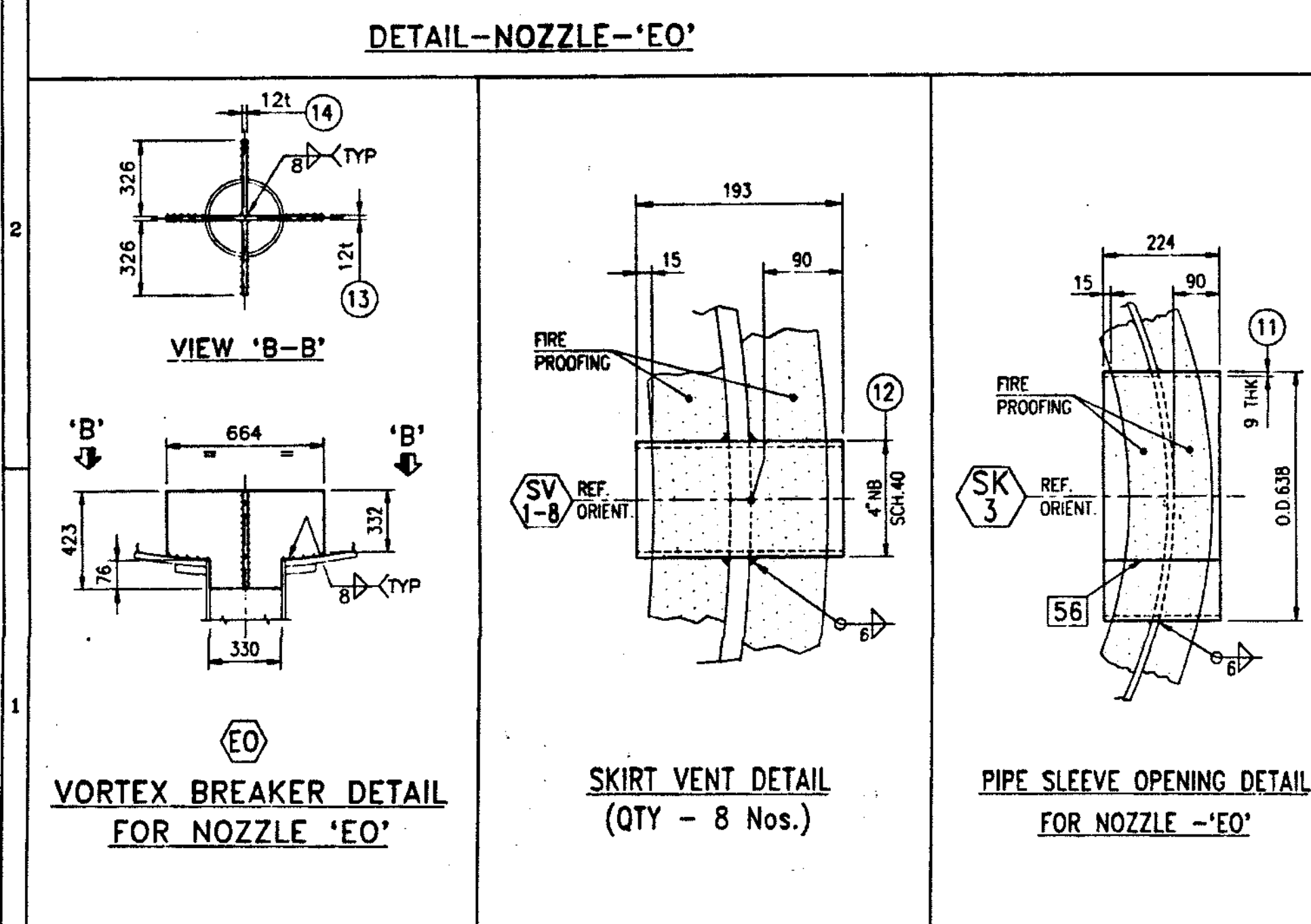
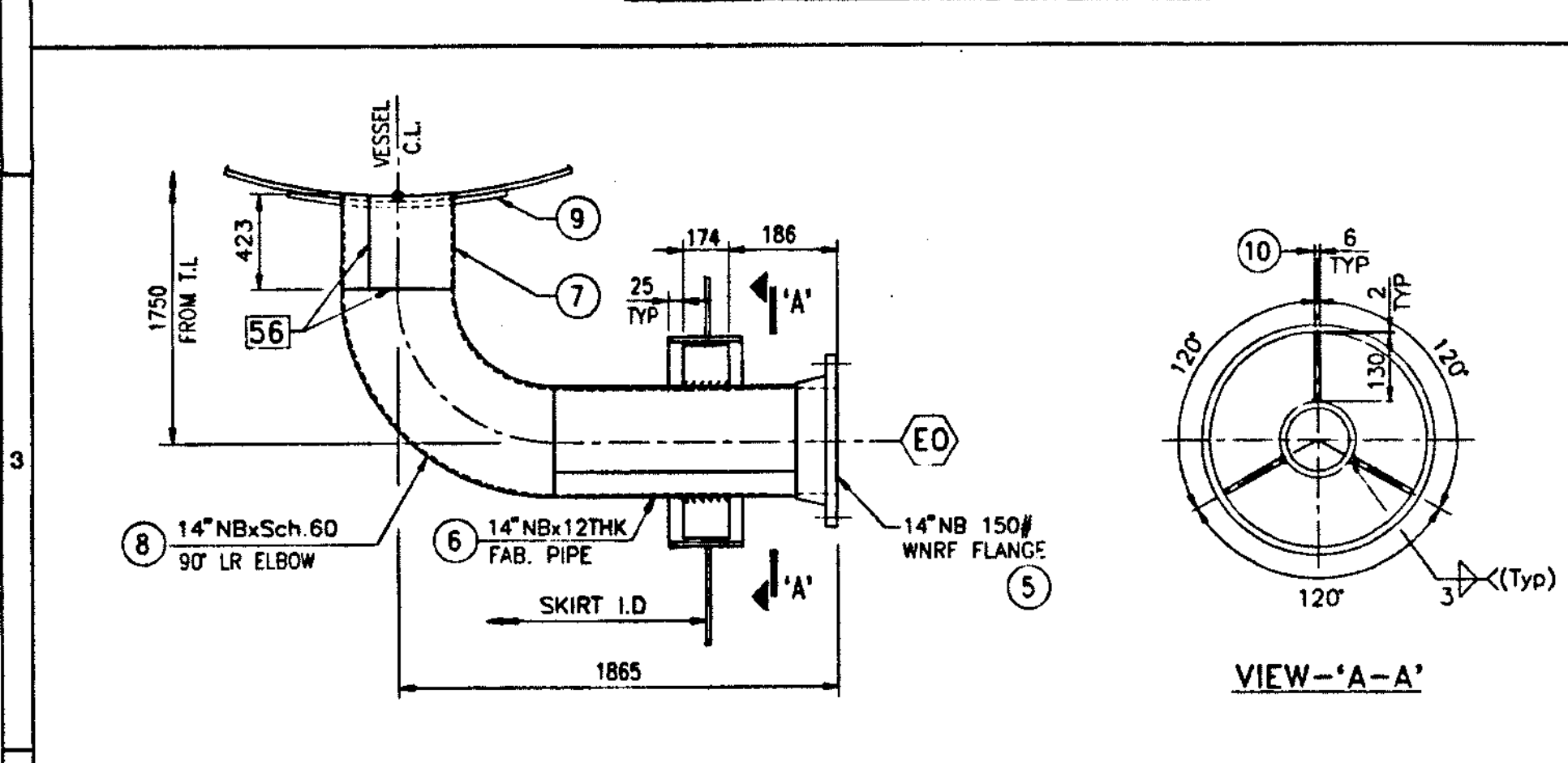
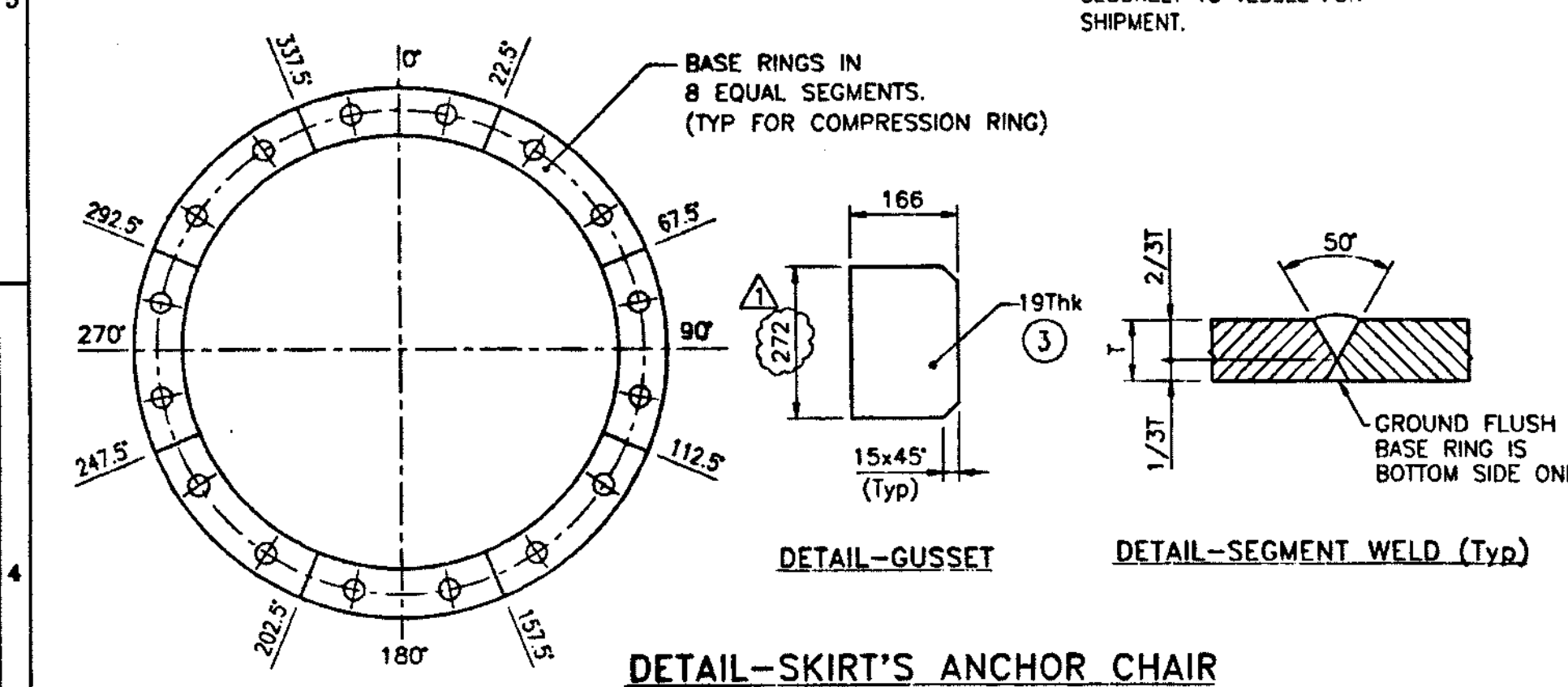
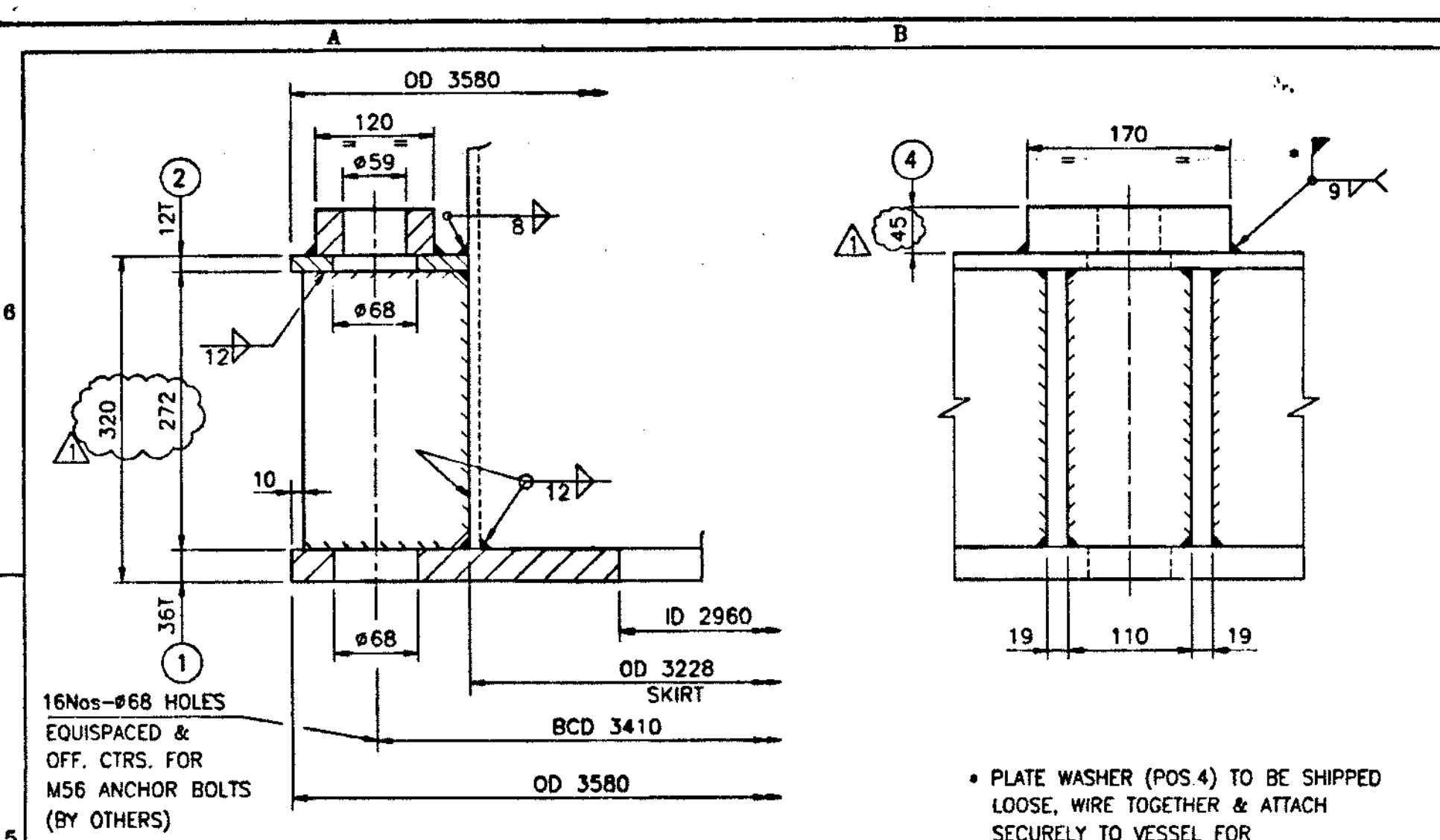
| FAM. | ITEM NO. | DESCRIPTION | LENGTH | WIDTH | THICK. | WT. FOR ONE FAM. | WT. IN KG. | MAT'L | MAT'L CODE | RDA: NO. |
|------|----------|--------------------|--------|-------|--------|------------------|------------|------------------|-------------|------------|
| | 42 | HANDLE-#19 | 255 | 0 | 0.0 | 0.4 | 0.8 | AS6 | 7033A20P01 | 703300-020 |
| | 41 | HANDLE-#19 | 816 | 0 | 0.0 | 1.8 | 1.8 | AS6 | 7033A20P01 | 703300-020 |
| | 40 | HANDLE-#19 | 686 | 0 | 0.0 | 1.5 | 1.5 | AS6 | 7033A20P01 | 703300-020 |
| | 39 | ROD-#19 | 982 | 0 | 0.0 | 2.3 | 50.6 | AS6 | 7033A20P01 | 703300-020 |
| | 38 | ROD-#19 | 832 | 0 | 0.0 | 1.9 | 20.9 | AS6 | 7033A20P01 | 703300-020 |
| | 37 | PI 4" (HALF PIPE) | 10884 | 100 | 0.0 | 6.5 | 6.5 | A106GRB | 7033A06T19 | 703300-001 |
| | 36 | TOP PLATE | 400 | 0 | 0.0 | 85.2 | 937.2 | A283GR.C | 7033A01L157 | 703300-001 |
| | 35 | RING 3448/3228/10T | 0 | 0 | 0.0 | 996.6 | AS16GR.70 | | 7033A01L28 | 703300-001 |
| | 34 | EARTHING LUG | 145 | 38 | 12.0 | 0.5 | 1.0 | SS304 | 2077A16L01 | STOCK |
| | 33 | RIVET #3 | 20 | 0 | 0.0 | 2.0 | 16.0 | COPPER | 7033A21B01 | 703300-021 |
| | 32 | ASME NAME PL. | 220 | 120 | 5.0 | 0.6 | SS304 | 000100050122 | STOCK | |
| | 31 | BELLELI NAME PL. | 160 | 100 | 5.0 | 0.4 | SS304 | 000100050122 | STOCK | |
| | 30 | NAME PL. BRACKET | 438 | 270 | 6.0 | 5.6 | SA16GR.70 | LP060A5172500800 | STOCK | |
| | 29 | RP 00970/518/14T | 0 | 0 | 0.0 | 58.0 | 58.0 | SA16GR.70 | 7033A01L12 | 703300-001 |
| | 28 | F 2" -150/WNRF | 0 | 0 | 0.0 | 77.1 | SA105 | | 7033A04F16 | 703300-004 |
| | 27 | NOZZ. NECK- DI | 1558 | 141 | 12.0 | 20.7 | SA16GR.70 | 7033A01L04 | 703300-001 | |
| | 26 | F 2" -150/WNRF | 165 | 0 | 0.0 | 25.0 | SA105 | | 7033A04F01 | 703300-004 |
| | 25 | PI Z-160 | 102 | 0 | 0.0 | 1.1 | 2.3 | SA106GR.B | 7033A06T01 | 703300-006 |
| | 24 | RP 00150/70/14T | 0 | 0 | 0.0 | 1.5 | 4.5 | SA16GR.70 | 7033A01L12 | 703300-001 |
| | 23 | F 2" -150/WNRF | 0 | 0 | 0.0 | 2.7 | 8.2 | SA105 | 7033A04F03 | 703300-004 |
| | 22 | PI Z-160 | 102 | 0 | 0.0 | 1.1 | 1.1 | SA106GR.B | 7033A06T01 | 703300-006 |
| | 21 | DELETED | 0 | 0 | 0.0 | 0.0 | | | | |
| | 20 | F 2" -150/WNRF | 0 | 0 | 0.0 | 2.7 | 2.7 | SA105 | 7033A04F03 | 703300-004 |
| | 19 | PI Z-160 | 134 | 0 | 0.0 | 1.5 | 1.5 | SA106GR.B | 7033A06T01 | 703300-006 |
| | 18 | RP 00870/467/18T | 0 | 0 | 0.0 | 53.2 | 53.2 | SA16GR.70 | 7033A01L16 | 703300-001 |
| | 17 | F 18" -150/WNRF | 0 | 0 | 0.0 | 63.6 | 63.6 | SA105 | 7033A04F15 | 703300-004 |
| | 16 | NOZZ. NECK- AO | 1398 | 496 | 12.0 | 65.4 | 65.4 | SA16GR.70 | 7033A01L04 | 703300-001 |
| | 15 | RP 001150/620/14T | 0 | 0 | 0.0 | 81.0 | 243.0 | SA16GR.70 | 7033A01L12 | 703300-001 |
| | 14 | NOZZ. NECK- CM/DLM | 1879 | 192 | 12.0 | 34.0 | 102.0 | SA16GR.70 | 7033A01L04 | 703300-001 |
| | 13 | ST+2HT 1/4" BUN | 178 | 0 | 0.0 | 1.7 | 122.4 | | 7033A11B02 | 703300-011 |
| | 12 | OK 24"-150 RF | 0 | 0 | 0.0 | 0.0 | 0.0 | | 7033A12004 | 703300-012 |
| | 11 | RP 001150/620/16T | 0 | 0 | 0.0 | 92.5 | 92.5 | SA16GR.70 | 7033A01L16 | 703300-001 |
| | 10 | BF 24"-150 RF | 0 | 0 | 0.0 | 187.0 | 561.0 | SA105 | 7033A04F21 | 703300-004 |
| | 9 | F 24"-150/WNRF | 0 | 0 | 0.0 | 118.0 | 472.0 | SA105 | 7033A04F17 | 703300-004 |
| | 8 | NOZZ. NECK- AM | 1879 | 160 | 12.0 | 63.7 | 63.7 | SA16GR.70 | 7033A01L04 | 703300-001 |
| | 7 | SKIRT ERL-C | 10103 | 1045 | 12.0 | 994.5 | 994.5 | AS6 | 7033A01L58 | 703300-001 |
| | 6 | SKIRT ERL-B&D | 10103 | 3000 | 12.0 | 2855.0 | 5710.0 | AS6 | 7033A01L58 | 703300-001 |
| | 5 | SKIRT ERL-A | 10103 | 500 | 12.0 | 475.9 | 475.9 | SA16GR.70 | 7033A01L04 | 703300-001 |
| | 4 | EH 103200X15(NOM) | 0 | 0 | 0.0 | 1356.4 | 2672.8 | SA16GR.70 | 7033A01L16 | 703300-001 |
| | 3 | SHELL ERL-STO11 | 10097 | 3000 | 14.0 | 3329.0 | 29961.0 | SA16GR.70 | 7033A01L05 | 703300-001 |
| | 2 | SHELL ERL-2 | 10097 | 3050 | 14.0 | 3384.5 | 3384.5 | SA16GR.70 | 7033A01L10 | 703300-001 |
| | 1 | SHELL ERL-1 | 10097 | 2000 | 14.0 | 2219.3 | 2219.3 | SA16GR.70 | 7033A01L12 | 703300-001 |

| REV. | DATE | DESCRIPTION | DRAWN | CHK'D | APP'D |
|------|----------|---|------------------------|-------|----------|
| 2 | 11.02.96 | REVISED AS PER CLIENT'S COMMENTS AND MARKED AS | RUP | | BANERJEE |
| 1 | 6.10.96 | DRAWING GENERALLY REVISED AND ISSUED FOR CONSTRUCTION | RUP | | BANERJEE |
| 0 | 26.06.96 | ISSUED FOR APPROVAL & INTERNAL COMMENTS | YSURESH JIVENKAT/KUMAR | | BANERJEE |

BELLELI SAUDI **بيليلي السعودية**
HEAVY INDUSTRIES LTD.
AL- JUBAIL, KINGDOM OF SAUDI ARABIA.

ARABIAN INDUSTRIAL FIBRES COMPANY (IBN RUSHD.)
PTA & AROMATICS PROJECT - AROMATICS
FINISHING COLUMN (53-C-03)
GENERAL ASSEMBLY

DA-7033-01-001 2



BELELI SAUDI HEAVY INDUSTRIES LTD.

AS BUILT

CERTIFIED BY:

TOTAL WT. = (3105.6 Kgs.)

| ITEM | POS. | DESCRIPTION | LENGTH | WIDTH | THICK. | WT. IN Kg. | MAT'L | MAT'L CODE | RDA NO. |
|-------|------|---------------------|--------|-------|--------|------------|-------|---------------|------------|
| 26 | 1 | SUPPORT | 400 | 130 | 36.0 | 14.7 | A36 | 703300166 | 703300-001 |
| 25 | 1 | BEAM - HEA300 | 3204 | 0 | 0.0 | 282.9 | A36 | 703300163 | 703300-001 |
| 24 | 1 | STIFFENER (SEE DWG) | 100 | 100 | 20.0 | 1.6 | A36 | 703300163 | 703300-001 |
| 23 | 1 | STIFFENER (SEE DWG) | 222 | 179 | 20.0 | 6.2 | A36 | 703300163 | 703300-001 |
| 22 | 2 | RING (O.D.20/D.10) | 0 | 0 | 25.0 | 5.6 | A36 | 703300164 | 703300-001 |
| 21 | 1 | TAILING LUG | 476 | 50 | 25.0 | 7.4 | A36 | 703300168 | 703300-001 |
| 20 | 2 | STIFF PLATE | 500 | 394 | 25.0 | 18.7 | A36 | 703300152 | 703300-001 |
| 19 | 2 | LIFTING LUG PAD | 600 | 500 | 14.0 | 33.0 | A36 | 703300112 | 703300-001 |
| 18 | 4 | WASHER (390/118/25) | 0 | 0 | 0.0 | 21.6 | A36 | 703300164 | 703300-001 |
| 17 | 2 | LIFTING LUG | 1565 | 500 | 50.0 | 307.1 | A36 | 703300168 | 703300-001 |
| 16 | 2 | HANDLE #19 | 816 | 0 | 0.0 | 1.8 | A36 | 703300201 | 703300-020 |
| 15 | 1 | ACCESS OPENING | 2207 | 213 | 9.0 | 33.2 | A36 | 6295050709906 | STOCK |
| 14 | 2 | PLATE | 423 | 328 | 12.0 | 13.0 | A36 | 703300104 | 703300-001 |
| 13 | 1 | PLATE | 664 | 423 | 12.0 | 26.5 | A36 | 703300104 | 703300-001 |
| 12 | 8 | PI 4" - 40 | 193 | 0 | 0.0 | 3.0 | A36 | 703300061 | 703300-006 |
| 11 | 1 | PIPE WAY OPENING | 1976 | 224 | 9.0 | 31.3 | A36 | 6295050709906 | STOCK |
| 10 | 3 | STIFFENER | 174 | 130 | 6.0 | 1.1 | A36 | 703300104 | 703300-001 |
| 9 | 1 | RP 660/566/167-EO | 0 | 0 | 0.0 | 32.4 | A36 | 703300116 | 703300-001 |
| 8 | 1 | E 14" - 60 90LR-EO | 0 | 0 | 0.0 | 71.6 | A36 | 703300904 | 703300-009 |
| 7 | 1 | NOZZLE NECK-EO | 1080 | 423 | 12.0 | 43.1 | A36 | 703300104 | 703300-001 |
| 6 | 1 | NOZZLE NECK-EO | 1080 | 1206 | 12.0 | 122.7 | A36 | 703300104 | 703300-001 |
| 5 | 1 | F 14"150# WNRF-12 | 0 | 0 | 0.0 | 46.3 | A105 | 703300413 | 703300-004 |
| 4 | 16 | PLATE WASHER | 170 | 120 | 45.0 | 7.2 | A36 | 703300157 | 703300-001 |
| 3 | 32 | GUSSET | 272 | 166 | 19.0 | 6.7 | A36 | 703300162 | 703300-001 |
| 2 | 1 | RING 3580/3228/127 | 0 | 0 | 0.0 | 177.2 | A36 | 703300158 | 703300-001 |
| 01-02 | 1 | RING 3580/2960/367 | 0 | 0 | 0.0 | 89.5 | A36 | 703300166 | 703300-001 |

LIST OF MATERIAL

CHIYODA

JOB NO. 51046 (IBN RUSHD AROMATICS PROJECT)

PO NO. SAY-POPO002

REV. NO. MR-50-C-003

IDENT NO. 53-C-03-DW-002

DATE: 14th Nov 2011

REVISIONS

| REV. | DATE | DESCRIPTION | DRAWN | CHK'D | APP'D |
|------|----------|--|----------------|--------------------|-------|
| 1 | 10.02.97 | REVISED AS PER CLIENT'S COMMENTS AND ISSUED FOR CONSTRUCTION | V SURESH KUMAR | J VIKRAM BANSERJEE | |
| 0 | 08.10.96 | ISSUED FOR APPROVAL | V SURESH KUMAR | J VIKRAM BANSERJEE | |

SCALE: 1 : 30

CLIENT: CHIYODA/IBN RUSHD.

ORDER: SAY-POPO002

APPROVED FOR CONSTRUCTION BY: A.K.BANERJEE

DATE: 15/11/2011

BELELI SAUDI HEAVY INDUSTRIES LTD.

AL- JUBAIL, KINGDOM OF SAUDI ARABIA

ARABIAN INDUSTRIAL FIBRES COMPANY (IBN RUSHD.)

PTA & AROMATICS PROJECT - AROMATICS

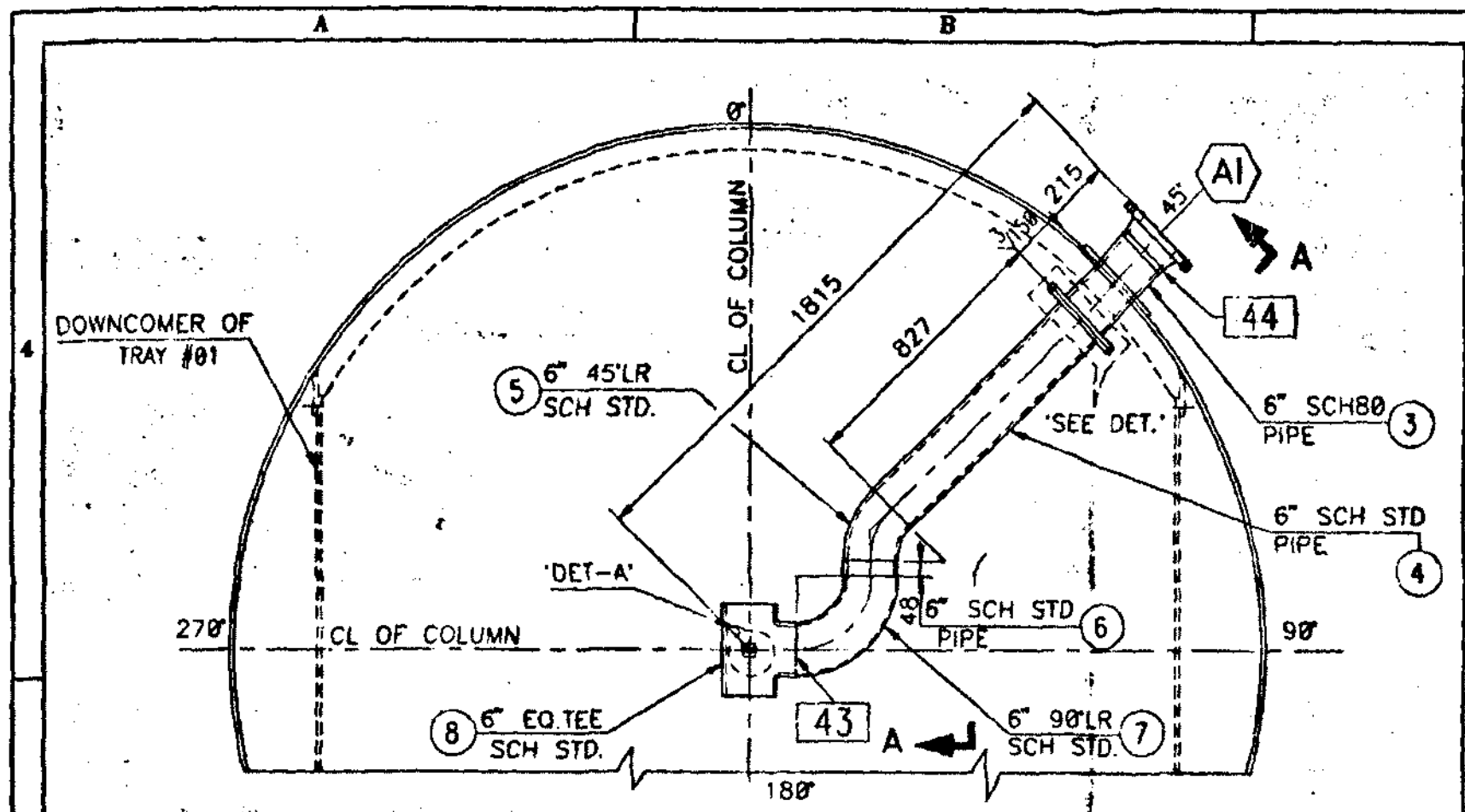
FINISHING COLUMN (53-C-03)

DETAIL DRAWING

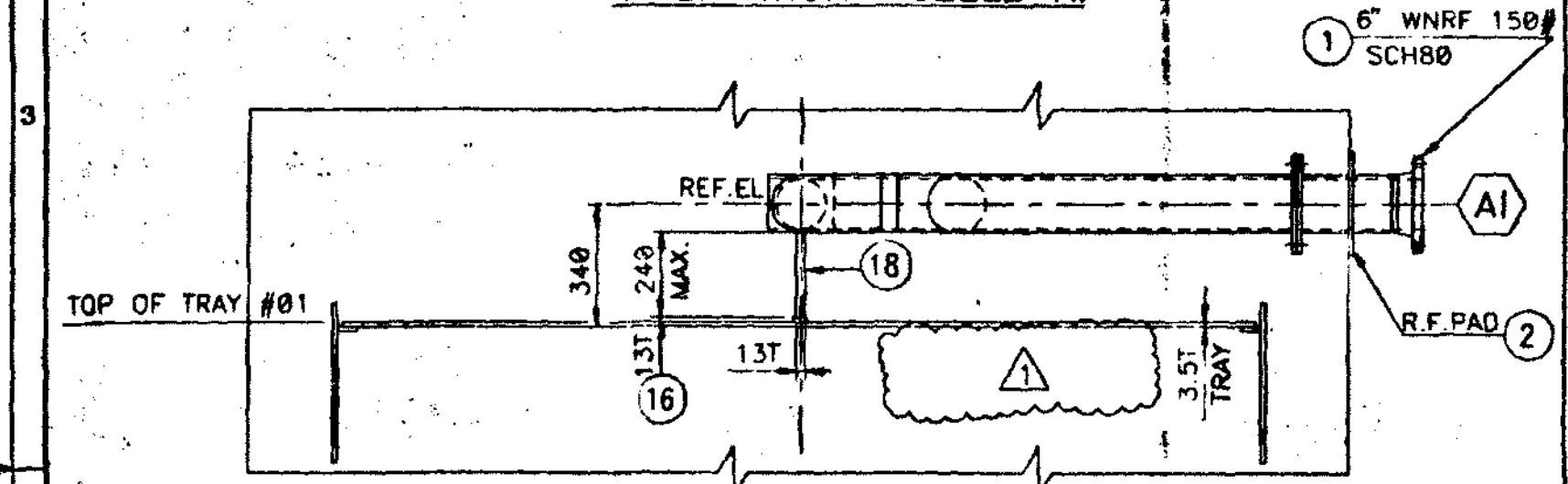
THIS DRAWING IS NOT TO BE REPRODUCED IN WHOLE OR PART NOR EMPLOYED FOR ANY PURPOSE OTHER THAN SPECIFICALLY PERMITTED IN WRITING BY BELLELI SAUDI HEAVY IND LTD.

DRAWING NO. DA-7033-01-002

REV. 1

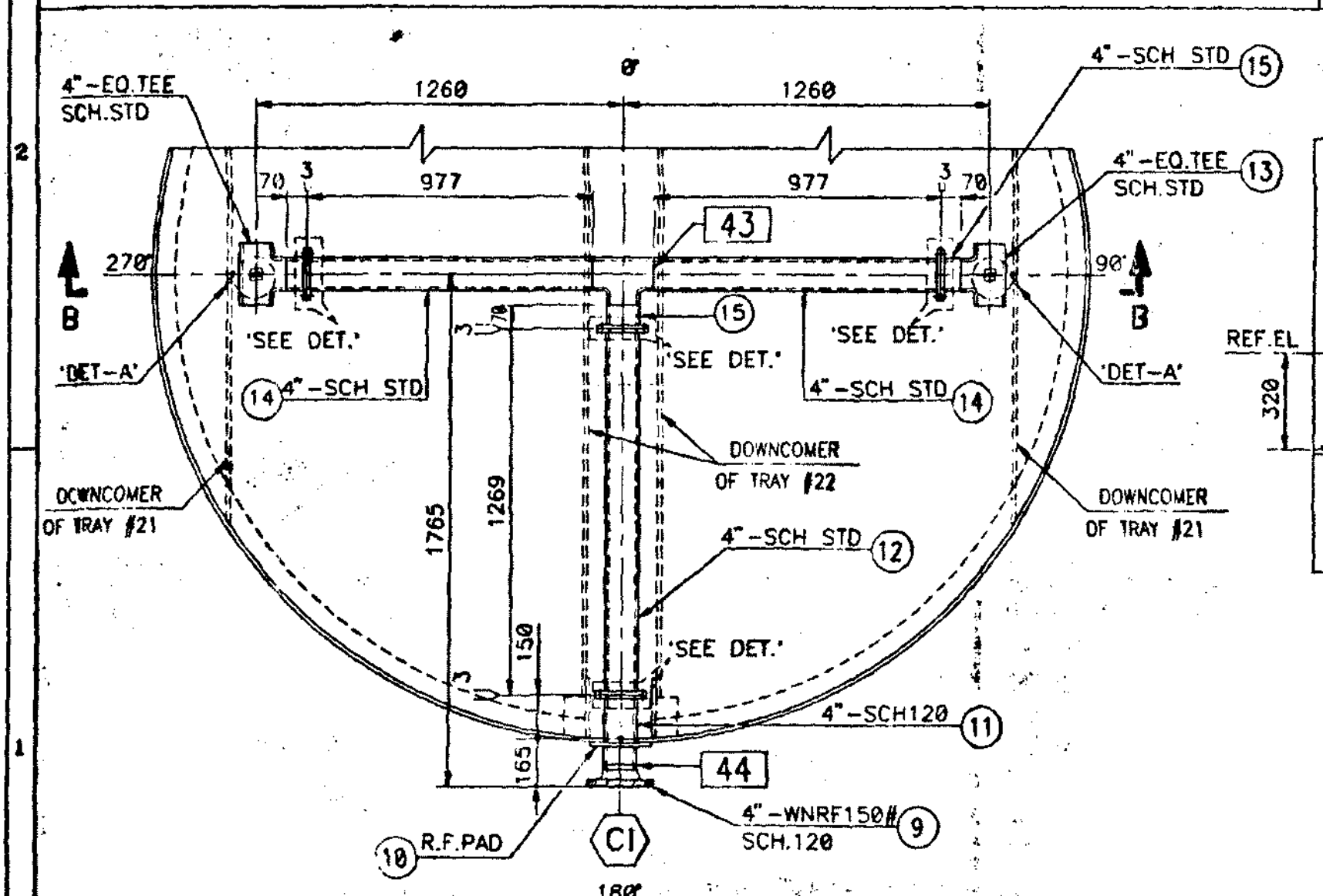


ORIENTATION-NOZZLE-AI



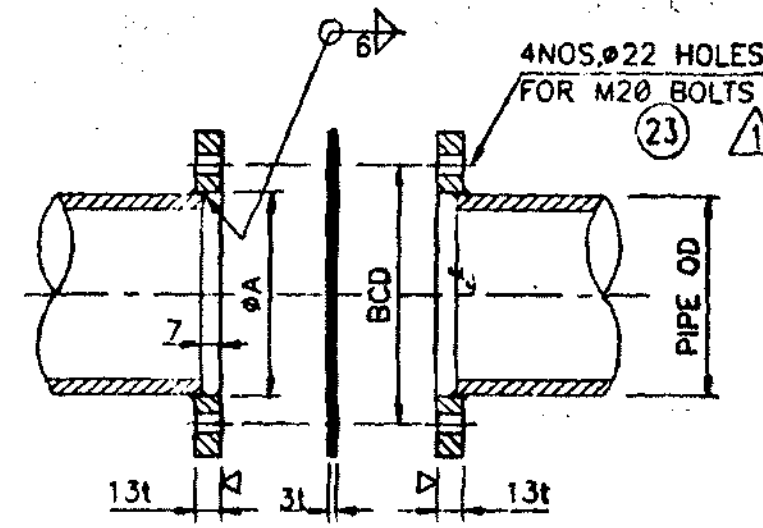
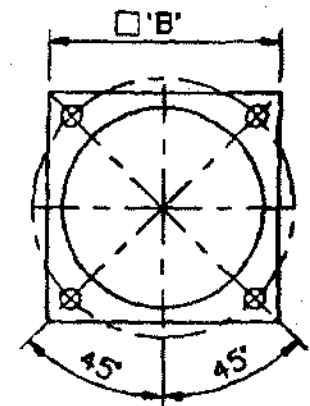
SECTION-A-A

INTERNAL DETAIL - NOZZLE-AI



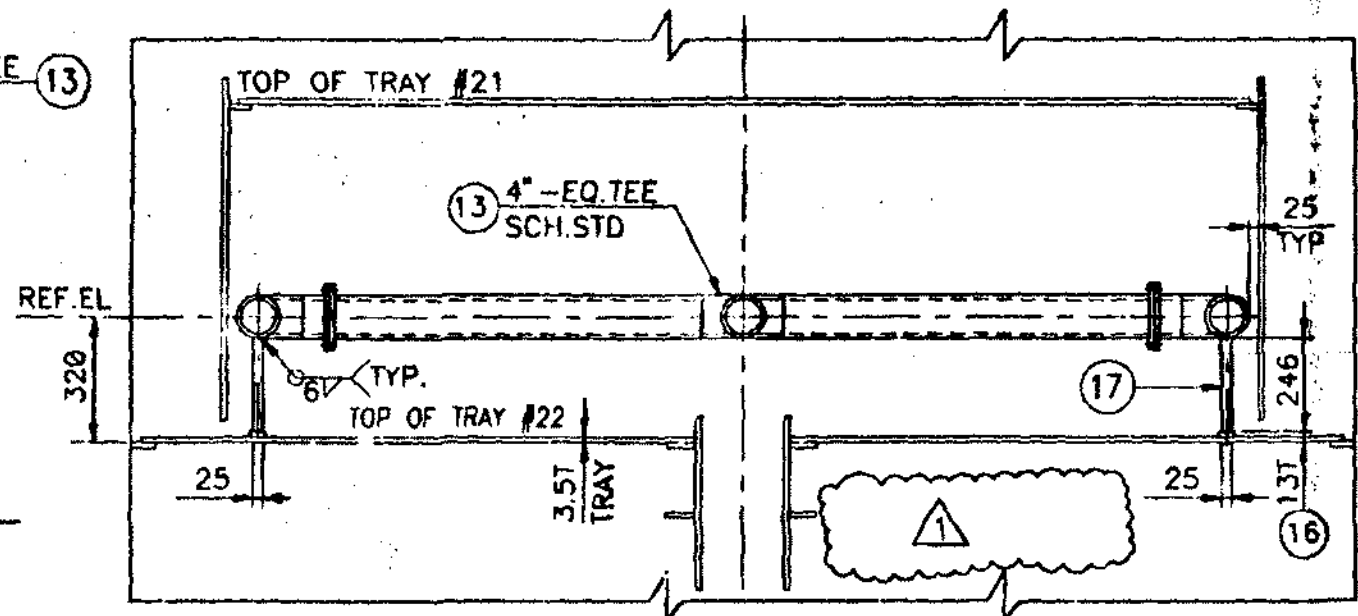
ORIENTATION-NOZZLE

INTERNAL DETAIL - NOZZLE-CI

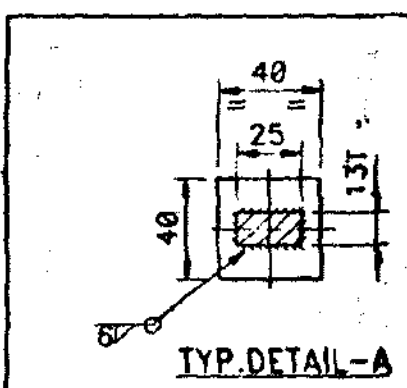


| NOZ. MARK | øA | □'B' | BCD | POS. No. |
|-----------|-----|------|-----|-----------|
| AI | 170 | 215 | 233 | (19) (20) |
| CI | 116 | 177 | 179 | (21) (22) |

DETAIL - PLATE FLANGE



SECTION-B-B



TYP. DETAIL-A

TOTAL WT. = 197.6 Kgs.

| ITEM NO. | QTY FOR ONE FAM. | DESCRIPTION | LENGTH | WIDTH | THICK | WT. IN Kg. For ONE POS. | For ONE FAM. | MAT'L | MAT'L CODE | RD. NO. |
|----------|------------------|---------------------|--------|-------|-------|-------------------------|--------------|---------------|------------|------------|
| 23 | 20 | B+INT M20 | 60 | 0 | 0.1 | 2.0 | 40.0 | SA193B/SA194Z | 005020000 | STOCK |
| 22 | 4 | GK (SEE DWG)-CI | 0 | 0 | 3.0 | 0.0 | 0.0 | GRAFOI | | |
| 21 | 8 | PLATE FLG.-CI | 177 | 177 | 16.0 | 2.0 | 16.0 | SA516G70 | 703300116 | 703300-001 |
| 20 | 1 | GK (SEE DWG)-AI | 0 | 0 | 3.0 | 0.0 | 0.0 | GRAFOI | | |
| 19 | 2 | PLATE FLG.-AI | 215 | 215 | 16.0 | 2.3 | 4.6 | SA516G70 | 703300116 | 703300-001 |
| 18 | 1 | SUPPORT BAR | 240 | 25 | 13.0 | 0.6 | 0.6 | SA516G70 | 703300106 | 703300-001 |
| 17 | 2 | SUPPORT BAR | 246 | 25 | 13.0 | 0.6 | 1.2 | SA516G70 | 703300106 | 703300-001 |
| 16 | 3 | WEAR PLATE | 40 | 40 | 13.0 | 0.2 | 0.6 | SA516G70 | 703300106 | 703300-001 |
| 15 | 3 | PI 4" STD-CI | 63 | 0 | 0.0 | 1.0 | 3.0 | SA106G8 | 6355406703 | STOCK |
| 14 | 2 | PI 4" STD-CI | 970 | 0 | 0.0 | 16.0 | 32.0 | SA106G8 | 6355406703 | STOCK |
| 13 | 3 | 4" EQ.TEE STD-CI | 0 | 0 | 0.0 | 6.0 | 18.0 | SA234WPB | 7033409C08 | 703300-009 |
| 12 | 1 | PI 4" STD-CI | 1255 | 0 | 0.0 | 20.2 | 20.2 | SA106G8 | 6355406703 | STOCK |
| 11 | 1 | PI 4" 120-CI | 232 | 0 | 0.0 | 2.2 | 2.2 | SA106G8 | 7033406703 | 703300-006 |
| 10 | 1 | RP 210/124/14T | 0 | 0 | 0.0 | 2.5 | 2.5 | SA516G70N | 703340112 | 703300-001 |
| 9 | 1 | F-4 WNR F150/120-CI | 0 | 0 | 0.0 | 10.0 | 10.0 | SA195 | 7033404787 | 703300-004 |
| 8 | 1 | 6" EQ.TEE STD-AI | 0 | 0 | 0.0 | 15.0 | 15.0 | SA234WPB | 7033409C09 | 703300-009 |
| 7 | 1 | E 6" 90°LR STD-AI | 0 | 0 | 0.0 | 11.0 | 11.0 | SA234WPB | 7033409C06 | 703300-009 |
| 6 | 1 | PI 6" STD-AI | 48 | 0 | 0.0 | 2.0 | 2.0 | SA106G8 | | |
| 5 | 1 | E 6" 45°LR STD-AI | 0 | 0 | 0.0 | 5.0 | 5.0 | SA234WPB | | |
| 4 | 1 | PI 6" STD-AI | 820 | 0 | 0.0 | 23.2 | 23.2 | SA106G8 | | |
| 3 | 1 | PI 6" 80-AI | 269 | 0 | 0.0 | 11.4 | 11.4 | SA106G8 | 7033406705 | 703300-006 |
| 2 | 1 | RP 300/178/14T | 0 | 0 | 0.0 | 5.0 | 5.0 | SA516G70N | 703340112 | 703300-001 |
| 01-04 | 1 | F-6 WNR F150/80-AI | 0 | 0 | 0.0 | 10.0 | 10.0 | SA105 | 7033404708 | 703300-004 |

LIST OF MATERIAL

AS BUILT

CHIYODA PETROSTAR LTD.
 JOB NO. 54001 IBN RUSHD AROMATICS PROJECT
 PO NO. SAY-POP0002
 REQ NO. MR-50-C-003
 IDENT NO. 53C03-DW-0004
 DATE: 11/19/97
 PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM HIS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER.

| REV. | DATE | DESCRIPTION | DRAWN | CHK'D | APP'L |
|------|---------|---|---------|---------------|-------|
| 1 | 7.3.97 | REVISED AS PER CLIENTS COMMENTS & ISSUED FOR CONSTRUCTION | Rama ra | YAKESH HAIDER | AKB |
| 0 | 11.2.97 | ISSUED FOR APPROVAL. | Rama ra | YAKESH HAIDER | AKB |

SCALE: 1 : 30
 CLIENT: CHYODA/IBN RUSHD.
 ORDER: SAY-POP0002
 APPROVED FOR CONSTRUCTION BY: AKB
 DATE: 11/19/97

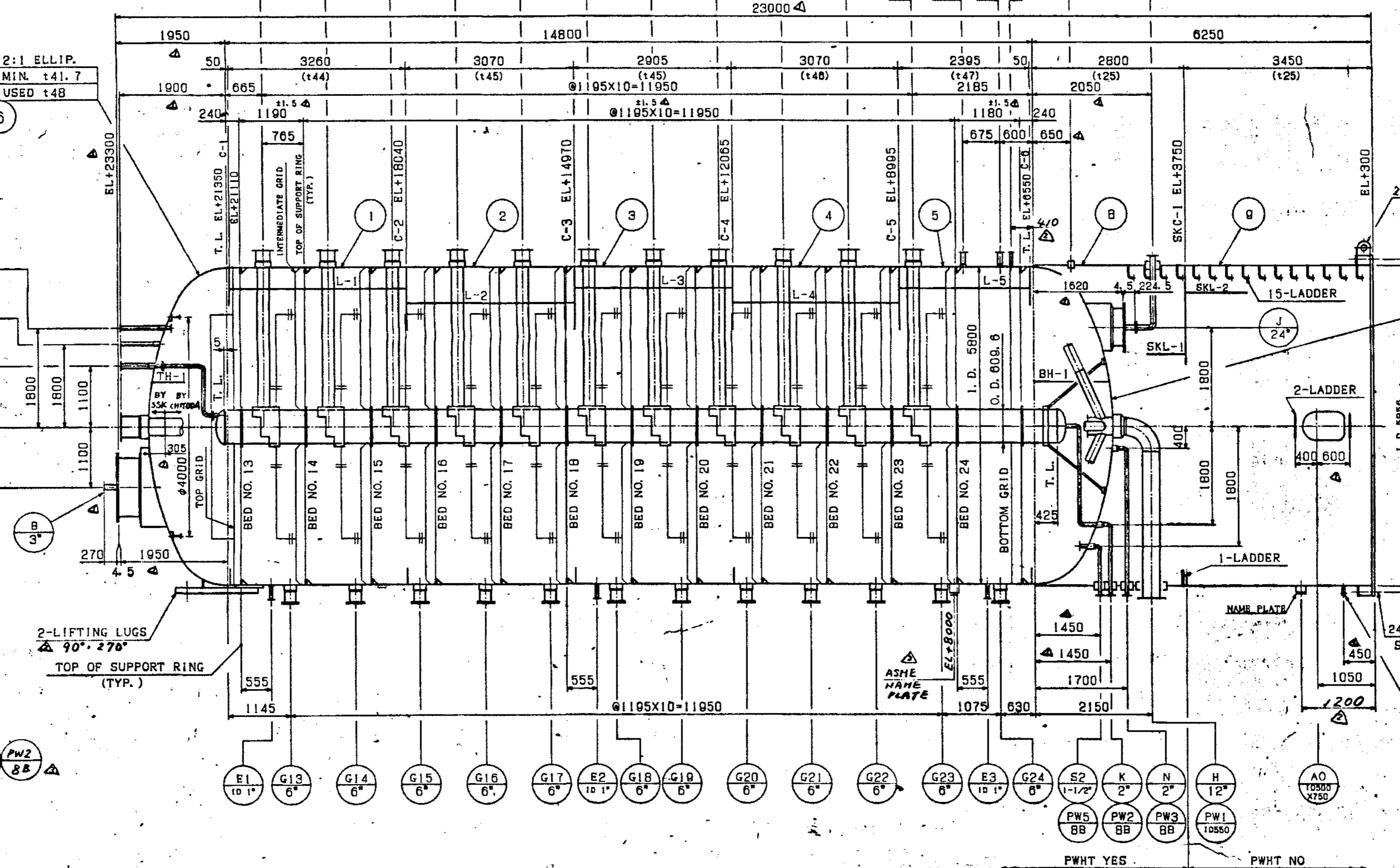
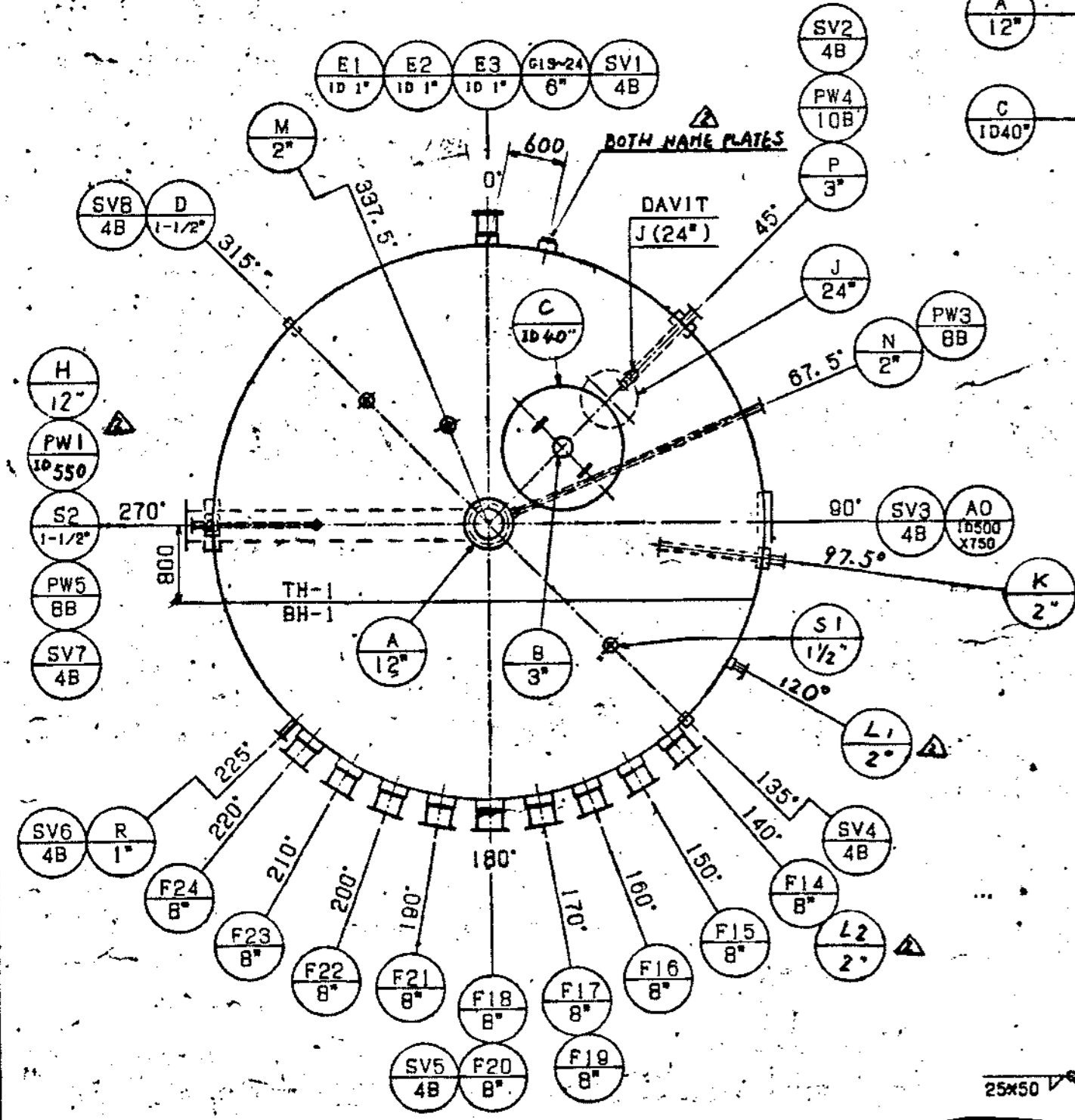
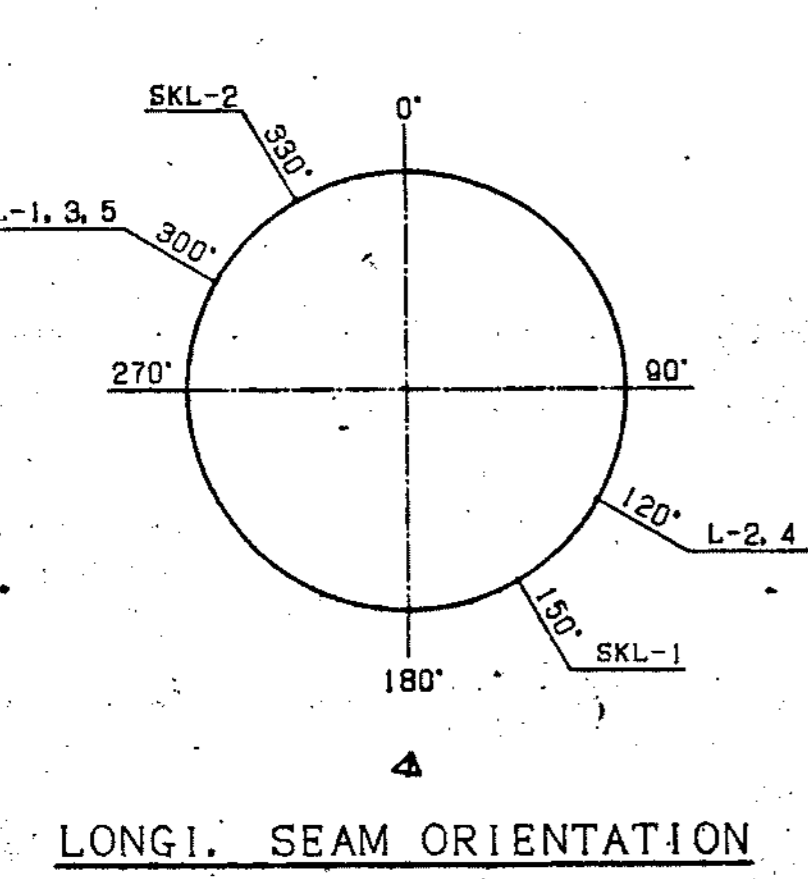
BELLELI SAUDI **بياللياب السعودية**
 HEAVY INDUSTRIES LTD. **للمصنعات الثقيلة المحدودة**
 AL- JUBAIL, KINGDOM OF SAUDI ARABIA. **الجبيل**
 ARABIAN INDUSTRIAL FIBRES COMPANY (IBN RUSHD.)
 PTA & AROMATICS PROJECT-AROMATICS
 FINISHING COLUMN (53-C-03)

| DETAIL OF INTERNALS | DRAWING NO. | REV |
|---|----------------|-----|
| THIS DRAWING IS NOT TO BE REPRODUCED IN WHOLE OR PART NOR EMPLOYED FOR ANY PURPOSE OTHER THAN SPECIFICALLY PERMITTED IN WRITING BY BELLELI SAUDI HEAVY IND.LTD. | DA-7033-01-004 | 1 |

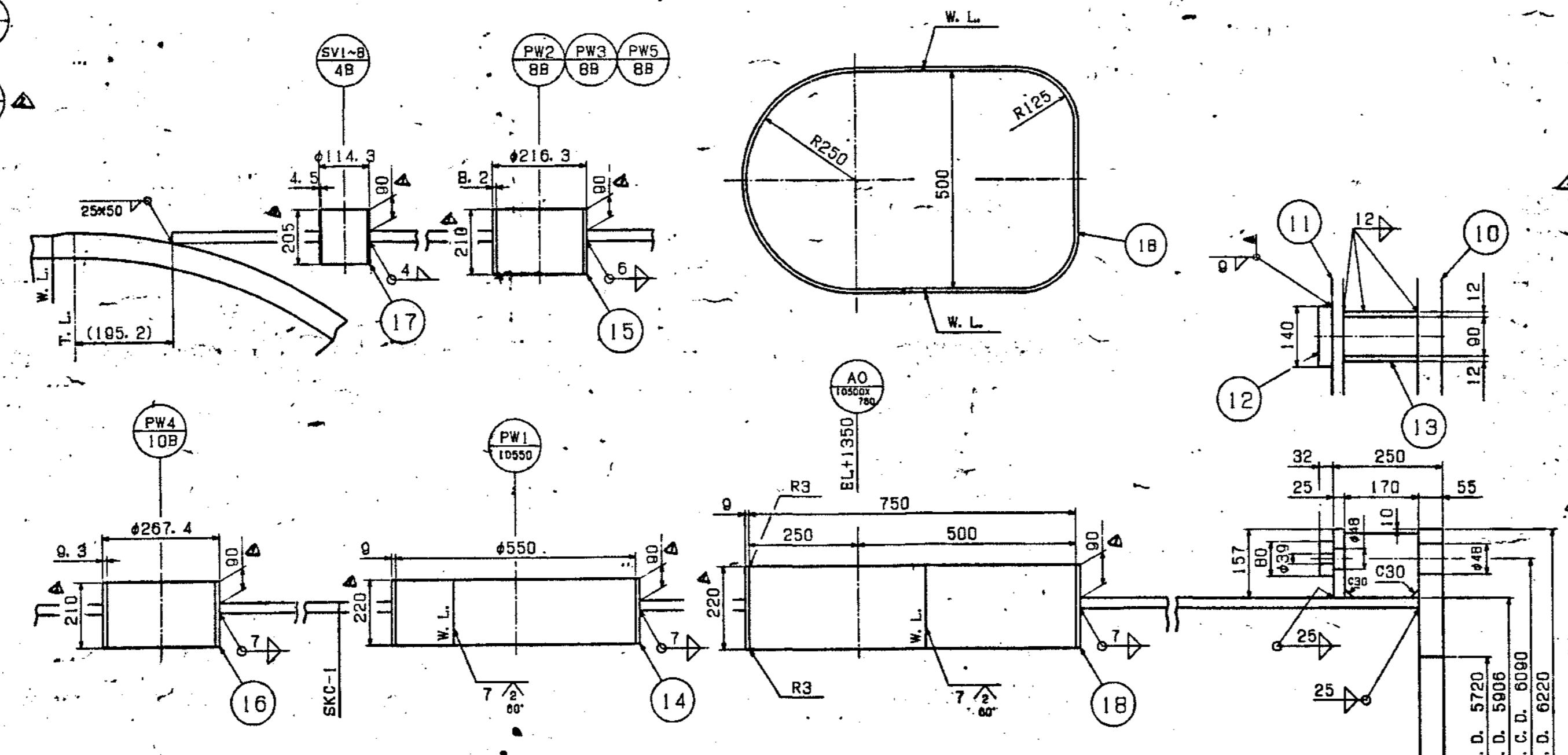
FILE NAME: 70330104

| REV NO. | DATE | BY | DESCRIPTION | D.S.M. APP'D | C.A.E. REV. BD |
|---------|-----------|------|--|--------------|----------------|
| A | AUG.21.96 | T.Y. | PURCHASER'S REQUEST FOR CONSTRUCTION | | As 22/96 |
| B | MAY.96 | T.Y. | REVISED 1/2" X 1/2" NOZZLE FITTING TO 1 1/2" X 1 1/2" E.E.G. | | As 22/96 |
| C | MAY.96 | T.Y. | REVISED 1/2" X 1/2" NOZZLE FITTING TO 1 1/2" X 1 1/2" E.E.G. | | As 22/96 |
| D | DEC.18.96 | T.Y. | REVISED BUILDING PROCESS OF E.P.C.-1 | | As 18/96 |
| E | FEB.5.97 | H.Y. | AS BUILT | | As 27/97 |

| 設計条件 DESIGN DATA | |
|-------------------------------|--|
| 製作標準 | ASME SECTION VIII DIV. 1-1995 (1995 EDITION) |
| ASME CODE STAMP | YES |
| FLUID | HYDROCARBON |
| NAME | 10-X (21X), M-X (54X), P-X (24X) |
| SPECIFIC GRAVITY | 0.850 |
| NORMAL LIQUID LEVEL | LIQUID FULL |
| (M. A. W. P.) DESIGN PRESS. | 14.8 (214.7PSI) / F. V. |
| 設計温度 DESIGN TEMP. | °C 204 (397°F) / 177 (351°F) |
| MIN. DESIGN METAL TEMPERATURE | °C 2 (35.6°F) |
| 操作温度 OPER. TEMP. | °C 177 (351°F) |
| 水圧試験圧力 HYDRO TEST PRESS. | 23.4 |
| 水圧試験温度 HYDRO TEST TEMP. | °C MIN.5 (41°F) |
| 真空試験圧力 VACUUM TEST PRESS. | - |
| 溶接方法 WELDING METHOD | POST WELD HEAT TREATMENT YES (PER DRAWING) |
| 放射線検査 RADIOGRAPH | FULL |
| 耐力余裕率 COR. ALLOWANCE | mm 3.0 (SKIRT 1.6) |
| 溶接継手 JOINT EFFICIENCY | 1.0 |
| 耐火性能 FIRE PROOF | mm 75 (BOTH SIDE) |
| 保温 INSULATION | mm 50 (HOT) |
| 容積 VOLUME | m³ 442.1 (15613FT³) |
| 吊上重量 LIFTING WEIGHT | Kg 188400 |
| TEST WEIGHT | Kg 924500 |
| 運転重量 OPERATING WEIGHT | Kg 894000 |
| CHARPY IMPACT TEST | NO [UCS-66 (a)] |
| 塗装 PAINTING | SYSTEM S2-S PER CHIYODA SPEC. SP-50-X-001 |



| MARKS | NAME | SIZE | THICK | NECC | F. RATING | REMARKS |
|---------|-------------------------|------------|-------|----------------|-----------|----------------------------|
| AO | ACCESS OPENING | 10500 X750 | 1 | 10 | - | - |
| SV1-SV8 | SKIRT VENT | 4B | 8 | 1.4.5 | - | - |
| PW5 | PIPEWAY | 8B | 1 | SCH40 | - | - |
| PW4 | PIPEWAY | 10B | 1 | SCH40 | - | - |
| PW3 | PIPEWAY | 8B | 1 | SCH40 | - | - |
| PW2 | PIPEWAY | 8B | 1 | SCH40 | - | - |
| PW1 | PIPEWAY | 10530 | 1 | 10 | - | - |
| S2 | FLUSH OUT | 1-1/2" | 1 | ANSI 300 RFLWN | 3130 | - |
| S1 | FLUSH OUT | 1-1/2" | 1 | ANSI 300 RFLWN | SEE DWG | - |
| R | SEAL ANGLE VENT | 1" | 1 | ANSI 300 RFLWN | 3100 | - |
| P | DRAIN/FLUSH IN | 3" | 1 | ANSI 300 RFLWN | 3130 | - |
| N | BOTTOM HEAD DRAIN | 2" | 1 | ANSI 300 RFLWN | 3130 | - |
| M | VENT (CENTERPIPE) | 2" | 1 | ANSI 300 RFLWN | SEE DWG | - |
| L1 | ADSORBENT SAMPLE | 2" | 2 | ANSI 300 RFLWN | 3100 | - |
| K | DRAIN/VENT (CENTERPIPE) | 2" | 1 | ANSI 300 RFLWN | 3130 | - |
| J | MANWAY | 24" | 1 | ANSI 300 RFLWN | SEE DWG | BLIND FL'G DAVIT |
| H | OUTLET | 12" | 1 | ANSI 300 RFLWN | 3180 | - |
| G13-G24 | DUMP | 6" | 12 | ANSI 300 RFLWN | 3150 | BLIND FL'G |
| F14-F24 | DISTRIBUTOR | 8" | 11 | ANSI 300 RFLWN | 3150 | - |
| E1-E3 | TI AND TR | 1D 1" | 3 | ANSI 300 RFLWN | 3100 | - |
| D | FLUSH IN | 1-1/2" | 1 | ANSI 300 RFLWN | SEE DWG | - |
| C | MANWAY | 10 40" | 1 | ANSI 300 RFLWN | SEE DWG | BLIND FL'G 916.47 SERIES B |
| B | VENT | 3" | 1 | ANSI 300 RFLWN | SEE DWG | - |
| A | INLET | 12" | 1 | ANSI 300 RFLWN | SEE DWG | - |



| TYPE | INSIDE | OUTSIDE |
|-----------------------|---------------|----------------|
| TYPE 1 C-1,2 | INSIDE : SAW | OUTSIDE : SAW |
| TYPE 2 L-1,2,3,4,5 | INSIDE : SAW | OUTSIDE : SAW |
| TYPE 3 C-4,5 | INSIDE : SAW | OUTSIDE : SAW |
| TYPE 4 C-6 | INSIDE : SAW | OUTSIDE : SAW |
| TYPE 5 SKC-1, SKL-1,2 | INSIDE : SAW | OUTSIDE : SAW |
| TYPE 6 TH-1, BH-1 | INSIDE : SMAW | OUTSIDE : SMAW |

| TITLE | DWG. NO. |
|--|---------------|
| DETAIL OF NOZZLE | BB1481-143-01 |
| MANHOLE DAVIT (J) | BB1481-143-02 |
| DETAIL OF CENTER PIPE | BB1481-144-01 |
| INTERNAL FITTING | BB1481-144-02 |
| EXTERNAL FITTING (1/2) | BB1481-145-01 |
| EXTERNAL FITTING (2/2) | BB1481-145-02 |
| LIFTING LUG | BB1481-145-04 |
| DETAIL OF PLATFORM & LADDER CLIP (1/2) | BB1481-145-05 |
| DETAIL OF PLATFORM & LADDER CLIP (2/2) | BB1481-145-06 |
| NAME PLATE | BB1481-001-80 |
| NAME PLATE (ASME CODE) | BB1481-001-85 |

ASME STAMP YES

CHUYODA
JOB NO. 51046 IBN RUSHD AROMATICS PROJECT
PO NO. SAYPOA0021
REQ NO. MR-50-D-007
IDENT NO. S3-D-02-DW 0001

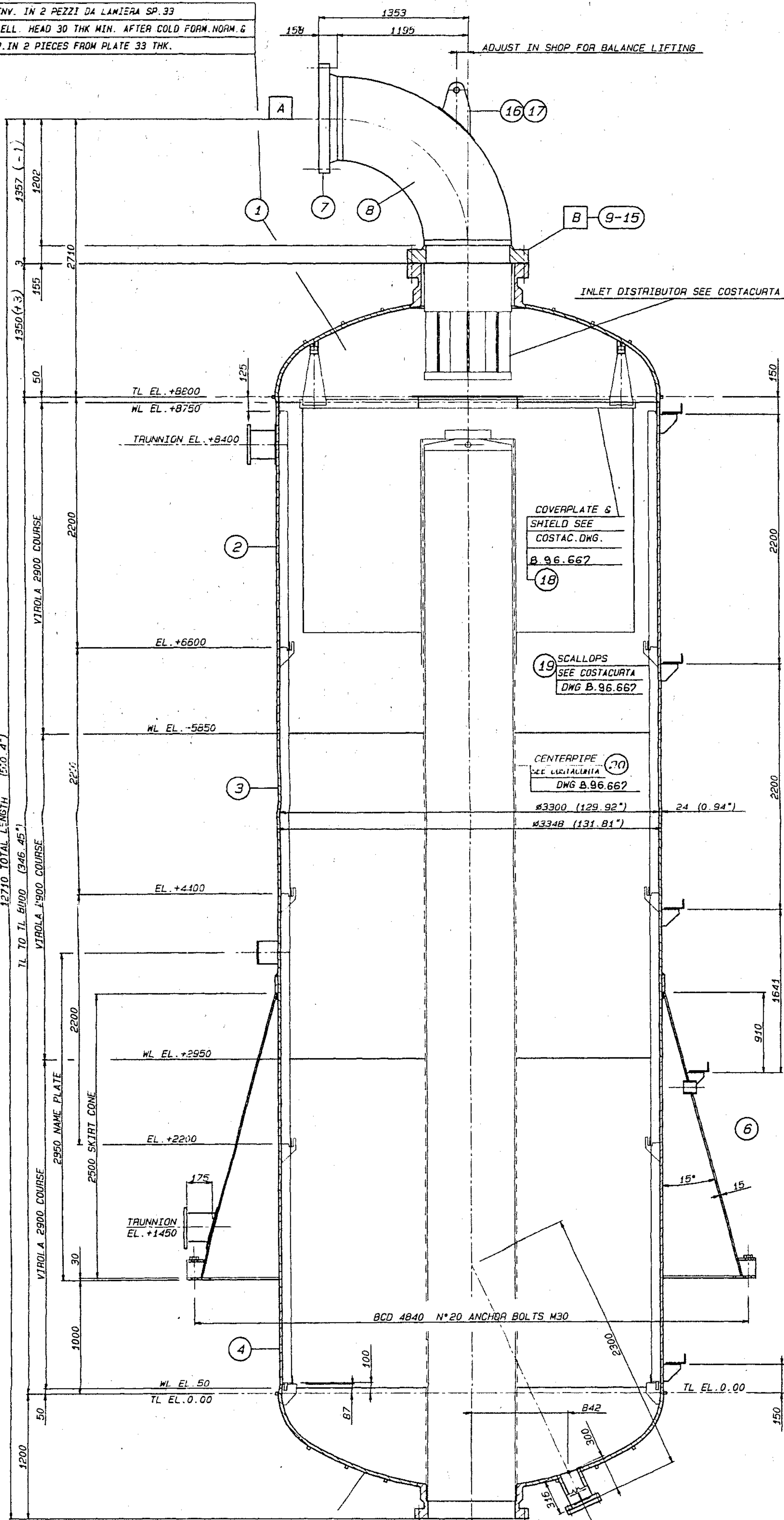
- ALL OPENINGS SHALL BE SEALED PRIOR TO SHIPMENT TO FIELD. ALL VESSEL INTERIOR SHALL BE THOROUGHLY CLEANED AND SHOT BLASTED TO REMOVE LOOSE MILL SCALE PRIOR TO SHIPMENT TO FIELD.
- REMOVE LOOSE MILL SCALE AND INTERNALLY CLEAN DISTRIBUTOR PIPING AND BLANKOFFS PRIOR TO SHIPMENT TO FIELD. TO INSURE THAT PIPING IS THOROUGHLY CLEANED USE A TURBINE DRIVEN WIRE BRUSH IN FIELD AND INSTALL IMMEDIATELY.

| TOTAL | | 150845 kg | |
|-------|----------------|-----------|-----------|
| 1 | ACCESS OPENING | 18 | 56400 |
| 8 | SKIRT VENT | 17 | 56P |
| 1 | PIPEWAY | 16 | 6TPG370 |
| 3 | PIPEWAY | 15 | 6TPG370 |
| 1 | PIPEWAY | 14 | 5S400 |
| 48 | GUSSET PLATE | 13 | 56400 |
| 24 | PLATE WASHER | 12 | 56400 |
| 1 | COMP. RING | 11 | 56400 |
| 1 | BASE PLATE | 10 | SA36 |
| 1 | SKIRT | 9 | SA36 |
| 1 | SKIRT | 8 | SA-316-65 |
| 1 | HEAD | 7 | |
| 1 | HEAD | 6 | |
| 1 | SHELL | 5 | |
| 1 | SHELL | 4 | |
| 1 | SHELL | 3 | |
| 1 | SHELL | 2 | |
| 1 | SHELL | 1 | |

CHUYODA CORPORATION
IBN RUSHD PTA& AROMATICS PROJECT-AROMATICS
ADSORBENT CHAMBER NO. 2
53-D-02
GENERAL ASSEMBLY DRAWING

NO. REQUIRED 1 SET
DATE DRAWN JUN. 19. 1996
SCALE 1/80
DATE ISSUED JUN. 19. 1996
CLASS 1/10

FONDO ELL. 2:1 SP. 30 MIN. DOPO FORM A FREDDO, NORM. E RINV. IN 2 PEZZI DA LAMIERA SP. 33
 2:1 ELL. HEAD 30 THK MIN. AFTER COLD FORM. NORM. & TEMP. IN 2 PIECES FROM PLATE 33 THK.



FONDO ELL. 2:1 SP. 30 MIN. DOPO FORM A FREDDO, NORM. E RINV. IN 2 PEZZI DA LAMIERA SP. 33
 2:1 ELL. HEAD 30 THK MIN. AFTER COLD FORM. NORM. & TEMP. IN 2 PEZZI DA LAMIERA SP. 33 THK.

SALDATURA LONGITUDINALE CONO "6"
 LONGITUDINAL WELD CONE "6"

SALDATURA LONGITUDINALE VIROLE "2-4-30"
 LONGITUDINAL WELD ELEMENT "2-4-30"

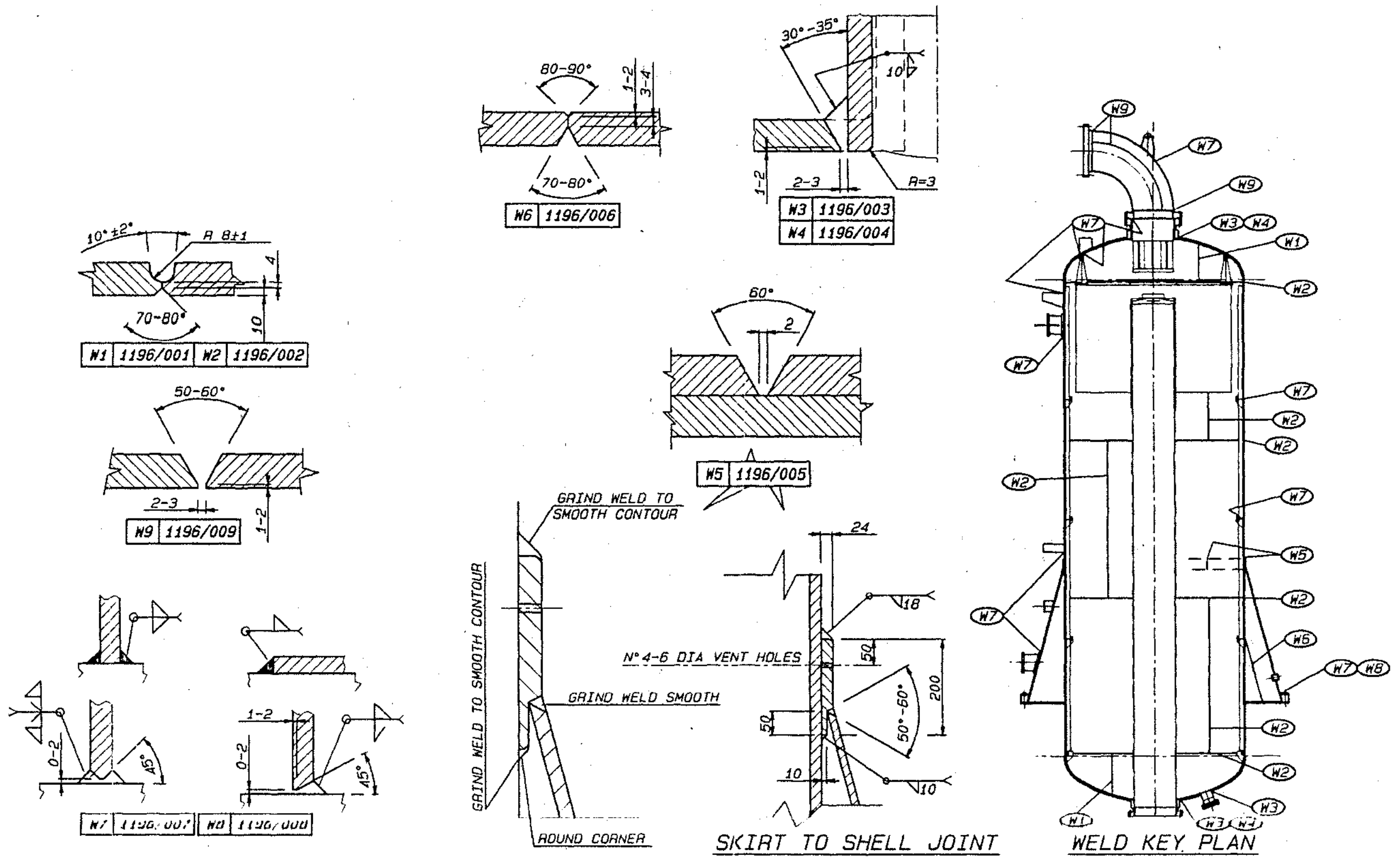
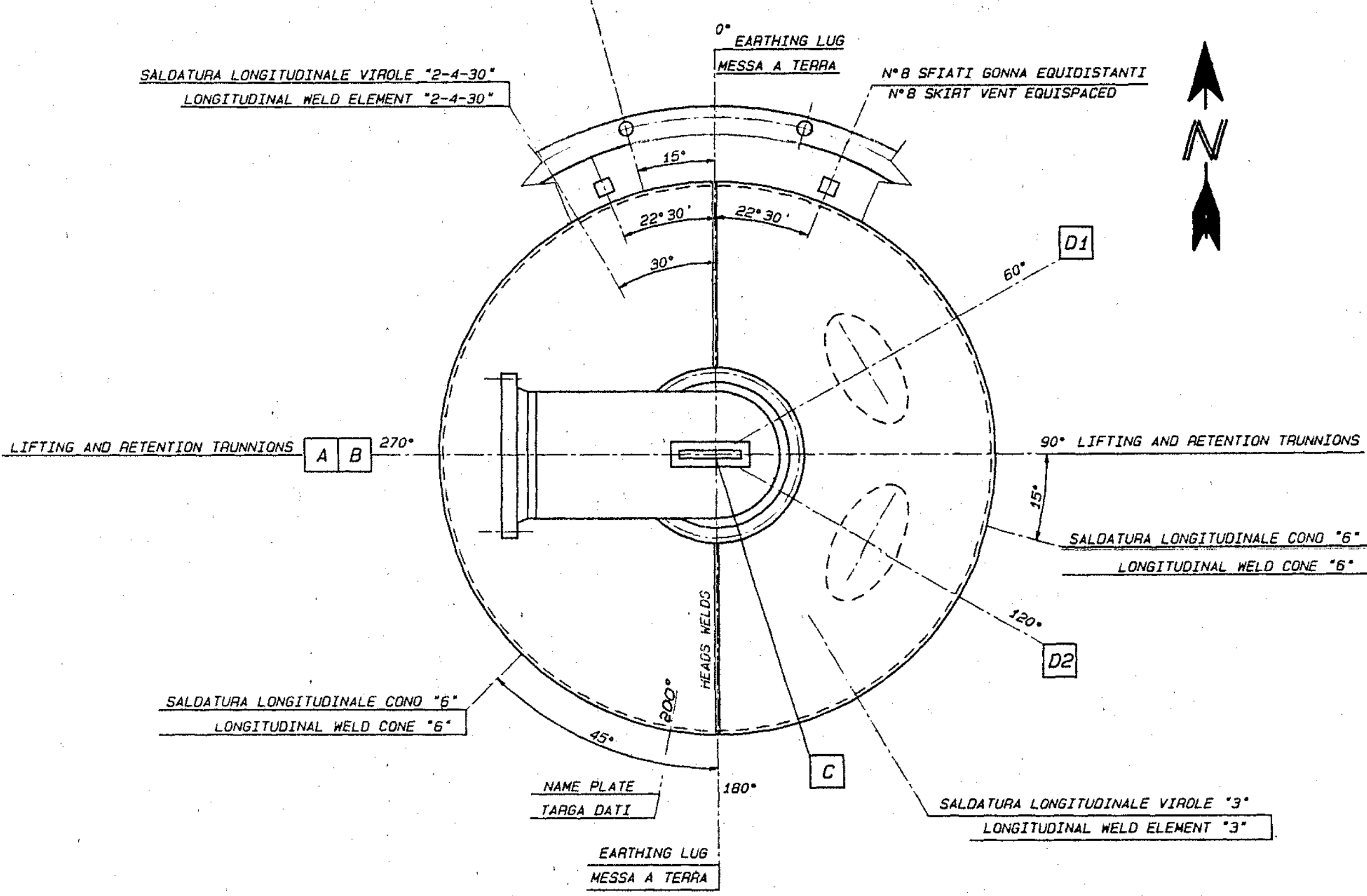
LIFTING AND RETENTION TRUNNIONS A B 270°

SALDATURA LONGITUDINALE CONO "6"
 LONGITUDINAL WELD CONE "6"

NAME PLATE
 TARGA DATI

EARTHING LUG
 MESSA A TERRA

ORIENTATION VIEW FROM TOP / ORIENTAMENTO VISTO DALL'ALTO



CONSTRUCTION NOTE:
 1) FLANGE CONTACT FACE SHALL BE FINISH WITH 125 - 250 RA
 2) NOZZLE FLANGE STUD BOLT HOLES STRADDLE TO CENTER LINES
 3) THE INDICATE THK ARE THE MIN. AFTER CONSTR. & OR FORMING AND ALL DIMENSIONS ARE IN MM
 4) INSIDE EDGES OF NOZZLES SHALL BE ROUNDED OFF WITH 5 MM RADIUS
 5) WELDS ATTACHING NON-PRESSURE-RETAINING COMPONENTS TO PRESSURE-RETAINING COMPONENTS SHALL BE FULL PENETRATION. ALL FILLET WELDS ATTACHED TO PRESSURE-RETAINING COMPONENTS SHALL BE GRIND TO A SMOOTH CONCAVE CONTOUR
 Tutte le saldature di parti non a pressione e parti a pressione dovranno essere a piena penetrazione e con filletto raccordato concavo
 a) ALL INTERNALS TO BE FABRICATED TO PASS THRU A 512 B IN MANNAY
 Tutti gli interni devono passare dal passo d'uomo #512.B
 b) ALL INTERNALS TO BE MOUNTING BEFORE SHIPPING EXCEPT CENTERPIPE
 Tutti gli interni dovranno essere montati prima della spedizione eccetto il centerpipe
 c) ALL INSIDE SHELL WELDS SHALL BE GRIND FLUSH IN SCALLOP AREA
 Tutte le saldature del mantello in corrispondenza delle scallops dovranno essere molate a filo

| ITEM NO. | DI. | TYPE | RATING | THK | SO. | DIAMET. | THK | PROJECT | FROM CL. | SERVICE |
|----------|--------|--------|---------|------|-----|---------|-----|----------------|---------------------|---------|
| D 2 | 6" | LWN RF | 300# | 27 | / | / | / | SEE DWG. | CATALYST WITHDRAWAL | |
| C 1 | 30" | SA RF | 300# | 65 | / | / | / | SELF REINFORC. | SEE DWG. | OUTLET |
| B 1 | 32" ID | SA RF | SPECIAL | 70.5 | / | / | / | SELF REINFORC. | SEE DWG. | MANNAY |
| A 1 | 30" | SA RF | 300# | 16 | PL | / | / | SEE DWG. | SEE DWG. | INLET |

| YEAR OF CONSTR. | | DESIGN CODE: | |
|------------------------|--------------------|--|--|
| 1997 | | ASME VIII div. 1 Ed. 95 | |
| REACTOR | | SPECIFICATION: | |
| | | UOP Standard Specification 3-12-2 6 9-11-1 | |
| | | UOP Project Specification 560692-304-0 | |
| CONSTRUCTION DATA | | | |
| FULL WATER WEIGHT | 120400 kg | DESIGN PRESS. | Bar-g/Psi.g 14.5 FV/ 210.3 FV |
| EMPTY WEIGHT + ATTACH. | / kg | FULL VACUUM at | *C/F 430 / 806 |
| EMPTY WEIGHT | 36000 kg | OPER. PRESS. | Bar-g/Psi.g / |
| ATTACH. WEIGHT | / kg | HYDROST. PRESS. SHOP | Bar-g/Psi.g 28 / 407 |
| OPER. WEIGHT | / kg | HYDROST. PRESS. FIELD | Bar-g/Psi.g 23.6 / 342 |
| EXT. SURFACE | 180 m ² | M.A.W.P. | Bar-g/Psi.g 15.1 / 219.1 |
| INTERNAL PROTECT. | SILICA-GEL | DESIGN TEMPERAT | *C/F 460 / 860 |
| | | OPERAT. TEMPERAT | *C/F 430 / 806 |
| SAND BLAST. | SEE RESTA SPEC. | MIN. DESIGN METAL TEMP. AT DESIGN PRESSURE | *C/F 9 / 48.2 |
| PAINTING | 1196/PAINT | REGENERAT. CONDITION | Bar-g AT °C 4.5 AT 330 Psi.g AT °F 68.2 AT 1000 |
| | | STEAM-OUT | / |
| | | RADIOGRAPHY | FULL |
| | | STRESS RELIEVING | YES |
| | | REFERENCE DRAWINGS | WELDING EFFICIENCY 100% |
| DETAILS DWG | 4646/A | PRODUCT TEST COUPON | SEE WKF 4646/MP |
| PART LIST DWG | 4646/B | CORROSION ALLOWANCE | 3 |
| NAME PLATE DWG | 4040/C | SPECIAL SERVICE | / |
| LOADING DATA | 4646/D | FLUID | / |
| TRANSPORTATION DWG | 4646/E | CAPACITY | #3 84.4 |
| PRESS. CALCULATIONS | 4646/F | GRAVITY OF PROCESS FLUID | / |
| NOZZLES LOAD CALCUL. | 4646/G | HYDROST. WATER TEMP. | *C/F 16 / 61 |
| SUPPORTS CALCULATION | 4646/H | HYDROSTATIC TIME | H 1 |
| MPS & PG | 4646/MP | INSULATION (BY OTHERS) | # 125 |
| INLET DISTRIBUTOR | B.96.667 | FIREPROOFING (BY OTHERS) | # 75 |
| COVERPLATE | B.96.667 | INSPECTION BY | ASME AUTHORITY |
| CENTERPIPE | B.96.667 | "U" STAMP REQUIRED | YES |

AS BUILT
 DWG
 Date 24-03-97

ASME STAMP REQUIRED

| APPROVED BY ENGINEER, MANAGER | SIGNATURE | DATE | | | |
|----------------------------------|--|------------------|-------|---------|------------|
| APPROVED BY QUAL. CONTR. MANAGER | SIGNATURE | DATE | | | |
| REVIEWED BY AUTHOR, INSPECTOR | | | | | |
| DATE | | | | | |
| NATIONAL BOARD NUMBER | | | | | |
| ITEM | 54-D-01 | N° | | | |
| N. | REVISIONS DESCRIPTION | SIGNATURE | CHECK | APPROV. | DATE |
| 1 | ISSUED FOR APPROVAL/MESSO PER APPROVAZIONE | GALLIZIA STEFANO | WJH | A | 19-04-1996 |
| 2 | REVISED ACCORDING TO CLIENT COMMENTS | GALLIZIA STEFANO | WJH | A | 09-03-1996 |
| 3 | REVISED AS MARKED | GALLIZIA STEFANO | WJH | A | 17-10-1996 |
| 4 | REVISED AS MARKED | GALLIZIA STEFANO | WJH | A | 11-11-1996 |

OFFICINE LUIGI RESTA S.p.A.
 TELEX 300572-TELEFAX 665340
 SCANZOROSCIATE (Bg)-CORSO EUROPA, 49-TEL. (035) 661.130

CLIENT: CHIYODA Corporation
 IBN RUSHD AROMATICS PROJECT

SERVICE: REACTOR
 ITEM: 54-D-01
 ASSEMBLY

DATE: 19-04-1996
 DWG. N°: GALLIZIA STEFANO
 CHECK: WJH
 APPROV. SCALE: NONE
 JOB: 11/96/1
 N.F. SHOP N: 4839
 DTS: 4646
 DWG. REV 3

3RD ANGLE PROJ

REFERENCE

| REV NO. | DATE | BY | DESCRIPTION | G.S.M. APP'D | G.A.E. REV'ED |
|---------|----------|------|--|--------------|---------------|
| A | 08.21.96 | T.Y. | PURCHASER'S REQUEST FOR CONSTRUCTION | 3.0 | Aug 27/96 |
| B | 07.21.96 | T.Y. | REVISED FOR NOZZLE FITTING POSITION & ETC. | 4.0 | 08.21/96 |
| C | 07.13.96 | T.Y. | REVISED FOR NOZZLE ORIENTATION | 5.0 | 08.21/96 |
| D | 06.18.96 | T.Y. | REVISED WELDING PROCESS OF SK-1 | 6.0 | 08.21/96 |
| E | 05.13.97 | H.Y. | AS BUILT | 7.0 | 08.21/97 |

| DESIGN DATA | |
|-------------------------------|---|
| 製作数 | NO. REQUIRED |
| 規程・規格 | REGULATION & CODE |
| ASME CODE STAMP | ASME SECT VIII DIV. 1-1995 (1005 EDITION) |
| ASME CODE STAMP | YES |
| FLUID NAME | HYDROCARBON |
| EPICLIFTE GRAVITY | 10-X(21M), M-X(54M), P-X(24M) |
| NORMAL LIQUID LEVEL | 0.850 LIQUID FULL |
| (M. A. W. P. =) DESIGN PRESS. | 14.9(214.7PSI)/P. V. |
| 設計温度 | DESIGN TEMP. °C |
| MIN. DESIGN METAL TEMPERATURE | 204(397°F)/177(351°F) |
| 操作圧力 | OPER. PRESS. bar-g |
| 操作温度 | OPER. TEMP. °C |
| 水圧試験圧力 | HYDRO C TEST PRESS. bar-g |
| 水圧試験温度 | HYDRO C TEST TEMP. °C |
| 真空試験圧力 | VACUUM TEST PRESS. bar-g |
| 応力除去 | POST WELD HEAT TREATMENT |
| 放射線検査 | RADIOGRAPH |
| 規格代 | CORR. ALLOWANCE |
| 継手効率 | JOINT EFFICIENCY |
| 耐火試験 | FIRE PROOF |
| 保温 | INSULATION |
| 容量 | VOLUME |
| 吊上重量 | ERECTION WEIGHT |
| TEST WEIGHT | |
| 運転重量 | OPERATING WEIGHT |
| CHARPY IMPACT TEST | NO (UCS-66(a)) |
| 塗装 | PAINTING |

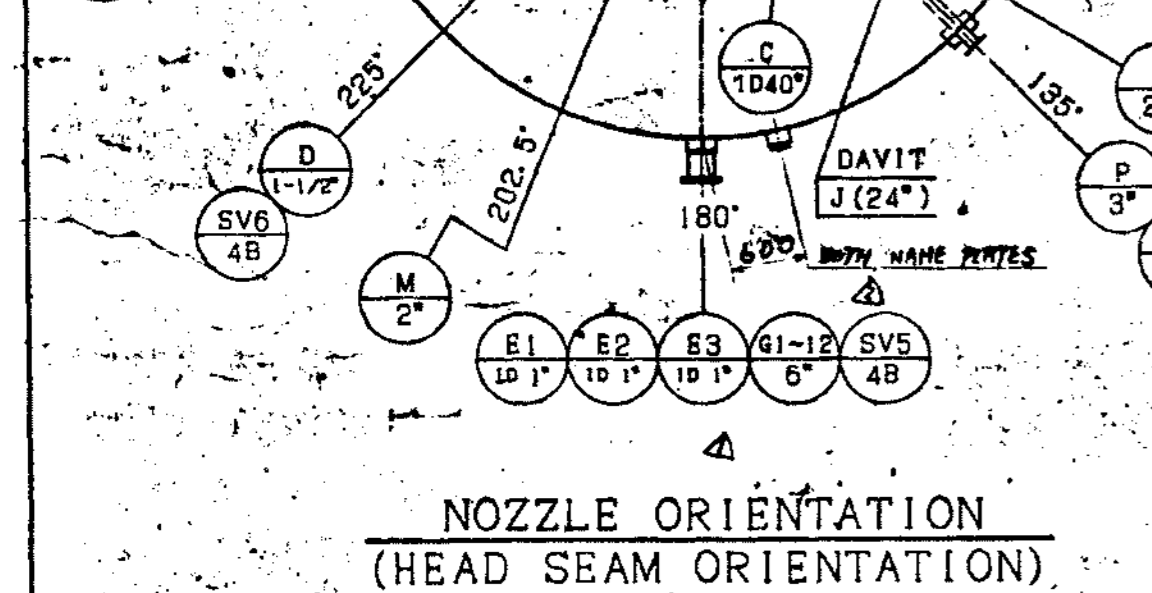
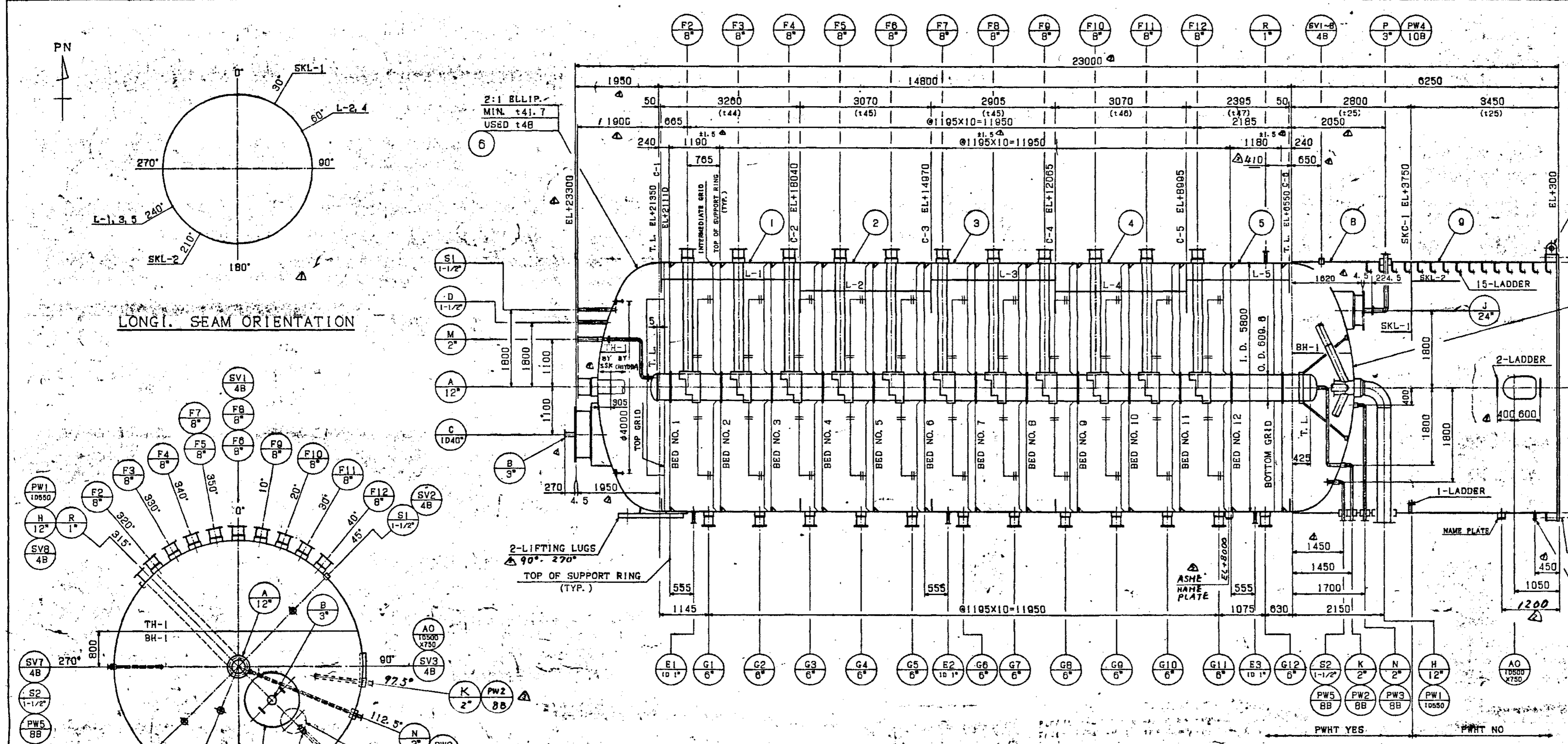
NOTES

- ALL OPENINGS SHALL BE SEALED PRIOR TO SHIPMENT TO FIELD. ALL VESSEL INTERIOR SHALL BE THOROUGHLY CLEANED AND SHOT BLASTED TO REMOVE LOOSE MILL SCALE PRIOR TO SHIPMENT TO FIELD.
- REMOVE LOOSE MILL SCALE AND INTERNALLY CLEAN DISTRIBUTOR PIPING AND BLANKOFFS PRIOR TO SHIPMENT TO FIELD. TO INSURE THAT PIPING IS THOROUGHLY CLEANED USE A TURBINE DRIVEN WIRE BRUSH IN FIELD AND INSTALL IMMEDIATELY.

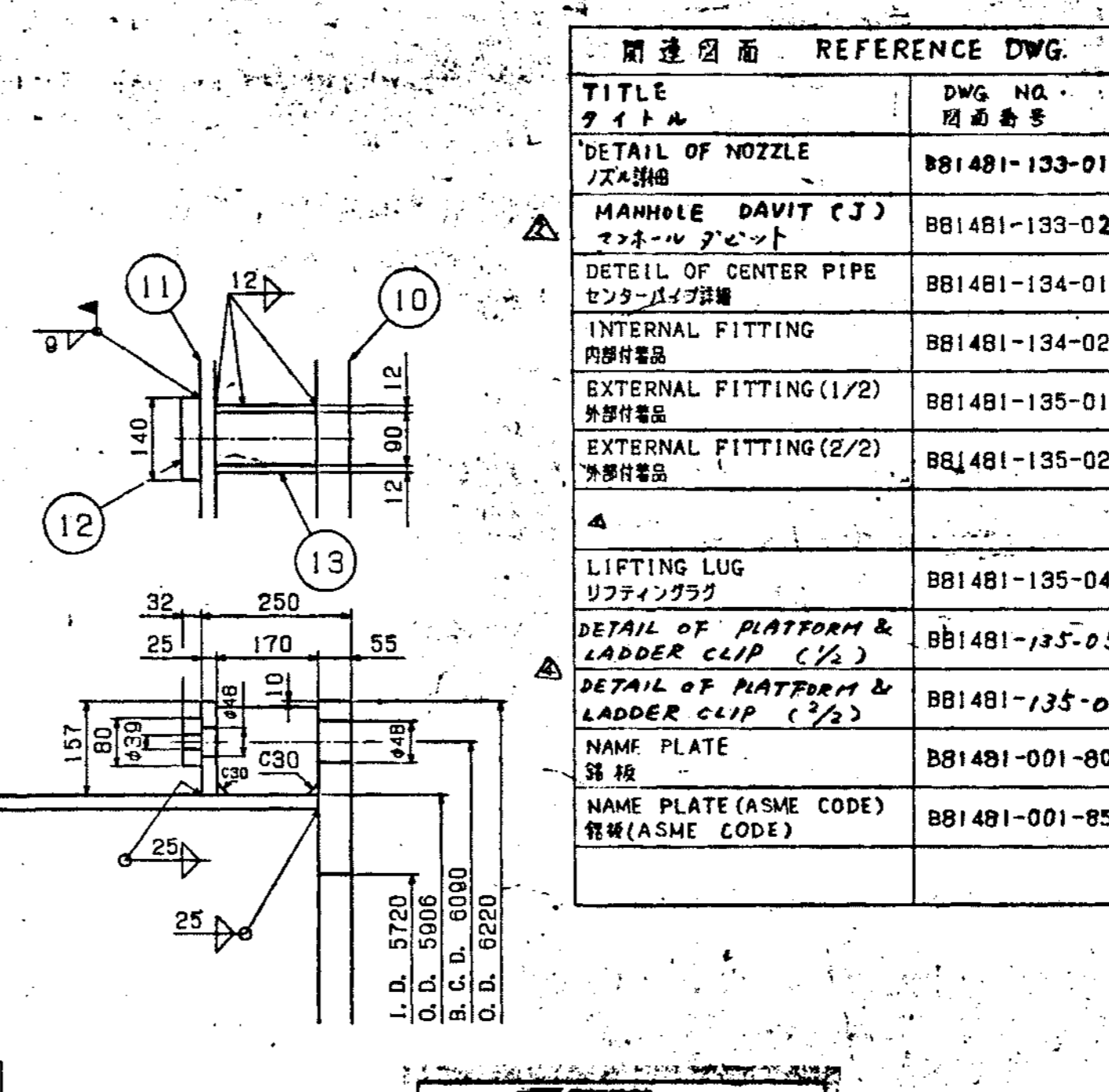
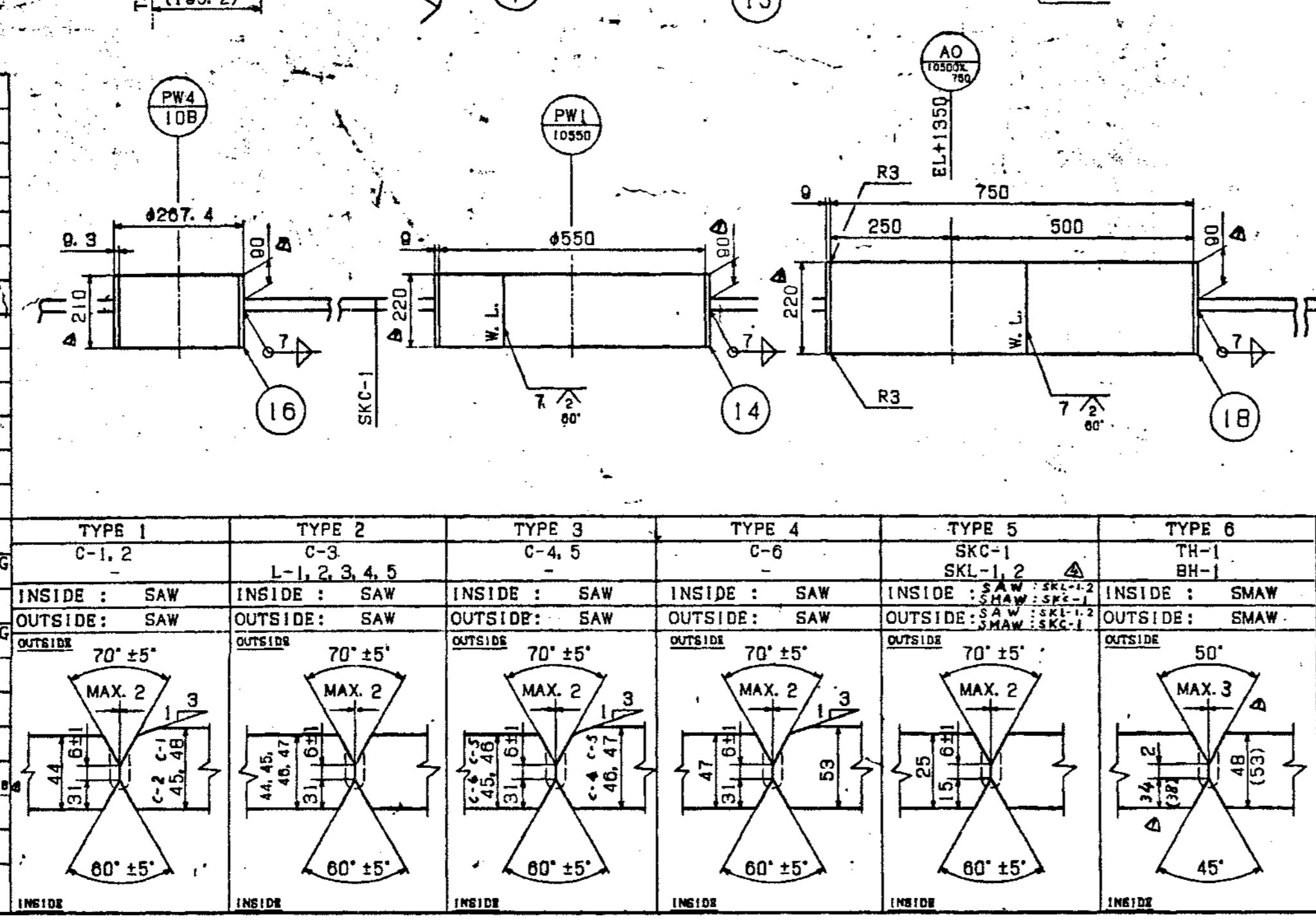
| TOTAL | | 150845 kg | |
|-------|-----------------|-----------|------------|
| 1 | ACCESS OPENNING | 18 | 66400 |
| 8 | SKIRT VENT | 17 | 56P |
| 1 | PIPEWAY | 16 | 5TPG370 |
| 3 | PIPEWAY | 15 | 5TPG370 |
| 1 | PIPEWAY | 14 | 6S400 |
| 48 | GUSSET PLATE | 13 | 6S400 |
| 24 | PLATE WASHER | 12 | 6S400 |
| 1 | COMP. RING | 11 | 6S400 |
| 1 | BASE PLATE | 10 | 6A30 |
| 1 | SKIRT | 9 | 6A30 |
| 1 | SKIRT | 8 | 6A-516-05 |
| 1 | HEAD | 7 | 15831 |
| 1 | HEAD | 6 | 14313 |
| 1 | SHELL | 5 | 16232 |
| 1 | SHELL | 4 | 20360 |
| 1 | SHELL | 3 | 18844 |
| 1 | SHELL | 2 | 19914 |
| 1 | SHELL | 1 | 15A-516-05 |

| NO. REQUIRED | DATE DRAWN | DATE ISSUED | REMARKS |
|--------------|---------------|-------------|---------|
| 1 SET | JUN. 19, 1996 | | |
| 1 SET | | | |

CHUYODA CORPORATION
IBN RUSHD PTA & AROMATICS PROJECT-AROMATICS
ADSORBENT CHAMBER NO. 1
53-D-01 005002
GENERAL ASSEMBLY DRAWING
REV. 1
DATE JUN. 20 1996



| AD | ACCESS OPENNING | 1900 | 1 | 10 | | |
|---------|--------------------------|--------|----|--------|----------------|---------|
| SV1-SV8 | SKIRT VENT | 48 | 8 | 14.5 | | |
| PW5 | PIPEWAY | 88 | 1 | SCH40 | | |
| PW4 | PIPEWAY | 108 | 1 | SCH40 | | |
| PW3 | PIPEWAY | 88 | 1 | SCH40 | | |
| PW2 | PIPEWAY | 88 | 1 | SCH40 | | |
| PW1 | PIPEWAY | 10550 | 1 | 10 | | |
| S2 | FLUSH OUT | 1-1/2" | 1 | 17.1 | ANSI 300 RFLWN | 3130 |
| S1 | FLUSH OUT | 1-1/2" | 1 | 17.1 | ANSI 300 RFLWN | SEE DWG |
| R | SEAL ANGLE VENT | 1" | 1 | 114.2 | ANSI 300 RFLWN | 3100 |
| P | DRAIN/FLUSH IN | 3" | 1 | 111.1 | ANSI 300 RFLWN | 3130 |
| N | BOTTOM HEAD DRAIN | 2" | 1 | 18.7 | ANSI 300 RFLWN | 3130 |
| M | VENT (CENTER PIPE) | 2" | 1 | 18.7 | ANSI 300 RFLWN | SEE DWG |
| K | DRAIN/VENT (CENTER PIPE) | 2" | 1 | 18.7 | ANSI 300 RFLWN | 3130 |
| J | MANWAY | 24" | 1 | 146 | ANSI 300 RFLWN | SEE DWG |
| H | OUTLET | 12" | 1 | 117.5 | ANSI 300 RFLWN | 3180 |
| G1-G19 | DUMP | 6" | 12 | 126.9 | ANSI 300 RFLWN | 3150 |
| F2-F12 | DISTRIBUTOR | 8" | 11 | 128.85 | ANSI 300 RFLWN | 3150 |
| E1-E3 | TI AND TR | 1D 1" | 3 | 114.2 | ANSI 300 RFLWN | 3100 |
| D | FLUSH IN | 1-1/2" | 1 | 17.1 | ANSI 300 RFLWN | SEE DWG |
| C | MANWAY | 1D 40" | 1 | 125.4 | ASME 300 RFLWN | SEE DWG |
| B | VENT | 3" | 1 | 120.6 | ANSI 300 RFLWN | SEE DWG |
| A | INLET | 12" | 1 | 142.9 | ANSI 300 RFLWN | SEE DWG |



ASME STAMP YES

CHUYODA CORPORATION

JOB NO. 51046 IBN RUSHD AROMATICS PROJECT
PO NO. SAYPOA 0021
REQ NO. MR-50-D-007
IDENT NO. 53-D-01-DW0001

APPROVED BY: JUN. 19, 1996
DESIGNED BY: JUN. 19, 1996
DRAWN BY: JUN. 19, 1996

NO. REQUIRED: 1 SET
DATE DRAWN: JUN. 19, 1996
DATE ISSUED: JUN. 19, 1996

CLASS: 1/10
SCALE: 1/10
REV. 1

CHUYODA CORPORATION
IBN RUSHD PTA & AROMATICS PROJECT-AROMATICS
ADSORBENT CHAMBER NO. 1
53-D-01 005002
GENERAL ASSEMBLY DRAWING
REV. 1
DATE JUN. 20 1996

ZONE 3

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

REFORMATE SPLITTER RECEIVER DATA SHEET

DOCUMENT NO:

DS-56-DA-502

GN-502 84.10

| | | | | | | | | |
|-----|--------------------|-----|------|-------|-----------|------------------------|---|------------------|
| | | | | | | ابن رشيد Abn Rushid | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | CTCI CORPORATION |
| 3 | Revised as Marked | LSH | SYL | YSL | 16-Nov-11 | CERTIFIED | | |
| 2 | Revised as Marked | LSH | SYL | YSL | 11-Aug-11 | PROJ. | | |
| 1 | Issued for Design | LSH | SYL | YSL | 26-Apr-11 | MGR | | DATE |
| 0 | Issue For Approval | LSH | SYL | YSL | 9-Mar-11 | CLIENT | | DATE |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | XC32B-56-502 | |

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CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 56-D-02 | 1 THRU 2 OF 2 | 3 | 14-Nov-2011 |

Attachment total 1 page.

GN-504 84.10

ابن رشد سابق
 ابن رشد سابق



REFORMATE SPLITTER RECEIVER
 DATA SHEET

XC32B-56-502

2 OF 2

DATE
 14-Nov-2011

REV.
 3

ابن رشيد
ibn rushd
FLUOR.

**HORIZONTAL VESSEL
DATA SHEET**

Contract: 10E0541A01
Equip. No.: 56-D-02
Revision : 3 Date : 14-Nov-2011
Unit : 56 - Sulfolane
P.O. No.:
Document No. : DS-56-DA-502
Sheet 1 of 2

سابك
sabic



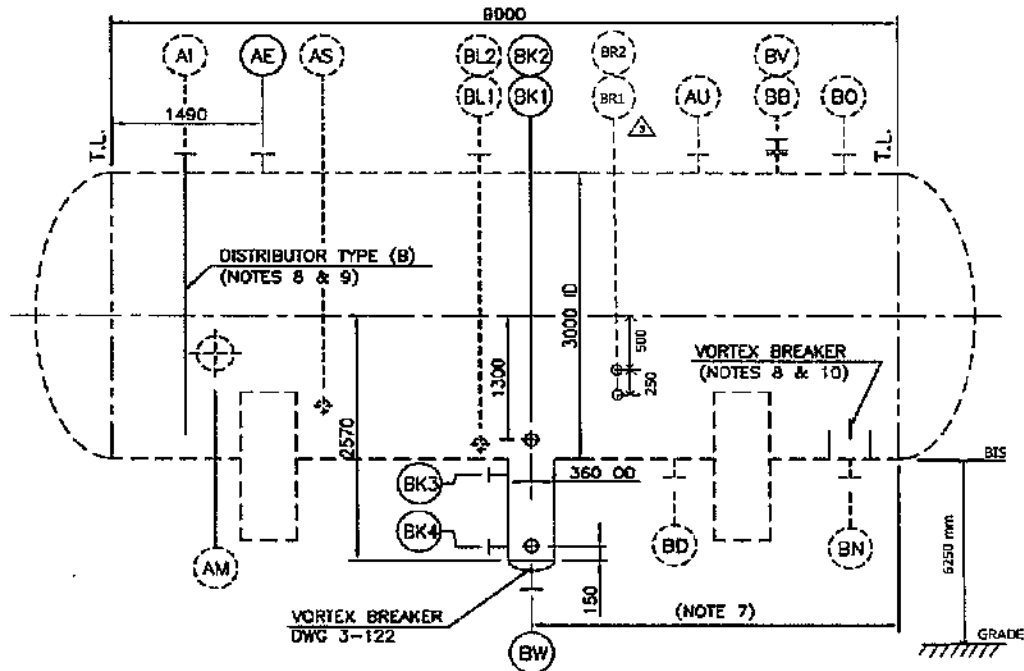
CTCI CORPORATION

REV

Client: Arabian Industrial Fibers Company Plant: Sulfolane
Service: Reformate Splitter Receiver Site: Yanbu, Kingdom of Saudi Arabia

DESIGN SKETCH

VESSEL DIMENSIONS: ID: 3000 T/T: 9000



DESIGN CONDITIONS

| | | |
|-----------------------------|-------------|--------|
| Pressure: | 4.5 | bar(g) |
| At: | 155 | °C |
| Vacuum: | FV | bar(g) |
| At: | 44 | °C |
| Min. Design Metal Temp: | 9 (Note 14) | °C |
| At: | MAWP | bar(g) |
| Maximum Liquid Level: | (Note 4&13) | mm |
| Specific Gravity of Liquid: | 0.701 | |

CONSTRUCTION

| MATERIALS | | CORROSION ALLOWANCE | |
|------------------|-------------------|---------------------|----|
| Shell: | SA-516-70 | 3 | mm |
| Internals: | C.S. | n/a | mm |
| Lining/Cladding: | n/a | n/a | mm |
| Head: | SA-516-70 | 3 | mm |
| Boot: | SA-516-70 (R.C.S) | 6 | mm |

INTERNALS

| DESCRIPTION | BULK DENSITY kg/m ³ | LIQUID HOLDUP Vol. % | ΔP bar |
|------------------|-----------------------------------|-------------------------|-----------|
| Packing/Tray: | n/a | n/a | n/a |
| Catalyst: | n/a | n/a | n/a |
| Mist Eliminator: | n/a | n/a | n/a |

OPERATING CONDITIONS

| | | |
|----------------------------|-----|--------|
| Pressure + : | 1.1 | bar(g) |
| At: | 44 | °C |
| Vacuum - : | | bar(g) |
| At: | | °C |
| Low Temperature: | | °C |
| At: | | bar(g) |
| Hydrogen Partial Pressure: | | bar(a) |
| At: | | °C |

NOTES & SPECIAL CONDITIONS

| | |
|---------------------------------------|-----|
| Stress Relieve (Process Reason Only): | NO |
| Vessel In Special Service: | |
| Steamout Required: | YES |

INSULATION

| | |
|------------------|-------------|
| Type: | Hot |
| Req'd Thickness: | 40 mm |
| Fireproofing: | Yes (75 mm) |



CLIENT : IBN RUSHD
 PROJECT PTA & AROMATICS -
 TITLE : AROMATICS
 JOB NO. : 51046
 DOC. NO. : DS-51-D-013 (Y1)

| | | REVISIONS | | | |
|------|-------------|------------|------------|------------|---|
| MARK | | ① | ② | ③ | ④ |
| APRD | OKR | OKR | THG | | |
| CHKD | THG | THG | THG | THG | |
| MADE | Pr. Handing | R. M. M. | R. M. M. | R. M. M. | |
| DATE | Mar 28 '96 | APR 05 '96 | May 29 '96 | Jun 30 '97 | |

| PROJECT SPECIFICATION | | | | | |
|---------------------------|---------|-----|-------|-----|------|
| 560689 - 301 - 2 SHEET 15 | | | | | |
| REV | DATE | BY | APP'D | REV | DATE |
| 0 | 5-26-95 | | | | |
| 1 | 12-5-95 | THG | THG | | |

25 East Algonquin Road - PO Box 5017 - Des Plaines, Illinois 60017-5017 - U.S.A.
VESSELS
 SERVICE STRIPPER RECEIVER ITEM NO. 51-D-19

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| | | | |
|----------------------|-------------------------|---------|-------------------|
| Design | INT 31.1 BAR (gp) | Ø120" E | (2) BY CONTRACTOR |
| Conditions at Top | EXT | " E | |
| Operating Conditions | Metel Temperature (Max) | 9 °C | |
| | | 35 °C | |
| | | °C | |

| | |
|---------------------|------|
| Radiograph | NR |
| Postweld Heat Treat | NR |
| Joint Efficiency | NR % |

| Material Specifications | |
|-------------------------|----------|
| Heads | SASIS-70 |
| Shell | SASIS-70 |

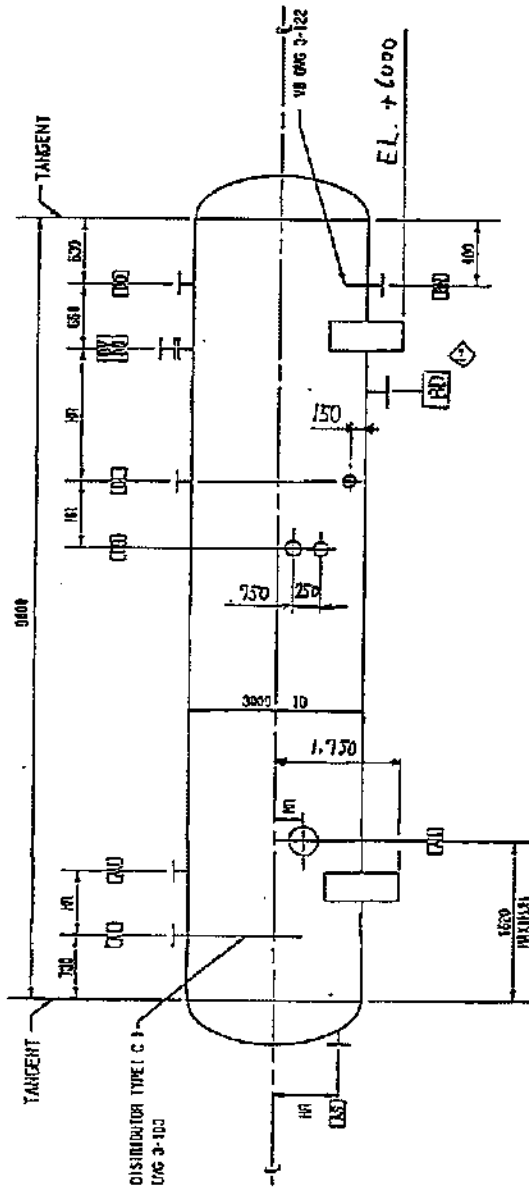
| | | |
|-------|-----------|---------------------------------|
| Shell | Thickness | Corrosion Required by Allowance |
| | Code-no. | mm, (Min) |
| | | 3 |

| | | |
|--------------|----------------|---|
| Heads | | 3 |
| Vessel Heads | | |
| Vessel | 2:1 ELLIPTICAL | |

| | |
|-----------------------------------|-----------------|
| Drop Leg | |
| Accessories Applied by Fabricator | |
| Ladder & Platform Clips | AS REQUIRED (-) |
| Insulation Clips & Rings | YES |
| Vessel Support | YES |

| Nozzles and Manways | | | |
|---------------------|----|-------------|-------------|
| Mark | No | Size inches | Service |
| AI | 1 | 24 | INLET |
| AM | 1 | 25 | MANWAY (-) |
| AS | 1 | 2 | STEAMOUT |
| AU | 1 | 12 | RELIEF (2) |
| ES | 1 | 8 | VENTILATION |
| EL | 2 | 1 1/2 | LEVEL |
| EN | 1 | 14 | OUTLET |
| EO | 1 | 16 | OUTLET |
| ER | 2 | 1 | LLS |
| EV | 1 | 2 | VENT |
| BV | 1 | 2" | DRAIN |

| | |
|---|--------------------|
| Class - ANSI CL150 | (-) SHEET 2-NOTE A |
| (2) ANSI CL300 | |
| Facing - RAISED FACE | |
| Normal Liquid Level = VESSEL CENTERLINE | |
| Specific Gravity = .632 | |



Drawings Referred to in this Specification
 3-122-0 3-183-0 3-317-1

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

CLAY TREATERS DATA SHEET

DOCUMENT NO:

DS-56-DA-503

GN-502 84.10

| | | | | | | | | |
|-----|--------------------|-----|------|-------|-----------|------------------------|---|------------------|
| | | | | | | ابن رشيد ibn.rushid | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | |
| | | | | | | | | CTCI CORPORATION |
| 3 | Revised as Marked | LSH | SYL | YSL | 11-Aug-11 | CERTIFIED | | |
| 2 | Revised as Marked | LSH | SYL | YSL | 11-Aug-11 | PROJ. | | |
| 1 | Issued for Design | LSH | SYL | YSL | 26-Apr-11 | MGR | DATE | |
| 0 | Issue For Approval | LSH | SYL | YSL | 9-Mar-11 | CLIENT | DATE | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | XC32B-56-503 | |

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GN-504 84.10

ابن رشد سابق
 ابن رشد سابق



CLAY TREATERS
 DATA SHEET

XC32B-56-503

2 OF 2

DATE
 14-Nov-2011

REV.
 3

CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 56-D-03A/B | 1 THRU 2 OF 2 | 3 | 14-Nov-2011 |

Attachment total 2 pages.

ابن رشيد
ibn rushid

VERTICAL VESSEL
DATASHEET

Contract: 10E0541A01
Equip. No.: 56-D-03A/B
Revision: 3 Date: 14-Nov-2011
Unit: 56 - Sulfolane
PO No.:
Document No. DS-56-DA-503
Sheet: 1 of 2

سابك
sabik



CTCI CORPORATION

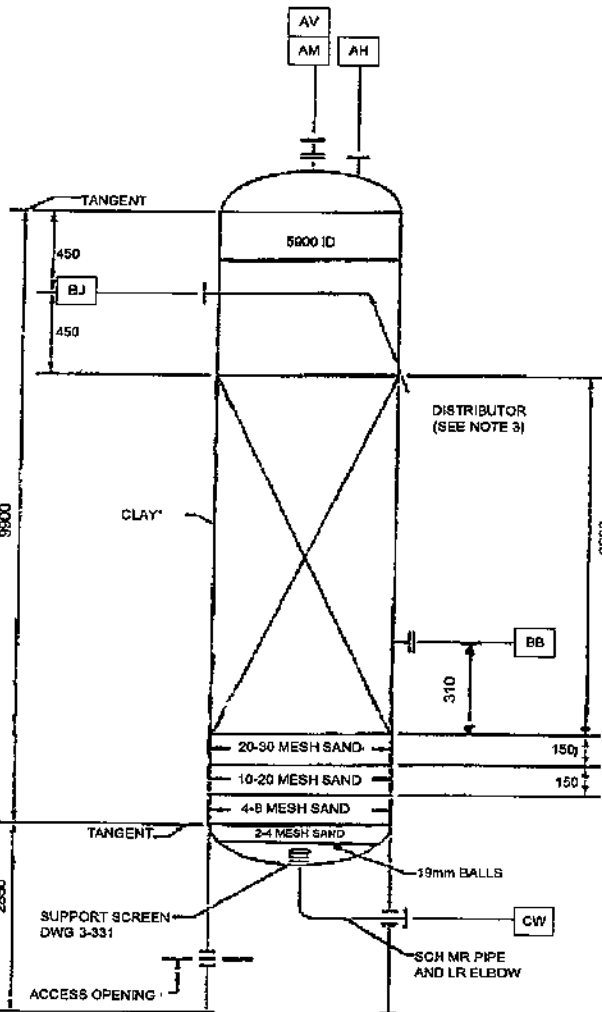
REV

CLIENT: Arabian Industrial Fibers Company (Ibn Rushid)
SERVICE: Clay Treaters

PLANT: Sulfolane
SITE: Yanbu, Kingdom of Saudi Arabia

DESIGN SKETCH

VESSEL DIMENSIONS: ID: 5900 mm T/T: 9900 mm



*BED MATERIAL, CERAMIC/ALUMINA BALLS AND SAND TO BE PROVIDED BY OTHERS.

DESIGN CONDITIONS

| | | | |
|-----------------------------|---------------|----|--------|
| Pressure: | 20.6 bar(g) | at | 230 °C |
| Vacuum: | FV bar(g) | at | 200 °C |
| Min Metal Temp: | 9 (Note 8) °C | at | bar(g) |
| Maximum Liquid Level: | NOTE 4 | | mm |
| Specific Gravity of Liquid: | 0.688 | at | °C |

OPERATING CONDITIONS

| | | | |
|-------------------------|-------------|----|--------|
| Pressure: | 15.5 bar(g) | at | 160 °C |
| Vacuum: | bar(g) | at | °C |
| Low Temperature: | °C | at | °C |
| Hydrogen Partial Press. | bar(g) | at | °C |

INTERNALS & INSULATION

| DESCRIPTION | Bulk Density kg/m ³ | Liquid Holdup vol% | Pressure Drop bar |
|------------------|--------------------------------|--|-------------------|
| Packing: | | | |
| Catalyst: | | | |
| Mist Eliminator: | | | |
| Insulation | 50 mm | Hot <input type="checkbox"/> Cold <input type="checkbox"/> | |
| Fire Proofing | 75 mm | Yes <input type="checkbox"/> No <input type="checkbox"/> | |

CONSTRUCTION

| | Materials | Corrosion Allowance |
|------------------|-----------|---------------------|
| Shell: | SA-516-70 | 3 mm |
| Heads: | SA-516-70 | 3 mm |
| Lining/Cladding: | | mm |
| Internals: | | mm |

SPECIAL CONDITIONS

| | |
|---------------------------------------|---|
| Stress Relieve (Process Reason Only): | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Vessel in Wet Sour Service: | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Steamout Required: | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |

See Notes on Page 2

THE ESTIMATED MECHANICAL WEIGHTS (kg)

| | | |
|---------------|---------|---|
| FABRICATED | | 2 |
| EMPTY | | |
| OPERATING | 589,500 | |
| FULL OF WATER | | |

THE ESTIMATED WALL THICKNESS (mm)

| | | |
|----------|--|---|
| TOP HEAD | | 2 |
| SHELL | | |
| BTM HEAD | | |
| SKIRT | | |



CHIYODA CORPORATION

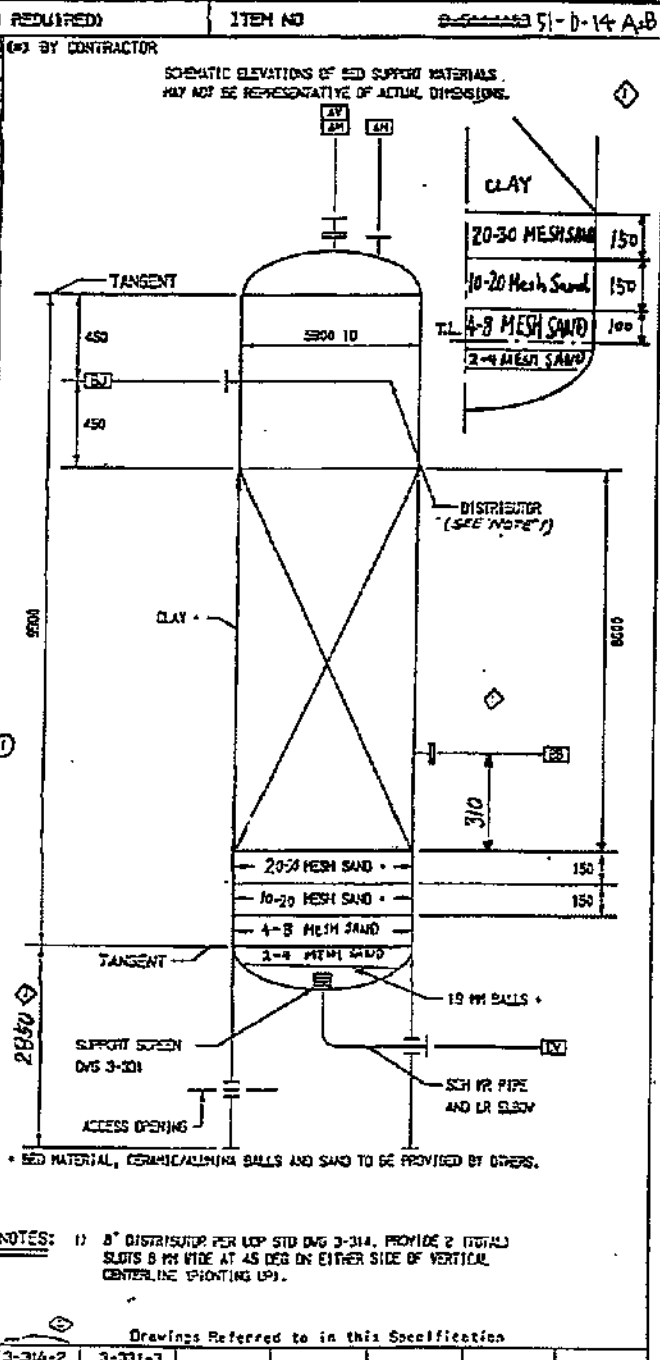
FOR RECORD

CLIENT : IBN RUSHD
 PROJECT PTA & AROMATICS -
 TITLE : AROMATICS
 JOB NO. : 51046
 DOC. NO. : DS-51-D-014 (1/1)

| | | REVISIONS | | | |
|------|--------------------|-------------|-------------|---|---|
| MARK | | ① | ② | ③ | ④ |
| APRD | <i>[Signature]</i> | | | | |
| CHKD | <i>[Signature]</i> | | | | |
| MADE | <i>[Signature]</i> | | | | |
| DATE | Mar. 05 '96 | Apr. 15 '96 | Jan. 30 '97 | | |

| | | |
|--|---|----------|
| UOP 25 East Algonquin Road - PO Box 5017 - Des Plaines, Illinois 60017-5017 - U.S.A. | PROJECT SPECIFICATION 560589 - 301 - / SHEET 16 | |
| | REV | DATE |
| | 0 | 15-22-95 |
| | 1 | 9-25-95 |

| | | | | | |
|-----------------------------------|---------------------------------|-------------------------------------|-------------------|---------|-------------|
| SERVICE | | CLAY TREATERS (TWO REQUIRED) | | ITEM NO | 51-D-14 A/B |
| Design Conditions at Top | INT 20.6 BAR (g) | 2200 °C | (S) BY CONTRACTOR | | |
| Operating Conditions | EXT FULL VACUUM | 200 °C | | | |
| | Metal Temperature (Min) | 9 °C | | | |
| | | 200 °C | | | |
| | | °C | | | |
| Radiograph | | NR | | | |
| Postweld Heat Treat | | NR | | | |
| Joint Efficiency | | NR | | | |
| Material Specifications | | | | | |
| Heads | SA516-70 | | | | |
| Shell | SA516-70 | | | | |
| Shell | Thickness Required by Code (mm) | Corrosion Allowance (mm) | | | |
| | | 3 | | | |
| Heads | J | | | | |
| Vessel Heads | | | | | |
| Top Head | 2:1 ELLIPTICAL | | | | |
| Bottom Head | 2:1 ELLIPTICAL | | | | |
| Accessories Applied by Fabricator | | | | | |
| Ladder & Platform Clips | AS REQUIRED (+) | | | | |
| Insulation Clips & Rings | YES | | | | |
| Vessel Support | YES | | | | |
| Nozzles and Manways | | | | | |
| Mark | No | Size Inches | Service | | |
| -AH | 1 | 8 | RELIEF | | |
| AH | 1 | 20 | MANWAY | | |
| AV | 1 | 3 | VENT | | |
| BB | 1 | 24 | MANWAY | | |
| BJ | 1 | 8 | INLET | | |
| CV | 1 | 8 | OUTLET | | |



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NOTES: 1) 8" DISTRIBUTOR PER UOP STD DWS 3-314. PROVIDE 2 (TOTAL) SLOTS 8 MM WIDE AT 45 DEG ON EITHER SIDE OF VERTICAL CENTERLINE (POINTING UP).

Drawings Referred to in this Specification

509162

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01


DOCUMENT TITLE:

TATORAY REACTOR DATA SHEET

DOCUMENT NO:

DS-57-DA-503

GN-502 84.10

| | | | | | | | | |
|-----------|--------------------|-----|------|-------|-----------|----------------------|---|---|
| | | | | | | ابن رشد ibn rushd | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA |  CTCI CORPORATION |
| CERTIFIED | | | | | | | | |
| 2 | Revised As Marked | KCK | CBC | YSL | 11-Aug-11 | PROJ. | | |
| 1 | Issued For Design | KCK | CBC | YSL | 26-Apr-11 | MGR | _____ | DATE _____ |
| 0 | Issue For Approval | KCK | CBC | YSL | 9-Mar-11 | CLIENT | _____ | DATE _____ |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | | XC32B-57-503 |

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GN-504 84.10



CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 57-D-03 | 1 THRU 3 OF 3 | 2 | 11-Aug.-2011 |

Attachment total 15 page.

XC32B-57-503

TATORAY REACTOR
 DATA SHEET

2 OF 2

| | |
|------|--------------|
| DATE | 11-Aug.-2011 |
| REV. | 2 |

ابن رشد
ibn rushd

VERTICAL VESSEL
DATA SHEET

Contract: 10E0541A01
Equip. No.: 57-D-03
Revision: 2 Date: 11-Aug.-2011
Unit: 57 - Tatoray
PO No.:
Document No.: DS-57-DA-503
Sheet: 1 of 3

سابك
sabic



CTCI CORPORATION

REV

| | | | | |
|----|---|--|--|---------------------|
| 1 | Client: Arabian Industrial Fibers Company | | Plant: Tatoray | |
| 2 | Service: Tatoray Reactor | | Site: Yanbu, Kingdom of Saudi Arabia | |
| 3 | DESIGN SKETCH | | DESIGN CONDITIONS | |
| 4 | VESSEL DIMENSIONS: ID: 4000 mm TTT: 5500 mm | | Pressure: 34 bar(g) at 518 °C | |
| 5 | | | Vacuum: FV bar(g) at 482 °C | |
| 6 | | | Min. Metal Temp: 9 (Note 14) °C at MAWP bar(g) | |
| 7 | | | Liquid Level: Full (Note 3) mm | |
| 8 | | | Specific Gravity of Liquid: at °C | |
| 9 | | | OPERATING CONDITIONS | |
| 10 | | | Pressure: 28.1 (Note 4) bar(g) at Max. 495 °C | |
| 12 | | | Vacuum: bar(g) at °C | |
| 13 | | | Low Temperature: °C at °C | |
| 14 | | | Hydrogen Partial Press. bar(a) at °C | |
| 15 | | | INTERNAL & INSULATION | |
| 17 | DESCRIPTION | | Bulk Density kg/m ³ | Liquid Holdup vol% |
| 18 | | | | Pressure Drop bar |
| 19 | Packing: | | | |
| 20 | Catalyst: | | 715 (Note 6) | |
| 21 | Mist Eliminator: | | | |
| 22 | Insulation | | 125 mm Hot <input checked="" type="checkbox"/> Cold <input type="checkbox"/> | |
| 23 | Fire Proofing | | 75 mm Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | |
| 24 | | | CONSTRUCTION | |
| 25 | | | Materials | Corrosion Allowance |
| 27 | Shell: | | A307 GR. H or GR. 12 | 3 mm |
| 28 | Heads: | | A307 GR. H or GR. 12 | 3 mm |
| 29 | Support | | | mm |
| 30 | | | SPECIAL CONDITIONS | |
| 31 | Stress Relieve (Process Reason Only): | | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | |
| 32 | Vessel in Wet Sour Service: | | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | |
| 33 | Steamout Required: | | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | |
| 34 | See Page 3 for Design Sketch | | | |
| 35 | | | | |
| 36 | | | | |
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| 50 | | | | |
| 51 | | | | |
| 52 | | | WEIGHTS ARE BASED ON THE VENDOR CERTIFIED DRAWING No. 57DD3DW0001 Rev. 4 2/24/97 | |
| 53 | | | EMPTY 115000 | |
| 54 | | | OPERATING 222200 | |
| 55 | | | FULL OF WATER 218100 | |
| 56 | | | THICKNESS ARE BASED ON THE VENDOR CERTIFIED DRAWING No. (mm) | |
| 57 | | | TOP HEAD (Note 5) | |
| 58 | | | SHELL (Note 5) | |
| 59 | | | BTM HEAD (Note 5) | |
| 60 | | | SKIRT | |
| 61 | | | | |
| 62 | | | | |
| 64 | | | | |
| 65 | | | | |
| 66 | | | | |

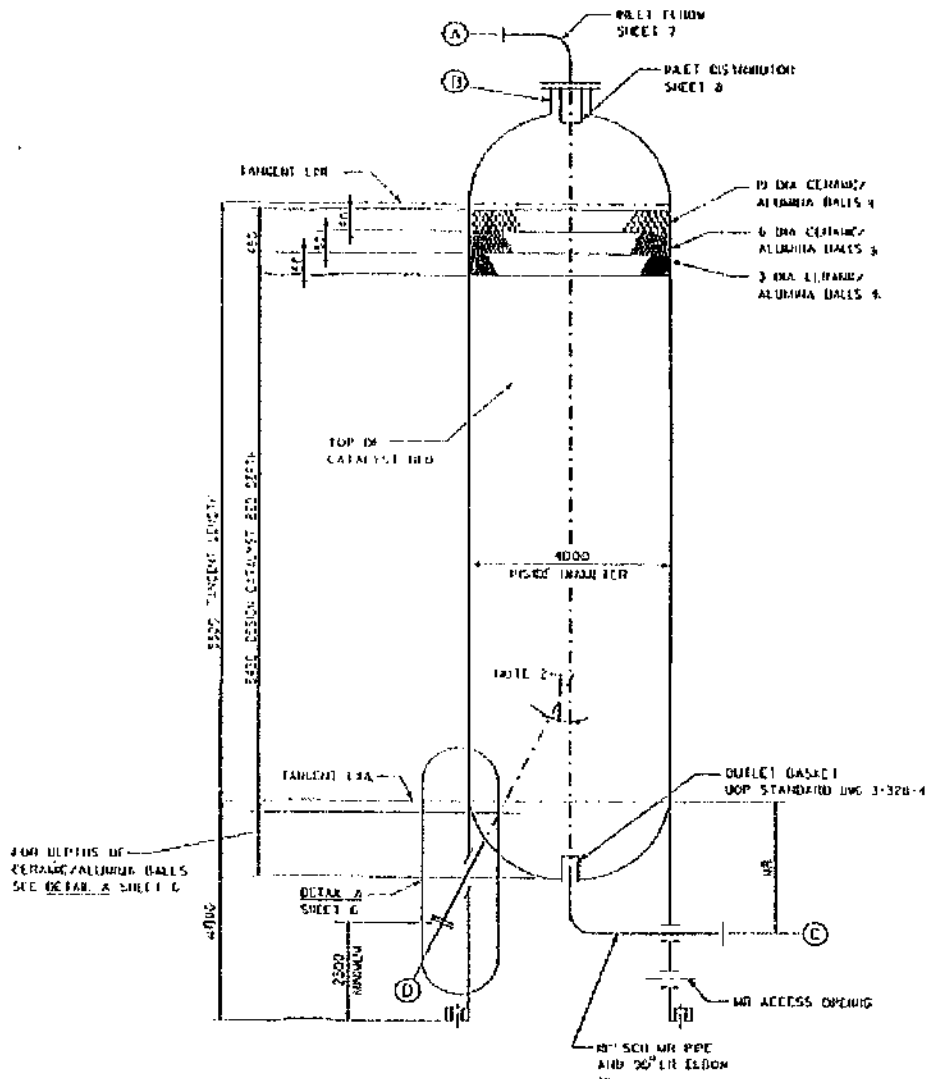
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| | | |
|---------------|--------------|-------------------|
| Contract: | 10E0541A01 | |
| Equip. No.: | 57-D-03 | |
| Revision: | 2 | Date: 11-Aug-2011 |
| Unit: | 57 - Tatoray | |
| PO No.: | | |
| Document No.: | DS-57-DA-503 | |
| Sheet: | 3 of 3 | |



DESIGN SKETCH

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DS-57-D-003 (2/4)

UOP

25 East Algonquin Road • Des Plaines, Illinois 60017-5017 • USA.

PROJECT SPECIFICATION

560695 - 304- O Sheet 2

REACTORS

| REV | DATE | BY | APP'D | REV | DATE | BY | APP'D |
|-----|----------|-----|-------|-----|------|----|-------|
| 0 | 11/19/97 | BPP | | | | | |
| | | | | | | | |
| | | | | | | | |

GENERAL NOTES

- 57-D-03
- A. The Tatoray Reactor (~~D-5703~~) shall be constructed in accordance with the following:
- Code(s): ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, Pressure Vessels (Latest Edition and Addenda).
- Specifications: UOP Standard Specification 3-12-2
UOP Project Specification 560688-102
- B. Where "MR" is specified, it indicates that it is the manufacturer's and/or contractor's responsibility to comply with all applicable codes and standards including any additional requirements specified in the UOP Specifications.
- C. Skirt to shell attachment shall be constructed as shown on the reactor elevation in this specification. Attachment designs must accommodate full, external, on site Ultrasonic Angle Beam examination of the shell/head weld(s).
- D. All nozzle projections shall be MR unless noted otherwise.
- E. Reinforcement for nozzles and manways shall be integrally provided in nozzle neck. All nozzle and manway attachments shall be in accordance with figure UW-16.1, sketch f of section VIII, Division 1 of the ASME Code. Sketches f-1 and f-4 are recommended configurations.
- F. Flanges that are not within the scope of ASME/ANSI B16.5 shall comply with section VIII, Div. 1 of ASME code.
- G. All flanges intended for use with spiral-wound gaskets shall have a flange surface finish of 125 Ra minimum to 250 Ra maximum.
- H. Material used shall be in accordance with the following specifications:
- 1. Plate - SA387 Gr. 11 or 12
 - 2. Forgings - SA182 Gr. F11 or F12
 - SA336 Gr. F11 or F12
 - 3. Pipe - SA335 Gr. P11 or P12
- I. Gaskets for use with raised face flanges shall be spiral wound with non-asbestos filler. These gaskets shall be designed per API 601 and shall be suitable for service.

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DS-57-D-003(3/4)

UOP

25 East Algonquin Road • Des Plaines, Illinois 60017-5017 • USA.

PROJECT SPECIFICATION

560695 -304- 0 Sheet 3

REACTORS

| REV | DATE | BY | APP'D | REV | DATE | BY | APP'D |
|-----|---------|-----|-------|-----|------|----|-------|
| 0 | 4/11/95 | BPP | | | | | |
| | | | | | | | |
| | | | | | | | |

FABRICATION

- A. Main reactor welds shall be full penetration double butt (or equivalent) welds free of undercuts and ground for radiographic inspection. They shall be designed to permit 100% radiographic inspection.
- B. Welds attaching non-pressure-retaining components to pressure-retaining components shall be full penetration. All fillet welds attached to pressure-retaining components shall be ground to a smooth, concave contour.
- C. All pressure retaining welds of the vessel, including any weld between an integral skirt to pressure vessel forging and the bottom head or shell of the pressure vessel, shall be located and fabricated to allow full, external, on-site Ultrasonic examination. For heavy wall pressure vessels (defined as a shell thickness in excess of 2 inches), or any pressure vessel utilizing an internal lining (clad or weld overlay) a calibration block for Ultrasonic examination shall be provided. The calibration block shall be in accordance with ASME Section V, Paragraph T-542.2.
- D. All components (regardless of size, thickness, or product form) shall be Postweld Heat Treated in accordance with ASME Section VIII, Division 1, except that the hold temperature shall be 1275°F ± 25°F (691°C ± 14°C).
- E. The maximum room temperature tensile strength of all pressure-retaining components, materials, and welds shall be 100,000 psi (690 MPa).
- E. The product analysis content of Tin and Phosphorus for all pressure-retaining components shall meet the following weight percent limits (welding consumables included):

$$\text{Sn} \leq 0.015\%$$

$$\text{P} \leq 0.012\%$$

EXAMINATION/TESTING

- A. Ultrasonic:
All weld reinforcements shall be contoured to allow proper interpretation of Ultrasonic examination.

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DS-57-D-003 (4/9)

UOP

25 East Algonquin Road - PO Box 5017 - Des Plaines, Illinois 60017-5017 - USA

PROJECT SPECIFICATION

560695 -304- | SHEET 4

REACTORS

| REV | DATE | BY | APPD | REV | DATE | BY | APPD |
|-----|---------|-----|------|-----|------|----|------|
| 0 | 4/19/57 | BPP | | | | | |
| 1 | 5/17/57 | TLW | TRD | | | | |
| | | | | | | | |
| | | | | | | | |

NOTE - These data are confidential and the property of UOP and shall not be disclosed to others or reproduced in any manner or used for any purpose whatsoever except by written permission or as provided in a signed agreement with UOP relating to such data.

B. Impact Test:

Charpy V-notch impact testing is required for all pressure-retaining components and welds. Impact tests shall be conducted in accordance with ASME Section VIII, Division 1, Paragraph UG-84, except that there shall be no exemptions from impact testing, and the test temperature shall not exceed 0°F (-18°C). When the tested component or weld will receive heat treatment, the test specimens shall be supplied in a completely heat-treated condition.

C. Magnetic Particle Examination:

- ① 1. Examination shall be in accordance with Appendix VI of Section VIII, Division 1, of the ASME code. If prods are used, tips shall be carbon steel, not lead or copper.
2. All plate edges shall be examined after trimming, but prior to welding, to reveal laminations and injurious segregations. Laminations and injurious segregations shall be removed by chipping or grinding and shall be re-examined to assure that all defects have been removed.
3. Double-butt welds shall have the initial root passes, including root tack welds, chipped, ground and gouged to sound metal, and the back chipped welds, welding groove and plate edges examined to assure that all cracks, pin holes, porosity or other weld defects are removed before commencing welding on the second side.
4. All weld root areas shall be examined before and after removal of defects.

D. Chemical Analysis:

1. Certified chemical analysis of all automatic weld wire is required. A check analysis of every 15th reel of wire or heat for alloy content is required.
2. Sample of each complete shell, head and nozzle weld shall be analyzed to confirm required alloy content. Samples to be taken from the inside weld surface prior to weld overlay.



DS-57-D-003 (5/4)

UOP
 25 East Algonquin Road • PO Box 5017 • Des Plaines, Illinois 60017-5017 • U.S.A.
REACTORS

PROJECT SPECIFICATION
 560695 - 304 - 1 SHEET 5

| REV | DATE | BY | APVD | REV | DATE | BY | APVD |
|-----|---------|-----|------|-----|------|----|------|
| 0 | 4/10/95 | BPP | | | | | |
| 1 | 5/11/95 | ELW | TPD | | | | |

NAME **TATRAY REACTOR** ITEM ~~DS-57-D-003~~ 57-D-03

Design Conditions
 INT 34 Bars (g) @ 518°C
 EXT FULL VACUUM @ 185°C
 Min. Metal Temperature 5°C
 Operating Conditions 485°C

Radiograph FULL
 Postweld Heat Treat YES
 Joint Efficiency 100%

Material Specifications

| | |
|--------------------------|------------------------|
| Shell | A307 GR. II DR. TP. 12 |
| Heads | SAME AS SHELL |
| Head | Nil |
| Corrosion Allowance (mm) | 3 |
| Head | Nil |
| Head | 3 |

Reactor Details Hemispherical

Accessories Supplied by Fabricator

| | |
|----------------------------|-----|
| Ladders And Platform Cligs | YES |
| Insulation Cligs And Rings | YES |
| Vessel Support | YES |

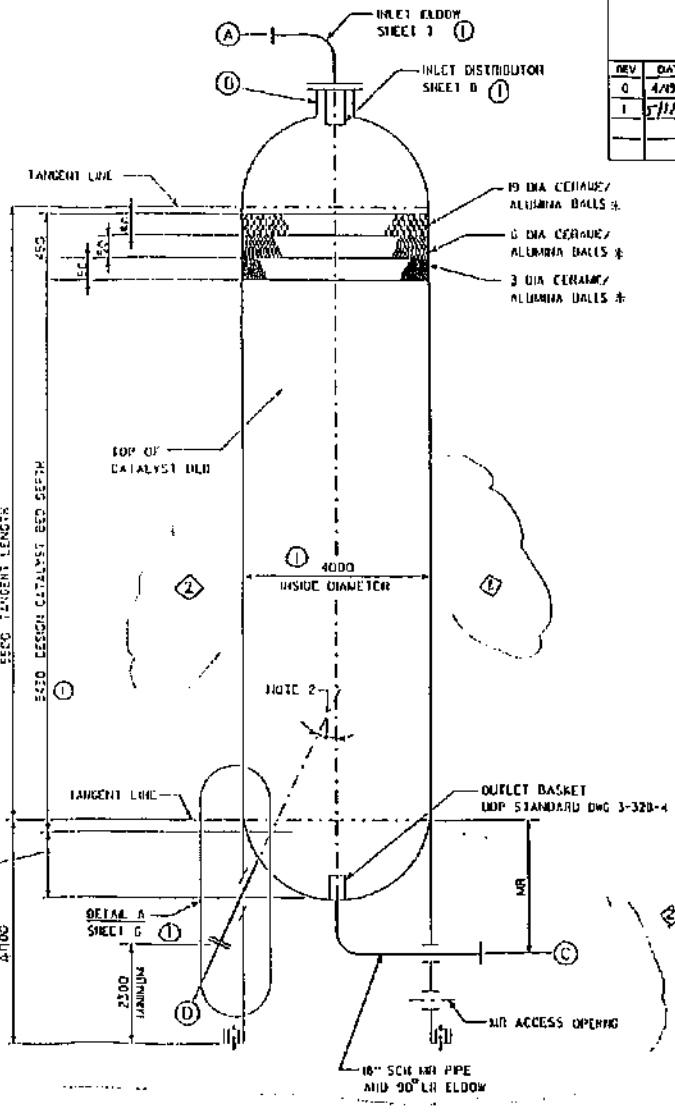
Nozzles and Manways

| Mark | No | Size Inches | Service |
|------|----|-------------|---------------------|
| A | 1 | Ø | INLET |
| B | 1 | 30 T.H. | MANWAY |
| C | 1 | Ø | OUTLET |
| D | 2 | G | CATALYST WITHDRAWAL |

Rating - ANSI CL. 600**
 Facing - Raised Facing

** EXCEPT NOZZLE (B) WHICH SHALL BE SPECIALLY DESIGNED PER ASME SECTION VIII, DIV. 1

- NOTES:**
- ALL MATERIALS TO BE FABRICATED TO PASS THRU A 30" ID MANWAY.
 - CONTRACTOR TO CHECK UNLOADING NOZZLE FOR MAXIMUM CATALYST REMOVAL. PROVIDE PROPER WORKING CLEARANCES BETWEEN FLANGES OF REACTOR SUPPORT, OUTLET ELBOW AND AIR SPACE.
 - FOR VOLUME OF CERAMIC/ALUMINA BALLS TO BE SUPPLIED BY OFFICE SEE UOP PROJECT SPECIFICATION 560695-32.
 - DESIGN CATALYST DENSITY: 657 KG/M³. DESIGN CERAMIC/ALUMINA BALLS DENSITY: 2000 KG/M³.
 - WORK THIS SHEET WITH SHEET G.
 - ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED.



C47325-6
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Drawings Referred to in this Specification

| | | | |
|---------|--|--|--|
| 3-320-1 | | | |
|---------|--|--|--|



Uop

25 East Algonquin Road - P.O. Box 5007 - Des Plaines, Illinois 60018-0007 - USA

REACTORS

NAME (TATURY) REACTOR

ITEM D-5703- 57-D-03

DS-57-D-003 (4/4)

PROJECT SPECIFICATION

560695 - 304 - 1 SHEET 6

| REV | DATE | BY | APPD | REV | DATE | BY | APPD |
|-----|---------|-----|------|-----|------|----|------|
| 0 | 4/12/75 | HW | | | | | |
| 1 | 5/27/75 | TLW | TPD | | | | |

NOTES:

WORK THIS SHEET WITH SHEET 5. (1)

AIR OR X 3 PLATE SLEEVE
LOOSE FIT W/ PROZLE

3 DIA CERAMIC
ALUMINA BALLS (2)

6 DIA CERAMIC
ALUMINA BALLS (3)

13 DIA CERAMIC
ALUMINA BALLS (4)

SEC SHIRT DETAIL
SHEET 5

AIR SPACE, IF REQUIRED:
UOP STANDARD
SPECIFICATION 9-10-1

INSULATION
BY OTHERS

FILL TOP 50 WITH 3 DIA CERAMIC/ALUMINA BALLS;
REMAINING LENGTH OF SLEEVE TO BE FILLED
WITH 6 DIA CERAMIC/ALUMINA BALLS (5)

TOP OF
OUTLET
DASKER

3 LUGS
EQUALLY
SPACED

1 LAYER OF
13 DIA X 3 PLY
TWISTED CERAMIC
FIBER ROPE
COILED TIGHTLY

5 REMOVABLE CATALYST
SUPPORT PLATE

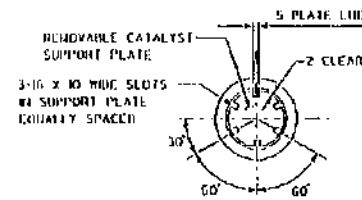
10 DIA ROD

5 X 13 X 13 PLATE LUG
13-REQUIRED
EQUALLY SPACED

DETAIL A

* NOTE 3, SHEET 5

(1)



SECTION B-B

C47326-1
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DS-57-D-003 (7/9)

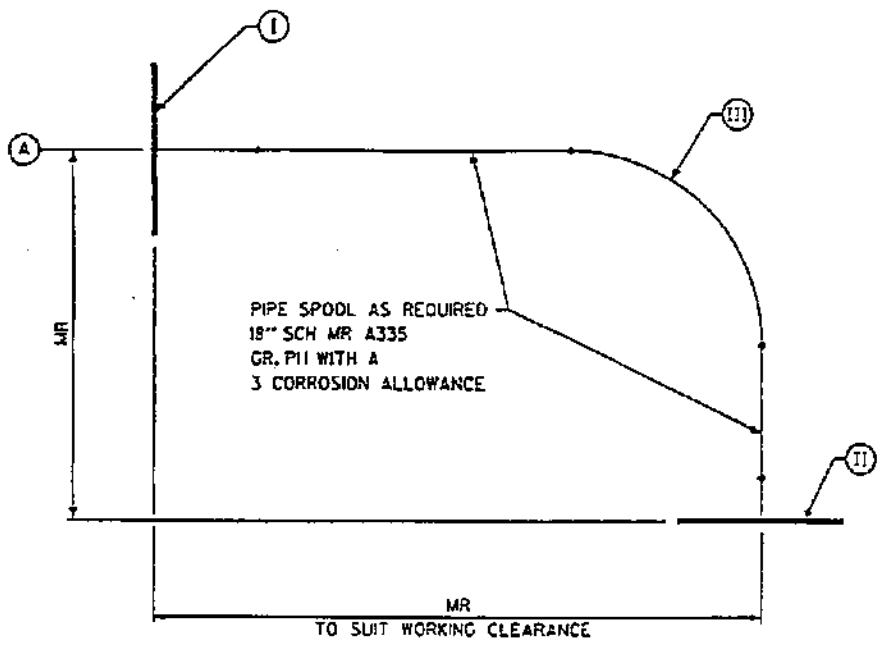
Uop
 25 East Algonquin Road • PO Box 5017 • Des Plaines, Illinois 60017-5017 • USA

REACTORS

| PROJECT SPECIFICATION | | | | | | | |
|-----------------------|---------|-----|------|---------|------|----|------|
| 560695-304-0 | | | | SHEET 7 | | | |
| REV | DATE | BY | APVD | REV | DATE | BY | APVD |
| 0 | 4/19/95 | BPP | | | | | |
| | | | | | | | |
| | | | | | | | |

NAME **INLET ELBOW DETAIL**

ITEM ~~D-5703~~ 57-D-03



- ① 18" WELDING NECK FLANGE, A182 GR. F11 OR F12
- ② 30" ID BLIND OR WELDING NECK REDUCING FLANGE, A182 GR. F11 OR F12
- ③ 18" SCH MR LONG RADIUS ELBOW A234 GR. WP11 OR WP12 WITH A 3 CORROSION ALLOWANCE

NOTES:

1. ALL FLANGE RATINGS TO BE ANSI CLASS 600. SEE GENERAL NOTES FOR ADDITIONAL INFORMATION.
2. PIPING SHALL BE FABRICATED IN ACCORDANCE WITH UOP STANDARD SPECIFICATION B-12-3
3. FLANGE ② SHALL BE SPECIALLY DESIGNED PER ASME SEC. VIII, DIV. 1 TO MATE AND MATCH WITH NOZZLE (B) ON SHEET 5.

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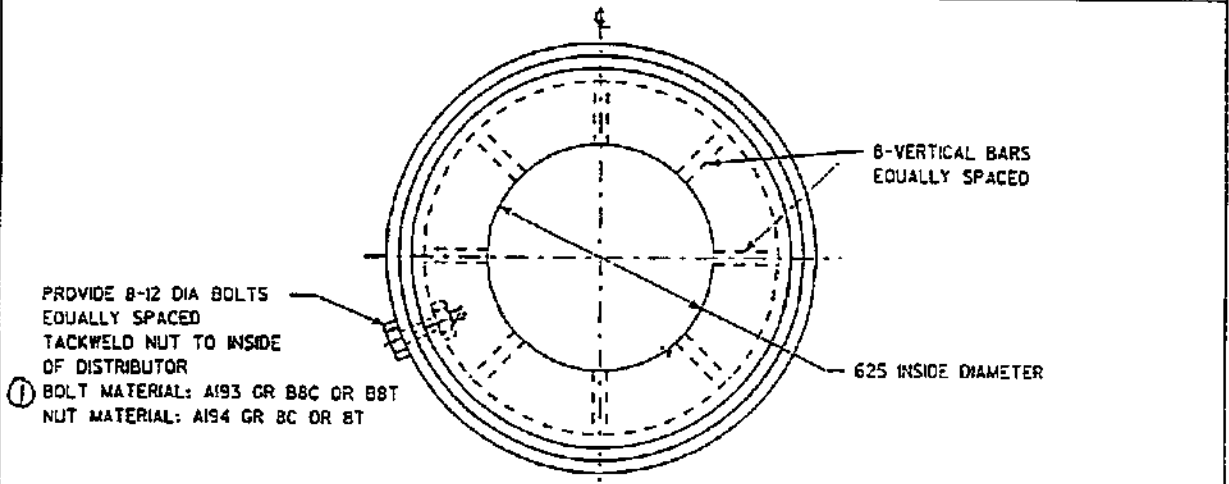
C47327-A



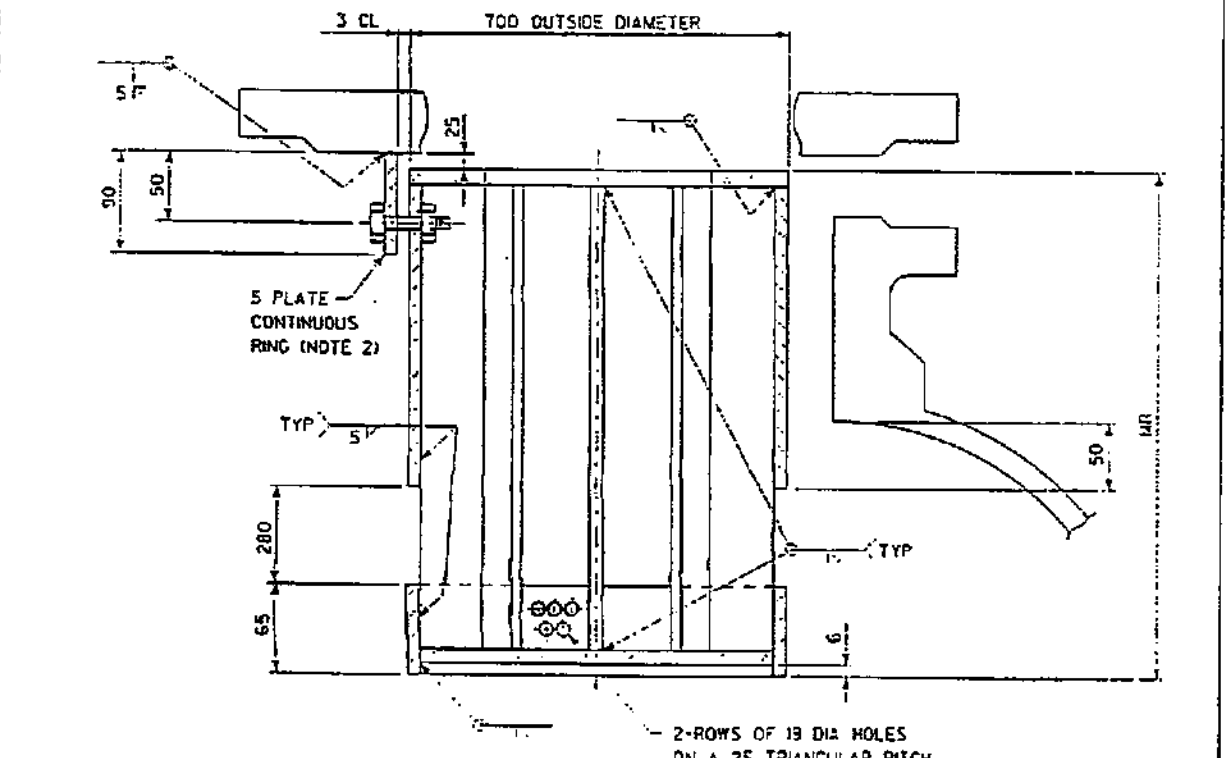
DS-57-D-003 (8/9)

| | | | | | | | | | | | |
|---|--|--|--|---|---------|-----|------|-----|------|----|------|
| Uop 25 East Algonquin Road • PO Box 5017 • Des Plaines, Illinois 60017-5017 • USA | | | | PROJECT SPECIFICATION 560695- 304 - : SHEET 8 | | | | | | | |
| REACTORS | | | | REV | DATE | BY | APVD | REV | DATE | BY | APVD |
| | | | | 0 | 4/19/95 | BPP | | | | | |
| | | | | 1 | 5/17/95 | TLW | TJD | | | | |
| | | | | | | | | | | | |

NAME INLET DISTRIBUTOR DETAIL ITEM ~~D-5705~~ 57-D-03



PLAN



ELEVATION

NOTES:

1. ALL PLATE MATERIAL SHALL BE 5 THICK A240 GR. 347 OR GR. 321 UNLESS NOTED.
2. 5 PLATE CONTINUOUS RING MATERIAL TO MATCH FLANGE MATERIAL.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED.

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C47328-A



DS-57-D-003 (9/9)

Uop

25 East Algonquin Road • PO Box 5017 • Des Plaines, Illinois 60017-5017 • USA

PROJECT SPECIFICATION

560695 - 304 - 1 SHEET 9

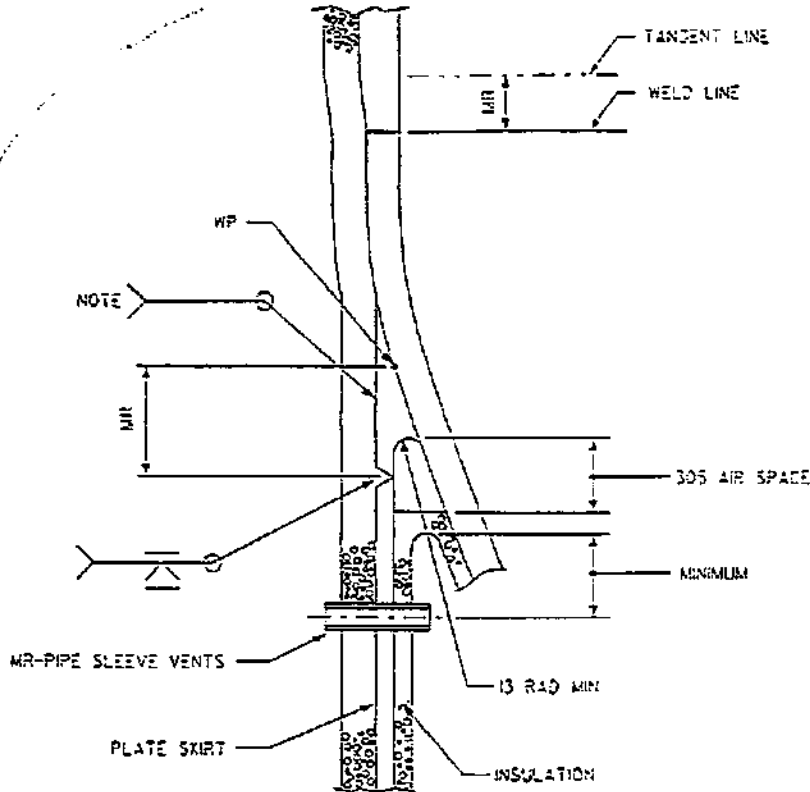
REACTORS

| REV | DATE | BY | APVD | REV | DATE | BY | APVD |
|-----|---------|-----|------|-----|------|----|------|
| 0 | 4/19/85 | BPP | | | | | |
| 1 | 5/12/85 | TLW | TFD | | | | |

SERVICE TATORAY REACTOR

ITEM NO ~~5-3735~~ 57-D-03

SKIRT DETAIL



DETAIL C

NOTES:

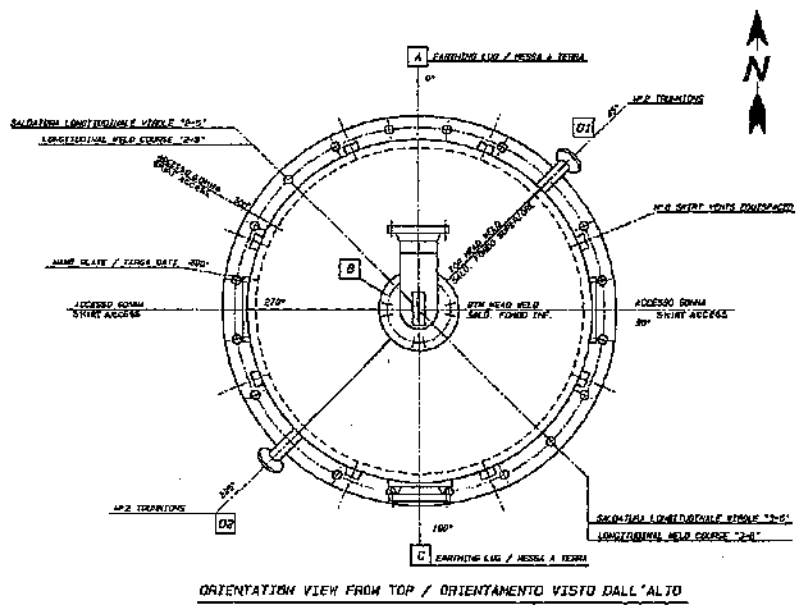
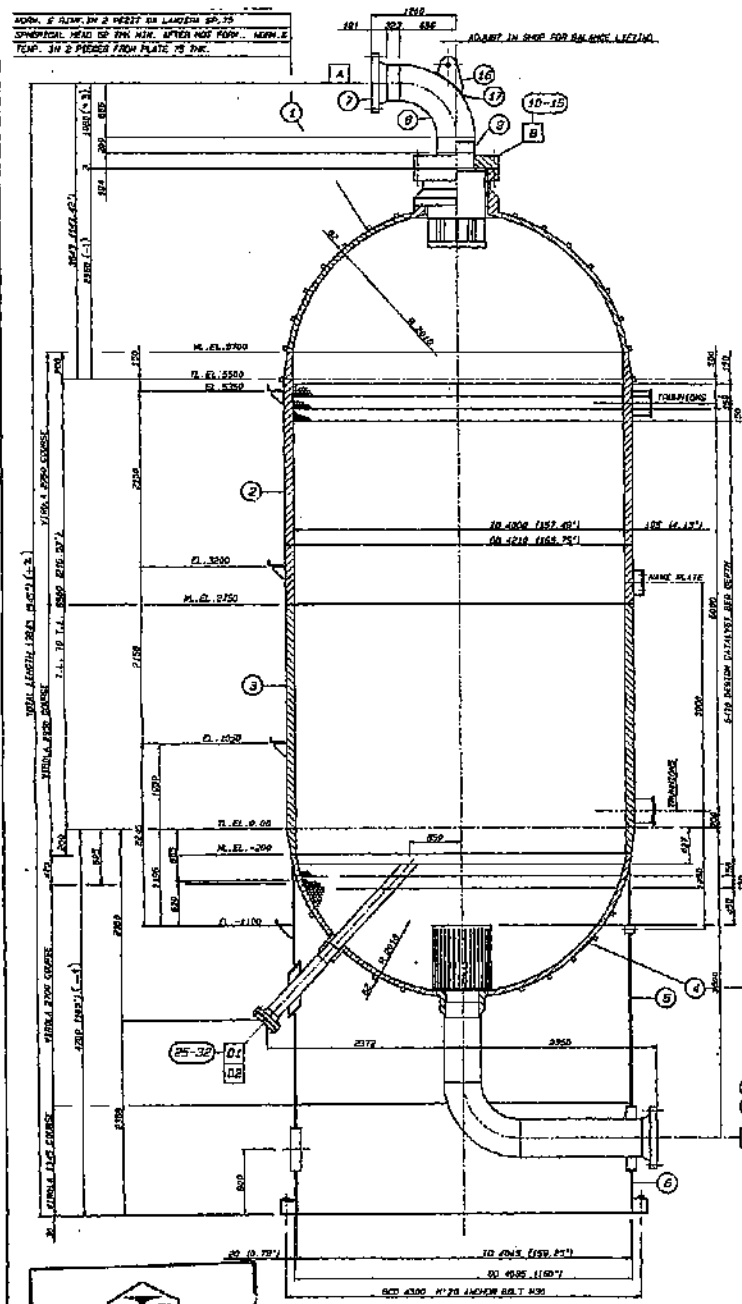
1. THE JOINT BETWEEN THE SUPPORT SKIRT AND BOTTOM HEAD SHALL HAVE THE SMOOTH STREAMLINE GEOMETRY AS SHOWN. THE JOINT DETAIL MAY BE MADE BY FORGING A SINGLE BUTT WELDING COMPONENT INTEGRAL WITH THE VESSEL. WELD METAL BUILD UP OR BUILT UP CONSTRUCTION USING PLATE AND WELD METAL BACKING STRIPS, IF USED, SHALL BE REMOVED AFTER WELDING. WELDS SHALL BE GROUND OR MACHINED TO A SMOOTH, FLUSH CONTOUR. 100% MAGNETIC PARTICLE OR DYE PENETRANT EXAMINATION OF ALL WELD SURFACES SHALL BE PERFORMED AFTER FINAL POSTWELD HEAT TREATMENT.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED.

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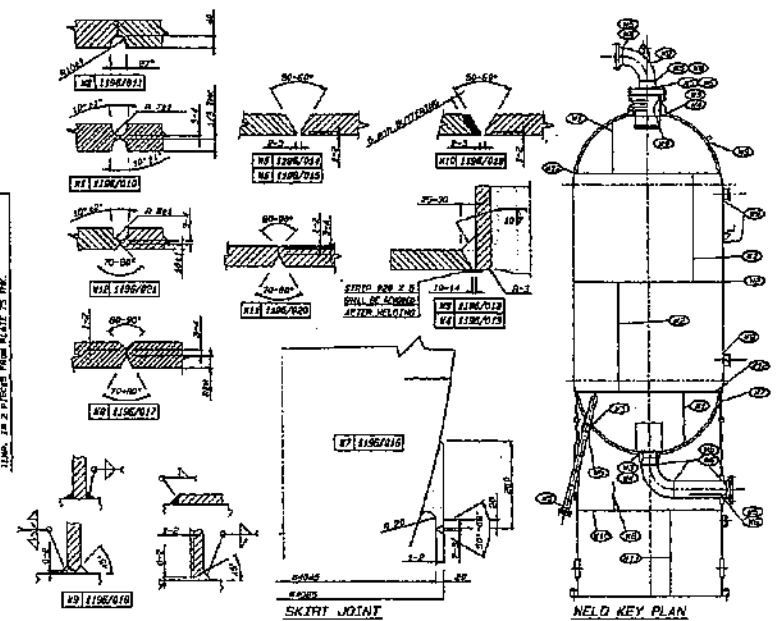
CAT329-A

509099

(1-9)



ORIENTATION VIEW FROM TOP / ORIENTAMENTO VISTO DALL'ALTO



CONSTRUCTION LIST:

- FLANGE CONTACT SURFACE BE FINISHED WITH R20 - 100 μm
- WELD FLANGES AND R20 FINISH TO CONTACT SURFACE
- THE SURFACE OF THE WELD AFTER QUALITY OF FINISHING AND ALL DIMENSIONS AND R20 μm
- INSIDE SURFACE OF WELDED JOINTS BE FINISHED WITH R20 μm
- WELD ATTACHING UNPRESSURIZED COMPONENTS TO PRESSURIZED COMPONENTS COMPATIBILITY SHALL BE FULLY VERIFIED. ALL WELDS SHALL BE ATTACHED TO PRESSURIZED COMPONENTS SHALL BE FINISHED WITH R20 μm
- WELDS SHALL BE FINISHED WITH R20 μm
- ALL WELDS SHALL BE FINISHED WITH R20 μm
- ALL WELDS SHALL BE FINISHED WITH R20 μm
- ALL WELDS SHALL BE FINISHED WITH R20 μm
- ALL WELDS SHALL BE FINISHED WITH R20 μm

| ITEM | QTY | UNIT | DESCRIPTION | REMARKS |
|------|-----|------|-------------|---------|
| 1 | 1 | NO | FLANGE | |
| 2 | 1 | NO | FLANGE | |
| 3 | 1 | NO | FLANGE | |
| 4 | 1 | NO | FLANGE | |
| 5 | 1 | NO | FLANGE | |
| 6 | 1 | NO | FLANGE | |
| 7 | 1 | NO | FLANGE | |
| 8 | 1 | NO | FLANGE | |
| 9 | 1 | NO | FLANGE | |
| 10 | 1 | NO | FLANGE | |
| 11 | 1 | NO | FLANGE | |
| 12 | 1 | NO | FLANGE | |
| 13 | 1 | NO | FLANGE | |
| 14 | 1 | NO | FLANGE | |
| 15 | 1 | NO | FLANGE | |
| 16 | 1 | NO | FLANGE | |
| 17 | 1 | NO | FLANGE | |
| 18 | 1 | NO | FLANGE | |
| 19 | 1 | NO | FLANGE | |
| 20 | 1 | NO | FLANGE | |
| 21 | 1 | NO | FLANGE | |
| 22 | 1 | NO | FLANGE | |
| 23 | 1 | NO | FLANGE | |
| 24 | 1 | NO | FLANGE | |
| 25 | 1 | NO | FLANGE | |
| 26 | 1 | NO | FLANGE | |
| 27 | 1 | NO | FLANGE | |
| 28 | 1 | NO | FLANGE | |
| 29 | 1 | NO | FLANGE | |
| 30 | 1 | NO | FLANGE | |
| 31 | 1 | NO | FLANGE | |
| 32 | 1 | NO | FLANGE | |
| 33 | 1 | NO | FLANGE | |
| 34 | 1 | NO | FLANGE | |
| 35 | 1 | NO | FLANGE | |
| 36 | 1 | NO | FLANGE | |
| 37 | 1 | NO | FLANGE | |
| 38 | 1 | NO | FLANGE | |
| 39 | 1 | NO | FLANGE | |
| 40 | 1 | NO | FLANGE | |
| 41 | 1 | NO | FLANGE | |
| 42 | 1 | NO | FLANGE | |
| 43 | 1 | NO | FLANGE | |
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| 45 | 1 | NO | FLANGE | |
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| 49 | 1 | NO | FLANGE | |
| 50 | 1 | NO | FLANGE | |
| 51 | 1 | NO | FLANGE | |
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| 53 | 1 | NO | FLANGE | |
| 54 | 1 | NO | FLANGE | |
| 55 | 1 | NO | FLANGE | |
| 56 | 1 | NO | FLANGE | |
| 57 | 1 | NO | FLANGE | |
| 58 | 1 | NO | FLANGE | |
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| 60 | 1 | NO | FLANGE | |
| 61 | 1 | NO | FLANGE | |
| 62 | 1 | NO | FLANGE | |
| 63 | 1 | NO | FLANGE | |
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| 65 | 1 | NO | FLANGE | |
| 66 | 1 | NO | FLANGE | |
| 67 | 1 | NO | FLANGE | |
| 68 | 1 | NO | FLANGE | |
| 69 | 1 | NO | FLANGE | |
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| 71 | 1 | NO | FLANGE | |
| 72 | 1 | NO | FLANGE | |
| 73 | 1 | NO | FLANGE | |
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| 75 | 1 | NO | FLANGE | |
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| 77 | 1 | NO | FLANGE | |
| 78 | 1 | NO | FLANGE | |
| 79 | 1 | NO | FLANGE | |
| 80 | 1 | NO | FLANGE | |
| 81 | 1 | NO | FLANGE | |
| 82 | 1 | NO | FLANGE | |
| 83 | 1 | NO | FLANGE | |
| 84 | 1 | NO | FLANGE | |
| 85 | 1 | NO | FLANGE | |
| 86 | 1 | NO | FLANGE | |
| 87 | 1 | NO | FLANGE | |
| 88 | 1 | NO | FLANGE | |
| 89 | 1 | NO | FLANGE | |
| 90 | 1 | NO | FLANGE | |
| 91 | 1 | NO | FLANGE | |
| 92 | 1 | NO | FLANGE | |
| 93 | 1 | NO | FLANGE | |
| 94 | 1 | NO | FLANGE | |
| 95 | 1 | NO | FLANGE | |
| 96 | 1 | NO | FLANGE | |
| 97 | 1 | NO | FLANGE | |
| 98 | 1 | NO | FLANGE | |
| 99 | 1 | NO | FLANGE | |
| 100 | 1 | NO | FLANGE | |

AS BUILT DWG
Date: 02-03-89

ASME STAMP REQUIRED

APPROVED BY ENGINEER, MANAGER: [Signature] DATE: [Date]

APPROVED BY QUAL. CONTROL, MANAGER: [Signature] DATE: [Date]

REVIEWED BY AUTHOR, INSPECTOR: [Signature] DATE: [Date]

DATE: [Date]

NATIONAL BOARD NUMBER: [Number]

| ITEM | REVISIONS DESCRIPTION | DATE | BY | APPV | DATE |
|------|---|-------|-------------|-------------|-------|
| 1 | ISSUED FOR APPROVAL/DESIGN FOR APPROVAL | 11/96 | [Signature] | [Signature] | 11/96 |
| 2 | REVISED ACCORDING TO DESIGN COMMENTS | 11/96 | [Signature] | [Signature] | 11/96 |
| 3 | REVISED AS SHOWN | 11/96 | [Signature] | [Signature] | 11/96 |
| 4 | REVISED AS SHOWN | 11/96 | [Signature] | [Signature] | 11/96 |
| 5 | REVISED AS SHOWN | 11/96 | [Signature] | [Signature] | 11/96 |

OFFICINE LUIGI RESTA S.p.A.
TELEX 34070 TELEFON 06248
SCADAPRODUTTE 001-CORSA SUPINA, 40-101, 00184 ROMA

CLIENT: [Name]

SCALE: 1:1

SOURCE: YATOVAY REACTOR

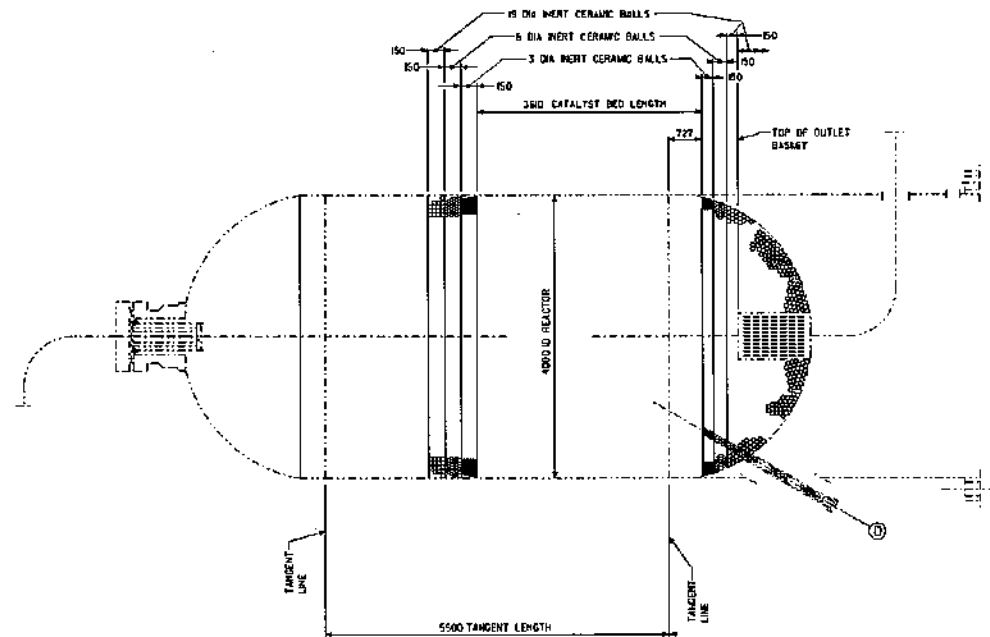
ITEM: 57-D-03

ASSEMBLY 061166

JOB: 11/96/2

4840

4547



REACTOR SECTIONAL ELEVATION

LEGEND

— NEW
 - - - EXISTING

NOTES:

1. WORK THIS DRAWING WITH UOP PROJECT SPECIFICATION 951609-304.
2. ALL INERT CERAMIC BALLS SHALL BE TYPE I AND SHALL COMPLY WITH THE REQUIREMENTS OF UOP STANDARD SPECIFICATION 3-37.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED.
4. CUSTOMER/CONTRACTOR SHALL VERIFY THAT THE STRUCTURAL AND MECHANICAL CONDITION OF THE EXISTING VESSEL, SUPPORT AND FOUNDATION ARE SATISFACTORY FOR CONTINUING OPERATION AT THE REVAMP DESIGN CONDITIONS AND UNDER CURRENT APPLICABLE CODES AND PRACTICES.
5. CUSTOMER/CONTRACTOR TO VERIFY EXISTING DIMENSIONS IN FIELD.
6. NOZZLES NOT LISTED IN THE NOZZLE DESIGNATION TABLE ARE NOT REQUIRED BY UOP AND HAVE NOT BEEN REVIEWED.

DESIGN DATA

NOZZLES AND MANWAYS

| <p>SPECIFICATION</p> <p>DESIGN CONDITIONS:</p> <p>INTERNAL: 34 bar (g) @ 58°C</p> <p>EXTERNAL: FULL VACUUM @ 49°C</p> <p>MINIMUM DESIGN METAL TEMPERATURE:</p> <p>OPERATING CONDITIONS: MAXIMUM 455°C</p> <p>RADIOGRAPH</p> <p>POSTWELD HEAT TREAT:</p> <p>JOINT EFFICIENCY</p> <p>REACTOR HEADS</p> | | <p>MATERIALS (UNLESS NOTED):</p> <p>SHELL AND HEADS</p> <p>INTERNAL PLATE</p> <p>INTERNAL BOLTING</p> <p>CORROSION ALLOWANCES</p> <p>CATALYST AND INERT CERAMIC BALL DESIGN DATA</p> <p>DESIGN CATALYST DENSITY: 76 kg/m³</p> <p>DESIGN CERAMIC/ALUMINA BALLS DENSITY: 2100 kg/m³</p> <p>ACCESSORIES SUPPLIED BY FABRICATOR:</p> <p>LADDERS AND PLATFORM CLIPS</p> <p>INSULATION CLIPS AND RINGS</p> <p>REACTOR SUPPORT SKIRT</p> | | <table border="1"> <thead> <tr> <th>MARK</th> <th>NO</th> <th>SIZE INCHES</th> <th>SERVICE</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td></td> <td>1</td> <td>18</td> <td>INLET</td> <td></td> </tr> <tr> <td></td> <td>1</td> <td>20 ID</td> <td>MANWAY</td> <td></td> </tr> <tr> <td></td> <td>1</td> <td>18</td> <td>OUTLET</td> <td></td> </tr> <tr> <td>0</td> <td>2</td> <td>6</td> <td>CATALYST WITHDRAWAL</td> <td>CUSTOMER/CONTRACTOR RESPONSIBLE FOR ANY MODIFICATION TO WITHDRAWAL NOZZLE SLEEVE TO ENSURE IT IS AT APPROPRIATE LEVEL WITHIN THE REACTOR PER UOP STANDARD DRAWING 3-225. FILL TOP 150 OF SLEEVE WITH 3 DIA INERT CERAMIC BALLS. FILL REMAINING LENGTH OF SLEEVE WITH 6 DIA INERT CERAMIC BALLS.</td> </tr> </tbody> </table> | | MARK | NO | SIZE INCHES | SERVICE | REMARKS | | 1 | 18 | INLET | | | 1 | 20 ID | MANWAY | | | 1 | 18 | OUTLET | | 0 | 2 | 6 | CATALYST WITHDRAWAL | CUSTOMER/CONTRACTOR RESPONSIBLE FOR ANY MODIFICATION TO WITHDRAWAL NOZZLE SLEEVE TO ENSURE IT IS AT APPROPRIATE LEVEL WITHIN THE REACTOR PER UOP STANDARD DRAWING 3-225. FILL TOP 150 OF SLEEVE WITH 3 DIA INERT CERAMIC BALLS. FILL REMAINING LENGTH OF SLEEVE WITH 6 DIA INERT CERAMIC BALLS. |
|---|----|---|---------------------|---|--|------|----|-------------|---------|---------|--|---|----|-------|--|--|---|-------|--------|--|--|---|----|--------|--|---|---|---|---------------------|---|
| MARK | NO | SIZE INCHES | SERVICE | REMARKS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 18 | INLET | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 20 ID | MANWAY | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 18 | OUTLET | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 2 | 6 | CATALYST WITHDRAWAL | CUSTOMER/CONTRACTOR RESPONSIBLE FOR ANY MODIFICATION TO WITHDRAWAL NOZZLE SLEEVE TO ENSURE IT IS AT APPROPRIATE LEVEL WITHIN THE REACTOR PER UOP STANDARD DRAWING 3-225. FILL TOP 150 OF SLEEVE WITH 3 DIA INERT CERAMIC BALLS. FILL REMAINING LENGTH OF SLEEVE WITH 6 DIA INERT CERAMIC BALLS. | | | | | | | | | | | | | | | | | | | | | | | | | | |



| | | | | | | | | | |
|--|------|-------|-------|------------------|------|--------|-----|-------|------|
| REV | DATE | BY | APP'D | DATE | REV | DATE | BY | APP'D | DATE |
| <p>UOP</p> <p>UOP LLC 25 East Algonquin Road Des Plaines, Illinois 60018-1037 USA</p> <p>REACTOR SECTIONAL ELEVATION ITEM NO. 57-D-03 TATORAY PROCESS UNIT</p> <p>ARABIAN INDUSTRIAL FIBERS COMPANY (IBF RUSHD) IR-2 PROJECTS: SULFONLINE AND AROMATICS DEN PROJECT YAMBU, KINGDOM OF SAUDI ARABIA</p> | | | | | | | | | |
| DATE | CHK | APP'D | DATE | PROJECT | TYPE | CHK NO | REV | | |
| PRK | PRK | RTS | 09 | 951609-304-01-A1 | 0 | | | | |

SCALE: NONE

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UOP

UOP LLC • 25 East Algonquin Road • Des Plaines, Illinois 60017-5017 • USA

PROJECT SPECIFICATION

932685 — 304

SHEET 1

REACTORS

| REV | DATE | BY | APVD | REV | DATE | BY | APVD |
|-----|---------|-----|------|-----|------|----|------|
| 0 | 03NOV06 | SJS | JRG | | | | |
| | | | | | | | |
| | | | | | | | |

Tatoray Process Unit (Revamp)

DEC 11 2006 10:00 AM

Sheet

General Notes

2

List of Reactor Drawings

2

AS-BUILT

Revision Indication



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Revision Indication



UOP LLC • 25 East Algonquin Road • Des Plaines, Illinois 60017-6017 • USA

PROJECT SPECIFICATION

932685 — 304

SHEET 2

REACTORS

| REV | DATE | BY | APVD | REV | DATE | BY | APD |
|-----|---------|-----|------|-----|------|----|-----|
| 0 | 03NOV06 | SJS | JRG | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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General Notes

- Notes Applicable For Existing Reactor
- A. Customer/Contractor shall verify that the structural and mechanical condition of the existing reactor, support and foundation are satisfactory for continuing operation at the revamp design conditions and under current applicable codes and practices.
- B. Customer/Contractor to verify existing dimensions in field.
- C. Vacuum design is specified for reactor that can undergo a vacuum condition for the following scenarios:
 1. Process fluid is allowed to cool.
 2. Vacuum condition during start-up or shutdown.

List of Reactor Drawings

For reactor details see the following UOP Drawings:

| <u>Drawing Number</u> | <u>Revision</u> | <u>Title</u> |
|-----------------------|-----------------|-----------------------------|
| 932685-304-01-A1 | 0 | Reactor Sectional Elevation |
| 932685-304-02-A1 | 0 | Catalyst Withdrawal |

List of Fabricator Drawings

The following drawings were used as reference material for UOP drawings 932685-304-01-A1 and 932685-304-02-A1:

| <u>Fabricator</u> | <u>Drawing Number</u> | <u>Revision</u> | <u>Title</u> |
|----------------------|-----------------------|-----------------|-------------------------------------|
| OFFICINE LUIGI RESTA | 4647 | 4 | Tatoray Reactor Assembly |
| OFFICINE LUIGI RESTA | 4647/A | 0 | Reactor Details |
| COSTACURTA | B.96.669 | 3 | Removable Internals Tatoray Reactor |

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

REGENERATION GAS DRIER DATA SHEET

DOCUMENT NO:

DS-57-DA-512

| | | | | | | | | |
|-----------|--------------------|-----|------|-------|-----------|----------------------|---|------------------|
| | | | | | | ابن رشد ibn rushd | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | CTCI CORPORATION |
| CERTIFIED | | | | | | | | |
| 2 | Revised As Marked | CAG | CMW | YSL | 14-Ab-11 | PROJ. | | |
| 1 | Issued For Design | CAG | CBC | YSL | 26-Apr-11 | MGR | DATE | |
| 0 | Issue For Approval | CAG | CMW | YSL | 9-Mar-11 | CLIENT | DATE | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | | XC32B-57-512 |

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GN-504 84.10

ابن رشد سابق
 ابن رشد سابق



REGENERATION GAS DRIER
 DATA SHEET

XC32B-57-512

2 OF 2

DATE
 14-Nov.-2011

REV.
 2

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| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 57-D-12 A-C | 1 THRU 2 OF 2 | 2 | 14-Nov.-2011 |

Attachment total 2 pages.

ابن رشيد
ibn rushid

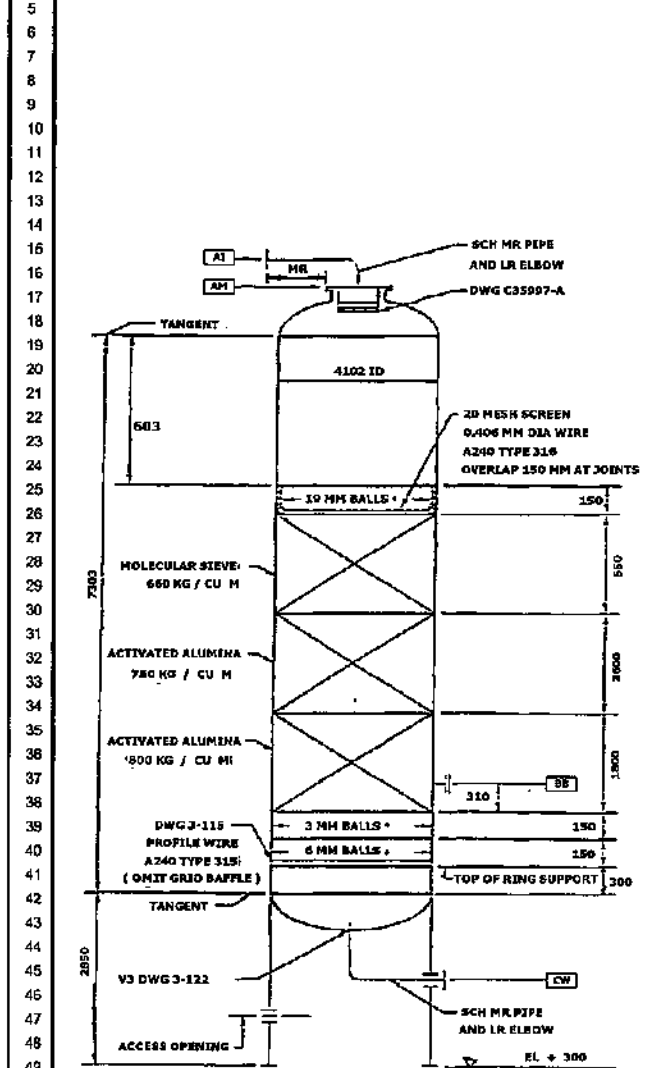
VERTICAL VESSEL
DATASHEET

Contract: 10E0541A01
Equip. No.: 57-D-12 A-C
Revision: 2 Date: 14-Nov.-2011
Unit: 57 - Taloray
PO No.:
Document No. DS-57-DA-512
Sheet: 1 of 2



CLIENT: Arabian Industrial Fibers Company (Ibn Rushid) PLANT: Taloray
SERVICE: Regeneration Gas Drier SITE: Yanbu, Kingdom of Saudi Arabia

DESIGN SKETCH
VESSEL DIMENSIONS: ID: 4102 mm T/T: 7303 mm



DESIGN CONDITIONS

| | | | |
|-----------------------------|-----------------|----|-------------|
| Pressure: | (Note 2) bar(g) | at | (Note 2) °C |
| Vacuum: | FV bar(g) | at | 260 °C |
| Min. Metal Temperature: | 9 (Note 13) °C | at | MAWP bar(g) |
| Liquid Level: | EMPTY mm | | |
| Specific Gravity of Liquid: | N/A at °C | | |

OPERATING CONDITIONS

| | | | |
|-------------------------|-----------------|----|-------------|
| Pressure: | (Note 3) bar(g) | at | (Note 3) °C |
| Vacuum: | bar(g) | at | °C |
| Low Temperature: | °C | at | °C |
| Hydrogen Partial Press. | bar(g) | at | °C |

INTERNALS & INSULATION

| DESCRIPTION | Bulk Density kg/cm3 | Liquid Holdup vol% | Pressure Drop bar |
|------------------|---|--------------------|-------------------|
| Packing: | | | |
| Catalyst: | | | |
| Mist Eliminator: | | | |
| Insulation | Hot <input checked="" type="checkbox"/> Cold <input type="checkbox"/> | | |
| Fire Proofing | Yes <input type="checkbox"/> No <input type="checkbox"/> | | |

CONSTRUCTION

| | Materials | Corrosion Allowance |
|-------------|-----------|---------------------|
| Shell: | SA-516-70 | 3 mm |
| Head | SA-516-70 | 3 mm |
| Body flange | | mm |

SPECIAL CONDITIONS

| | |
|---------------------------------------|---|
| Stress Relieve (Process Reason Only): | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Vessel in Wet Sour Service: | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| Steamout Required: | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |

See Notes on Page 2

FLUOR'S OPINION OF THE ESTIMATED MECHANICAL WEIGHTS (kg)

| | |
|---------------|--|
| FABRICATED | |
| EMPTY | |
| OPERATING | |
| FULL OF WATER | |

FLUOR'S OPINION OF THE ESTIMATED WALL THICKNESS (mm)

| | |
|----------|--|
| TOP HEAD | |
| SHELL | |
| BTM HEAD | |
| LEG | |



CHIYODA CORPORATION

CLIENT : IBN RUSHD
 PROJECT : PTA & AROMATICS -
 TITLE : AROMATICS
 JOB NO. : 51046
 DOC. NO. : 15-51-D-212

| | | REVISIONS | | | |
|------|------------|------------|------------|---|---|
| MARK | | ① | ② | ③ | ④ |
| APRD | | | | | |
| CHKD | | | | | |
| MADE | | | | | |
| DATE | Mar 08 '96 | APR 11 '96 | JUN 30 '96 | | |

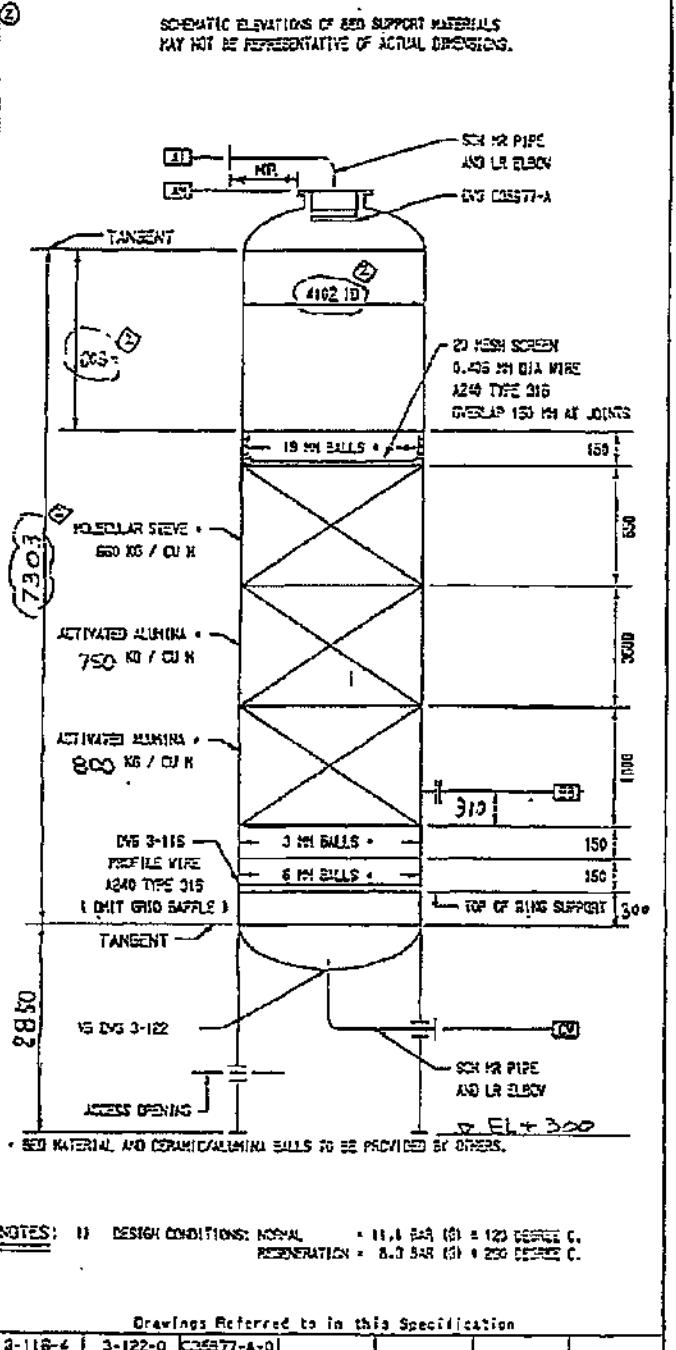
FOR RECORD

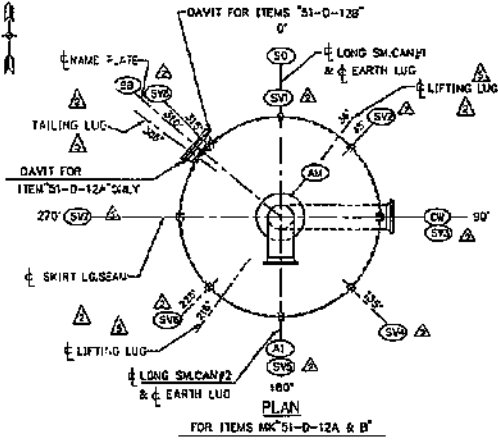
| | | |
|---|--|----------|
| UOP 25 East Algonquin Road • PO Box 5017 • Oak Plains, Illinois 60457-5017 • U.S.A. | PROJECT SPECIFICATION 580689 - 301 - 2 SHEET 14 | |
| | REV | DATE |
| | 05-2-95 | |
| 1 | 12-16-95 | MAG IMA6 |
| 2 | 1-5-96 | MRS IMA6 |

| | | | |
|---------|-------------------------------------|---------|----------|
| SERVICE | RECYCLE GAS DRIERS (THREE REQUIRED) | ITEM NO | 51-D-212 |
|---------|-------------------------------------|---------|----------|

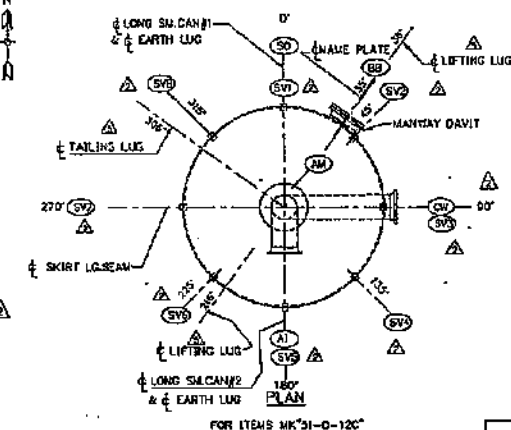
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| | | | |
|---------------------------------------|-------------------------|-------------------|------------|
| Design | INT NOTE-C | BY CONTRACTOR | |
| Conditions at Top | EXT FULL VACUUM @ 210°C | | |
| Operating Conditions | NORMAL | 25°C | |
| Regeneration | | 250°C | |
| Radiograph | NR | | |
| Postweld Heat Treat | NR | | |
| Joint Efficiency | NR | | |
| Material Specifications | | | |
| Heads | SA 516-70 | | |
| Shell | SA 516-70 | | |
| Shell | Thickness | Corrosion Allowed | |
| | Code-ns | mm. (Min) | |
| | | 3 | |
| Heads | | 3 | |
| Vessel Heads | | | |
| Top Head | 2:1 ELLIPTICAL | | |
| Bottom Head | 2:1 ELLIPTICAL | | |
| Accessories Applied by Fabricator | | | |
| Ladder & Platform Clips | AS REQUIRED (N) | | |
| Insulation Clips & Rings | YES | | |
| Vessel Support | YES | | |
| Nozzles and Manways | | | |
| Mark | No | Size Inches | Service |
| AI | 1 | 20 | INLET |
| AM | 1 | 30 | MANWAY (*) |
| BS | 1 | 24 | MANWAY |
| CV | 1 | 20 | OUTLET |
| CT4ss - ANSI CL150 (*) SHEET 2-NOTE A | | | |
| Facing - RAISED FACE | | | |
| Normal Liquid Level - EMPTY | | | |
| Specific Gravity - N/A | | | |

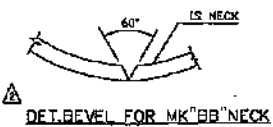




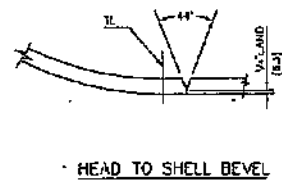
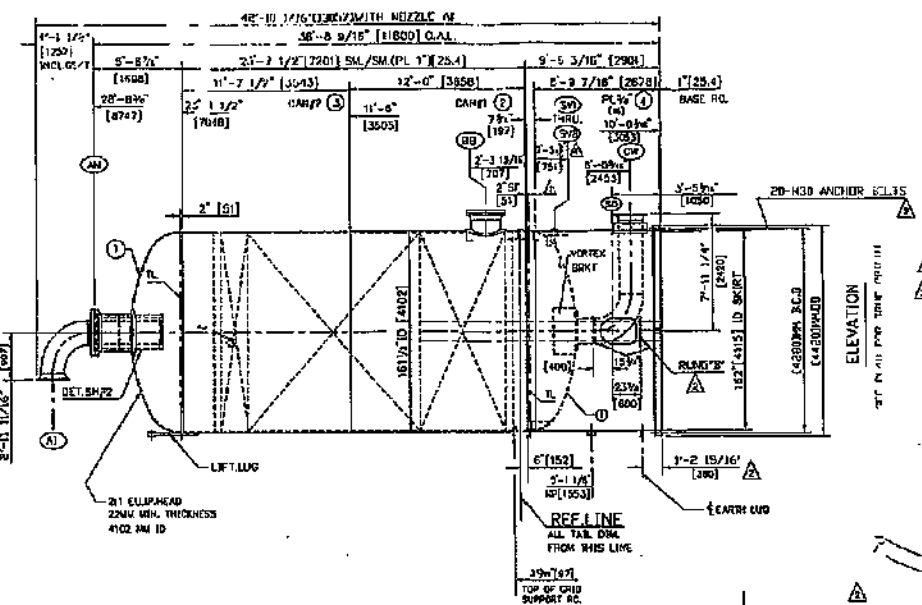
FOR ITEMS MK'51-D-12A & B'



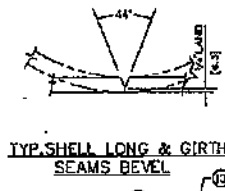
FOR ITEMS MK'51-D-12C"



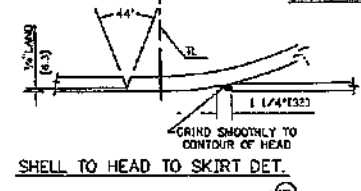
DET. BEVEL FOR MK'BB'NECK



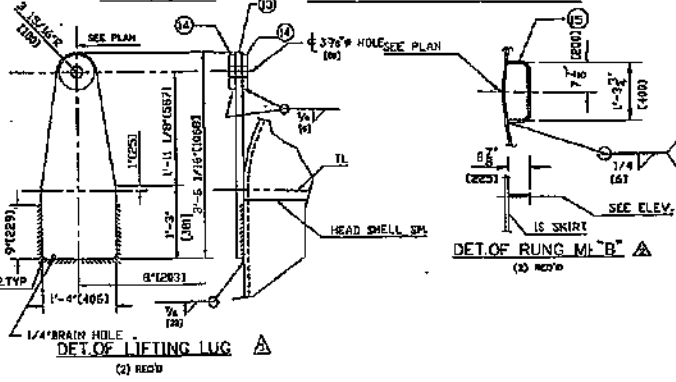
HEAD TO SHELL BEVEL



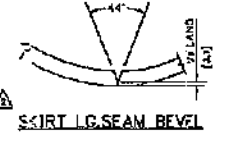
TYP. SHELL LONG & GIRTH SEAMS BEVEL



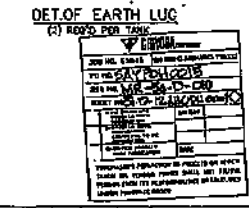
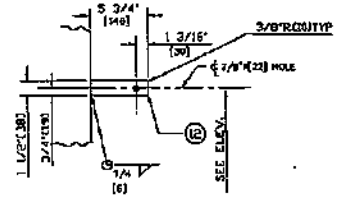
SHELL TO HEAD TO SKIRT DET.



DET. OF LIFTING LUG



SKIRT LG. SEAM BEVEL



DET. OF EARTH LUG

INSPECTION RECORD

| NO. | DATE | BY | REMARKS |
|-----|---------|-----|---------|
| 1 | 2-11-68 | ... | ... |
| 2 | 2-11-68 | ... | ... |
| 3 | 2-11-68 | ... | ... |
| 4 | 2-11-68 | ... | ... |
| 5 | 2-11-68 | ... | ... |
| 6 | 2-11-68 | ... | ... |
| 7 | 2-11-68 | ... | ... |
| 8 | 2-11-68 | ... | ... |
| 9 | 2-11-68 | ... | ... |
| 10 | 2-11-68 | ... | ... |
| 11 | 2-11-68 | ... | ... |
| 12 | 2-11-68 | ... | ... |
| 13 | 2-11-68 | ... | ... |
| 14 | 2-11-68 | ... | ... |
| 15 | 2-11-68 | ... | ... |
| 16 | 2-11-68 | ... | ... |
| 17 | 2-11-68 | ... | ... |
| 18 | 2-11-68 | ... | ... |
| 19 | 2-11-68 | ... | ... |
| 20 | 2-11-68 | ... | ... |
| 21 | 2-11-68 | ... | ... |
| 22 | 2-11-68 | ... | ... |
| 23 | 2-11-68 | ... | ... |
| 24 | 2-11-68 | ... | ... |
| 25 | 2-11-68 | ... | ... |
| 26 | 2-11-68 | ... | ... |
| 27 | 2-11-68 | ... | ... |
| 28 | 2-11-68 | ... | ... |
| 29 | 2-11-68 | ... | ... |
| 30 | 2-11-68 | ... | ... |



| ITEM NO. | QTY. | DESCRIPTION | MATERIAL | REMARKS | PART NAME |
|----------|------|-------------|----------|---------|-----------|
| 1 | 2 | 2\"/> | | | |

125-150 RMS (3.2-6.3 MICRON) FLANGE FINISH
MAX CARBON CONTENT OF CARBON STEELS SHALL BE LIMITED TO 0.25%
ALL DIMENSIONS SHOWN IN BRACKETS ARE IN MILLIMETERS

| ITEM NO. | QTY. | DESCRIPTION | MATERIAL | REMARKS | PART NAME |
|----------|------|--------------------|----------|---------|-----------|
| SK-8 | 4 | SKIRT JOINT | SCND | | |
| SK-9 | 1 | SKIRT OPENING | PL 18 | | |
| SK-10 | 1 | SKIRT SLEEVE AT CN | PL 18 | | |
| CW-1 | 1 | 20\"/> | | | |

| DATE | BY | REVISION | DESCRIPTION |
|---------|-----|----------|------------------------------------|
| 2-11-68 | ... | 1 | ISSUED FOR FABRICATION |
| 2-11-68 | ... | 2 | OPERATION OF LIFTING & TAILING LUG |
| 2-11-68 | ... | 3 | REVISION OF SKIRT SEAMS |
| 2-11-68 | ... | 4 | REVISION OF LIFTING LUG |
| 2-11-68 | ... | 5 | REVISION OF SKIRT LONG SEAM BEVEL |
| 2-11-68 | ... | 6 | ADDED SKIRT LONG SEAM ELEVATION |
| 2-11-68 | ... | 7 | REVISION OF EARTH LUG DETAIL |
| 2-11-68 | ... | 8 | REVISION OF LIFTING LUG DETAIL |
| 2-11-68 | ... | 9 | REVISION OF SKIRT LONG SEAM BEVEL |
| 2-11-68 | ... | 10 | REVISION OF EARTH LUG DETAIL |
| 2-11-68 | ... | 11 | REVISION OF LIFTING LUG DETAIL |
| 2-11-68 | ... | 12 | REVISION OF SKIRT LONG SEAM BEVEL |
| 2-11-68 | ... | 13 | REVISION OF EARTH LUG DETAIL |
| 2-11-68 | ... | 14 | REVISION OF LIFTING LUG DETAIL |
| 2-11-68 | ... | 15 | REVISION OF SKIRT LONG SEAM BEVEL |
| 2-11-68 | ... | 16 | REVISION OF EARTH LUG DETAIL |
| 2-11-68 | ... | 17 | REVISION OF LIFTING LUG DETAIL |
| 2-11-68 | ... | 18 | REVISION OF SKIRT LONG SEAM BEVEL |
| 2-11-68 | ... | 19 | REVISION OF EARTH LUG DETAIL |
| 2-11-68 | ... | 20 | REVISION OF LIFTING LUG DETAIL |

ALLIED INDUSTRIES, INC.
HOUSTON, TX
150-1601 CERTIFIED
ITEM NO. 51-D-12A, B, C
TYPE (3) 48\"/>

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GN-502 84.10



ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

BENZENE COLUMN DATA SHEET

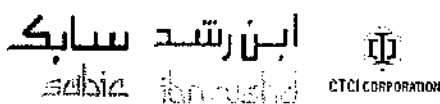
DOCUMENT NO:

DS-58-CA-501

| | | | | | | | | |
|-----|--------------------|-----|------|-------|-----------|------------------------|---|--------------|
| | | | | | | ابن رشيد ibn.rushid | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | |
| | | | | | | CERTIFIED | | |
| 1 | Issued For Design | CAG | CMW | YSL | 31-Mar-11 | PROJ. MGR | S P L for | DATE 3/31/11 |
| 0 | Issue For Approval | CAG | CMW | YSL | 9-Mar-11 | CLIENT | | DATE |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | | XC32A-58-501 |

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GN-504 84.10



**BENZENE COLUMN
DATA SHEET**

XC32A-58-501

2 OF 2

DATE
31-Mar.-2011

REV.

1

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| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 58-C-01 | 1 THRU 2 OF 2 | 1 | 31-Mar.-2011 |

Attachment total 1 page.

ابن رشيد
ibn.rushid

COLUMN
DATASHEET

Contract: 10E0541A01
Equip. No.: 58-C-01
Revision: 1 Date: 31-Mar.-2011
Unit: 58 - BT Fractionation
PO No.:
Document No.: DS-58-CA-501
Sheet: 1 of 2

سابك
SABIC



CTCI CORPORATION

REV

| | | | | |
|----|---|---|--------------------------|----------------------|
| 1 | Client: Arabian Industrial Fibers Company | Plant: BT Fractionation | | |
| 2 | Service: Benzene Column | Site: Yanbu, Kingdom of Saudi Arabia | | |
| 3 | DESIGN SKETCH | | | |
| 4 | VESSEL DIMENSIONS ID: 5200 mm T/T: 42300 mm | | | |
| 5 | | | | |
| 6 | | | DESIGN CONDITIONS | |
| 7 | | | Pressure: | 3.5 bar(g) at 179 °C |
| 8 | | | Vacuum: | FV bar(g) at 151 °C |
| 9 | | | Min. Metal Temp: | 9 °C at MAWP bar(g) |
| 10 | | | Liquid Level: | Note1 mm |
| 11 | Specific Gravity of Liquid: | 0.751 at °C | | |
| 12 | OPERATING CONDITIONS | | | |
| 13 | Pressure: | Note 2 bar(g) at Note 2 °C | | |
| 14 | Vacuum: | - bar(g) at - °C | | |
| 15 | Low Temperature: | - °C at - °C | | |
| 16 | Hydrogen Partial Press. | - bar(a) at - °C | | |
| 17 | INTERNALS & INSULATION | | | |
| 18 | DESCRIPTION | Bulk Density kg/m ³ | Liquid Holdup vol% | Pressure Drop bar |
| 19 | Packing: | | | |
| 20 | Catalyst: | | | |
| 21 | Mist Eliminator: | | | |
| 22 | Insulation | 40/50 mm Hot <input type="checkbox"/> Cold <input type="checkbox"/> | | |
| 23 | Fire Proofing | 76 mm Yes <input type="checkbox"/> No <input type="checkbox"/> | | |
| 24 | CONSTRUCTION | | | |
| 25 | | Materials | Corrosion Allowance | |
| 26 | Shell: | SA-516-60 | 3 mm | |
| 27 | Heads | SA-516-60 | 3 mm | |
| 28 | Support | | mm | |
| 29 | SPECIAL CONDITIONS | | | |
| 30 | Stress Relieve (Process Reason Only): | Yes <input type="checkbox"/> No <input type="checkbox"/> | | |
| 31 | Vessel in Wet Sour Service: | Yes <input type="checkbox"/> No <input type="checkbox"/> | | |
| 32 | Steamout Required: | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | | |
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ابن رشيد
ibn rushd

COLUMN
DATASHEET

Contract: 10E0541A01
Equip. No.: 58-C-01
Revision: 1 Date: 31-Mar.-2011
Unit: 58 - BT Fractionation
PO No.:
Document No.: DS-58-CA-501
Sheet: 2 of 2



REV

NOZZLE SCHEDULE

| Tag | Qty. | Size in | Pressure Rating | Description |
|--------|------|---------|-----------------|----------------------------|
| AI | 1 | 8 | 150# RFWN | REFLUX |
| AM | 1 | 24 | 150# RFWN | MANWAY W/ B.F |
| AO | 1 | 28 | 150# RFWN | VAPOR OUT |
| AV | 1 | 3 | 150# RFFN | VENT |
| BU1-2 | 2 | 1 ID | 150# RFLWN | TDRG-TI |
| CO | 1 | 6 | 150# RFWN | PRODUCT |
| DU 1-2 | 2 | 1 ID | 150# RFLWN | TDRG-TI |
| EM | 1 | 24 | 300# RFWN | MANWAY W/ B.F & DAVIT |
| EU 1-2 | 2 | 1 ID | 150# RFLWN | TDRG-TI |
| FU 1-2 | 2 | 1 ID | 150# RFLWN | TDRG-TI |
| GU 1-2 | 2 | 1 ID | 150# RFLWN | TDRG-TI |
| HI | 1 | 8 | 150# RFWN | FEED |
| HM | 1 | 24 | 150# RFWN | MANWAY W/ B.F & DAVIT |
| IM | 1 | 24 | 150# RFWN | MANWAY W/ B.F & DAVIT |
| IU 1-2 | 2 | 1 ID | 150# RFLWN | TDRG-TI |
| J1 1-2 | 2 | 30 | 150# RFWN | REBOILER IN |
| JL 1-2 | 2 | 2 | 150# RFWN | LEVEL |
| JM | 1 | 24 | 150# RFWN | MANWAY W/ B.F & DAVIT |
| JS | 1 | 3 | 150# RFWN | STEAMOUT (Note 9) |
| KO | 1 | 24 | 150# RFWN | BTMS OUT W/ VORTEX BREAKER |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
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| | | | | |

- NOTES:
- Normal liquid level (NLL) is 970 mm above bottom tangent line. HLL: 1214 mm, LLL: 727 mm.
 - Operating Pressure/Temperature=Top: 0.41 bar(g)/91°C; Bottom: 1.03 bar(g)/156°C.
 - Total pressure drop through column internals = 0.496 bar.
 - Vendor shall follow UOP standard 3-115, 3-122, 3-180, 3-148, 3-180, 3-204.
 - Ladder & Platform Clips: as required.
 - Insulation Clips & Rings: Yes.
 - Vessel Support: Yes.
 - Vessel Heads=Top: 2:1 Elliptical; Bottom: 2:1 Elliptical.
 - Steamout at 150 (232 max.) °C and 3.5 (4.1 max.) bar (g).
 - Existing column, blank 35% of holes in top section and middle section and 50% holes in the bottom section trays, Skirt 7300 mm.

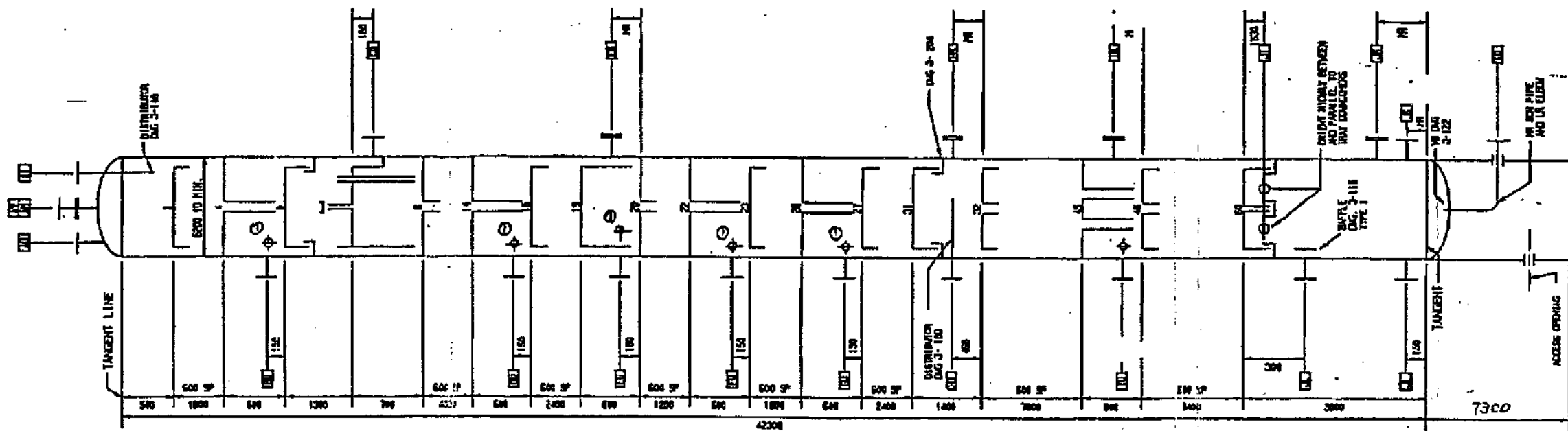
| | | | | | |
|-------|------|------------|------------|--|--|
| ICS - | APRD | | | | |
| | CHKD | | | | |
| | MADE | | | | |
| (1/1) | DATE | Feb 26 '76 | Jan 21 '77 | | |

U.S.A.

ITEM NO 58-C-01 @500+

PROJECT SPECIFICATION
560696 - 301 - 1 SHEET 3

| REV | DATE | BY | APP'D | REV | DATE | BY | APP'D |
|-----|---------|--------|-------|-----|------|----|-------|
| 0 | 1/1/75 | | | | | | |
| 1 | 1/21/76 | J.W.R. | A.K. | | | | |



Drawings Referred to in this Specification

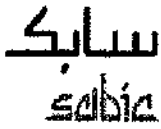
| | | | | | | | | |
|---------|---------|---------|---------|---------|--|--|--|--|
| 3-115-2 | 3-122-6 | 3-148-2 | 3-186-1 | 3-204-2 | | | | |
|---------|---------|---------|---------|---------|--|--|--|--|

509136

593

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GN-502 84.10



ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT


PROJECT NO. 10E0541A01

DOCUMENT TITLE:

CLAY TREATERS

DOCUMENT NO:

DS-58-DA-504

| | | | | | | | | | |
|-----|--------------------|-----|------|-------|-----------|------------------------|--|---|------------------|
| | | | | | | ابن رشيد ibn rushid | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA |  | CTCI CORPORATION |
| 3 | Revised as Marked | WCC | CMW | YSL | 14-10-11 | CERTIFIED | | | |
| 2 | Revised as Marked | WCC | CMW | YSL | 11-Aug-11 | PROJ. | | | |
| 1 | Issued for Design | WCC | CMW | YSL | 26-Apr-11 | MGR _____ | | DATE _____ | |
| 0 | Issue For Approval | WCC | CMW | YSL | 9-Mar-11 | CLIENT _____ | | DATE _____ | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | | XC32B-58-504 | |

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| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 58-D-04A/B | 1 THRU 2 OF 2 | 3 | 14-Nov.-2011 |

GN-504 84.10

ابن رشد سابق
 ابن رشد سابق



CLAY TREATERS
 DATA SHEET

XC32B-58-504

2 OF 2

DATE
 14-Nov.-2011

REV.

3

ابن رشيد
ibn rushid
FLUOR.

VERTICAL VESSEL DATASHEET

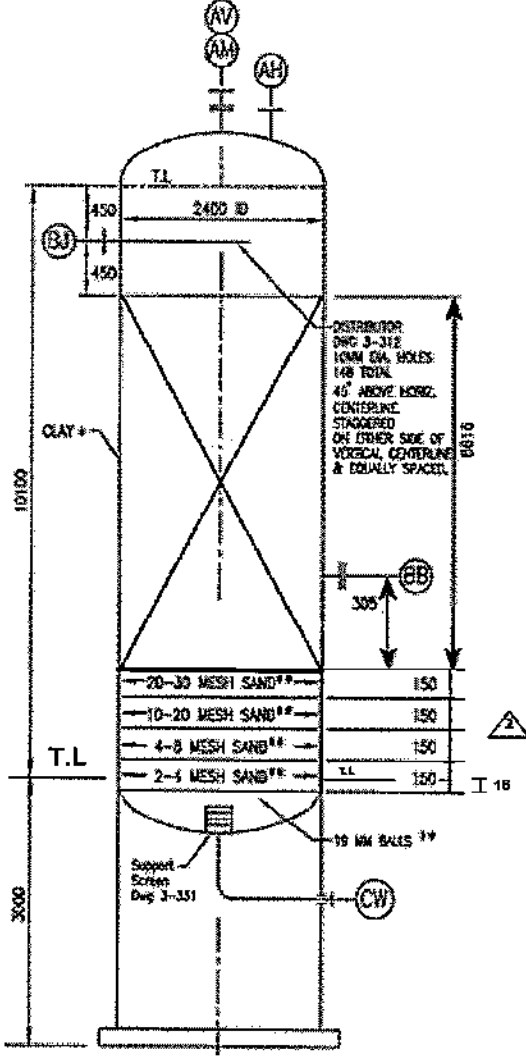
Contract: 10E0541A01
Equip. No.: 58-D-04 AVB
Revision: 3 Date: 14-Nov-2011
Unit: 58 - Benzene Toluene Fract
PO No.:
Document No. DS-58-DA-504
Sheet: 1 of 2



Client: Arabian Industrial Fibers Company (Ibn Rushid) Plant: Benzene Toluene Fract
Service: Clay Treaters Site: Yanbu, Kingdom of Saudi Arabia

DESIGN SKETCH

VESSEL DIMENSIONS: ID: 2400 mm T/T: 10100 mm



* BED MATERIAL, SEE PROJECT SPEC 106.
** MESH CERAMIC BALLS
TYPE 1, SEE STD SPEC 3-37
SAND, SEE STD SPEC 3-38

DESIGN CONDITIONS

| | | | | |
|-----------------------------|-------------|----|-------------|----|
| Pressure: | 30.0 bar(g) | at | 230 °C | |
| Vacuum: | FV bar(g) | at | 199 °C | |
| Low Temperature: | 6 °C | at | MAWP bar(g) | 0 |
| Liquid Level: | Note 4 | | | mm |
| Specific Gravity of Liquid: | 0.731 | at | 199 °C | |

OPERATING CONDITIONS

| | | | | |
|-------------------------|-------------|----|--------|---|
| Pressure: Top | 16.7 bar(g) | at | 199 °C | 0 |
| Bottom | bar(g) | at | 193 °C | |
| Vacuum: | bar(g) | at | °C | |
| Low Temperature: | °C | at | °C | |
| Hydrogen Partial Press. | bar(g) | at | °C | |

INTERNALS & INSULATION

| DESCRIPTION | Bulk Density kg/m³ | Liquid Holdup vol% | Pressure Drop bar |
|------------------|--|---|-------------------|
| Packing: | | | |
| Catalyst: | | | |
| Mist Eliminator: | | | |
| Insulation | 50 mm | Hot <input checked="" type="checkbox"/> Cold <input type="checkbox"/> | |
| Fire Proofing | Yes <input type="checkbox"/> No <input type="checkbox"/> | | |

CONSTRUCTION

| | Materials | Corrosion Allowance |
|------------------|-------------------|---------------------|
| Shell: | SA-518-70N(K.C.S) | 3 mm |
| Heads | SA-518-70N(K.C.S) | 3 mm |
| Lining/Cladding: | | mm |

SPECIAL CONDITIONS

| | |
|---------------------------------------|---|
| Stress Relieve (Process Reason Only): | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Vessel in Wet Sour Service: | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Steamout Required: | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |

See Notes on Page 2

THE ESTIMATED MECHANICAL WEIGHTS (kg)

| | |
|---------------|--------|
| FABRICATED | 30900 |
| EMPTY | 42900 |
| OPERATING | 154000 |
| FULL OF WATER | 89600 |

THE ESTIMATED WALL THICKNESS (mm)

| | |
|----------|----|
| TOP HEAD | 30 |
| SHELL | 31 |
| BTM HEAD | 31 |
| SKIRT | 12 |

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ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

REFORMATE SPLITTER REBOILER DATA SHEET

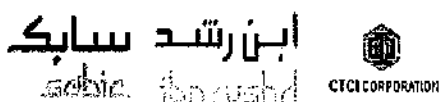
DOCUMENT NO:

DS-56-BA-501

| | | | | | | | | | |
|-----------|--------------------|-----|------|-------|-----------|----------------------|---|------|------------------|
| | | | | | | ابن رشد ibn rushd | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | | CTCI CORPORATION |
| CERTIFIED | | | | | | | | | |
| 2 | Revised As Marked | CAG | SYL | YSL | 11 Aug-11 | PROJ. | | | |
| 1 | Issued For Design | CAG | SYL | YSL | 27-May-11 | MGR | | DATE | |
| 0 | Issue For Approval | CAG | SYL | YSL | 23-Mar-11 | CLIENT | | DATE | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | | | XC33D-56-501 |

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GN-504 84.10



REFORMATE SPLITTER REBOILER
DATA SHEET

| | |
|---------------------|-----------------------------|
| XC33D-56-501 | |
| 2 OF 2 | DATE 11-Aug.-2011 |
| | REV. 2 |

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| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
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| 1. | 56-B-01 | 1 THRU 5 OF 5 | 2 | 11-Aug.-2011 |

Attachment total 13 pages.

**FIRED HEATER
DATA SHEET**

Contract: 10E0541A01
Equipment No.: 56-B-01
Revision: 2 Date: 11-Aug-2011
Unit: 56 - Sulfolane
P.O. No.:
Document No.: DS-56-BA-501
Sheet: 1 of 5



| | | |
|---|---|---|
| 1 | Client: Arabian Industrial Fibers Company (Ibn Rushd) | Vendor: Existing Born Heater - Revamped for New Service |
| 2 | Service: Reformate Splitter Reboiler | Plant: Sulfolane Site: Yanbu, Saudi Arabia |
| 3 | Type of Heater: Vertical Cylindrical | Vendor: Existing Born Heater |
| 4 | Total Heater Absorbed Duty: 18.04 MW | Assembly: |

PROCESS DESIGN CONDITIONS

| * OPERATION CASE | | REVAMP | | | |
|------------------|---|----------------|--|--|--|
| 6 | HEATER SECTION | Radiant/Convec | | | |
| 7 | SERVICE | See Line 2 | | | |
| 8 | HEAT ABSORPTION MW | 18.04 | | | |
| 9 | FLUID NAME | Hydrocarbon | | | |
| 10 | FLOW RATE kg/hr | 1,133,981 | | | |
| 11 | FLOW RATE B.P.D. | | | | |
| 12 | PRESSURE DROP - ALLOWABLE (CLEAN / FOULED) bar | 1.9 | | | |
| 13 | PRESSURE DROP - CALCULATED (CLEAN / FOULED) bar | | | | |
| 14 | FOULING ALLOWANCE m ² ·°C/W | | | | |
| 15 | THERMAL CONDUCTIVITY OF COKE/SCALE W/m·°C | | | | |
| 16 | COKING ALLOWANCE mm | | | | |
| 17 | AVG. RADIANT SECTION FLUX DENSITY - ALLOWABLE W/m ² | | | | |
| 18 | AVG. RADIANT SECTION FLUX DENSITY - CALCULATED W/m ² | | | | |
| 19 | MAX. RADIANT SECTION FLUX DENSITY W/m ² | | | | |
| 20 | CONVECTION SECTION FLUX DENSITY, (BARE TUBE) W/m ² | | | | |
| 21 | VELOCITY LIMITATION m/s | | | | |
| 22 | PROCESS FLUID MASS VELOCITY kg/s·m ² | | | | |
| 23 | MAX. ALLOWABLE / CALCULATED INSIDE FILM TEMPERATURE °C | | | | |

| INLET CONDITIONS: | | | | | |
|-------------------|---|-----------|--|--|--|
| 25 | TEMPERATURE °C | 204 | | | |
| 26 | PRESSURE <input checked="" type="checkbox"/> bar (g) <input type="checkbox"/> bar (g) | 4.67 | | | |
| 27 | LIQUID FLOW kg/hr | 1,133,981 | | | |
| 28 | VAPOR FLOW kg/hr | 0 | | | |
| 29 | DENSITY - LIQUID kg/m ³ | 697.9 | | | |
| 30 | VAPOR MOLECULAR WEIGHT | | | | |
| 31 | VISCOSITY - (LIQUID / VAPOR) mPa·s | 0.217 | | | |
| 32 | SPECIFIC HEAT - (LIQUID / VAPOR) kJ/kg·°C | 2.451 | | | |
| 33 | THERMAL CONDUCTIVITY - (LIQUID / VAPOR) W/m·°C | 0.102 | | | |

| OUTLET CONDITIONS: | | | | | |
|--------------------|---|-----------|-------|--|--|
| 34 | TEMPERATURE °C | 215 | | | |
| 35 | PRESSURE <input checked="" type="checkbox"/> bar (g) <input type="checkbox"/> bar (g) | 2.77 | | | |
| 36 | LIQUID FLOW kg/hr | 1,015,480 | | | |
| 37 | VAPOR FLOW kg/hr | 118,501 | | | |
| 38 | DENSITY - LIQUID kg/m ³ | 684.8 | | | |
| 39 | VAPOR MOLECULAR WEIGHT | 114.2 | | | |
| 40 | VISCOSITY - (LIQUID / VAPOR) mPa·s | 0.207 | 0.010 | | |
| 41 | SPECIFIC HEAT - (LIQUID / VAPOR) kJ/kg·°C | 2.498 | 1.985 | | |
| 42 | THERMAL CONDUCTIVITY - (LIQUID / VAPOR) W/m·°C | 0.101 | 0.025 | | |

REMARKS AND SPECIAL REQUIREMENTS:
 43 DISTILLATION DATA OR FEED COMPOSITION: See Fluid Properties on Sheets 3 and 4
 44 SHORT TERM OPERATING CONDITIONS:
 45 OTHER:

NOTES:
 46 See Notes on Sheet 5
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
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 61
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**FIRED HEATER
DATA SHEET**

Contract: 10E0541A01
Equipment No.: 56-B-01
Revision: 2 Date: 11-Aug-2011
Unit: 56 - Sulfolane
P.O. No.:
Document No.: DS-56-BA-501
Sheet: 2 of 5



| COMBUSTION DESIGN CONDITIONS | | | | REV | |
|------------------------------|---|--|----------------------------------|---------------|---|
| 1 | OPERATING CASE | | | | |
| 2 | * TYPE OF FUEL | REVAMP | | | |
| 3 | * EXCESS AIR % | Sales Gas | | | |
| 4 | CALCULATED HEAT RELEASE (LHV) MW | 50.0 | | | |
| 5 | CALCULATED THERMAL EFFICIENCY % (LHV) | 21.21 | | | |
| 6 | CALCULATED FUEL EFFICIENCY % (LHV) | 85.0 | | | |
| 7 | * GUARANTEED FUEL EFFICIENCY % (LHV) | | | | |
| 8 | RADIATION LOSS % OF HEAT RELEASE (LHV) | 2.0 | | | |
| 9 | FLUE GAS TEMPERATURE LEAVING: RADIANT SECT. °C | 555 | | | |
| 10 | CONVECTION SECTION °C | 230 | | | |
| 11 | AIR PREHEATER °C | n/a | | | |
| 12 | FLUE GAS QUANTITY kg/hr | 41,546 | | | |
| 13 | FLUE GAS MASS VELOCITY THRU CONVECTION SECTION kg/s·m² | | | | |
| 14 | VOLUMETRIC HEAT RELEASE (LHV) kW/m³ | | | | |
| 15 | DRAFT: IMMEDIATELY ABOVE TOP CONVECTION ROW, mm H2O | 2.9 | | | 1 |
| 16 | IMMEDIATELY BELOW BOTTOM CONVECTION ROW, mm H2O | 2.5 | | | 1 |
| 17 | AT BURNERS, mm H2O | 14.8 | | | |
| 18 | AMBIENT AIR TEMPERATURE - EFFICIENCY CALCULATION °C | 15.6 | | | |
| 19 | * AMBIENT AIR TEMPERATURE - STACK DESIGN °C | 50.0 | | | |
| 20 | COMBUSTION AIR QUANTITY kg/hr | 39,665 | | | |
| 21 | * ALTITUDE ABOVE SEA LEVEL m | 7.25 | | | |
| 22 | FUEL CHARACTERISTICS | | | | |
| 23 | * GAS TYPE Sales Gas | * GAS TYPE | * LIQUID TYPE | | |
| 24 | * LHV 40,512 <input checked="" type="checkbox"/> kJ/kg <input type="checkbox"/> kJ/Sm³ | * LHV <input type="checkbox"/> kJ/kg <input type="checkbox"/> kJ/Sm³ | * LHV kJ/kg | | |
| 25 | * HHV <input type="checkbox"/> kJ/kg <input type="checkbox"/> kJ/Sm³ | * HHV <input type="checkbox"/> kJ/kg <input type="checkbox"/> kJ/Sm³ | * HHV kJ/kg | | |
| 26 | * PRESS. @ BURNER 1.75 bar (g) | * PRESS. @ BURNER bar (g) | * PRESS. @ BURNER bar (g) | | |
| 27 | * TEMP. @ BURNER 15.6 °C | * TEMP. @ BURNER °C | * TEMP. @ BURNER °C | | |
| 28 | * MOLECULAR WEIGHT | * MOLECULAR WEIGHT | * VISCOSITY @ °C SSU | | |
| 29 | | | * ATOMIZING STEAM TEMP. °C | | |
| 30 | | | * ATOMIZING STEAM PRESS. bar (g) | | |
| 31 | COMPOSITION | MOLE % | COMPOSITION | MOLE % | |
| 32 | N2 | 12.0 | | | |
| 33 | C1 | 82.7 | | | |
| 34 | C2 | 5.0 | | | |
| 35 | C3 | 0.3 | | | |
| 36 | H2S | <2.0 wt ppm | | | |
| 37 | TOTAL | 100.0 | | | |
| 38 | | | | | |
| 39 | | | | | |
| 40 | | | | | |
| 41 | | | | | |
| 42 | | | | | |
| 43 | | | | | |
| 44 | | | * VANADIUM (ppm) | | |
| 45 | | | * SODIUM (ppm) | | |
| 46 | | | * SULFUR | | |
| 47 | | | * ASH | | |
| 48 | DATA FOR EXISTING BURNERS | | | | |
| 49 | MANUFACTURER: John Zink | SIZE / MODEL: PSFG-16 | NUMBER: 12 | | 0 |
| 50 | TYPE: Forced Draft, Low Nox, Staged Fuel | LOCATION: RADIANT FLOOR | ORIENTATION: FIRING UP | | 0 |
| 51 | HEAT RELEASE PER BURNER: MW | DESIGN: 4.950 | NORMAL: 1.77 | MINIMUM: 1.65 | |
| 52 | PRESSURE DROP ACROSS BURNER @ DESIGN HEAT RELEASE: By Vendor mm H2O | | | | |
| 53 | DISTANCE BURNER CENTER LINE TO TUBE CENTER LINE: HORIZONTAL: 2,626 mm | | VERTICAL: mm | | |
| 54 | DISTANCE BURNER CENTER LINE TO UNSHIELDED REFRACTORY: HORIZONTAL: mm | | VERTICAL: 17,907 mm | | |
| 55 | BURNER PILOT: CAPACITY 20 kW | FUEL Sales Gas | FUEL PRESSURE bar (g) | | |
| 56 | IGNITION METHOD: Automatic | | | | |
| 57 | SPECIAL REQUIREMENTS (FLAME DETECTION DEVICES, SAFETY INTERLOCKS, ETC.): UV SCANNERS | | | | |
| 58 | REQUIRED EMISSIONS: <input type="checkbox"/> ppmv(d) (CORRECTED TO 3% O2) | NOx: Remark 1 | CO: Remark 1 | SOx: Remark 1 | |
| 59 | See REMARK NO. 1 <input type="checkbox"/> kg/kJ <input type="checkbox"/> (LHV) <input type="checkbox"/> (HHV) | UHC: Remark 1 | PARTICULATES: Remark 1 | | |
| 60 | REMARKS: | | | | |
| 61 | 1. The Royal Commission for Jubail and Yanbu has issued the "Royal Commission Environmental Regulations (RCER)" to be adopted by industries both in Jubail and Yanbu. Any facility operating or planning to operate on the Royal Commission property shall comply with these regulations. | | | | |
| 62 | | | | | |

**FIRED HEATER
DATA SHEET**

Contract: 10E0541A01
Equipment No.: 56-B-01
Revision: 2 Date: 11-Aug-2011
Unit: 56 - Sulfolane
P.O. No.:
Document No.: DS-56-BA-501
Sheet: 3 of 5

| FLUID PROPERTIES: | | | | | | | | | | | | | REV |
|-------------------------|------------|-----------------------------|-------------------|------------------------------|------------------------------|-----------------|----------------------------|-------------------|------------------------------|------------------------------|-----------------|----------------------------|-------------------------------|
| PROCESS | | | | | | | | | | | | | |
| Thermodynamic condition | | | Vapor | | | | | Liquid | | | | | |
| Pressure bar(a) | Temp °C | Weight fraction vapor | Enthalpy kJ/kg | Density kg/m ³ | Specific heat kJ/kg-°C | Viscosity cP | Thermal cond. W/m-°C | Enthalpy kJ/kg | Density kg/m ³ | Specific heat kJ/kg-°C | Viscosity cP | Thermal cond. W/m-°C | Surface tension dyne/cm |
| 3.771 | 203.89 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 385.99 | 696.64 | 2.4505 | 0.2167 | 0.1023 | 11.58 |
| 3.771 | 207.27 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 394.29 | 692.96 | 2.4652 | 0.2133 | 0.1018 | 11.28 |
| 3.771 | 210.64 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 402.64 | 689.11 | 2.4794 | 0.2101 | 0.1014 | 10.98 |
| 3.771 | 214.01 | 0.0000 | 700.35 | 11.70 | 1.9816 | 0.0100 | 0.0249 | 411.01 | 685.43 | 2.4941 | 0.2069 | 0.1009 | 10.68 |
| 3.771 | 214.08 | 0.0105 | 700.48 | 11.70 | 1.9820 | 0.0100 | 0.0249 | 411.17 | 685.27 | 2.4945 | 0.2069 | 0.1009 | 10.68 |
| 3.771 | 214.15 | 0.0209 | 700.60 | 11.70 | 1.9825 | 0.0100 | 0.0249 | 411.34 | 685.27 | 2.4949 | 0.2069 | 0.1009 | 10.67 |
| 3.771 | 214.22 | 0.0314 | 700.72 | 11.70 | 1.9825 | 0.0100 | 0.0249 | 411.50 | 685.27 | 2.4949 | 0.2069 | 0.1009 | 10.67 |
| 3.771 | 214.29 | 0.0419 | 700.84 | 11.71 | 1.9829 | 0.0100 | 0.0249 | 411.67 | 685.27 | 2.4953 | 0.2069 | 0.1009 | 10.67 |
| 3.771 | 214.36 | 0.0524 | 700.96 | 11.71 | 1.9833 | 0.0100 | 0.0249 | 411.83 | 685.27 | 2.4953 | 0.2069 | 0.1007 | 10.67 |
| 3.771 | 214.43 | 0.0629 | 701.09 | 11.71 | 1.9833 | 0.0100 | 0.0249 | 412.00 | 685.11 | 2.4958 | 0.2069 | 0.1007 | 10.67 |
| 3.771 | 214.50 | 0.0734 | 701.21 | 11.71 | 1.9837 | 0.0100 | 0.0249 | 412.17 | 685.11 | 2.4962 | 0.2070 | 0.1007 | 10.66 |
| 3.771 | 214.57 | 0.0839 | 701.34 | 11.71 | 1.9841 | 0.0100 | 0.0249 | 412.33 | 685.11 | 2.4962 | 0.2070 | 0.1007 | 10.66 |
| 3.771 | 214.64 | 0.0944 | 701.46 | 11.71 | 1.9845 | 0.0100 | 0.0249 | 412.50 | 685.11 | 2.4966 | 0.2070 | 0.1007 | 10.66 |
| 3.771 | 214.72 | 0.1049 | 701.58 | 11.72 | 1.9845 | 0.0100 | 0.0249 | 412.67 | 684.95 | 2.4966 | 0.2070 | 0.1007 | 10.66 |
| 4.170 | 203.89 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 385.99 | 696.64 | 2.4505 | 0.2168 | 0.1023 | 11.58 |
| 4.170 | 209.05 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 398.70 | 691.04 | 2.4727 | 0.2116 | 0.1016 | 11.12 |
| 4.170 | 214.21 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 411.52 | 685.27 | 2.4949 | 0.2067 | 0.1009 | 10.68 |
| 4.170 | 219.37 | 0.0000 | 709.74 | 12.91 | 2.0034 | 0.0100 | 0.0254 | 424.43 | 679.50 | 2.5175 | 0.2020 | 0.1000 | 10.21 |
| 4.170 | 219.43 | 0.0105 | 709.87 | 12.91 | 2.0038 | 0.0100 | 0.0254 | 424.60 | 679.34 | 2.5179 | 0.2020 | 0.1000 | 10.21 |
| 4.170 | 219.50 | 0.0209 | 709.99 | 12.91 | 2.0038 | 0.0100 | 0.0254 | 424.76 | 679.34 | 2.5184 | 0.2020 | 0.1000 | 10.20 |
| 4.170 | 219.57 | 0.0314 | 710.11 | 12.91 | 2.0042 | 0.0100 | 0.0254 | 424.92 | 679.34 | 2.5184 | 0.2021 | 0.1000 | 10.20 |
| 4.170 | 219.64 | 0.0419 | 710.23 | 12.91 | 2.0046 | 0.0100 | 0.0254 | 425.09 | 679.34 | 2.5188 | 0.2021 | 0.1000 | 10.20 |
| 4.170 | 219.71 | 0.0524 | 710.35 | 12.92 | 2.0051 | 0.0100 | 0.0254 | 425.25 | 679.34 | 2.5188 | 0.2021 | 0.1000 | 10.20 |
| 4.170 | 219.78 | 0.0629 | 710.48 | 12.92 | 2.0051 | 0.0100 | 0.0254 | 425.42 | 679.18 | 2.5192 | 0.2021 | 0.1000 | 10.20 |
| 4.170 | 219.85 | 0.0734 | 710.60 | 12.92 | 2.0056 | 0.0100 | 0.0254 | 425.58 | 679.18 | 2.5196 | 0.2021 | 0.1000 | 10.19 |
| 4.170 | 219.92 | 0.0839 | 710.73 | 12.92 | 2.0059 | 0.0100 | 0.0254 | 425.75 | 679.18 | 2.5196 | 0.2021 | 0.1000 | 10.19 |
| 4.170 | 219.99 | 0.0944 | 710.85 | 12.92 | 2.0059 | 0.0100 | 0.0254 | 425.92 | 679.18 | 2.5200 | 0.2021 | 0.1000 | 10.19 |
| 4.170 | 220.06 | 0.1050 | 710.98 | 12.92 | 2.0063 | 0.0100 | 0.0254 | 426.08 | 679.02 | 2.5200 | 0.2021 | 0.1000 | 10.19 |
| 4.568 | 203.89 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 385.99 | 696.80 | 2.4505 | 0.2188 | 0.1023 | 11.58 |
| 4.568 | 210.71 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 402.81 | 689.43 | 2.4798 | 0.2101 | 0.1012 | 10.97 |
| 4.568 | 217.53 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 419.83 | 681.75 | 2.5096 | 0.2037 | 0.1004 | 10.37 |
| 4.568 | 224.34 | 0.0000 | 718.50 | 14.12 | 2.0239 | 0.0101 | 0.0258 | 437.02 | 673.90 | 2.5397 | 0.1977 | 0.0993 | 9.76 |
| 4.568 | 224.41 | 0.0105 | 718.62 | 14.12 | 2.0239 | 0.0101 | 0.0258 | 437.19 | 673.74 | 2.5401 | 0.1977 | 0.0993 | 9.77 |
| 4.568 | 224.48 | 0.0210 | 718.74 | 14.12 | 2.0243 | 0.0101 | 0.0258 | 437.35 | 673.74 | 2.5401 | 0.1977 | 0.0993 | 9.77 |
| 4.568 | 224.54 | 0.0315 | 718.87 | 14.12 | 2.0247 | 0.0101 | 0.0258 | 437.51 | 673.74 | 2.5406 | 0.1977 | 0.0993 | 9.77 |
| 4.568 | 224.62 | 0.0419 | 718.99 | 14.13 | 2.0247 | 0.0101 | 0.0258 | 437.67 | 673.74 | 2.5410 | 0.1977 | 0.0993 | 9.77 |
| 4.568 | 224.68 | 0.0524 | 719.11 | 14.13 | 2.0252 | 0.0101 | 0.0258 | 437.84 | 673.58 | 2.5410 | 0.1977 | 0.0993 | 9.76 |
| 4.568 | 224.75 | 0.0630 | 719.23 | 14.13 | 2.0256 | 0.0101 | 0.0258 | 438.00 | 673.58 | 2.5414 | 0.1977 | 0.0993 | 9.76 |
| 4.568 | 224.82 | 0.0735 | 719.36 | 14.13 | 2.0260 | 0.0101 | 0.0258 | 438.17 | 673.58 | 2.5418 | 0.1978 | 0.0993 | 9.76 |
| 4.568 | 224.88 | 0.0840 | 719.48 | 14.13 | 2.0260 | 0.0101 | 0.0258 | 438.33 | 673.58 | 2.5418 | 0.1978 | 0.0993 | 9.76 |
| 4.568 | 224.96 | 0.0945 | 719.61 | 14.13 | 2.0264 | 0.0101 | 0.0258 | 438.50 | 673.58 | 2.5422 | 0.1978 | 0.0993 | 9.76 |
| 4.568 | 225.03 | 0.1050 | 719.73 | 14.14 | 2.0268 | 0.0101 | 0.0258 | 438.67 | 673.42 | 2.5422 | 0.1978 | 0.0993 | 9.75 |
| 4.967 | 203.89 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 385.99 | 696.96 | 2.4505 | 0.2168 | 0.1023 | 11.58 |
| 4.967 | 212.26 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 405.65 | 687.83 | 2.4865 | 0.2087 | 0.1011 | 10.83 |
| 4.967 | 220.63 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 427.63 | 678.38 | 2.5234 | 0.2010 | 0.0999 | 10.10 |
| 4.967 | 229.00 | 0.0000 | 726.72 | 15.33 | 2.0432 | 0.0102 | 0.0261 | 448.90 | 668.45 | 2.5611 | 0.1938 | 0.0987 | 9.37 |
| 4.967 | 229.07 | 0.0105 | 726.84 | 15.33 | 2.0432 | 0.0102 | 0.0261 | 449.05 | 668.45 | 2.5611 | 0.1938 | 0.0987 | 9.37 |
| 4.967 | 229.13 | 0.0210 | 726.96 | 15.34 | 2.0436 | 0.0102 | 0.0261 | 449.23 | 668.45 | 2.5615 | 0.1938 | 0.0987 | 9.37 |
| 4.967 | 229.20 | 0.0315 | 727.08 | 15.34 | 2.0440 | 0.0102 | 0.0261 | 449.39 | 668.45 | 2.5619 | 0.1938 | 0.0987 | 9.37 |
| 4.967 | 229.27 | 0.0420 | 727.21 | 15.34 | 2.0440 | 0.0102 | 0.0261 | 449.55 | 668.29 | 2.5619 | 0.1938 | 0.0987 | 9.37 |
| 4.967 | 229.33 | 0.0525 | 727.33 | 15.34 | 2.0444 | 0.0102 | 0.0261 | 449.71 | 668.29 | 2.5623 | 0.1938 | 0.0987 | 9.36 |
| 4.967 | 229.41 | 0.0630 | 727.45 | 15.35 | 2.0448 | 0.0102 | 0.0261 | 449.88 | 668.29 | 2.5623 | 0.1938 | 0.0987 | 9.36 |
| 4.967 | 229.47 | 0.0735 | 727.58 | 15.35 | 2.0448 | 0.0102 | 0.0261 | 450.04 | 668.29 | 2.5627 | 0.1938 | 0.0987 | 9.36 |
| 4.967 | 229.54 | 0.0840 | 727.70 | 15.35 | 2.0453 | 0.0102 | 0.0261 | 450.21 | 668.13 | 2.5632 | 0.1938 | 0.0987 | 9.36 |
| 4.967 | 229.61 | 0.0945 | 727.82 | 15.35 | 2.0467 | 0.0102 | 0.0261 | 450.37 | 668.13 | 2.5632 | 0.1938 | 0.0987 | 9.35 |
| 4.967 | 229.68 | 0.1051 | 727.95 | 15.35 | 2.0461 | 0.0102 | 0.0261 | 450.54 | 668.13 | 2.5636 | 0.1938 | 0.0987 | 9.35 |
| 5.365 | 203.89 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 385.99 | 697.12 | 2.4505 | 0.2169 | 0.1023 | 11.58 |
| 5.365 | 213.72 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 410.30 | 688.39 | 2.4928 | 0.2073 | 0.1009 | 10.70 |
| 5.365 | 223.56 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 435.03 | 675.18 | 2.5364 | 0.1985 | 0.0995 | 9.84 |
| 5.365 | 233.38 | 0.0000 | 734.47 | 16.55 | 2.0612 | 0.0103 | 0.0265 | 460.17 | 663.32 | 2.5812 | 0.1902 | 0.0981 | 9.00 |
| 5.365 | 233.44 | 0.0105 | 734.59 | 16.56 | 2.0616 | 0.0103 | 0.0265 | 460.33 | 663.32 | 2.5816 | 0.1902 | 0.0981 | 9.00 |
| 5.365 | 233.51 | 0.0210 | 734.71 | 16.56 | 2.0620 | 0.0103 | 0.0265 | 460.49 | 663.32 | 2.5816 | 0.1902 | 0.0981 | 8.99 |
| 5.365 | 233.58 | 0.0315 | 734.83 | 16.56 | 2.0620 | 0.0103 | 0.0265 | 460.65 | 663.32 | 2.5820 | 0.1902 | 0.0981 | 8.99 |
| 5.365 | 233.64 | 0.0420 | 734.95 | 16.56 | 2.0624 | 0.0103 | 0.0265 | 460.81 | 663.16 | 2.5820 | 0.1902 | 0.0981 | 8.99 |
| 5.365 | 233.71 | 0.0525 | 735.07 | 16.56 | 2.0628 | 0.0103 | 0.0265 | 460.97 | 663.16 | 2.5824 | 0.1902 | 0.0981 | 8.99 |
| 5.365 | 233.78 | 0.0630 | 735.20 | 16.57 | 2.0628 | 0.0103 | 0.0265 | 461.14 | 663.16 | 2.5828 | 0.1902 | 0.0981 | 8.99 |
| 5.365 | 233.85 | 0.0735 | 735.32 | 16.57 | 2.0633 | 0.0103 | 0.0265 | 461.30 | 663.16 | 2.5828 | 0.1902 | 0.0980 | 8.98 |
| 5.365 | 233.92 | 0.0841 | 735.44 | 16.57 | 2.0637 | 0.0103 | 0.0265 | 461.46 | 663.16 | 2.5833 | 0.1903 | 0.0980 | 8.98 |
| 5.365 | 233.98 | 0.0946 | 735.57 | 16.57 | 2.0641 | 0.0103 | 0.0265 | 461.63 | 663.00 | 2.5837 | 0.1903 | 0.0980 | 8.98 |
| 5.365 | 234.05 | 0.1052 | 735.69 | 16.58 | 2.0641 | 0.0103 | 0.0267 | 461.79 | 663.00 | 2.5837 | 0.1903 | 0.0980 | 8.98 |

ابن رشيد
ibn rushd
FLUOR.

**FIRED HEATER
DATA SHEET**

Contract: 10E0541A01
Equipment No.: 56-B-01
Revision: 2 Date: 11-Aug-2011
Unit: 56 - Sulfolane
P.O. No.:
Document No.: DS-56-BA-501
Sheet: 4 of 5

سابك
SABIC


CYCI CORPORATION

| FLUID PROPERTIES: | | PROCESS | | | | | | | | | | | | REV |
|-------------------------|------------|-----------------------------|-------------------|------------------------------|------------------------------|-----------------|----------------------------|-------------------|------------------------------|------------------------------|-----------------|----------------------------|-------------------------------|-----|
| Thermodynamic condition | | | Vapor | | | | | Liquid | | | | | | |
| Pressure bar(a) | Temp °C | Weight fraction vapor | Enthalpy kJ/kg | Density kg/m ³ | Specific heat kJ/kg·°C | Viscosity cP | Thermal cond. W/m·°C | Enthalpy kJ/kg | Density kg/m ³ | Specific heat kJ/kg·°C | Viscosity cP | Thermal cond. W/m·°C | Surface tension dyne/cm | |
| 5.764 | 203.89 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 385.99 | 697.28 | 2.4505 | 0.2169 | 0.1023 | 11.58 | |
| 5.764 | 215.10 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 413.74 | 664.95 | 2.4591 | 0.2061 | 0.1007 | 10.58 | |
| 5.764 | 226.31 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 442.03 | 672.13 | 2.5435 | 0.1982 | 0.0992 | 9.61 | |
| 5.764 | 237.52 | 0.0000 | 741.80 | 17.78 | 2.0787 | 0.0103 | 0.0268 | 470.89 | 656.52 | 2.5004 | 0.1869 | 0.0974 | 8.65 | |
| 5.764 | 237.58 | 0.0105 | 741.92 | 17.78 | 2.0792 | 0.0103 | 0.0268 | 471.05 | 656.36 | 2.5008 | 0.1869 | 0.0974 | 8.64 | |
| 5.764 | 237.65 | 0.0210 | 742.04 | 17.79 | 2.0796 | 0.0103 | 0.0268 | 471.21 | 656.36 | 2.5013 | 0.1869 | 0.0974 | 8.64 | |
| 5.764 | 237.72 | 0.0315 | 742.16 | 17.79 | 2.0796 | 0.0103 | 0.0268 | 471.37 | 656.36 | 2.5013 | 0.1869 | 0.0974 | 8.64 | |
| 5.764 | 237.78 | 0.0420 | 742.28 | 17.79 | 2.0800 | 0.0103 | 0.0268 | 471.53 | 656.36 | 2.5017 | 0.1869 | 0.0974 | 8.64 | |
| 5.764 | 237.85 | 0.0525 | 742.41 | 17.79 | 2.0804 | 0.0103 | 0.0268 | 471.69 | 656.36 | 2.5021 | 0.1869 | 0.0974 | 8.64 | |
| 5.764 | 237.92 | 0.0631 | 742.53 | 17.80 | 2.0804 | 0.0103 | 0.0268 | 471.86 | 656.20 | 2.5021 | 0.1869 | 0.0974 | 8.63 | |
| 5.764 | 237.98 | 0.0736 | 742.65 | 17.80 | 2.0808 | 0.0103 | 0.0268 | 472.02 | 656.20 | 2.5025 | 0.1870 | 0.0974 | 8.63 | |
| 5.764 | 238.05 | 0.0841 | 742.76 | 17.80 | 2.0813 | 0.0103 | 0.0268 | 472.19 | 656.20 | 2.5025 | 0.1870 | 0.0974 | 8.63 | |
| 5.764 | 238.12 | 0.0947 | 742.90 | 17.80 | 2.0813 | 0.0103 | 0.0268 | 472.35 | 656.20 | 2.5029 | 0.1870 | 0.0974 | 8.63 | |
| 5.764 | 238.18 | 0.1052 | 743.02 | 17.81 | 2.0817 | 0.0103 | 0.0270 | 472.51 | 656.04 | 2.5034 | 0.1870 | 0.0974 | 8.63 | |
| 6.163 | 203.89 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 385.99 | 697.44 | 2.4505 | 0.2170 | 0.1023 | 11.58 | |
| 6.163 | 216.41 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 417.02 | 663.67 | 2.5045 | 0.2050 | 0.1006 | 10.47 | |
| 6.163 | 228.93 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 446.73 | 666.08 | 2.5806 | 0.1940 | 0.0987 | 9.36 | |
| 6.163 | 241.44 | 0.0000 | 748.77 | 19.02 | 2.0955 | 0.0104 | 0.0272 | 481.14 | 653.71 | 2.5197 | 0.1839 | 0.0969 | 8.31 | |
| 6.163 | 241.51 | 0.0105 | 748.89 | 19.02 | 2.0958 | 0.0104 | 0.0272 | 481.30 | 653.71 | 2.5197 | 0.1839 | 0.0969 | 8.31 | |
| 6.163 | 241.57 | 0.0210 | 749.01 | 19.02 | 2.0963 | 0.0104 | 0.0272 | 481.46 | 653.71 | 2.5201 | 0.1839 | 0.0969 | 8.31 | |
| 6.163 | 241.64 | 0.0315 | 749.13 | 19.02 | 2.0963 | 0.0104 | 0.0272 | 481.62 | 653.55 | 2.5201 | 0.1839 | 0.0969 | 8.31 | |
| 6.163 | 241.71 | 0.0420 | 749.25 | 19.03 | 2.0968 | 0.0104 | 0.0272 | 481.78 | 653.55 | 2.5205 | 0.1839 | 0.0969 | 8.31 | |
| 6.163 | 241.77 | 0.0525 | 749.37 | 19.03 | 2.0972 | 0.0104 | 0.0272 | 481.94 | 653.55 | 2.5209 | 0.1839 | 0.0969 | 8.31 | |
| 6.163 | 241.83 | 0.0631 | 749.49 | 19.03 | 2.0972 | 0.0104 | 0.0272 | 482.10 | 653.55 | 2.5209 | 0.1839 | 0.0969 | 8.30 | |
| 6.163 | 241.90 | 0.0736 | 749.62 | 19.03 | 2.0976 | 0.0104 | 0.0272 | 482.26 | 653.39 | 2.5214 | 0.1839 | 0.0969 | 8.30 | |
| 6.163 | 241.97 | 0.0842 | 749.74 | 19.04 | 2.0980 | 0.0104 | 0.0272 | 482.43 | 653.39 | 2.5214 | 0.1839 | 0.0969 | 8.30 | |
| 6.163 | 242.03 | 0.0947 | 749.86 | 19.04 | 2.0980 | 0.0104 | 0.0272 | 482.59 | 653.39 | 2.5218 | 0.1839 | 0.0969 | 8.30 | |
| 6.163 | 242.10 | 0.1053 | 749.99 | 19.04 | 2.0984 | 0.0104 | 0.0272 | 482.75 | 653.39 | 2.5222 | 0.1839 | 0.0969 | 8.30 | |
| 6.561 | 203.89 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 385.99 | 697.60 | 2.4505 | 0.2170 | 0.1023 | 11.58 | |
| 6.561 | 217.68 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 420.14 | 682.39 | 2.5100 | 0.2039 | 0.1004 | 10.36 | |
| 6.561 | 231.42 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 455.12 | 686.37 | 2.5720 | 0.1920 | 0.0983 | 9.17 | |
| 6.561 | 245.18 | 0.0000 | 755.41 | 20.26 | 2.1118 | 0.0104 | 0.0275 | 490.97 | 649.07 | 2.6377 | 0.1810 | 0.0964 | 8.00 | |
| 6.561 | 245.24 | 0.0105 | 755.52 | 20.26 | 2.1122 | 0.0104 | 0.0275 | 491.12 | 649.07 | 2.6381 | 0.1810 | 0.0964 | 8.00 | |
| 6.561 | 245.31 | 0.0210 | 755.65 | 20.26 | 2.1122 | 0.0104 | 0.0275 | 491.28 | 649.07 | 2.6385 | 0.1810 | 0.0964 | 8.00 | |
| 6.561 | 245.37 | 0.0315 | 755.77 | 20.27 | 2.1127 | 0.0104 | 0.0275 | 491.44 | 649.07 | 2.6385 | 0.1810 | 0.0964 | 8.00 | |
| 6.561 | 245.44 | 0.0421 | 755.89 | 20.27 | 2.1131 | 0.0104 | 0.0275 | 491.60 | 649.07 | 2.6389 | 0.1811 | 0.0964 | 7.99 | |
| 6.561 | 245.51 | 0.0526 | 756.01 | 20.27 | 2.1131 | 0.0104 | 0.0275 | 491.76 | 648.91 | 2.6389 | 0.1811 | 0.0964 | 7.99 | |
| 6.561 | 245.57 | 0.0631 | 756.13 | 20.27 | 2.1135 | 0.0104 | 0.0275 | 491.92 | 648.91 | 2.6394 | 0.1811 | 0.0964 | 7.99 | |
| 6.561 | 245.63 | 0.0737 | 756.25 | 20.28 | 2.1139 | 0.0104 | 0.0275 | 492.08 | 648.91 | 2.6398 | 0.1811 | 0.0964 | 7.99 | |
| 6.561 | 245.70 | 0.0842 | 756.38 | 20.28 | 2.1139 | 0.0104 | 0.0275 | 492.24 | 648.91 | 2.6398 | 0.1811 | 0.0964 | 7.99 | |
| 6.561 | 245.77 | 0.0948 | 756.50 | 20.28 | 2.1143 | 0.0104 | 0.0275 | 492.41 | 648.75 | 2.6402 | 0.1811 | 0.0964 | 7.98 | |
| 6.561 | 245.83 | 0.1053 | 756.62 | 20.29 | 2.1143 | 0.0104 | 0.0275 | 492.57 | 648.75 | 2.6406 | 0.1811 | 0.0964 | 7.98 | |
| 6.960 | 203.89 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 385.99 | 697.76 | 2.4505 | 0.2171 | 0.1023 | 11.58 | |
| 6.960 | 218.84 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 423.13 | 681.27 | 2.5154 | 0.2028 | 0.1002 | 10.25 | |
| 6.960 | 233.80 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 461.25 | 663.64 | 2.5833 | 0.1801 | 0.0981 | 8.95 | |
| 6.960 | 248.75 | 0.0000 | 761.75 | 21.51 | 2.1277 | 0.0105 | 0.0279 | 500.41 | 644.74 | 2.6567 | 0.1784 | 0.0959 | 7.70 | |
| 6.960 | 248.81 | 0.0105 | 761.87 | 21.51 | 2.1277 | 0.0105 | 0.0279 | 500.56 | 644.58 | 2.6561 | 0.1784 | 0.0959 | 7.70 | |
| 6.960 | 248.87 | 0.0210 | 761.99 | 21.51 | 2.1282 | 0.0105 | 0.0279 | 500.72 | 644.58 | 2.6561 | 0.1784 | 0.0959 | 7.70 | |
| 6.960 | 248.94 | 0.0316 | 762.11 | 21.52 | 2.1282 | 0.0105 | 0.0279 | 500.88 | 644.58 | 2.6565 | 0.1784 | 0.0959 | 7.70 | |
| 6.960 | 249.00 | 0.0421 | 762.23 | 21.52 | 2.1286 | 0.0105 | 0.0279 | 501.04 | 644.58 | 2.6569 | 0.1784 | 0.0959 | 7.70 | |
| 6.960 | 249.07 | 0.0526 | 762.35 | 21.52 | 2.1290 | 0.0105 | 0.0279 | 501.20 | 644.58 | 2.6569 | 0.1784 | 0.0959 | 7.70 | |
| 6.960 | 249.13 | 0.0632 | 762.47 | 21.53 | 2.1290 | 0.0105 | 0.0279 | 501.36 | 644.42 | 2.6574 | 0.1784 | 0.0959 | 7.69 | |
| 6.960 | 249.19 | 0.0737 | 762.59 | 21.53 | 2.1294 | 0.0105 | 0.0279 | 501.52 | 644.42 | 2.6574 | 0.1784 | 0.0959 | 7.69 | |
| 6.960 | 249.26 | 0.0843 | 762.71 | 21.53 | 2.1298 | 0.0105 | 0.0279 | 501.68 | 644.42 | 2.6578 | 0.1784 | 0.0959 | 7.69 | |
| 6.960 | 249.32 | 0.0948 | 762.84 | 21.54 | 2.1298 | 0.0105 | 0.0279 | 501.84 | 644.42 | 2.6582 | 0.1784 | 0.0959 | 7.69 | |
| 6.960 | 249.39 | 0.1054 | 762.96 | 21.54 | 2.1302 | 0.0105 | 0.0279 | 502.00 | 644.26 | 2.6582 | 0.1784 | 0.0959 | 7.69 | |
| 7.358 | 203.89 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 385.99 | 697.92 | 2.4505 | 0.2171 | 0.1023 | 11.58 | |
| 7.358 | 219.98 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 425.99 | 680.14 | 2.5205 | 0.2019 | 0.1000 | 10.15 | |
| 7.358 | 236.08 | 0.0000 | 0.00 | 0.00 | 0.0000 | 0.0000 | 0.0000 | 467.15 | 661.08 | 2.5937 | 0.1883 | 0.0978 | 8.77 | |
| 7.358 | 252.16 | 0.0000 | 767.82 | 22.77 | 2.1428 | 0.0105 | 0.0280 | 509.51 | 640.42 | 2.6733 | 0.1759 | 0.0954 | 7.42 | |
| 7.358 | 252.22 | 0.0105 | 767.94 | 22.77 | 2.1428 | 0.0105 | 0.0280 | 509.66 | 640.26 | 2.6733 | 0.1759 | 0.0954 | 7.42 | |
| 7.358 | 252.29 | 0.0210 | 768.06 | 22.78 | 2.1432 | 0.0105 | 0.0280 | 509.82 | 640.26 | 2.6737 | 0.1759 | 0.0954 | 7.42 | |
| 7.358 | 252.35 | 0.0316 | 768.18 | 22.78 | 2.1436 | 0.0105 | 0.0280 | 509.98 | 640.26 | 2.6741 | 0.1759 | 0.0954 | 7.42 | |
| 7.358 | 252.41 | 0.0421 | 768.30 | 22.78 | 2.1438 | 0.0105 | 0.0282 | 510.13 | 640.26 | 2.6741 | 0.1759 | 0.0954 | 7.42 | |
| 7.358 | 252.48 | 0.0526 | 768.42 | 22.78 | 2.1441 | 0.0105 | 0.0282 | 510.29 | 640.10 | 2.6745 | 0.1759 | 0.0954 | 7.41 | |
| 7.358 | 252.54 | 0.0632 | 768.54 | 22.79 | 2.1445 | 0.0105 | 0.0282 | 510.45 | 640.10 | 2.6749 | 0.1759 | 0.0954 | 7.41 | |
| 7.358 | 252.61 | 0.0737 | 768.66 | 22.79 | 2.1445 | 0.0105 | 0.0282 | 510.61 | 640.10 | 2.6749 | 0.1759 | 0.0954 | 7.41 | |
| 7.358 | 252.67 | 0.0843 | 768.78 | 22.79 | 2.1449 | 0.0105 | 0.0282 | 510.77 | 640.10 | 2.6754 | 0.1759 | 0.0954 | 7.41 | |
| 7.358 | 252.73 | 0.0949 | 768.91 | 22.80 | 2.1449 | 0.0105 | 0.0282 | 510.93 | 640.10 | 2.6758 | 0.1759 | 0.0954 | 7.41 | |
| 7.358 | 252.79 | 0.1054 | 769.03 | 22.80 | 2.1453 | 0.0105 | 0.0282 | 511.08 | 639.94 | 2.6758 | 0.1759 | 0.0954 | 7.40 | |

**FIRED HEATER
DATA SHEET**

| | |
|----------------|---------------------|
| Contract: | 10E0641A01 |
| Equipment No.: | 56-B-01 |
| Revision: | 2 Date: 11-Aug-2011 |
| Unit: | 56 - Sulfonane |
| P.O. No.: | |
| Document No.: | DS-56-BA-501 |
| Sheet: | 5 of 5 |



| 1 | NOTES | REV |
|----|--|-----|
| 2 | | |
| 3 | | |
| 4 | MODIFICATIONS | |
| 5 | 1. The existing Stripper Reboiler Heater, Equipment No. 51-B-06A, is suitable for the revamp conditions with a change in service (now Equipment No. 56-B-01 Reformate Splitter Reboiler). | 0 |
| 6 | 2. No other modifications, except those given below are required for the existing heater as long as it is "fit for service", which shall be determined by CTCI. (Also, see "Revamp Notes" below). | 0 |
| 7 | a. Existing parallel heater, Equipment No. 51-B-06B, shall be IDLED for the revamp operation. Isolate the idled heater (process and fuel) as required. | |
| 8 | b. UOP combustion conditions shown on Sheet 2 of this data sheet are based on 'Sales Gas' composition given in UOP document number 951606 - A.4 "Basic Engineering Design Questionnaire, Rev. 3. CTCI/Heater Vendor shall confirm the adequacy of the existing burners and fuel gas supply system for the full range of fuel gas compositions anticipated for the revamp operation as shown in latest revision of Fluor document SP-000-AA-5002 "Basic Engineering Design Data". | 0 |
| 9 | c. Heater vendor shall verify the adequacy of the process coils and manifolds for full vacuum at 215°C. | 2 |
| 10 | d. UOP estimates that the forced draft fan inlet box dampers will be almost fully closed. Heater vendor shall confirm the suitability of the forced draft combustion air system for revamp operation. If system turndown is an issue, consider operating with even higher excess air rates, bleed air through the idled heater, modify burners for natural draft operation (i.e., forced draft air system idled). | |
| 11 | e. Provide NPS 3 Sch 80 ASTM A 312 Gr TP310 open ended waste gas nozzle located within the burner circle for disposal of 136 kg/h of waste stream with a composition of 9.40 mol% H ₂ O, 17.0 mol% Benzene, 4.0 mol% Toluene, 56.2 mol% Nitrogen and 13.4 mol% Oxygen at an estimated pressure of 0.035 bar (g) and estimated temperature of 45°C. The molecular weight of the mixture is 38.69. | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |
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| 19 | | |
| 20 | | |
| 21 | | |
| 22 | | |
| 23 | REFERENCE DATA | |
| 24 | 1. Born API Fired Heater Data Sheet Rev. 4 dated 2-Apr-96. | |
| 25 | 2. Born Burner Data Sheet Spec. No. 2881/0400/127/AB Rev. 0 dated 7-Mar-96. | |
| 26 | 3. Born Overall Layout & Plot Drawing No. 2881-51B06-01A Rev. 0 dated 7-Mar-96. | |
| 27 | 4. Born General Arrangement (Elevations) Drawing No. 2881-51B06-02A Rev. 0 dated 7-Mar-96. | |
| 28 | 5. Born FD Fan Data Sheet (Equipment No. 51-K-03 A & B) (4 Pages) [Title block illegible]. | |
| 29 | | |
| 30 | REVAMP NOTES | |
| 31 | 1. The revamp conclusions are based on the assumption that all existing coil components that are to be re-used for the revamp are identical to the vendor's data sheets referenced above, and: | |
| 32 | a. The tubes/fittings have normal original wall thickness. | |
| 33 | b. No significant corrosion or metallurgical damage has occurred. | |
| 34 | c. The tubes/fittings are not severely warped, bulged, nor oxidized. | |
| 35 | d. The tubes/fittings are free of internal and external deposits. | |
| 36 | Changes to this information will require further review of this specification by UOP. | |
| 37 | 2. CTCI/heater vendor is responsible for the following: | 0 |
| 38 | a. Providing confirmation and guarantee that the existing heater will meet UOP's predicted thermal and hydraulic performance while complying with specified noise and emissions limits. | |
| 39 | b. Conducting a detailed field inspection based upon consultation with the component vendors. | 0 |
| 40 | c. Ensuring that the heaters and ancillary equipment are refurbished, as required, to provide for safe operation at the revamp conditions. | 0 |
| 41 | d. Verifying that the structural and mechanical integrity of the heater and ancillary equipment is satisfactory for the revamp conditions. | 0 |
| 42 | e. Ensuring compliance with existing codes and practices, including environmental regulations. | 0 |
| 43 | f. Ensuring that any replacement parts or modifications shall comply with the same standards as the original equipment. | 0 |
| 44 | g. Vendor shall verify capacity of 56-K-03 A/B (Existing 51-K-03 A/B) and duty of 56-E-22 (Existing 51-E-32). | 0 |
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| 57 | | |
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| 59 | | |
| 60 | | |
| 61 | | |
| 62 | | |



4-1

CLIENT : CHIYODA / ARABIAN INDUSTRIAL FIBERS CO LTD
 CHIYODA PO : SAY POE 0002
 LOCATION : IBN RUSHD PTA & AROMATICS PLANT PROJECT
 EQUIPMENT : 51-B-06 STRIPPER REBOILER
 REQUISITION NO : 22854-MR-000-B-501

RETURNED
 JUL. 19. 1996
 CHIYODA
 V P C

RECVD
 JUL. 1. 1996
 CHIYODA
 VPC

| | |
|---|-----------------------------|
| CHIYODA CORPORATION | |
| JOB NO. 51046 | IBN RUSHD AROMATICS PROJECT |
| PO NO. SAY POE 0002 | |
| REQ NO. 22854000B501 | |
| IDENT NO. 22854000B501 <i>DC0125</i> <i>16</i> | |
| A-NO COMMENTS PROCEED WITH FABRICATION | SAY TEAM |
| B-PROCEED WITH FABRICATION COMMENTS TO BE CONSIDERED | <i>PYD RYH</i> |
| C-DO NOT PROCEED WITH FABRICATION | DATE <i>7.1.96</i> |
| PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER. | |

| REV | INTL | DATE | REVISIONS | CHKD | DATE | APP | DATE |
|-----|------|---------|---------------------|------|---------|-----|---------|
| 4 | BP | 10/5/96 | PER CLIENT COMMENTS | FLD | 21/5/96 | @1 | 26/6/96 |
| 3 | BP | 7/3/96 | AS NOTED. | RW | 7/3/96 | @1 | 11/3/96 |

CAT CODE : D1

UNIT: 51-B-06



TITLE: FRED HEATER
 DATA SHEET

SPEC NO:
 2881. 51B06-ETD 002 /A.

SHEET 1 OF 9 REV *A*

MANUFACTURE AND CONSTRUCTION TO BE CARRIED OUT STRICTLY IN ACCORDANCE WITH THE REQUIREMENTS OF THIS DRAWING SPECIFICATION.
 NO CHANGES ARE TO BE MADE WITHOUT THE PRIOR AGREEMENT OF THE CHIEF ENGINEER OR THE ORGANISING SECTION WITHIN ENGINEERING DEPARTMENT.

064003 9-2-1



CTCI CORPORATION

ALTERNATE DESIGN

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service /Item Stripper Reboiler 51B06
 Type rad con V-C Plant Location
 Quantity 2
 Owner Ref. No.
 Purchaser Chiyoda Ref. No.
 Date 07/03/96 Born Ref No. BJ 2881
 By: BDP Page 1 of 8

PROCESS DESIGN CONDITIONS

1. Total duty heater, MW
2. Heater section
3. Service per heater
4. Heat Absorption per heater, MW
5. Fluid Name
6. Flow rate, kg/hr
7. Flow rate, dm(cube)/s
8. Press drop (allow, clean/fouled), bar
9. Press drop (calc, clean/fouled), bar
10. Fouling allowance, m(sq)-C(deg)/W
11. Them conductivity of coke/scale, WmC(deg)
12. Avg. radiant flux density (allowable), W/m(sq)
13. Avg. radiant flux density (calculated), W/m(sq)
14. Avg. convection flux density (allowable), W/m(sq)
15. Avg. convection flux density (calculated), W/m(sq)
16. Max radiant flux density, W/m(sq)
17. Max convection flux density, W/m(sq)
18. Velocity limitation, m/sec
19. Max. Allowable Inside film temperature, C(deg)

INLET CONDITIONS:

20. Temperature, C(deg)
21. Pressure, barg
22. Liquid flow, kg/hr
23. Vapor flow, kg/hr
24. Density of Liquid @ T. P. , S.G
25. Vapor, molecular weight
26. Viscosity, liquid, mPa.s
27. Viscosity, vapor, mPa.s
28. Specific heat, liquid, KJ/kgC(deg)
29. Specific heat, vapor, KJ/kgC(deg)
30. Thermal conductivity, liquid, W/mC(deg)
31. Thermal conductivity, vapor, W/mC(deg)

OUTLET CONDITIONS:

32. Temperature, Degree C
33. Pressure, barg
34. Liquid flow, kg/hr
35. Vapor flow, kg/hr
36. Density of Liquid @ T. P. , Kg/cuM
37. Vapor, molecular weight
38. Viscosity, liquid, mPa*s
39. Viscosity, vapor, mPa*s
40. Specific heat, liquid, KJ/kgC(deg)
41. Specific heat, vapor, KJ/kgC(deg)
42. Thermal conductivity, liquid, W/mC(deg)
43. Thermal conductivity, vapor, W/mC(deg)

REMARKS

44. Distillation data should be attached
for vaporization service
45. Other

| 94.04 | | | |
|-------------------------|-------|----------|--|
| Radiant | Conv. | | |
| Stripper Reboiler 51B06 | | | |
| 32.28 | 14.74 | | |
| HC | | | |
| 746364 | | | |
| | | | |
| 3.8 | | | |
| 2.3 | | | |
| | | | |
| | | | |
| 31546 | | | |
| 30622 | | | |
| | | | |
| | | | |
| | | 3341 | |
| 55120 | | | |
| | | 60329 | |
| | | | |
| | | | |
| | | 212 | |
| | | 12.80 | |
| | | 746364 | |
| | | 0 | |
| | | 0.671 | |
| | | | |
| | | 0.166 | |
| | | | |
| | | 2.477 | |
| | | | |
| | | 0.101 | |
| | | | |
| | | | |
| | | 224 | |
| | | 8.00 | |
| | | 223909.2 | |
| | | 522454.8 | |
| | | 0.664 | |
| | | 91.9 | |
| | | 0.168 | |
| | | 0.011 | |
| | | 2.535 | |
| | | 1.975 | |
| | | 0.099 | |
| | | 0.027 | |

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service/Item Stripper Reboiler 51B06
Unit rad con V-C Plant Location
Type Quantity 2
Owner Ref. No.
Purchaser Chiyoda Ref. No.
Date: 07/03/96 Born Ref No. BJ 2881
By: BDP Page 3 of 8

Coil Design: (RADIANT)

4. Design basis of tube wall thk. (code or specs)
5. Design basis for rupture strength, (min or avg)
6. Design life, hr
7. Elastic design pressure, bar
8. Rupture design pressure, bar
9. Temperature allowance, C(deg)
10. Corrosion allowance, mm
11. Stress relieve (YES or NO)
12. Weld inspection requirements radiography, %
13. Hydrostatic test pressure, BARG
14. Max tube metal temperature (clean) C(deg)
15. Design tube metal temperature C(deg)
16. Inside film coefficient, W/m C(deg)

Coil Configuration: (RADIANT)

17. Tubes (vertical or horizontal)
18. No. of flow passes
19. Effective tube length, m
20. Bare tubes, number
21. Bare tubes, exposed surface, m(sq)
22. Bare tubes, total exposed surface, m(sq)
23. Tubes, inline or staggered
24. Tube spacing, C to C, mm

Tubes: (RADIANT)

25. Material (ASTM spec. or grade)
26. Outside diameter, mm
27. wall thickness, mm or Sch
28. Overall tube length, m
29. No. of intermediate welds
30. Distance from Center Line of tube to wall, mm

Heater Section

Plug-Type Headers:

31. Location (one end or both ends)
32. Manufacture and type
33. Nominal rating
34. Welded or rolled joint

Return Bends:

35. Location (header box or firebox)
36. Material (ASTM spec and grade)

| API 530 | Radiant Shock | API 530 |
|----------|---------------|------------|
| 100000 | | 100000 |
| 15.80 | | 15.80 |
| 28 | | 28 |
| 3 | | 3 |
| NO | | NO |
| 100 | | 100 |
| 27.4 | | 27.4 |
| 289 | | |
| 317 | | 317 |
| 1124 | | 1120 |
| VERT | | HORIZ |
| 8 | | 8 |
| 17.91 | | 8.077 |
| 80 | | 16 |
| 985.97 | | 68.28 |
| 1054.25 | | |
| IN LINE | | STAGGERED |
| 406.4 | | 304.8 |
| A106 GRB | | A 106 GRB |
| 219.1 | | 168.3 |
| sch 40aw | | sch 40 aw |
| 80 | | None |
| 305 | | 152 |
| Radiant | | |
| None | | None |
| Firebox | | Header box |
| A234 WPB | | A 234 WPB |

064006

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service/Item Stripper Reboiler 51B06
Unit rad con V-C Plant Location
Type Quantity 2
Owner Ref. No.
Purchaser Chiyoda Ref. No.
Date: 07/03/96 Bom Ref No. BJ 2881
By: BDP Page 4 of 8

Coil Design: (CONVECTION)

4. Design basis of tube wall thk. (code)
5. Design basis for rupture strength
6. Design life, hr.
7. Elastic design pressure, BAR
8. Rupture design pressure, BAR
9. Temperature allowance, C(deg)
10. Corrosion allowance, mm
11. Stress relieve (yes or no)
12. Weld inspection requirements radiography, %
13. Hydrostatic test pressure, Barg
14. Max tube metal temperature (clean), C(deg)
15. Design tube metal temperature, C(deg)
16. Inside film coefficient, W/m(sq) C(deg)

Coil Configuration: (CONV.)

17. Tubes (vertical or horizontal)
18. No. of flow passes/tubes per row
19. Effective tube length, m
20. Bare tubes, number
21. Bare tubes, exposed surface, m(sq)
22. Ext tubes, number
23. Ext surface tubes, exp. surface, m(sq)
24. Ext surface tubes, total exp. surface, m(sq)
25. Tubes, staggered/inline
26. Tube spacing, C to C, mm

Tubes: (CONVECTION)

27. Material (ASTM spec. or grade)
28. Outside diameter, mm
29. wall thickness, m m or Sch
30. Overall tube length, m
31. No. of intermediate welds
32. Distance from tube center line to wall, mm

Description of Extended Surface:

33. Type (studs, serrated fins or solid fins)
34. Material
35. Fin Height, mm
36. Fin Thickness, mm
37. Fins Per m
38. Max tip temperature, C(deg)
39. Extension ratio

Heater Section

Plug-Type Headers:

40. Location (one end or both ends)
41. Manufacture and type
42. Nominal rating
43. Welded or rolled joint

Return Bends:

44. Location (header box or firebox)
45. Material (ASTM spec and grade)

| | BARE | EXT. | EXT. | EXT. |
|---------|---------|---------|---------|---------|
| API 530 | API 530 | API 530 | API 530 | API 530 |
| | 100,000 | 100,000 | 100,000 | 100,000 |
| | 15.8 | 15.8 | 15.8 | 15.8 |
| | 28 | 28 | 28 | 28 |
| | 3 | 3 | 3 | 3 |
| | NO | NO | NO | NO |
| | 100 | 100 | 100 | 100 |
| | 27.4 | 27.4 | 27.4 | 27.4 |
| | 255 | 281 | 276 | 266 |
| | 283 | 309 | 304 | 294 |
| | 1823 | 1828 | 1834 | 1840 |

| | HORL. | HORL. | HORL. | HORL. |
|--|-----------|-----------|-----------|-----------|
| | 8 16 | 8 16 | 8 16 | 8 16 |
| | 8.077 | 8.077 | 8.077 | 8.077 |
| | 32 | 0 | 0 | 0 |
| | 136.66 | | | |
| | 0 | 16 | 16 | 64 |
| | | 290.50 | 543.57 | 3441.66 |
| | | 4275.73 | | 0 |
| | STAGGERED | STAGGERED | STAGGERED | STAGGERED |
| | 305 | 305 | 305 | 305 |

| | A106 GRB | A106 GRB | A106 GRB | A106 GRB |
|--|----------|-----------|-----------|-----------|
| | 168.3 | 168.3 | 168.3 | 168.3 |
| | sch 40aw | sch 40 aw | sch 40 aw | sch 40 aw |
| | None | None | None | None |
| | 152 | 152 | 152 | 152 |

| | SOLID FIN | SOLID FIN | SOLID FIN |
|--|-----------|-----------|-----------|
| | Car/Sil | Car/Sil | Car/SIL |
| | 12.70 | 25.40 | 25.40 |
| | 1.30 | 1.30 | 1.30 |
| | 118 | 118 | 197 |
| | 331 | 389 | 334 |
| | 4.252 | 7.956 | 12.594 |

Convection

| | | | |
|--|------|--|--|
| | NONE | | |
| | | | |
| | | | |

| Header box | Header box | Header box | Header box |
|------------|------------|------------|------------|
| A-234-WPB | A-234-WPB | A-234-WPB | A-234-WPB |

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service/Item Stripper Reboiler 51B06
 Unit rad con V-C Plant Location
 Type Quantity 2
 Owner Ref. No.
 Purchaser Chiyoda Ref. No.
 Date: 07/03/96 Bom Ref No. BJ 2881
 By: BDP Page 5 of 8

Heater Section Continued:

Terminals:

- 1. Type (welded or flanged)

Inlet:

- 2. Material (ASTM spec and grade)
- 3. Size/rating, schedule or thickness
- 4. Number of terminals

Outlet:

- 5. Material (ASTM spec and grade)
- 6. Size/rating, schedule or thickness
- 7. Number of terminals

Manifolds:

- 8. Connection to tubes (weld or flanged)
- 9. Location (internal or external)

Inlet:

- 10. Material (ASTM spec and grade)
- 11. Size/schedule or thickness
- 12. Flange/material (ASTM spec and grade)
- 13. Flange size and rating

Outlet:

- ⚠ 14. Material (ASTM spec and grade)
- ⚠ 15. Size schedule or thickness
- ⚠ 16. Flange/material (ASTM spec and grade)
- ⚠ 17. Terminal size and rating

Crossovers:

- 18. Location (internal or external)
- 19. Pipe mat'l (ASTM spec and grade)
- 20. Pipe size/schedule or thickness
- 21. Flange mat'l (ASTM spec and grade)
- 22. Flange size and rating

Tube Supports:

- 23. Location (top, bottom, intermediate)
- 24. Material (ASTM spec and grade)
- 25. Spacing
- 26. Coating (type and thickness)

Tube Guides:

- 27. Location and spacing (Top/Bottom)
- 28. Material (ASTM spec and grade)

Settings:

Floor:

- 29. Lining: Thickness - Hot face temp. - calc - design 200 819 C
- 30. Mat'l/thk/service temperature 200 MM LW CASTABLE
- 31. Anchor (type & mat'l)
- 32. Casing: Thickness - Material - Temperature 6mm C.S. plate

Exposed Vertical Walls:

- 33. Lining: Thickness - Hot face temp. - calc - design
- 34. Mat'l/thk/service temperature
- 35. Anchor (type & mat'l)
- 36. Casing: Thickness - Material - Temperature

| Radiant | Convection | |
|---|-------------------|----------------|
| Flanged | Flanged | |
| | A105 | |
| | 6" SCH 40 AW 300# | |
| | 8 PER HEATER | |
| A105 | | |
| 8" SCH40AW 300# | | |
| 8 PER HEATER | | |
| Flanged | | |
| External | | |
| None | | |
| | | |
| | | |
| A105 GrB | | |
| 26" x STD WT | | |
| None (Connections to Heater terminals only) | | |
| 26" x STD WT Bevelled | | |
| External | | |
| A105 GRB | | |
| 6" SCH40AW | | |
| None | | |
| | | |
| TOP | INTER | ENDS |
| 25/20 CR NI | 25/20CR NI | C.S. PLATE |
| | 4150 mm | |
| | | 100 mm LW cast |
| BOTTOM | | |
| 310 SS | | |



BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

| | | | |
|--------------|-------------------------|----------------|---------|
| Service/Item | Stripper Reboiler 51B06 | | |
| Unit | rad con V-C | Plant Location | |
| Type | | Quantity | 2 |
| Owner | | Ref. No. | |
| Purchaser | Chiyoda | Ref. No. | |
| Date: | 07/03/96 | Bom Ref No. | BJ 2881 |
| By: | BDP | Page 6 of | 8 |

Mechanical Design Conditions (continued)

Heater Section (continued):

Shielded Vertical Walls:

| | | | |
|---|--|------------|--------|
| 1. Lining: Thickness - Hot face temp. - calc - design | 125 | 554 C | 1260 C |
| 2. Thk/Mat'l/service temperature | 50 -128 kg/ cu m CFNB + 75 -96 kg/ cu m CFNB+3mm stalastic | | |
| 3. Anchor (type & matl) | TP 310 SS Studs and Washers | | |
| 4. Casing: Thickness - Material - Temperature | 6mm | C.S. plate | |

Arch:

| | | | |
|---|--|------------|--------|
| 5. Lining: Thickness - Hot face temp. - calc - design | 150 | 819 C | 1260 C |
| 6. Thk/Mat'l/service temperature | 50mm128kg/cumCFNB+100mm96 kg/cum CFNB+3mm silastic | | |
| 7. Anchor (type & matl) | TP 310 SS Studs and Washers | | |
| 8. Casing: Thickness - Material - Temperature | 6mm | C.S. plate | |

Convection Walls:

| | | | |
|---|--------------------|------------|--------|
| 9. Lining: Thickness - Hot face temp. - calc - design | 125 | 534 C | 1100 C |
| 10. Thk/Mat'l/service temperature | 125 mm LW castable | | |
| 11. Anchor (type & matl) | v' type | 304 SS | |
| 12. Casing: Thickness - Material - Temperature | 6mm | C.S. plate | |

Breeching:

| | | | |
|--|-------------|-------|--------|
| 13. Lining: Thickness - Hot face temp. - calc - design | 75 | 249 C | 1093 C |
| 14. Thk/Mat'l/service temperature | LW CASTABLE | | |
| 15. Anchor (type & matl) | v' type | CS | |
| 16. Casing: Thickness - Material - Temperature | 5 | | |

Flue Gas Ducts:

| | | | |
|-----------------------------------|---------------------------|--|--|
| 17. Location | top of convection section | | |
| 18. Lining (internal or external) | internal | | |
| 19. Thickness & Material | 50 mm LW castable | | |
| 20. Anchor, type and material | CS 'v' anchors | | |
| 21. Hot face design temperature | | | |
| 22. Cold face design temperature | | | |

Combustion Air Ducts:

| | | | |
|---|--------------------------|--|--|
| 23. Location | FD fan to burner plenums | | |
| 24. Lining (internal or external) | | | |
| 25. Thickness and Material | | | |
| 26. Anchor, type and material | | | |
| 27. Hot face / cold face design temperature, C(deg) | | | |

Header Boxes:

| | | | |
|-------------------------------------|-------------------|---------------------|--------|
| 28. Location | Conv. ends | Hinged doors/bolted | Bolted |
| 29. Lining (Thickness & Material) | 50 mm LW castable | | |
| 30. Anchor (type and material) | v' type | CS | |
| 31. Door/panel (matl and thickness) | 6mm | C.S. plate | |

Burner Windboxes

| | | | |
|-----------------------------------|--------------------------|------------|--------------|
| 32. Lining (Internal or external) | internal | Matl & thk | mineral wool |
| 33. Anchor (type and matl) | CS 'v' | | |
| 34. Casing: Materials and thk. | CS 5 | | |
| 35. Hot face design temp., C(deg) | Cold face design temp.,C | | |

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

Service /Item Stripper Reboiler 51B06
Unit rad con V-C Plant Location
Type Quantity 2
Owner Ref. No.
Purchaser Chiyoda Ref. No.
Date: 07/03/96 Born Ref No. BJ 2881
By: BDP Page 7 of 8

Mechanical Design Conditions (continued)
Heater Section (continued):

Stack:

1. Location
Inside met. dia., mm
2. Stack design metal temperature.
3. Plate, min. thickness, mm
4. Lining : (Internal or External)
5. Thickness and Material, mm
6. Anchor, type and material:

Bridgeway:

7. Height, mm
- Matl and thickness:

Dampers:

8. Location
9. Material of blade
10. Material of shaft
11. Bearing type
12. Multiple or single blade
13. Desc of provision for operation
14. Location and type of operator

Miscellaneous:

Platforms:

- | | Location/No. |
|-----------------------------|--------------|
| 15. Hearth / One | |
| 16. Convection Side(s) /One | |
| 17. Convection End(s) /Two | |
| 18. Rad Intermediate /One | |
| 19. Stack Damper / One | |
| 20. Stack Sample Port | |
| 21. Type of flooring | |
| Doors: | |
| 22. Access Doors | |
| 23 | |
| 24. Observation Doors | |
| 25 | |
| 26 | |
| 27. Steam Lance Doors | |
| 28 | |
| 29 Explosion Door | |
| 30 | |
| 31 | |

Instruments and Aux. connections

32. Process fluid temperature
33. Flue gas / combustion air temp.
34. Flue gas / combustion air pressure
35. Flue gas composition (sample)
36. Snuffing steam
37. Purge
38. Vents and drains
39. Tubeskip thermocouples

| | |
|---------------|-------------------------|
| top of heater | Corr Allow |
| 2713 | Ht. above grade: mm |
| | Stack length, mm 24689 |
| 6 | Material: Carbon steel |
| Internal | Extent of lining To top |
| 50 | LW Castable |
| v' type | CS |

| | |
|------|----------|
| none | Location |
|------|----------|

| |
|----------------|
| Stack |
| TP304SS |
| TP304SS |
| PILLOW BLOCK |
| Multiple blade |
| actuated |

| Width | Length/Arc | Access | |
|---------|------------|----------------|-------|
| | | Stairs/Ladder | Grade |
| 1100 mm | 360 DEGREE | 1stair/1ladder | |
| 1100 mm | | 1 LADDER | |
| 1100 mm | | 2 WALKWAYS | |
| 1100 mm | | 1 Ladder | |
| 1100 mm | 270 DEGREE | 1 LADDER | |

| Number | Location | Size | Hinged/Bolted |
|--------|-----------|------------------|-------------------|
| 2 | FLOOR | 450 x 600 | Hinged |
| 12 | RAD SIDE | 127 x 406 | HINGED(20-std-03) |
| 4 | CONV SIDE | 600 x 150 bolted | (BLS-D-106) |
| 1 | RAD SIDE | 473 x 432 | HINGED |

| Number | Size | Type |
|--------------------------------|--------|---------------------|
| SEE DRAWING No. 2281/403/126CA | | |
| & 2281-51B06-02A & 02B | | |
| 4 | 2" NPS | 3000# CRG with Plug |

4-9

BORN

WORLD-WIDE MANUFACTURERS OF
DIRECT FIRED HEATERS
SI UNITS

| | | | |
|--------------|-------------------------|----------------|---------|
| Service Item | Stripper Reboiler 51B06 | Plant Location | |
| Unit | rad con V-C | Quantity | 2 |
| Type | | Ref. No. | |
| Owner | | Ref. No. | |
| Purchaser | Chiyoda | Born Ref No. | BJ 2881 |
| Date | 07/03/96 | Page 8 of | 8 |
| By: | BDP | | |

Mechanical Design Conditions (continued)
Heater Section (continued):

| | |
|---|---|
| 1. Painting requirements: | 22854-SP-000-X-002 System 2 to Prime coat only final coat at site |
| 2. Galvanizing requirements. | Ladders and Platforms to ASTM A123 |
| 3. Internal coatings (casing, ducts, stack) | Stalastic behind ceramic fibre blanket |
| 4. Fireproofing requirements. | None |

Burner and Auxiliary Equipment:

Burners:

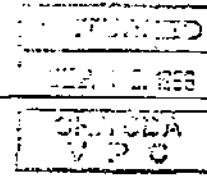
| | | | | |
|---|----------------|--------------------|-------------|-----------|
| 5. Manufacture/type | J.Z. Type PSFG | FD gas only | Location | rad floor |
| 6. Designation/size | 16 | Number: | 12 | Fuel: gas |
| 7. Heat rel. (MW per burner) at design excess air (Max\Norm\Min) | | | 4.95 (110%) | 4.50 |
| 8. Design press drop across burner | 50mm | @ max heat release | | |
| 9. BCD | 5100 mm | | | |
| Distance burner centerline to unshielded refractory: | 17907 mm | | | |
| 10. Burner pilot: | | | | |
| Capacity (KW) | 20 | Fuel: Gas | Fuel press | |
| Fuel Pressure/ Fuel: | | Type of ignition: | AUTO | |
| 11. Special requirements: (flame detection devices, safety interlocks etc.) | | | UV SCANNERS | |

Sootblowers:

| | |
|---|-------------------------------|
| 12. Location | SPACE FOR FUTURE INSTALLATION |
| 13. Manufacture and type | |
| 14. Number | |
| 15. Maximum cleaning radius, mm | |
| 16. Lane dimensions (min. clearance) | |
| 17. Orientation (horizontal or vertical) | |
| 18. Cleaning medium | |
| 19. Supply pressure/temperature | |
| 20. Flow rate per blower, kg/s | |
| 21. Materials of construction | |
| 22. Driver type (manual, air, or elec.) | |
| 23. Control systems type (auto or manual, sequential, local, or remote panel) | |

054011

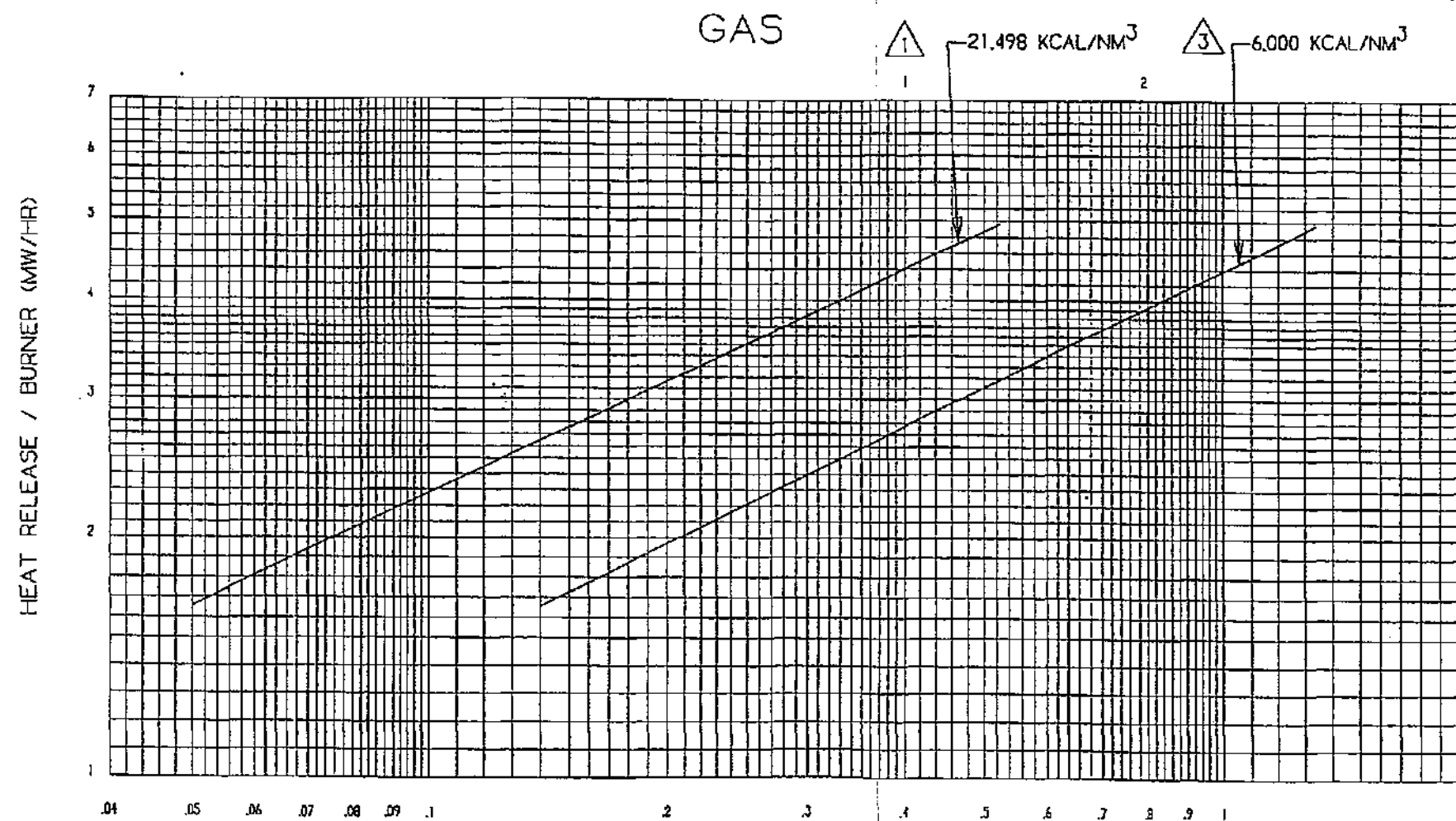
9-9-9



1 : CUSTOMER : BORN HEATERS INTERNATIONAL
 1A: P.O. NO.: 010990-2881
 1B: USER : ARABIAN INDUSTRIAL FIBERS
 1C: JOBSITE : YANBU CITY, SAUDI ARABIA
 1D: ELEVATION : < 305m
 1E: QUAN. REQ'D.: 24
 1F: JOHN ZINK SERIAL NO.: AO-17229-2
 2 : TAG NO'S.: B-602-1 BURNER ASSEMBLY, B-602-2 MORTAR
 ABOVE TAGS PRECEDED BY: UNIT 51-B-06 A/B
 STABILIZER REBOILER
 2A: REF. DWG'G.: B-BU-A17229-602 PSFG-16R BURNER ASSEMBLY
 B-BU-17229-608 PILOT ASSEMBLY
 3 : FUEL GAS: REFINERY GAS PROPANE
 3A: LHV (KCAL/NM³): 6,000 21,498
 3B: M.W.: 9.83 43.53
 3C: TEMP.: (°C) 60 38
 4 : FUEL OIL: A B C D E
 4A: LHV (BTU/LB):
 4B: API GR.:
 4C: TEMP.: (°F)
 4D: RECOMMENDED OPERATING VISCOSITY: 250 SSU (MAX)
 5 : PILOT ORIFICE DRILLED: 1/16" DIA
 5A: PILOT GAS PRESSURE: .48 - 1.03 Barg. (NATURAL GAS)
 6 : DRAFT LOSS : 50mm W.C. @ 4.95 MW/HR. W/ 15% X-S AIR @ 15.6 °C.
 7 : HEAT RELEASE PER BURNER (NET):
 7A: MAX.: 4.95 M.W.
 7B: NORM.: 4.50 M.W.
 7C: MIN.: 1.65 M.W.
 TIP DRILLINGS : PRIMARY: (4) #2 MTD F.P.
 (6) 1/16" DIA. IP
 STAGED: (2) LTR "B" F.P.
 (2) #48 MTD. IP.

DATA SHEET NO.: D-BU-A17229-802
 BURNER DATA SHEET FOR: PSFG-16R STAGED GAS BURNER ASSEMBLY
 HEATER NO.: 1 51-B-06 A/B STABILIZER REBOILER
 S.O. NO.: AO-17229

CAPACITY - PRESSURE CURVE



BORN DOCUMENT NO.

| JOB NO. | REQN. NO. | ITEM NO. | SUFFIX | REV. |
|---------|-----------|----------|--------|------|
| 2881 | 0400 | 127 | AB | 03 |

CHIYODA CORPORATION

| | |
|-----------------------------|-----------------------------|
| JOB NO. 51046 | IBN RUSHD AROMATICS PROJECT |
| PO NO. SAYPOE0002 | |
| REQ NO. 2285400B501 | |
| IDENT NO. 2285400B501AC0039 | |

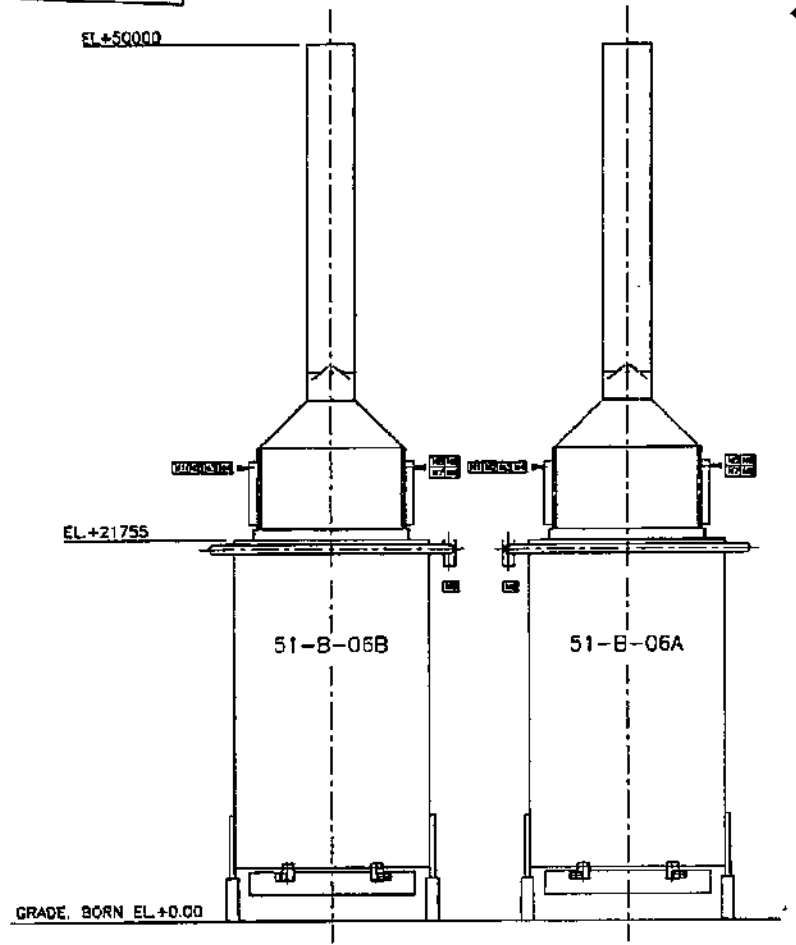
| | |
|--|-------------|
| A-NO COMMENTS PROCEED WITH FABRICATION | SAY TEAM |
| B-PROCEED WITH FABRICATION COMMENTS TO BE CONSIDERED | FD 4/2/96 |
| C-DO NOT PROCEED WITH FABRICATION | DATE 4/2/96 |

064025

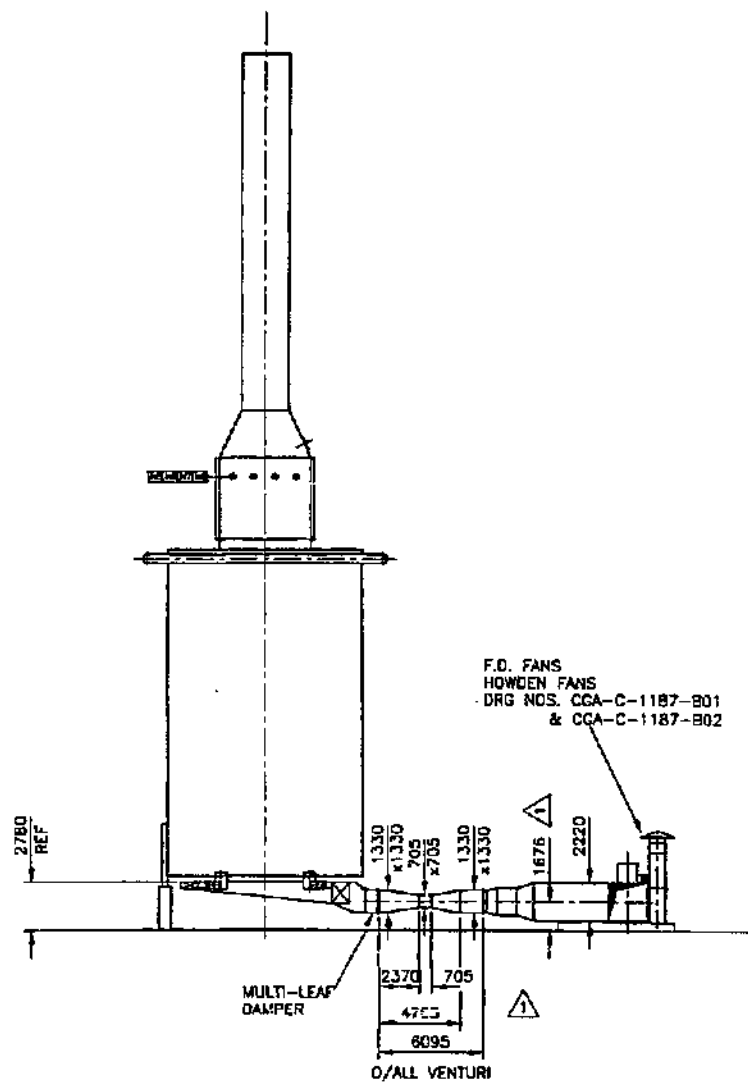
| | | |
|-----------|---------------|------------------------------|
| DR.: JL | DATE: 1-22-96 | CERTIFIED S.N. 6-14-96 |
| CK: | DATE: | |
| APP.: TMY | DATE: 1-26-96 | |

| NO. | REVISION DESCRIPTION | BY | CK | APP | DATE |
|-----|---|----|-----|-----|--------|
| 3 | REVISED AS NOTED PER CUSTOMER COMMENTS/ VDR 50319 | JL | TOM | TMY | 8-14-9 |
| 2 | REV'D TIP DRILLING PER VDR 50414/TEST 6-13-96 | JL | TOM | TMY | 6-14-9 |
| 1 | REVISED AS NOTED PER CUSTOMER COMMENTS/ VDR 50270 | JL | TOM | TMY | 5/16/9 |

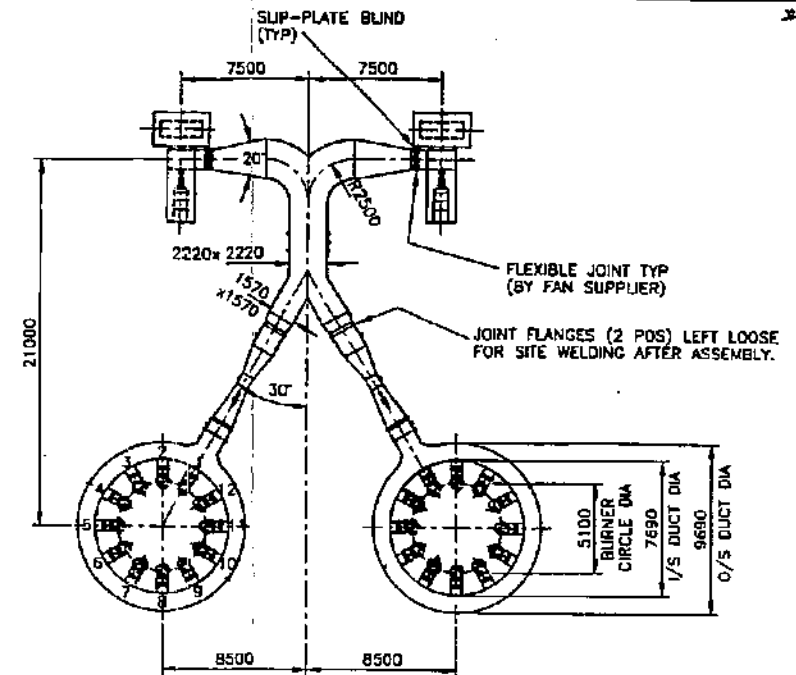
DDC:B-A17229-802



VIEW ON A-A



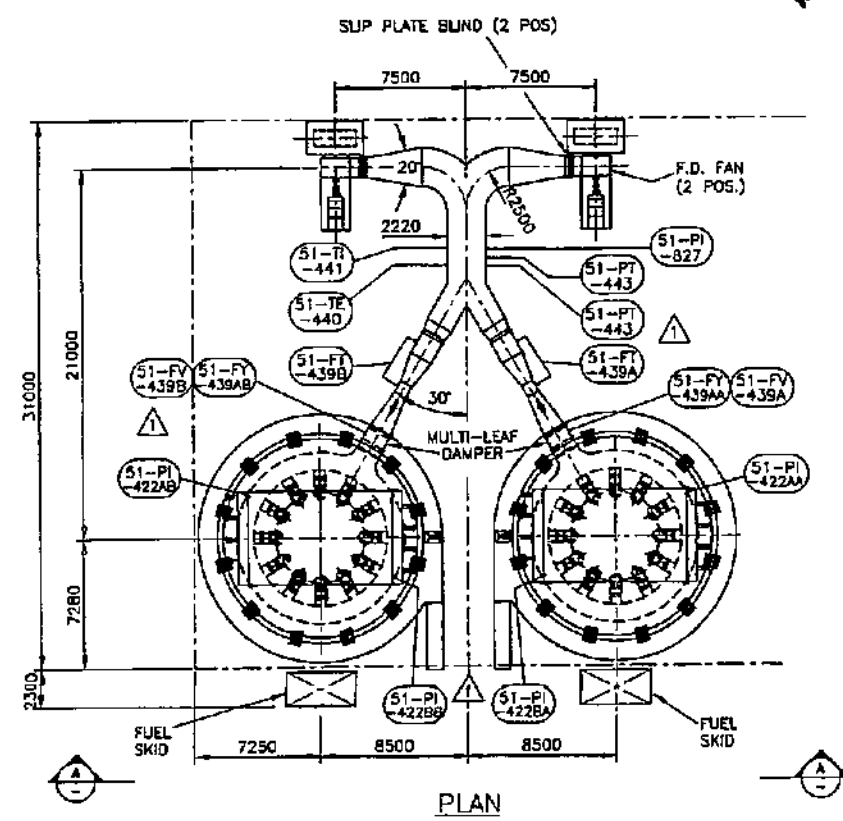
VIEW ON B-B



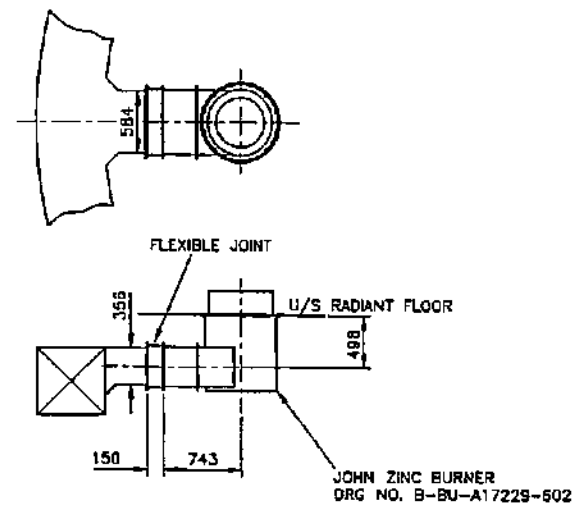
PLENUM DUCT FREE FLOW AREAS
 AT BURNER 1,2,12 : 1.23 m²
 AT BURNER 3,11 : 1.03 m²
 AT BURNER 4,10 : 0.83 m²
 AT BURNER 5,9 : 0.60 m²
 AT BURNER 6,8 : 0.40 m²
 AT BURNER 7 : 0.375 m²

PLAN ON BURNER DUCT

NOTE. ALL DUCT SIZES 1/2" SIDE STEEL (DUCT UNLINED)



PLAN



BURNER/DUCT DETAIL



| | |
|--|-----------------------------|
| CHRYCOA | |
| FOR NO. 51046 | IBN RUSHO AROMATICS PROJECT |
| PO NO. | SAYPOLDD02 |
| REQ NO. | 22854000501 |
| EVENT NO. | 22854000501DW025 |
| NO COMMENTS PROC'D WITH FABRICATOR | SAY TEAM |
| NO COMMENTS PROC'D WITH FABRICATOR | DATE 22 Nov '98 |
| PURCHASER'S PERMISSION TO PROCEED OR REVISION TAKEN ON VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM HIS RESPONSIBILITIES OR LIMITS UNDER PURCHASE ORDER | |

| | | | | | |
|---------------------------|---------|----------------|---------|----------|--------|
| BORN | | | | | |
| DRAWING TITLE | | | | | |
| OVERALL LAYOUT & PLOT | | | | | |
| SERVICE | | | | | |
| 51-B-06 STRIPPER REBOILER | | | | | |
| FOR | | | | | |
| IBN RUSHO | | | | | |
| 054021 | | | | | |
| DRAWN | DATE | CHECKED | DATE | APPROVED | DATE |
| STEPHENS | JAN '98 | CT | 29.2.98 | RG | 7.3.98 |
| JOB No. 2881 | | DRAWING NO. | | REV. | |
| | | 2881-51B06-01A | | 1 | |

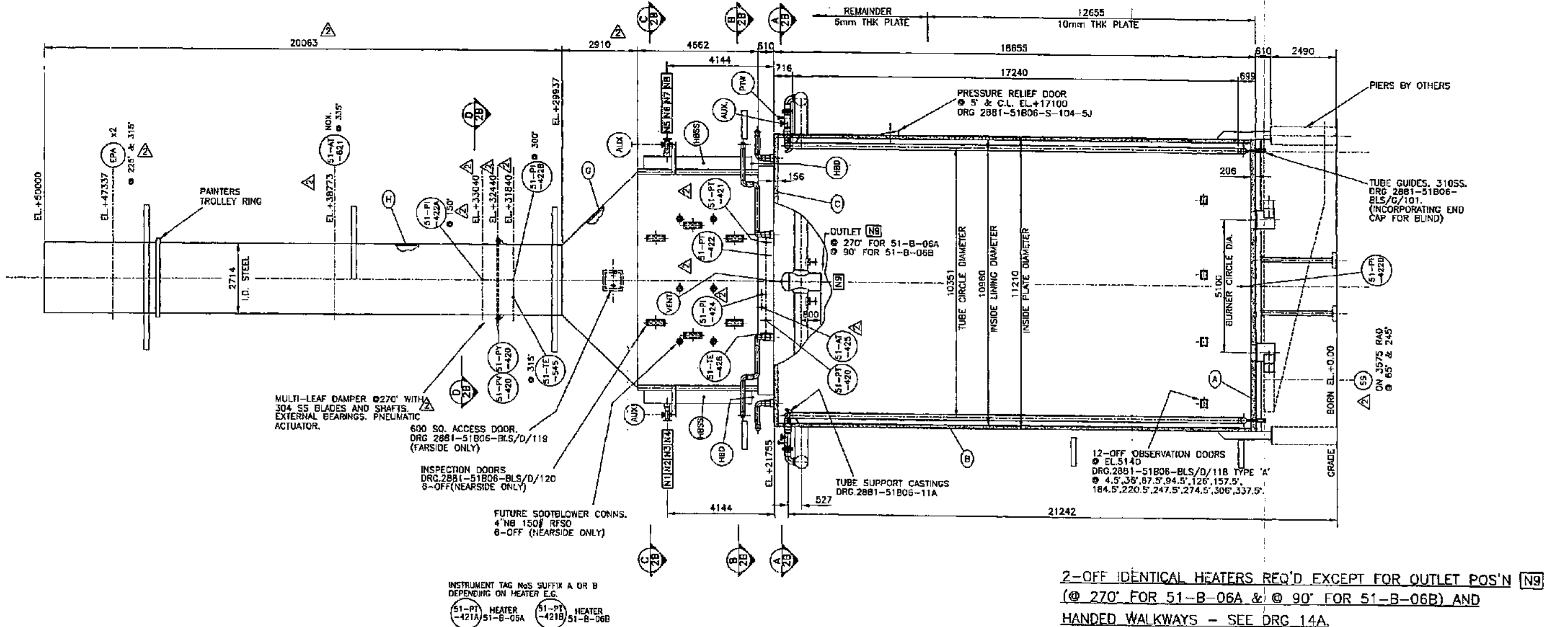
BURNER PLENUM DETAILS ADDED. FANS RE-POSITIONED.
 OTHER REVISIONS PER CLIENT RETURN PRINT DATED 21.5.98.
 BURNER PLENUM CENTRE-LINE DIA'N OF 1876 WAS 1326.

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CTCI CORPORATION

FOR TRUE ORIENTATION OF INSTRUMENTS, PLATFORMS ETC. SEE DRGS 2881-51B06-02B & -14A



2-OFF IDENTICAL HEATERS REQ'D EXCEPT FOR OUTLET POS'N (N9)
 (@ 270' FOR 51-B-06A & @ 90' FOR 51-B-06B) AND
 HANDED WALKWAYS - SEE DRG. 14A.

| NOZZLE SCHEDULE (PER HEATER) | | | INSULATION SCHEDULE | | INSTRUMENT SCHEDULE (PER HEATER) | | PROCESS OPERATING DATA | | COIL DATA (PER HEATER) | | NOTES | |
|--|--|--|---------------------|--|----------------------------------|-------------|--------------------------|--|------------------------|--|--|---|
| TAG | ITEM | DESCRIPTION | TAG | DESCRIPTION | TAG | DESCRIPTION | REMARKS | PROCESS-INLET | PROCESS-OUTLET | RAOIANI | | |
| (N1) TO (N8) | PROCESS INLETS | 6" - 300# RFWN FLANGE x SCH 40 AW | (A) | RADIANT FLOOR 200mm THK LW CASTABLE | (51-PT) (-422A) | TO | | TEMPERATURE: 212 - °C PRESSURE: 12.8 - Barg | | 80 - 219.1 mm O.D. (6" N.B.) x SCH. 40 A.W. TUBES PER A.S.T.M. A106 GRADE B. | 1. ALL ELEVATIONS SHOWN ARE FROM GRADE, BORN EL.+0.00. | |
| (N9) | PROCESS OUTLET | 28" NB x 10mm AW TUBE MAT'L: ASTM A105B BUTT WELD (END BEVELLED) | (B) | RADIANT SIDE WALLS 125 mm THICK. 50mm-128 kg/m ³ + 75mm-98 kg/m ³ CFNB. ANCHORS-STUDS & WASHERS (TP310SS) | (51-PT) (-422B) | INCL. | DRAFT GAUGES | TEMPERATURE: 224 - °C PRESSURE: 9 - Barg | | CONVECTION 144 - 168.3 mm O.D. (6" N.B.) x SCH. 40 A.W. TUBES PER A.S.T.M. A106 GRADE B. 9 ROWS WITH 16 TUBES PER ROW (8 PASSES) 3 ROWS BARE 8 ROWS FINNED OVER A LENGTH OF 8305 mm WITH 1 ROW @ 12.7 HIGH X 1.3 THK X 118 PER METRE 1 ROW @ 25.4 HIGH X 1.3 THK X 118 PER METRE 4 ROWS @ 25.4 HIGH X 1.3 THK X 197 PER METRE | SURFACE PREPARATION & PAINTING DETAILS HEATER & STACK SECTIONS a) PREPARATION: SHOTBLAST TO SA 2 1/2 b) PRIMER: - PER SPEC. 22854-SP-000-X-002 REV. 1 SYSTEM S2 (PRIME COAT ONLY) | |
| MANIFOLD DATA | | | (C) | RADIANT ARCH 150 mm THICK. 50mm-128 kg/m ³ + 100mm-98 kg/m ³ CFNB. ANCHORS-STUDS & WASHERS (TP310SS) | (51-PT) (-420) | | PRESS. XMTR | AUXILLARY SCHEDULE (PER HEATER) | | | LADDERS & PLATFORMS c) HOT DIPPED GALVANIZED -- PER ASTM A123 | |
| OUTLET MANIFOLD | 20" NB x STD WT TUBE MAT'L: ASTM A105B | | (D) | CONVECTION SIDE WALLS 125mm THK LW CASTABLE ANCHORS - BULLHORN (304SS) | (51-PT) (-421) | | PRESS. XMTR FOR BMS | (TAG) | QTY. | ITEM | DESCRIPTION | REFERENCE DRAWINGS DRAWING No. DESCRIPTION -01A OVERALL LAYOUT & PLOT -02B HEATER GENERAL ARRANGEMENT (Elevs.) -03A FOUNDATION LADING PLAN -11A TUBE SUPPORT CASTINGS -11B TUBE SUPPORT CASTINGS -12A CONVECTION COIL DETAILS -12B RADIANT COIL DETAILS -12C CROSSOVERS/MANIFOLDS -14A LADDER & PLATFORM GENERAL ARRGT. |
| MAXIMUM ALLOWABLE FORCE & MOMENTS FOR NOZZLE INTERFACES. | | | (E) | CONVECTION END SHEETS 100mm THK LW CASTABLE ANCHORS - BULLHORN (304SS) | (51-TE) (-425) | | THERMOCOUPLE AND WELL | (AUX) | 16 | AUX. CONN. | 3" 300# RFWN FLANGE WITH BLIND | BURNERS (PER HEATER) 12 OFF FORCED DRAUGHT STAGED GAS ONLY BURNERS JOHN ZINC TYPE PSFC-16R |
| MAXIMUM ALLOWABLE FORCES & MOMENTS ARE 3 TIMES THE VALUE STATED IN API 560 | | | (F) | HEADER BOXES 50mm THK LW CASTABLE ANCHORS - BULLHORN (CS) | (51-AT) (-424) | | OXYGEN ANALYZER | (HBD) | 2 | HEADER BOX DRAIN | 1 1/2" NPT 3000# COUPLING WITH PLUG | |
| | | | (G) | TRANSITION 75mm THK LW CASTABLE ANCHORS - BULLHORN (CS) | (51-AT) (-425) | | COMBUSTIBLE ANALYZER | (HBSS) | 2 | HEADER BOX STEAM SNUFFING | 1 1/2" NPT 3000# COUPLING WITH PLUG | |
| | | | (H) | STACK 50mm THK LW CASTABLE ANCHORS - BULLHORN (CS) | (51-AT) (-821) | | NOX. ANALYZER | (PTW) | 8 | PROCESS THERMO. | 1" 300# RFWN FLANGE | |
| | | | | NOTE: INTERIOR SURFACES OF RADIANT SIDE WALLS AND ARCH TO BE COATED WITH 3mm (WET THICKNESS) OF STALASTIC HIGH TEMPERATURE GRADE PROTECTIVE COATING. | (51-TE) (-545) | | THERMOCOUPLE AND WELL | (SS) | 2 | STEAM SNUFFING | 2" NPT 3000# COUPLING WITH PLUG | |
| | | | | | (51-PT) (-420) | | DAMPER TO STACK | (EPA) | 2 | FLUE GAS ANALYSER | 4" 150# RFSO FLANGE ON BLIND | |
| | | | | | (51-PT) (-420) | | I/P CONVERTER FOR DAMPER | (VENT) | 1 | MANIFOLD VENT | 1" NPT 3000# COUPLING WITH PLUG | |

CHRYODA
 JOB NO. 51046 IBN RUSHD AROMATICS PROJECT
 P.O. NO. 547000002
 R.O. NO. 22854000901
 IDENT NO. 228540009501D00026
 RETURNED OCT. 2 1996
 CHRYODA VPC
 RECVD OCT. 1 1996
 CHRYODA VPC

BORN
 DRAWING TITLE: GENERAL ARRANGEMENT (ELEVATIONS)
 SERVICE: 51-B-06 STRIPPER REBOILER
 FOR: IBN RUSHD
 DRAWN: 30.1.96
 CHECKED: 29.2.96
 DATE: 30.1.96
 M.D.O. 29.2.96
 APPROVED: 27.2.96
 DATE: 27.2.96
 JOB No. 2881 2881-51B06-02A 2

FILENAME: X:\DWGS\2881\5106\02BA
 SCALE: 1:75
 ORIGINAL SIZE: A1

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GN-502 84.10



ARABIAN INDUSTRIAL FIBERS COMPANY

IR-II AROMATICS PROJECT

PROJECT NO. 10E0541A01

DOCUMENT TITLE:

REFORMATE SPLITTER DATA SHEET

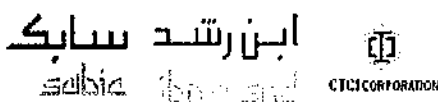
DOCUMENT NO:

DS-56-CA-502

| | | | | | | | | |
|-----|--------------------|-----|------|-------|-----------|----------------------|---|------------------|
| | | | | | | ابن رشد ibn rushd | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | CTCI CORPORATION |
| | | | | | | CERTIFIED | | |
| 2 | Issued for Design | LSH | SYL | YSL | 31-Mar-11 | PROJ. | | |
| 1 | Revised as Marked | LSH | SYL | YSL | 11-Mar-11 | MGR | S P L for | DATE 3/31/11 |
| 0 | Issue For Approval | LSH | SYL | YSL | 1-Feb-11 | CLIENT | DATE | |
| REV | DESCRIPTION | BY | CHK. | APPR. | DATE | PAGE 1 OF 2 | XC32A-56-502 | |

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GN-504 84.10



CONTENTS

| <u>ITEM</u> | <u>EQUIPMENT NO.</u> | <u>SHEET NO.</u> | <u>REV. NO.</u> | <u>REV. DATE</u> |
|-------------|----------------------|------------------|-----------------|------------------|
| 1. | 56-C-02 | 1 THRU 2 OF 2 | 2 | 31-Mar.-2011 |

Attachment total 1 page.

| | | |
|--------------------------------------|---------------------|----------------------|
| REFORMATE SPLITTER DATA SHEET | XC32A-56-502 | |
| | 2 OF 2 | DATE 31-Mar.-2011 |
| | | REV. 2 |

ابن رقتد
ibn riqtd

FLUOR

VERTICAL VESSEL
DATASHEET

Contract: 10E0541A01
Equip. No.: 56-C-02
Revision: 2 Date: 31-Mar-2011
Unit: 56 - Sulfolane
PO No.:
Document No.: DS-56-CA-502
Sheet: 1 of 2

سابك
SABIC



CTCI CORPORATION

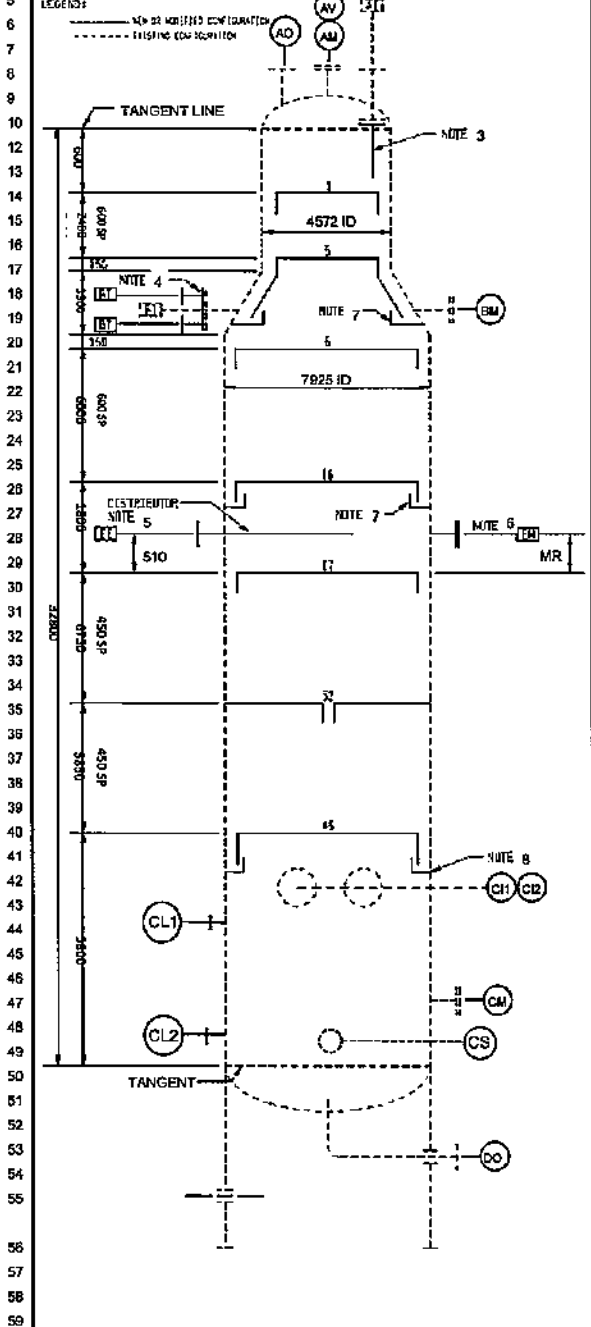
REV

1 Client: Arabian Industrial Fibers Company
2 Service: Reformate Splitter

Plant: Sulfolane
Site: Yanbu, Kingdom of Saudi Arabia

DESIGN SKETCH

VESSEL DIMENSIONS: ID: 4572 / 7925 mm T/T: 32800 mm



DESIGN CONDITIONS

| | | | |
|-----------------------------|---------------------|----|-------------|
| Pressure: | 3.5 (Note 1) bar(g) | at | 245 °C |
| Vacuum: | FV (Note 15) bar(g) | at | 215 °C |
| Min. Metal Temp: | 9 (Note 25) °C | at | MAWP bar(g) |
| Liquid Level: | Note 16 mm | | |
| Specific Gravity of Liquid: | 0.700 | at | 204 °C |

OPERATING CONDITIONS

| | | | |
|-------------------------|----------------|----|------------|
| Pressure: | Note 23 bar(g) | at | Note 17 °C |
| Vacuum: | bar(g) | at | °C |
| Low Temperature: | °C | at | °C |
| Hydrogen Partial Press. | 0 bar(e) | at | °C |

INTERNALS & INSULATION

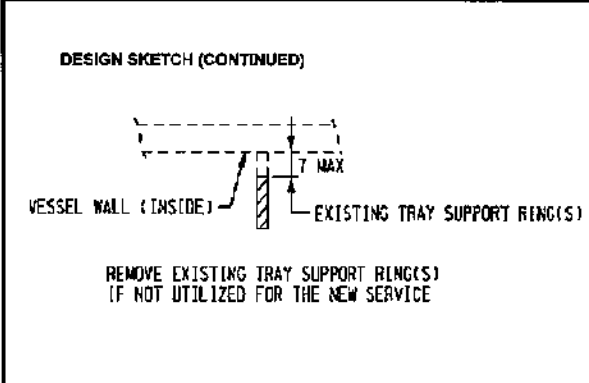
| DESCRIPTION | Bulk Density kg/m ³ | Liquid Holdup vol% | Pressure Drop bar |
|------------------|--------------------------------|--|-------------------|
| Packing: | | | |
| Catalyst: | | | |
| Mist Eliminator: | | | |
| Insulation | 40 / 50 mm | Hot <input type="checkbox"/> Cold <input type="checkbox"/> | |
| Fire Proofing | 76 mm | Yes <input type="checkbox"/> No <input type="checkbox"/> | |

CONSTRUCTION

| | Materials | Corrosion Allowance |
|----------|----------------------|---------------------|
| Shell: | SA-516-65 | 3 mm |
| Heads: | SA-516-65 | 3 mm |
| Support: | SA-516-65 / SA-283-C | 1.6 mm |

SPECIAL CONDITIONS

| | |
|---------------------------------------|---|
| Stress Relieve (Process Reason Only): | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Vessel in Wet Sour Service: | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |
| Steamout Required: | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |



WEIGHTS ARE BASED ON THE VENDOR CERTIFIED DRAWING No. 6T067-0501 REV 4 (1989) (kg)

| | |
|---------------|-----------|
| EMPTY | 531 900 |
| OPERATING | 799 200 |
| FULL OF WATER | 2 067 800 |

THICKNESS ARE BASED ON THE VENDOR CERTIFIED DRAWING No. 6T067-0501 REV 4 (1989) (mm)

| | |
|----------|-----------|
| TOP HEAD | 25.1 min. |
| SHELL | 26-47 |
| BTM HEAD | 43.3 min. |
| SKIRT | 18 |

FOR RECORD



CLIENT : IBN RUSHD
 PROJECT PTA & AROMATICS -
 TITLE : AROMATICS
 JOB NO. : 51046
 DOC. NO. : 05-51-C-002 (1/1)

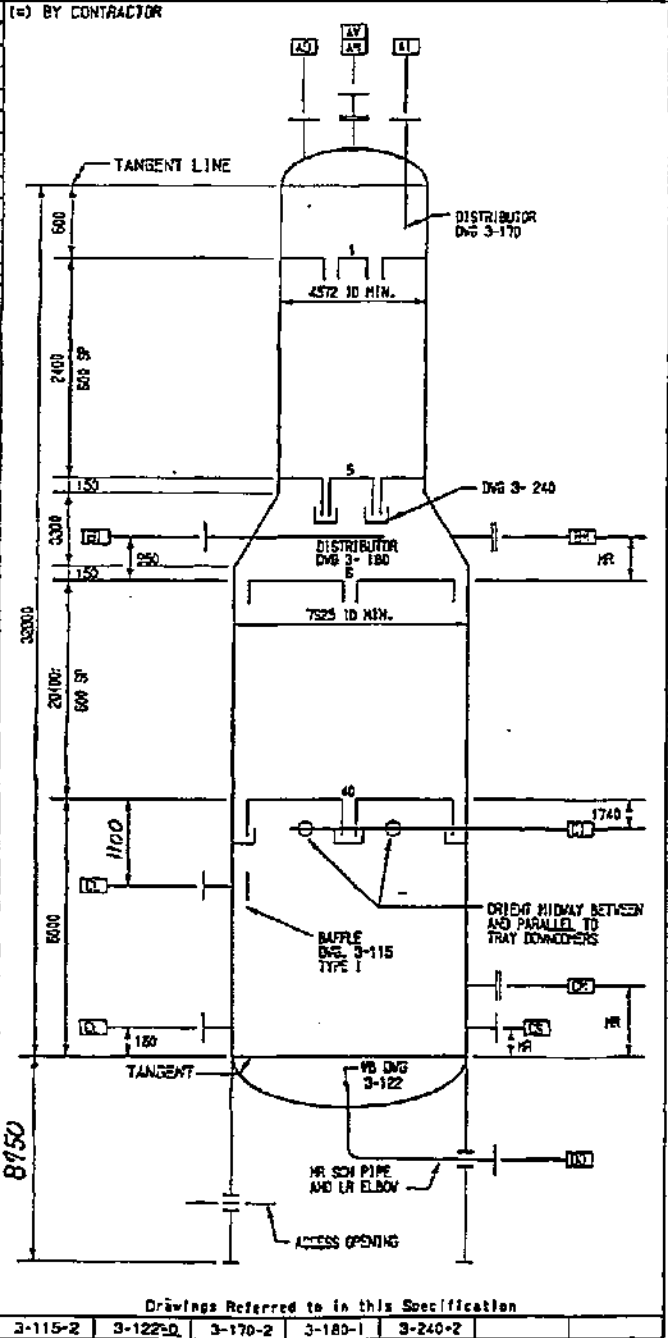
| | | REVISIONS | | | |
|------|--------------------|-----------|---|---|---|
| MARK | | ◇ | ◇ | ◇ | ◇ |
| APRD | <i>[Signature]</i> | | | | |
| CHKD | <i>[Signature]</i> | | | | |
| MADE | <i>[Signature]</i> | | | | |
| DATE | Mar. 22 '96 | | | | |

| | | | | |
|--|--------------------------|---------|----|-------|
| UOP 25 East Algonquin Road • PO Box 5017 • Des Plaines, Illinois 60017-5017 • U.S.A. | PROJECT SPECIFICATION | | | |
| | 560689 - 301 - 0 SHEET 4 | | | |
| | REV | DATE | BY | APP'D |
| | 0 | 5-26-95 | | |

SERVICE **(CYCLAR) STRIPPER**

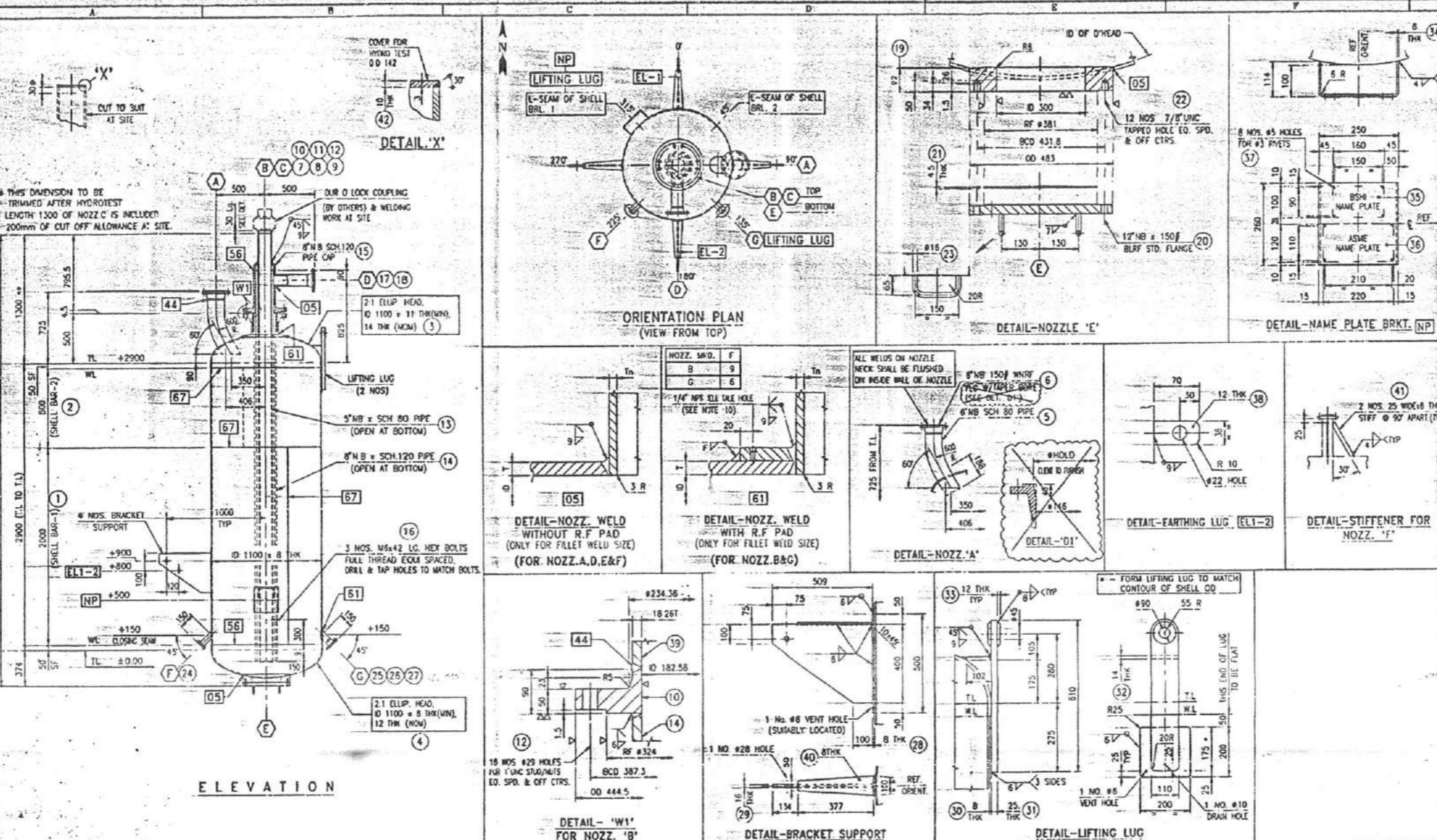
ITEM NO **51-C-02**

| | | | |
|--|------------------|-------------------------|-------------------|
| Design | INT 10.B BAR (P) | ø343×C | (=) BY CONTRACTOR |
| Conditions at Top | EXT | 0 °C | |
| | | Metal Temperature (Min) | 9 °C |
| Operating Conditions | TOP | 115 °C | |
| | BOTTOM | 222 °C | |
| Radiograph | | HR | |
| Postweld Heat Treat | | HR | |
| Joint Efficiency | | HR | |
| Material Specifications | | | |
| Heads | SA 516-65 | | |
| Shell | SA 516-65 | | |
| Shell | Thickness | Corrosion Allowed | |
| | Reqd. Code-in. | In. (Min) | 3 |
| Heads | 3 | | |
| Vessel Heads | | | |
| Top Head | 2:1 ELLIPTICAL | | |
| Bottom Head | 2:1 ELLIPTICAL | | |
| Accessories Applied by Fabricator | | | |
| Ladder & Platform Clips | AS REQUIRED (R) | | |
| Insulation Clips & Rings | YES | | |
| Vessel Support | YES | | |
| Nozzles and Manways | | | |
| Mark | No | Size Inches | Service |
| AI | 1 | 10 | REFLUX |
| AH | 1 | 24 | MANWAY |
| AO | 1 | 30 | VAPOR OUTLET (-) |
| AV | 1 | 2 | VENT |
| BI | 1 | 30 | INLET-FEED (-) |
| BH | 1 | 48 | MANWAY (-) |
| CI | 2 | 36 | REG RETURN (-) |
| CL | 2 | 2 | LEVEL |
| CH | 1 | 24 | MANWAY |
| CS | 1 | 4 | STEAM-OUT |
| CO | 1 | 36 | BTHS-OUT (-) |
| Glass - ANSI CL300 (-) SHEET 2-NOTE A | | | |
| Facing - RAISED FACE | | | |
| Normal Liquid Level = 1750 MM ABOVE BOTTOM TANGENT | | | |
| Specific Gravity = 0.678 | | | |
| Delta-P Trays (Total) = 0.25 BAR | | | |
| NOZZLES MUST NOT BE LOCATED IN DOWNCOMERS | | | |



NOTE - These data are confidential and the property of UOP and shall not be disclosed to others or reproduced in any manner or used for any purpose whatsoever except by written permission or as provided in a signed agreement with UOP relating to such data.

| | | | | |
|--|---------|---------|---------|---------|
| Drawings Referred to in this Specification | | | | |
| 3-115-2 | 3-122-0 | 3-170-2 | 3-180-1 | 3-240-2 |



* 4.5mm THK SS 316 SPIRAL WOUND GRAPHITE FILLED WITH SS 316 INNER AND SS/CS OUTER CENTERING RING.

TOTAL WT. = 1927.4 Kgs.

| ITEM NO. | DESCRIPTION | LENGTH | WIDTH | THICKNESS | WT. IN GR. | MAT'L | MAT'L CODE | ROA. NO. |
|----------|---------------------|--------|-------|-----------|------------|--------|------------------|------------|
| 42 | COVER PL. #142 | 0 | 0 | 10.0 | 1.3 | ASB | 70004817250000 | STOCK |
| 41 | SWT (CUT TO SLIT) | 0 | 0 | 8.0 | 0.7 | SA105 | 703340128 | 703300-001 |
| 40 | SUPP. PLATE | 137 | 100 | 8.0 | 2.4 | SA105 | 703340128 | 703300-001 |
| 39 | PI 8" 120-C | 321 | 0 | 0.0 | 20.8 | SA105 | 63306407702 | STOCK |
| 38 | EARTHING LUG | 70 | 38 | 12.0 | 0.3 | SA105 | 703340128 | 703300-001 |
| 37 | PIVET #5 | 15 | 0 | 0.0 | 0.0 | COPPER | 703340128 | 703300-001 |
| 36 | ASME NAME PLATE | 220 | 120 | 10.0 | 0.6 | SA105 | 000100050122 | STOCK |
| 35 | BSH NAME PLATE | 160 | 100 | 10.0 | 0.4 | SA105 | 000100050122 | STOCK |
| 34 | NAME PLATE BRKT. | 470 | 280 | 6.0 | 5.8 | SA105 | LP06060172500000 | STOCK |
| 33 | PLATE 90/45/12 | 0 | 0 | 0.0 | 0.5 | SA105 | 703340128 | 703300-001 |
| 32 | PLATE | 110 | 102 | 14.0 | 1.2 | SA105 | 703340128 | 703300-001 |
| 31 | LIFTING LUG PLATE | 610 | 110 | 25.0 | 13.2 | SA105 | 703340128 | 703300-001 |
| 30 | PIVOT | 200 | 200 | 8.0 | 2.5 | SA105 | 703340128 | 703300-001 |
| 29 | PLATE | 500 | 400 | 18.0 | 23.6 | SA105 | 703340128 | 703300-001 |
| 28 | PAD PLATE | 500 | 100 | 8.0 | 3.1 | SA105 | 703340128 | 703300-001 |
| 27 | PI 150/70/ST-C | 0 | 0 | 0.0 | 2.8 | SA105 | 703340128 | 703300-004 |
| 26 | PI 7" 160-C | 127 | 0 | 0.0 | 1.4 | SA105 | 703340128 | 703300-006 |
| 25 | PI 150/70/ST-C | 0 | 0 | 0.0 | 0.8 | SA105 | 703340128 | 703300-001 |
| 24 | PI 150/70/ST-C | 178 | 0 | 0.0 | 2.6 | SA105 | 703340128 | 703300-004 |
| 23 | MANHOLE #16-E | 263 | 0 | 0.0 | 0.8 | SA105 | 703340128 | 703300-004 |
| 22 | ST/INT 7/8 UNC-E | 100 | 0 | 0.0 | 0.6 | SA105 | 703340128 | 703300-011 |
| 21 | CK 12" 150/8-E | 0 | 0 | 0.0 | 0.0 | SA105 | 703340128 | 703300-012 |
| 20 | PI 12" 150/8-E | 0 | 0 | 0.0 | 50.0 | SA105 | 703340128 | 703300-004 |
| 19 | FORNICK (SEE DWG)-E | 0 | 0 | 0.0 | 81.3 | SA105 | 703340128 | 703300-004 |
| 18 | PI 150/80/ST-D | 0 | 0 | 0.0 | 6.8 | SA105 | 703340128 | 703300-004 |
| 17 | PI 4" 120-D | 353 | 0 | 0.0 | 7.8 | SA105 | 703340128 | 703300-006 |
| 16 | BT WE (FULL THREAD) | 47 | 0 | 0.0 | 0.0 | SA105 | 703340128 | 703300-009 |
| 15 | CK 8" 120-C | 0 | 0 | 0.0 | 7.8 | SA105 | 703340128 | 703300-009 |
| 14 | PI 8" 120-C | 1521 | 0 | 0.0 | 318.4 | SA105 | 63306407702 | STOCK |
| 13 | PI 8" 80-C | 4356 | 0 | 0.0 | 154.9 | SA105 | 703340128 | 703300-006 |
| 12 | ST/INT 7" UNC-B | 150 | 0 | 0.0 | 1.0 | SA105 | 703340128 | 703300-011 |
| 11 | CK 10" 300/8-B | 0 | 0 | 0.0 | 0.0 | SA105 | 703340128 | 703300-012 |
| 10 | TRIP (SEE DWG)-B | 0 | 0 | 0.0 | 56.0 | SA105 | 703340128 | 703300-004 |
| 9 | PI 10" 300/8-B | 0 | 0 | 0.0 | 40.9 | SA105 | 703340128 | 703300-006 |
| 8 | PI 10" 300/8-B | 118 | 0 | 0.0 | 11.3 | SA105 | 703340128 | 703300-006 |
| 7 | PI 10" 285/7.5-B | 0 | 0 | 0.0 | 14.4 | SA105 | 703340128 | 703300-001 |
| 6 | PI 150/80/ST-B | 0 | 0 | 0.0 | 10.8 | SA105 | 703340128 | 703300-004 |
| 5 | PI 8" 80-A | 678 | 0 | 0.0 | 24.1 | SA105 | 703340128 | 703300-006 |
| 4 | PI 8" 80-A | 0 | 0 | 0.0 | 148.3 | SA105 | 703340128 | 703300-001 |
| 3 | PI 8" 80-A | 0 | 0 | 0.0 | 114.0 | SA105 | 703340128 | 703300-001 |
| 2 | SHELL BRK-2 | 3481 | 800 | 8.0 | 374.9 | SA105 | 703340128 | 703300-001 |
| 1 | SHELL BRK-1 | 287 | 200 | 8.0 | 437.2 | SA105 | 703340128 | 703300-001 |

LIST OF MATERIAL

BELLELI SAUDI HEAVY INDUSTRIES LTD.
AS BUILT
CERTIFIED BY.....

CHYODA PISTONSTAR LTD.
JOB NO. 54001 BY ROSE MORGES PHOTO
PO NO. SAT-POP0001
REQ NO. NR-50-D-0-1
IDENT NO. 52003-DW-0001

| REV. | DATE | DESCRIPTION | DRAWN | CHK'D | APP'D |
|------|----------|--|-------|--------------|-------|
| 3 | 02.07.97 | REVISED AS MARKED & AS BUILT. | R.A. | | |
| 2 | 18.03.97 | REVISED AS PER CLIENT'S COMMENTS AND MARKED AS | RJP | YOGESH CHAL. | AKB |
| 1 | 17.12.96 | DWG. GENERALLY REVISED & ISSUED FOR CONSTRUCTION | AMER | R. ALY | GC |
| 0 | 09.06.96 | ISSUED FOR APPROVAL & INTERNAL COMMENTS | DEPRE | R. ALY/HADER | GC |

No. REQUIRED : 1 UNIT

SCALE: 1:24

BELLELI SAUDI **بيلعلي السعودية**
HEAVY INDUSTRIES LTD.
AL-JUBAIL, KINGDOM OF SAUDI ARABIA.
الجبيل للصناعات الثقيلة المحدودة

CLIENT: CHYODA/IBN RUSHD
OWNER: SAY-POP0001
ARABIAN INDUSTRIAL FIBRES COMPANY (IBN RUSHD)
PTA & AROMATICS PROJECT - AROMATICS
LIFT ENGAGER NO. 2 (52-D-03)
GENERAL ASSEMBLY

APPROVED FOR CONSTRUCTION BY: CPOLLOM
DATE: 19-11-96

QUESTO DISCHIO NON PUO' ESSERE COPERTO RIPRODOTTO MOSTRATO A TERZI SENZA MOSTRA AUTORIZZAZIONE

DRAWING NO. DA-7034-08-001
REV. 3

BELLELI REFERENCE DRAWINGS

| | |
|----------------|----------------------|
| DA-7034-08-002 | FORMED HEAD - TOP |
| DA-7034-08-003 | FORMED HEAD - BOTTOM |
| DA-7034-08-004 | BSH NAME PLATE |
| DA-7034-08-005 | ASME NAME PLATE |
| ST-7034-08-001 | FINISH REQUIREMENTS |

GENERAL NOTES

- HEAD SEAMS SHALL BE FULLY RADIOGRAPHED. HEAD TO SHELL SEAMS SHALL BE SPOT RADIOGRAPHED PER UW-11(a)(5)(c). OTHER SEAMS SHALL BE SPOT RADIOGRAPHED PER UW-11(b).
- FOR CARBON AND CARBON MANGANESE STEEL THE CARBON CONTENT SHALL BE LIMITED TO 0.25% MAXIMUM.
- THE LONGITUDINAL BUTT WELD OF NOZZLES FABRICATED FROM PLATE SHALL BE 100% RADIOGRAPHED.
- MARK INDICATES THE BSH WELD STANDARD NUMBER.
- MARK INDICATES THE POSITION NUMBER WITH REFERENCE TO LIST OF MATERIAL.
- MARK INDICATES THE NOZZLE MARK NUMBER.
- SHOW HYD. TEST GASKETS - (T) BLUNDED NOZZLES WILL HAVE JOB GASKETS. (S) ALL OTHER NOZZLES WILL HAVE CAF GASKET.
- SPARE PARTS: ITEMS COMMISSIONING/STARTUP OPERATIONAL SHOP HYD. TEST
(GASKETS) 200% 100% 100%
(FASTENERS) 10X(MIN 2 SETS) 10X(MIN 2 SETS) NOT REQUIRED
- QTY. OF SPARES FOR GASKETS AND FASTENERS ARE INCLUDED IN LIST OF MATERIALS.
- ALL BOLTS & NUTS SHALL BE OF UNC SERIES UPTO & INCLUDING 1" SIZE & RUN ABOVE 1" SIZE.
- FLANGES UPTO & INCLUDING 24" NB SHALL BE AS PER ANSI B16.5 & THE FLANGE FACE FINISH SHALL BE 3.2 TO 6.3 MICROMETER.
- MINIMUM TEMPERATURE OF HYDROTEST WATER SHALL BE 17°C AND THE TEST PRESSURE SHALL BE HELD FOR HALF AN HOUR PER INCH OF THICKNESS WITH ONE HOUR MINIMUM.
- EACH REINFORCING PAD OR SEGMENT THEREOF SHALL BE PROVIDED WITH ONE NO. (TWO NOS FOR NOZZLES 16" NB AND ABOVE @ 180° APART) 1/4" NPT. TELL TALE HOLE AS PER ANSI B1.20.1. ALL R.F. PAD WELDS SHALL BE TESTED TO 15 PSI. MINIMUM WITH AIR & SOAPY BUBBLE TEST.
- A PERMANENT REFERENCE WORKLINE FOR VERTICAL VESSELS BOTTOM TAN LINE SHALL BE PUNCHMARKED AROUND THE VESSEL PERIMETER AT 0.90, 180 & 270° AND HORIZONTAL VESSELS CENTER LEVEL SHALL BE PUNCHMARKED ON BOTH SIDE SURFACES OF SHELL NEAR THE HEAD.
- THE VESSEL SHALL BE THOROUGHLY CLEANED INSIDE & OUTSIDE AND SHALL BE FREE OF ALL DIRT, WELD ROD STUBS & LOOSE FOREIGN MATERIALS ETC.
- ALL REMOVABLE INTERNALS SHALL PASS THROUGH THE NEAREST MANHOLE.
- WELD SEAMS COWING UNDER WISC. ATTACHMENTS SHALL BE GROUND SMOOTH & RADIOGRAPHED FOR A DISTANCE OF 150MM BEYOND THE ATTACHMENT WELD.
- ALL NOZZLES AND MANWAY THAT DO NOT EXTEND INTO THE VESSEL SHALL BE FINISHED FLUSH WITH THE INSIDE & THE INNER EDGE SHALL BE ROUNDED OFF TO A MIN 6MM RADIUS.
- NOZZLE POSITIONS ON VESSEL ELEVATIONS ARE CONVENTIONAL FOR TRUE LOCATION. SEE NOZZLE ORIENTATION PLAN.
- NOZZLE PROJECTION IS FROM CENTER LINE OF VESSEL TO GASKET FACE OF FLANGE UNLESS SPECIFIED OTHERWISE.
- ALL FLANGE BOLT HOLES SHALL STRADDLE VERTICAL AND/OR NORTH SOUTH CENTER LINES UNLESS SHOWN OTHERWISE.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

NOZZLE SCHEDULE

| MARK | QTY | SIZE | PROJ FROM CL | SERVICE | NOZZLE NICK | NOZZ. FLANGE | REIN. PAD | | | |
|------|-----|--------|--------------|----------------|-------------|--------------|-----------|------|-----|----|
| G | 1 | 2" | SEE DGC | DRAIN | 60.3 | 160 | 874 WNR | 150# | 150 | B |
| F | 1 | 1" | SEE DGC | SAMPLE | 50.8 | 127 | LNRF | 150# | - | - |
| E | 1 | 1 1/2" | SEE DGC | CLEANOUT W/BF | 114.3 | 80 | LNRF | 150# | - | - |
| D | 1 | 4" | SEE DGC | GAS INLET | 141.3 | 80 | LNRF | 150# | - | - |
| C | 1 | 5" | SEE DGC | LIFT PIPE | 273.1 | 80 | LNRF | 150# | - | - |
| B | 1 | 10" | SEE DGC | OUTLET W/BF | 168.3 | 80 | LNRF | 150# | 510 | 13 |
| A | 1 | 6" | SEE DGC | CATALYST INLET | 168.3 | 80 | LNRF | 150# | - | - |

DESIGN DATA

| NO. | DESIGN CONDITIONS | UNITS | VALUES |
|-----|-----------------------------------|-------|-----------------------------------|
| 33 | FABRICATION WEIGHT | Kg | 1900 |
| 32 | FULL OF WATER WEIGHT | Kg | 6300 |
| 31 | OPERATING WEIGHT | Kg | 5500 |
| 30 | ERECTION WEIGHT | Kg | 2000 |
| 29 | MANUFACTURER'S SERIAL NO. | - | 2574 |
| 28 | MANUFACTURER'S JOB NUMBER | - | 7034-08 |
| 27 | MANUFACTURER'S NAME | - | BELLELI SAUDI HEAVY IND. LTD. |
| 26 | CODE STAMP | - | YES |
| 25 | DESIGN CODE | - | ASME SEC VIII DIV.1 1995 EDITION |
| 24 | SERVICE | - | LIFT ENGAGER NO. 2 |
| 23 | VOLUME | m³ | 3.11 |
| 22 | FIREPROOFING | mm | NO |
| 21 | INSULATION | mm | NO |
| 20 | SPECIFIC GRAVITY | - | - |
| 19 | OPERATING FLUID | - | NITROGEN&CATALYST |
| 18 | INSPECTION AUTHORITY | - | CLIENT/ABS |
| 17 | WIND SPEED/EXPOSURE CATEGORY | km/hr | 125/C |
| 16 | EARTHQUAKE DESIGN | - | ASCE 7-88 ZONE 1 |
| 15 | MINIMUM DESIGN METAL TEMPERATURE | °C | 9 |
| 14 | CHARPY IMPACT TEST | - | NO |
| 13 | ULTRASONIC EXAMINATION | - | NO |
| 12 | POST WELD HEAT TREATMENT | - | NO |
| 11 | JOINT EFFICIENCY (SHELL/HEAD) | % | 85/100 |
| 10 | RADIOGRAPHY (SHELL/HEAD) | - | R14 AS PER UG 116(e) (SEE NOTE-1) |
| 9 | CORROSION ALLOWANCE | mm | 3.0 |
| 8 | M.A.W.P. AT DESIGN TEMPERATURE | barG | 8.84 (LIMITED BY SHELL) |
| 7 | M.A.P. (NEW & COLD) | barG | 14.79 (LIMITED BY SHELL) |
| 6 | HILLD HYDROTEST PRESSURE (CORROD) | barG | 13.26 |
| 5 | SHOP HYDROTEST PRESSURE (HOR) | barG | 22.08 (TOP) |
| 4 | OPERATING TEMPERATURE | °C | 58 |
| 3 | OPERATING PRESSURE | barG | - |
| 2 | DESIGN TEMPERATURE | °C | 260 |
| 1 | DESIGN PRESSURE | barG | 3.5 |

HEAT TREATMENT

| Part | Procedure | Holding Temp °C | Heating rate °C/hr | Holding time min | Cooling rate °C/hr | Temperature measured |
|---|-----------|-----------------|--------------------|------------------|--------------------|----------------------|
| AS PER BELLELI STD. PROCEDURE PR-HIT-01 | | | | | | |
| HEAT TREATMENT | | | | | | |
| 610 ± 10°C | | | | | | |
| 205°C / HR ABOVE 475°C | | | | | | |
| 60 Minutes | | | | | | |
| 260°C / HR UPTO 427°C | | | | | | |
| AS PER BELLELI STD. PROCEDURE PR-HIT-01 | | | | | | |

CLIENT'S REF. DWGS. & SPECS

| DRAWING NO. | DESCRIPTION |
|--------------------------|--|
| CHYODA STD. DR-50-08-013 | NAME PLATE |
| CHYODA STD. DR-50-08-011 | FLANGED NOZZLE |
| CHYODA STD. DR-50-08-008 | LIFTING LUG FOR VERTICAL VESSEL |
| CHYODA STD. DR-50-08-004 | BRACKET FOR VERTICAL VESSEL |
| LEP 510 SPEC 3-11 | PRESSURE VESSELS CARBON STEEL |
| IBN RUSHD 2784-P-02-8-20 | BASIC CIVIL ENGINEERING DESIGN DATA |
| IBN RUSHD 2784-P-02-8-20 | UNWELDED PRESSURE VESSELS |
| IBN RUSHD 2784-P-02-8-20 | WATERMILL/COMBUSTION & CORROSION CONTROL |
| IBN RUSHD 2784-P-02-8-20 | CLIENT'S DATA SHEET |

CLIENT : IBN RUSHD
 PROJECT : PTA & AROMATICS -
 TITLE : AROMATICS
 JOB NO. : 51046
 DOC. NO. : **D5-52-D-003 (VI)**

| | | REVISIONS | | | |
|------|--------------------|-----------|---|---|---|
| MARK | | ① | ② | ③ | ④ |
| APRD | <i>[Signature]</i> | | | | |
| CHKD | <i>[Signature]</i> | | | | |
| MADE | <i>[Signature]</i> | | | | |
| DATE | Mar. 05 '91 | | | | |

FOR RECORD

UOP
 25 East Algonquin Road - PO Box 5017 - Des Plaines, Illinois 60017-5017 - USA

VESSELS

SERVICE: **LIFT ENGAGER NO. 2** ITEM NO: **D-5203 52-11-03**

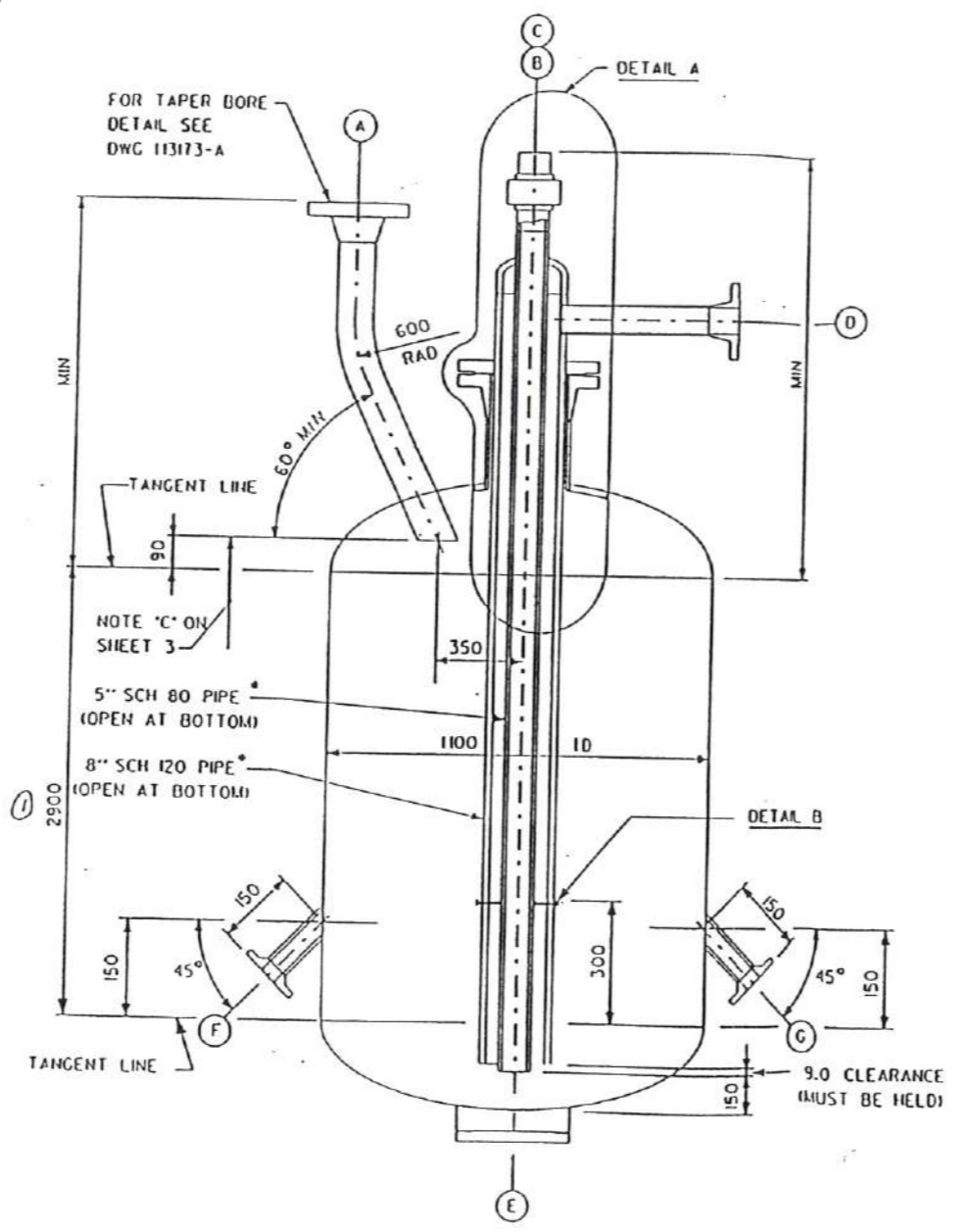
| | | |
|---------------------|-----------------------|---------|
| Design | INT 3.5 BAR (g) | @ 260°C |
| Conditions | EXT | @ °C |
| At Top | Min Metal Temperature | 9°C |
| Operating | | 38°C |
| Conditions | | °C |
| Radiograph | | MR |
| Postweld Heat Treat | | MR |
| Joint Efficiency | | MR % |

| Material Specifications | | |
|-------------------------|----------------------------|------------------------------|
| Heads | SA 516-70 | |
| Shell | SA 516-70 | |
| Shell | Thickness Req'd By Code-mm | Corrosion Allowance mm (Min) |
| | | 3 |
| Heads | 3 | |

| | |
|-----------------------------------|------------------------|
| Vessel Heads | Top: 2:1 Elliptical |
| | Bottom: 2:1 Elliptical |
| Accessories Applied by Fabricator | |
| Ladder & Platform Clips | NO |
| Insulation Clips & Rings | NO |
| Vessel Support | YES |

| Nozzles and Manways | | | |
|---------------------|----|-------------|---------------------|
| Mark | No | Size Inches | Service |
| A | 1 | 6 | CATALYST INLET |
| B | 1 | 10 | OUTLET |
| C | 1 | 5 | LIFT PIPE |
| D | 1 | 4 | GAS INLET |
| E | 1 | 12 | CLEANOUT WITH BLIND |
| F | 1 | 1 | SAMPLE |
| G | 1 | 2 | DRAIN |

Class-ANSI CL150
 Facing-RAISED FACE
 EXCEPT NOZZLES
 (D) ANSICL300
 (C) DUR O LOK COUPLING
 (E) STUDDED CONNECTION (PAD TYPE NOZZLE)



ELEVATION

Drawings Referred to in this Specification

| | | | | |
|------------|--|--|--|--|
| 113173-A-0 | | | | |
|------------|--|--|--|--|

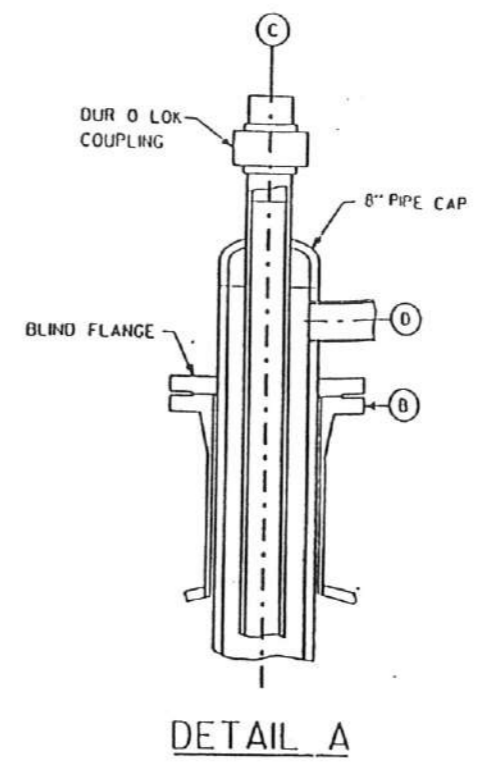
NOTES:

- NOZZLE 'A' TO BE OF BUILT-UP CONSTRUCTION USING SCH 80 PIPE AND WELDING NECK FLANGE BORED TO SCH 80. SEE NOTE 'E' ON SHEET 4.
- NOZZLE 'C' TO BE OF BUILT-UP CONSTRUCTION USING SCH 80 PIPE AND DUR O LOK COUPLING BORED TO SCH 80. SEE NOTES 'E' AND 'F' ON SHEET 4.

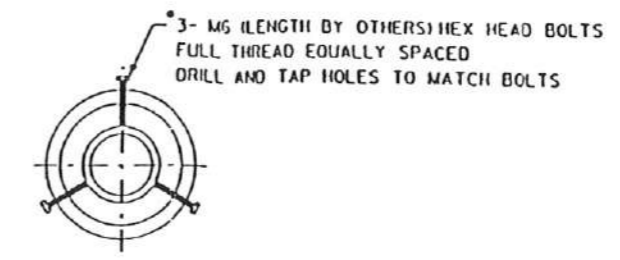
PROJECT SPECIFICATION

560690 - 301 - 1 SHEET 7

| REV | DATE | BY | APP'D | REV | DATE | BY | APP'D |
|-----|----------|----|-------|-----|------|----|-------|
| 0 | 5/15/95 | | | | | | |
| 1 | 11/28/95 | ZD | ESL | | | | |



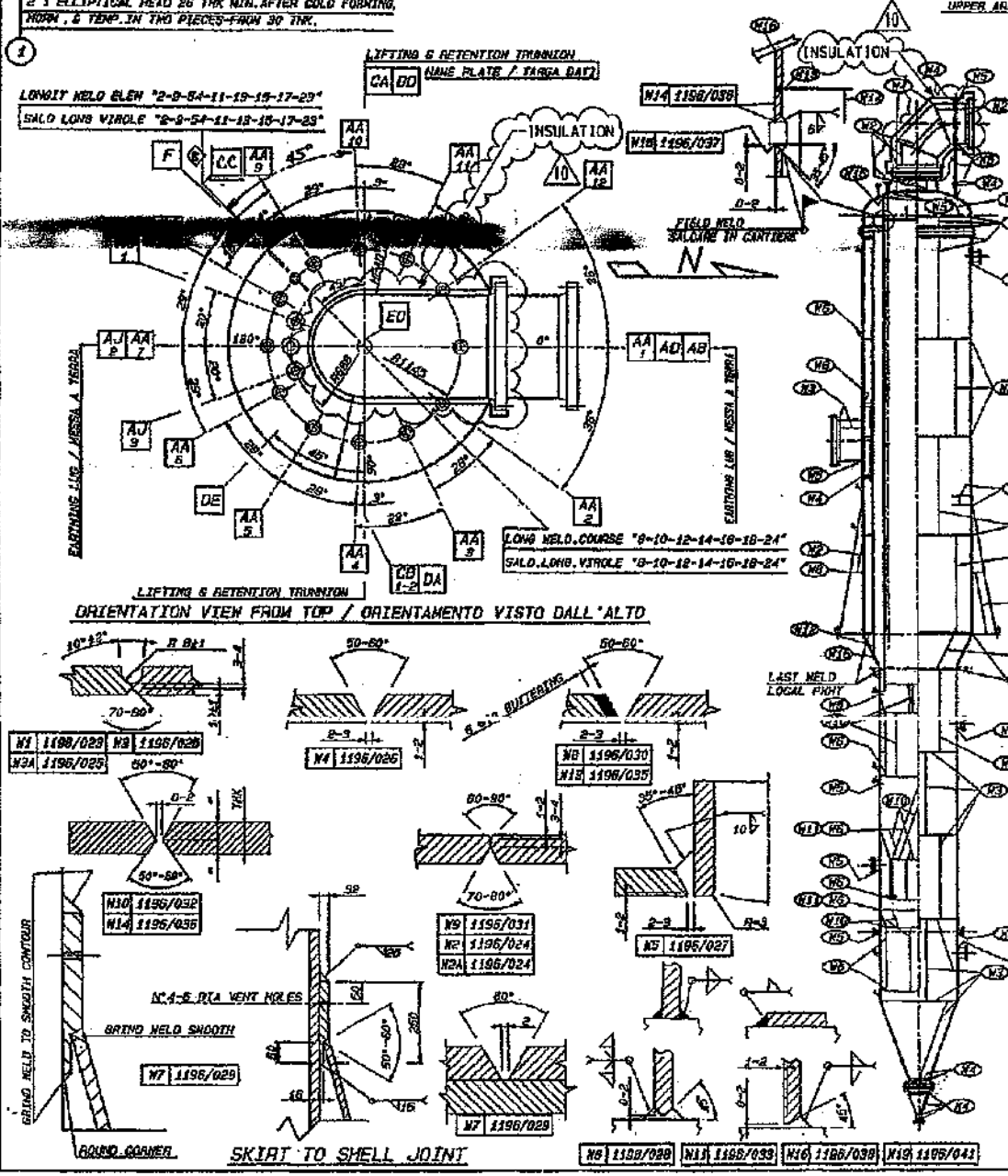
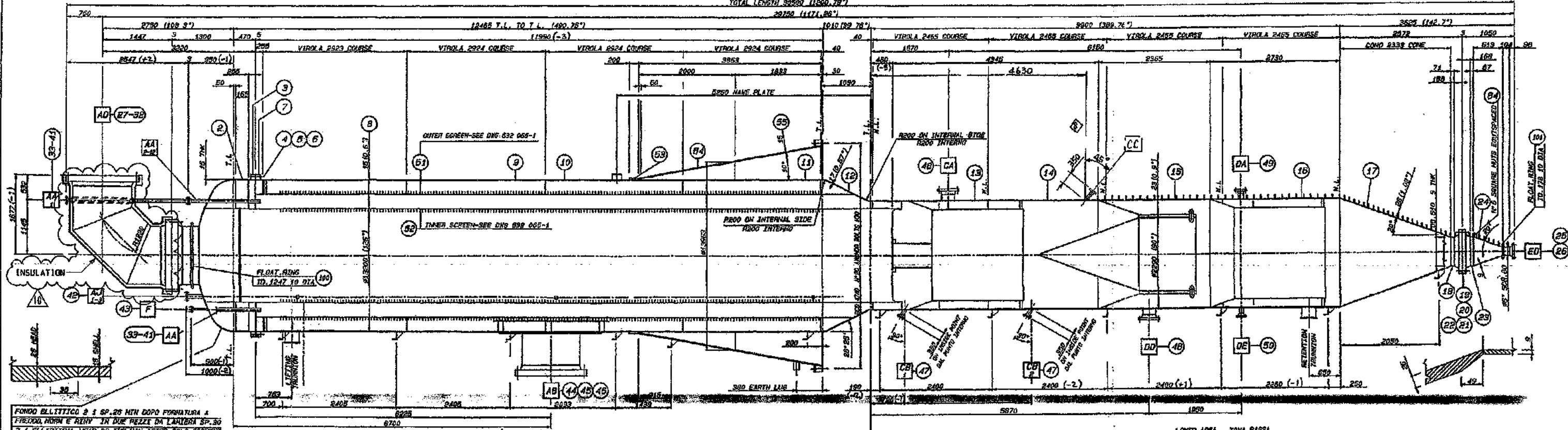
DETAIL A



DETAIL B

* PROVIDE BOLT LENGTH TO KEEP PIPES CONCENTRIC AND TO ENABLE, WITHOUT INTERFERENCE, REMOVAL AND INSERTION OF LIFT PIPE ASSEMBLY THROUGH NOZZLE 'D'. SCHEDULE AND SIZE OF PIPES MUST BE HELD. PIPES SHALL BE CUT SQUARE AND ALL BURRS AT OPEN ENDS REMOVED.

560690v201.dgn



CONSTRUCTION NOTE

- 1) FLANGE CONTACT FACE SHALL BE FINISH WITH 125 - 200 GR.
- 2) HOLE IN FLANGE SHALL ONLY HOLES STRAIGHT TO CENTER LINES.
- 3) THE INDICATE TAP ARE THE MIN. AFTER CONSTR. ON FOUNDING AND ALL DIMENSIONS ARE IN MM.
- 4) THICK EDGES OF HOLES SHALL BE ROUNDED OFF WITH R 10 RADIUS.
- 5) WELDS ATTACHED LOW-PRESSURE-RETAINING COMPONENTS TO PRESSURE-RETAINING COMPONENTS SHALL BE FULL PENETRATION. ALL FILLET WELDS ATTACHED TO PRESSURE-RETAINING COMPONENTS SHALL BE ROUNDED TO A MINIMUM RADIUS.
- 6) ALL INTERFACES TO BE MOUNTING AS PER SPECIFICATIONS.
- 7) WELDS MUST BE SMOOTH SMOOTH ALL SURFACES IN CONTACT WITH CATALYST SHALL BE FREE OF BURRS AND SHARP EDGES.
- 8) ALL CATALYST INLET AND OUTLET SHALL BE 1/2" DIA. IN DIAMETER & CORRECTED TO 1/2" DIA. IN DIAMETER.
- 9) CATALYST INLET AND OUTLET SHALL BE 1/2" DIA. IN DIAMETER & CORRECTED TO 1/2" DIA. IN DIAMETER.

| CC | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| CC 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

| YEAR OF CONSTR. | 1987 | DESIGN CODE | ARRE VIELI DIV. 1 Ed. 85 |
|--------------------------|--------------------|--------------------------|--|
| TONER | | SPECIFICATION | UP Standard Specification 2-1-2 & 2-11-1 TOP Project Specification 860890-302 |
| CONSTRUCTION DATA | | | |
| FULL VESSEL WEIGHT | 220800 kg | DESIGN PRESS. | 500 kPa |
| EMPTY WEIGHT + ATTACH. | 18000 kg | FULL VACUUM VC | 0 kPa |
| EMPTY WEIGHT | 60000 kg | OPER. PRESS. | 500 kPa |
| ATTACH. WEIGHT | 12000 kg | HYDROST. PRESS. SHIP | 19.5/202 |
| OPER. WEIGHT | 12000 kg | HYDROST. PRESS. FIELD | 12.2/177 |
| EXT. SURFACE | 565 m ² | N.A.N.P. | 500 kPa |
| INTERNAL PROTECT. | 571 IGA-02L | DESIGN TEMPERAT. | 50°C |
| SAND BLAST. | SEE RESTA SPEC. | OPERAT. TEMPERAT. | 50°C |
| PAINTING | 1198/PAINT | WIP DESIGN PRESS. TEMP. | 50°C |
| | | AT DESIGN PRESS. | 50°C |
| | | STEAM-OUT | |
| | | RADIOGRAPHY | FL/L |
| | | STRESS RELIEVING | YES |
| | | WELDING EFFICIENCY | 100% |
| | | PRODUCT TEST CURVE | SEE WIP 4848/1P |
| | | CORROSION ALLOWANCE | 3 |
| | | SPECIAL SERVICE | FLUID |
| | | CAPACITY | 155.8 |
| | | GRAVITY OF PROCESS FLUID | |
| | | HYDROST. WATER TEMP. | 16 / 51 |
| | | HYDROSTATIC TEST | 1 |
| | | INSULATION (BY OTHERS) | 125 |
| | | INSULATION BY OTHERS | 75 |
| | | INSPECTION BY | ASME AUTHORITY |
| | | "U" STAMP REQUIRED | YES |

DOCUMENT CONTROL

MASTER COPY

ARABIAN INDUSTRIAL FIBERS CO. (AIFCO)

AS BUILT

DATE: 11-04-97

ASME STAMP REQUIRED

MASTER COPY

REVIEWED BY: [Signature]

INSPECTOR: [Signature]

DATE: 02-07-97

| REVISIONS DESCRIPTION | DATE | APPR. |
|---|----------|-------------|
| 1) REVISED AS MARKED (REPAIRING RESULT) | 02/07/97 | [Signature] |
| 2) REVISED AS MODIFICATION WORK | 02/07/97 | [Signature] |
| 3) REVISED AS MARKED | 02/07/97 | [Signature] |
| 4) REVISED AS MARKED | 02/07/97 | [Signature] |
| 5) REVISED AS MARKED | 02/07/97 | [Signature] |
| 6) REVISED AS MARKED | 02/07/97 | [Signature] |
| 7) AS-BUILT AS PER MOCN CCR-89-EC-02 | 02/07/97 | [Signature] |

OFFICINA LUIGI RESTA s.p.a.

TELEX 300572-TELEFAX 683340

SCANEGROSTATE (Sp) - Corso Europa, 43 - Tel. (0321) 561.130

CLIENT: CHIFFOIA CORPORATION

DATE: 23-04-1996

JOB: 11/96/3

ITEM: 52-D-07

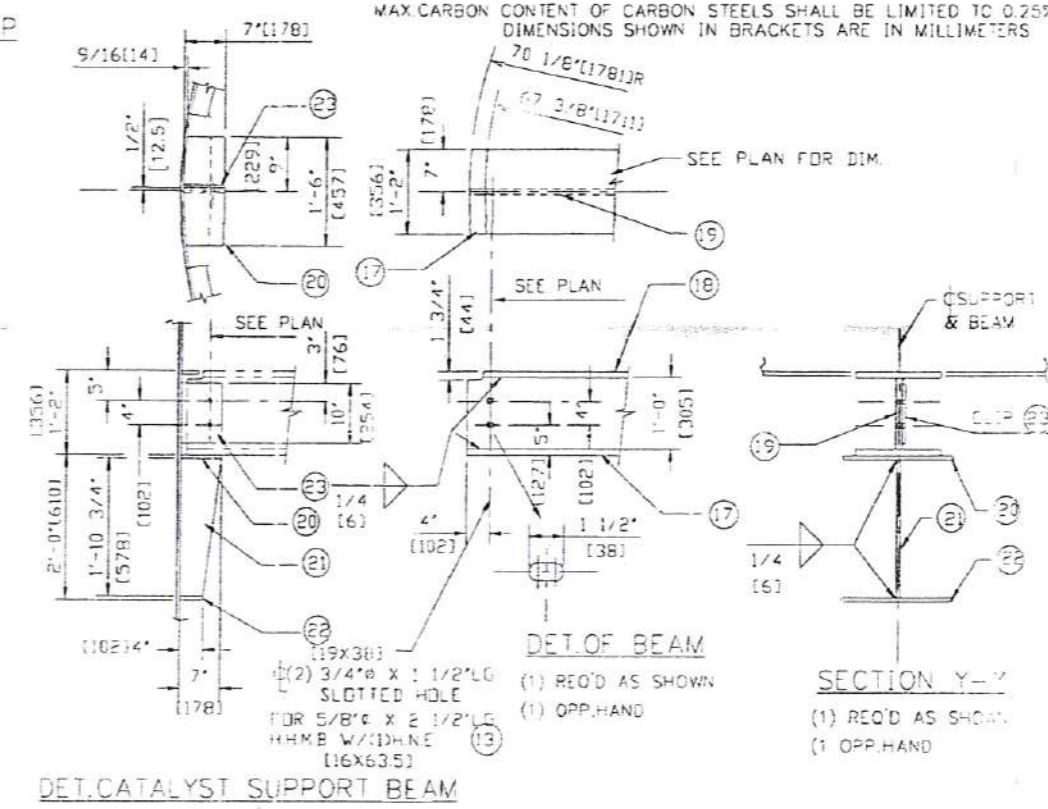
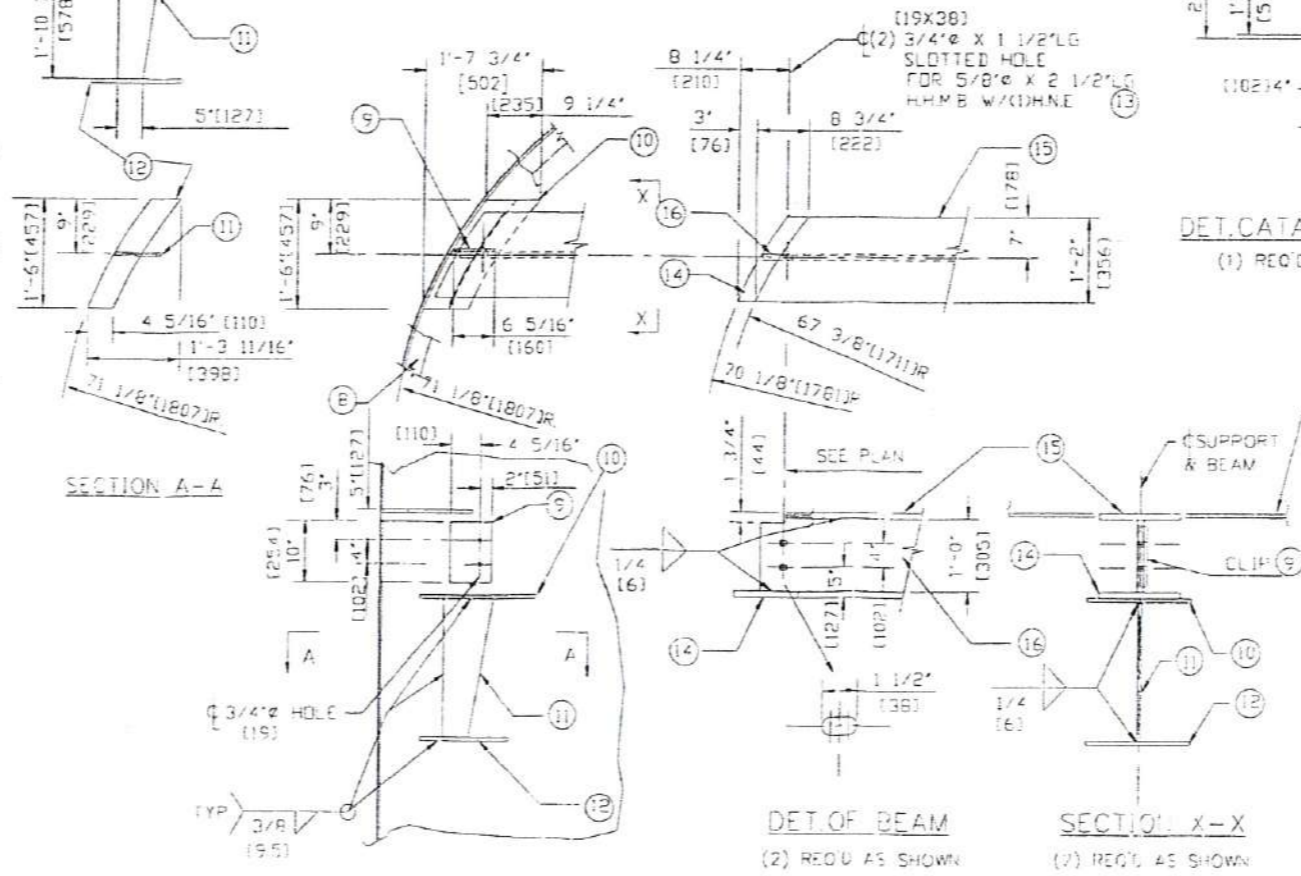
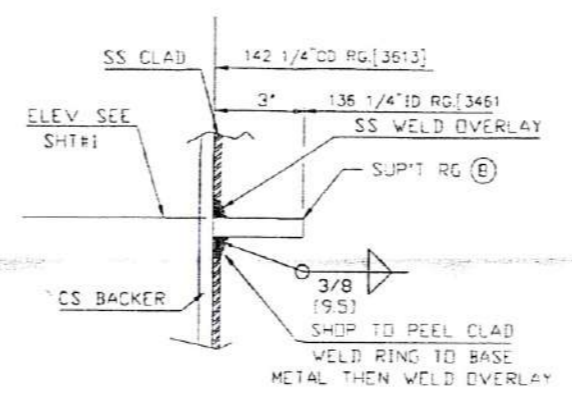
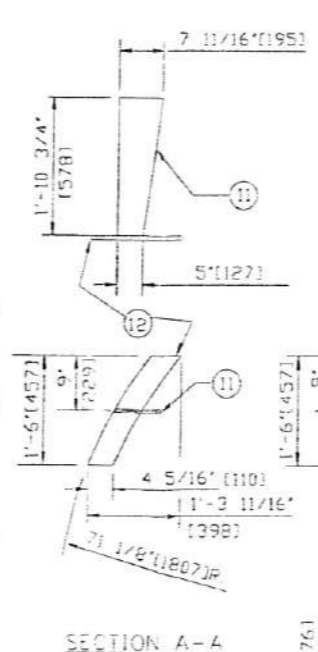
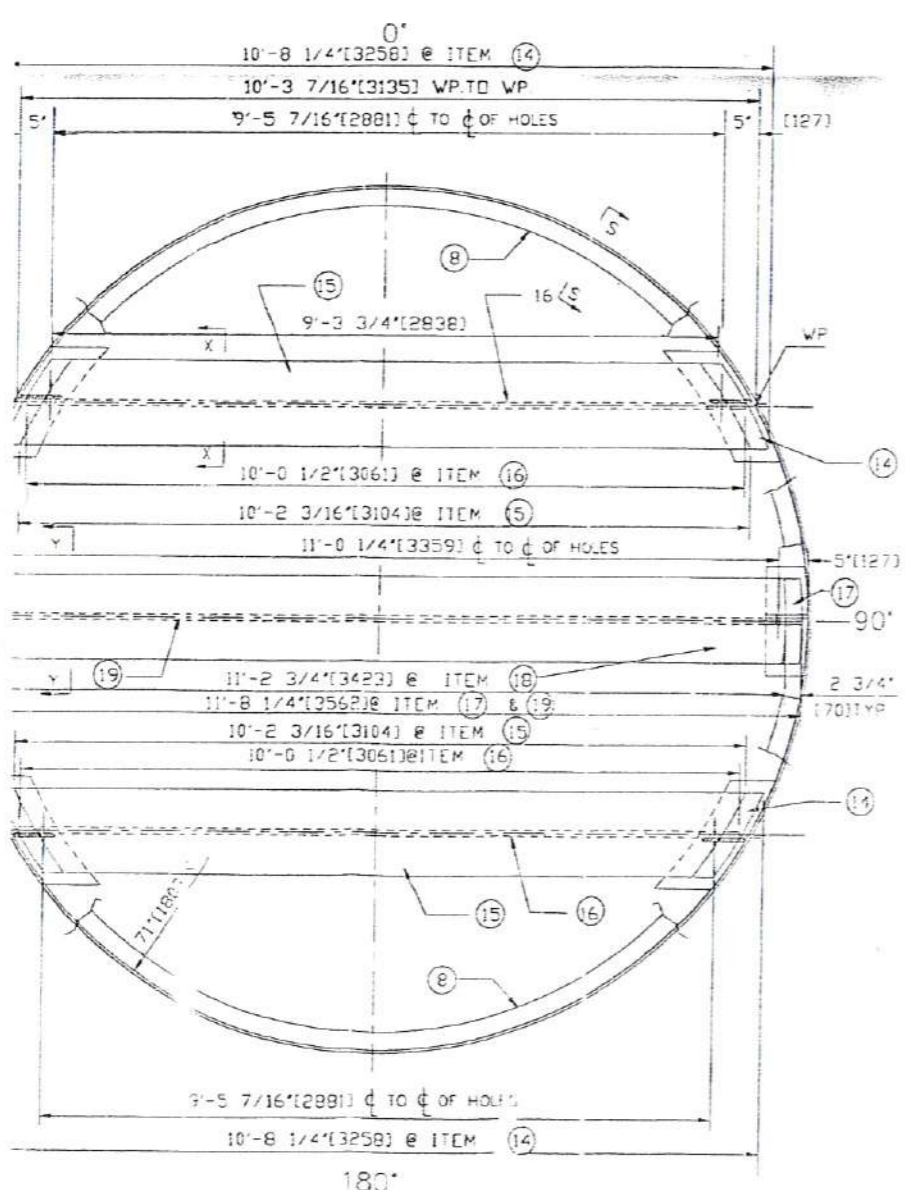
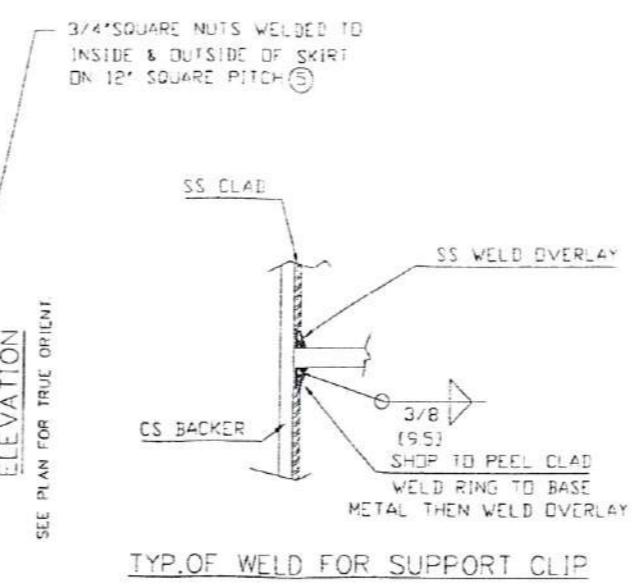
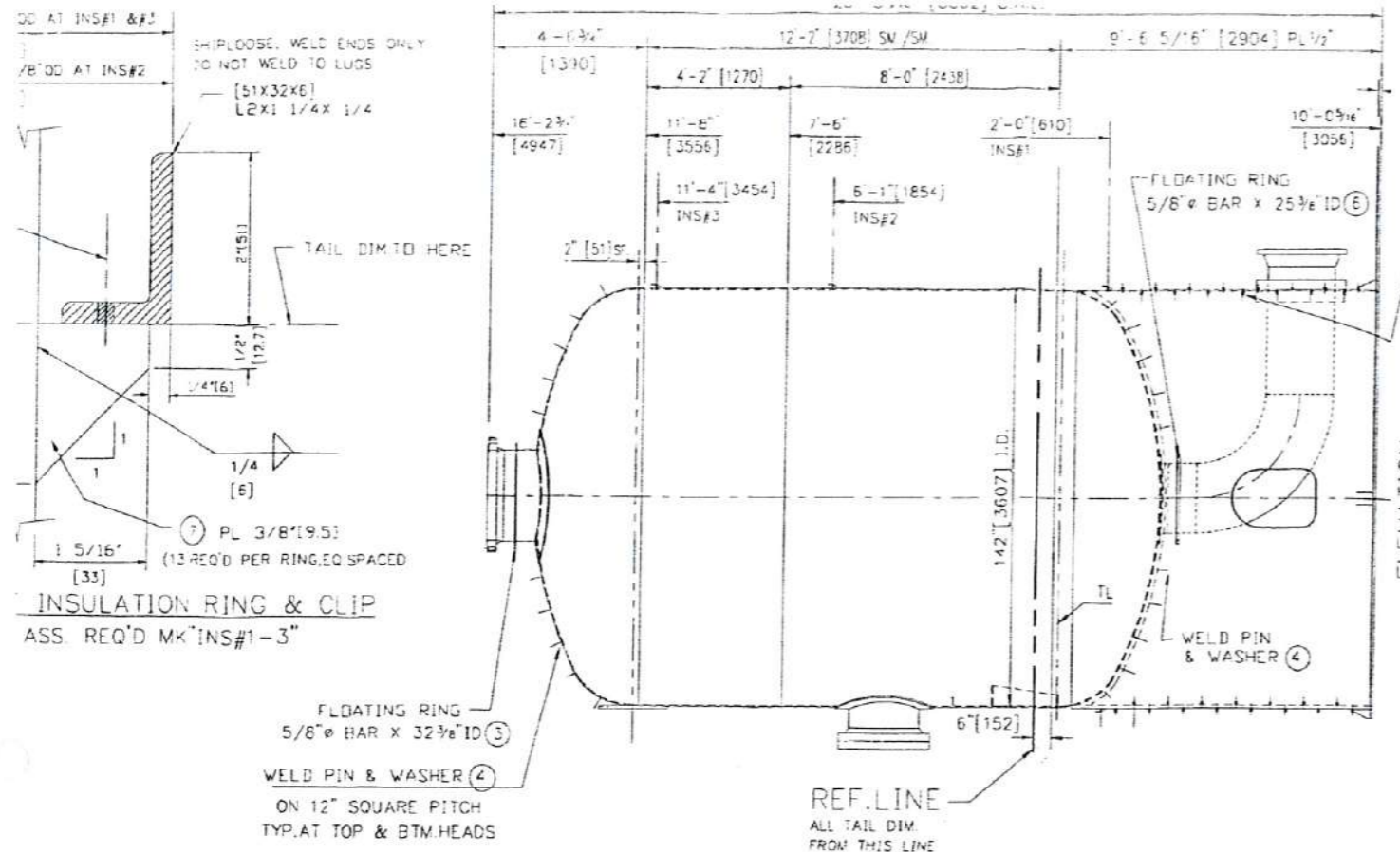
ASSEMBLY

SCALE: NONE

JOB: 4841

OTIS: 4648

P.O. N° SAYP08007



| ITEM NO | UNIT QTY | TOT QTY | DESCRIPTIONS | MATERIAL | REMARKS | PART NAME |
|---------|----------|---------|--|--------------|---------|-----------|
| 1 | 2 | 4 | L 2 X 1/4 X 1/4 X 38-3 7/16" LG | SA-36 | | INS#1&2 |
| 2 | 1 | 2 | L 2 X 1/4 X 1/4 X 38-3 7/8" LG | SA-36 | | INS#7 |
| 3 | 1 | 2 | BAR 5/8" X 6"-7 11/16" LG | SA-36 | | RG FOR A |
| 4 | 270 | 540 | WELD PIN AND WASHER | CS | | |
| 5 | 560 | 1120 | 3/4" SQUARE NUTS | CS | | FIREPROOF |
| 6 | 1 | 2 | BAR 5/8" X 6"-9 11/16" LG | SA-36 | | RG FOR OP |
| 7 | 38 | 76 | PL 3/8" X 1 5/16" X 1 13/16" LG | SA-516-70 | | INS LUG |
| 8 | 1 | 2 | PL 5/8" X 142 1/4" OD X 136 1/4" ID | SA-240-1316L | | INT. RG |
| 9 | 4 | 8 | PL 5/8" X 6 5/16" X 10" LG | SA-240-1316L | | CLIP |
| 10 | 4 | 8 | PL 5/8" X 19 3/4" X 18" LG | SA-240-1316L | | SUPT. |
| 11 | 4 | 8 | PL 5/8" X 7 11/16" X 22 3/4" LG | SA-240-1316L | | SUPT. |
| 12 | 4 | 8 | PL 5/8" X 15 11/16" X 18" LG | SA-240-1316L | | SUPT. |
| 13 | 12 | 24 | 5/8" X 2 1/2" LG HHMB BOLT W/ (1) H.N.E.A. | 1316L | | BOLTING |
| 14 | 2 | 4 | PL 1" X 14" X 10"-B 1/4" LG | SA-240-1316L | | BEAM PL |
| 15 | 2 | 4 | PL 1" X 14" X 10"-2 3/16" LG | SA-240-1316L | | BEAM PL |
| 16 | 2 | 4 | PL 1" X 12" X 10"-0 1/2" LG | SA-240-1316L | | BEAM PL |
| 17 | 1 | 2 | PL 1" X 14" X 11"-B 1/4" LG | SA-240-1316L | | BEAM PL |
| 18 | 1 | 2 | PL 1" X 14" X 11"-2 3/4" LG | SA-240-1316L | | BEAM PL |
| 19 | 1 | 2 | PL 1" X 12" X 11"-B 1/4" LG | SA-240-1316L | | BEAM PL |
| 20 | 2 | 4 | PL 5/8" X 7" X 18" LG | SA-240-1316L | | SUPT PL |
| 21 | 2 | 4 | PL 5/8" X 7" X 22 3/4" LG | SA-240-1316L | | SUPT PL |
| 22 | 2 | 4 | PL 5/8" X 4" X 18" LG | SA-240-1316L | | SUPT PL |
| 23 | 2 | 4 | PL 5/8" X 7" X 10" LG | SA-240-1316L | | CLIPS |

MAX. CARBON CONTENT OF CARBON STEELS SHALL BE LIMITED TO 0.25%
DIMENSIONS SHOWN IN BRACKETS ARE IN MILLIMETERS

CHIVODA
JOB NO. 5104E IBN & SAIB AROMATICS PROJECT
PO NO. SAYPH0015
REQ NO. MR-50-D-010
IDENT NO. 52-D-1746-BU-0000

CERTIFIED
BY: *D. Williams*
DATE: 6-2-97

PRINT RECORD

| DATE | REV. | FOR | NO. |
|------|------|------|-----|
| 2-20 | 0 | CUST | 1-5 |
| 2-20 | 0 | SHOP | 1B |

LAW 5-29
LAW 2-20 SC P7-20
BY: DATE: CND BY: M/C
PROJ. MGR: DICK WILLIAMS

ISSUED CERTIFIED
ISSUED FOR FAB.

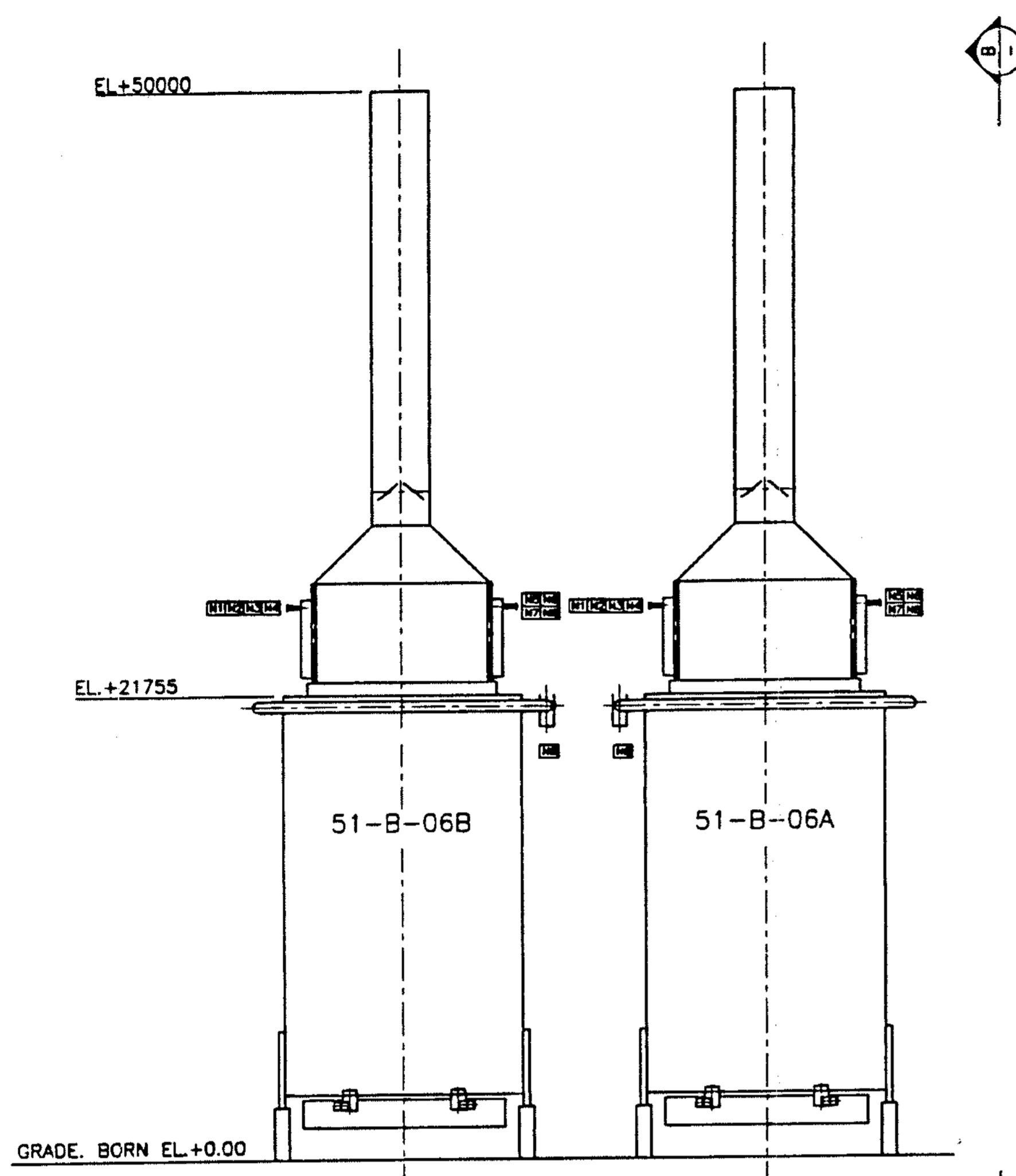
REVISIONS
PH. NO. (713) 676-6044
ALLIED INDUSTRIES, INC.
HOUSTON, TX
150-9001 CERTIFIED

TITLE: (2) 142" ID X 12'-2" SM/SV. REGENERATION DRYER
ITEM NO. 52-D-1746 & E

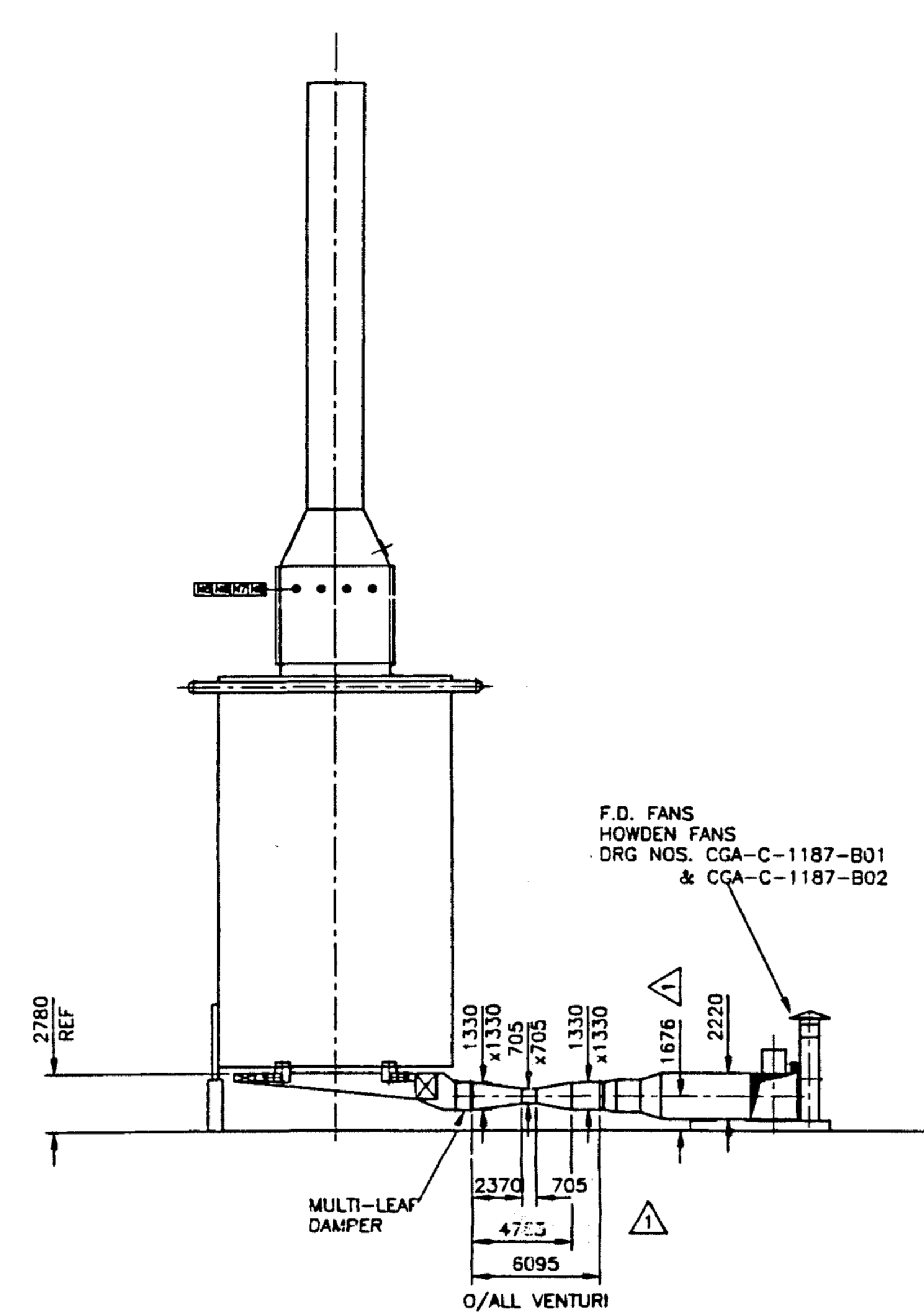
CUSTOMER: CHIVODA INTERNATIONAL CORPORATION
PROJECT TITLE: IBN RUSHD PTA & AROMATICS PROJECT AROMATICS
ARABIAN INDUSTRIAL FIBERS CO. LTD. CUST. P.O. SAYPH0015
DESCRIPTION: DET. OF INSULATION & CATALYST BEAM SUP'T

DRAWN BY: LAW DATE: 12-5-96
CHK'D BY: SC DATE: 2-20-97
APPROVED BY: DATE: 2-20-97

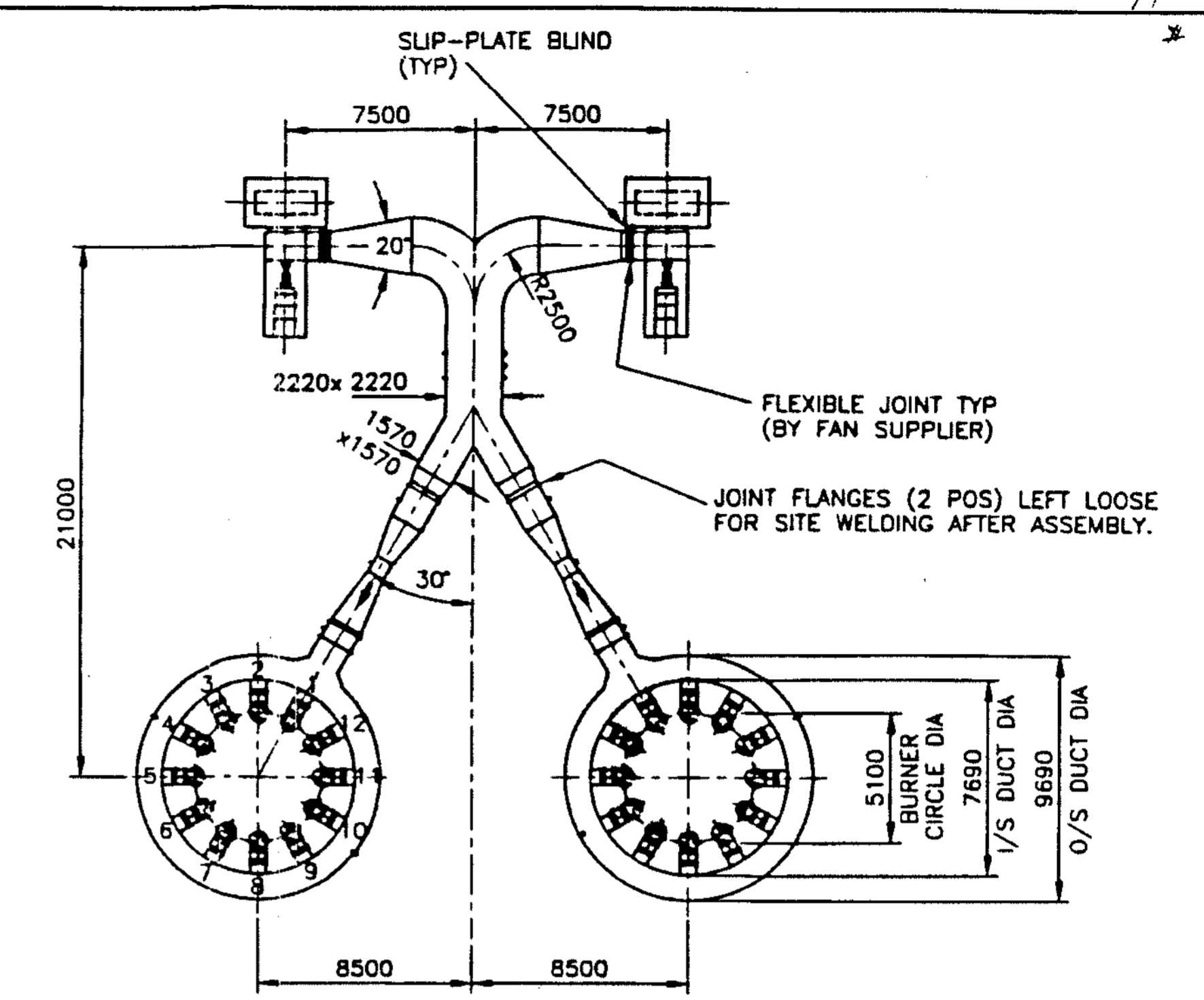
DWG NO. 096-8514-01
REV. 6



VIEW ON A-A



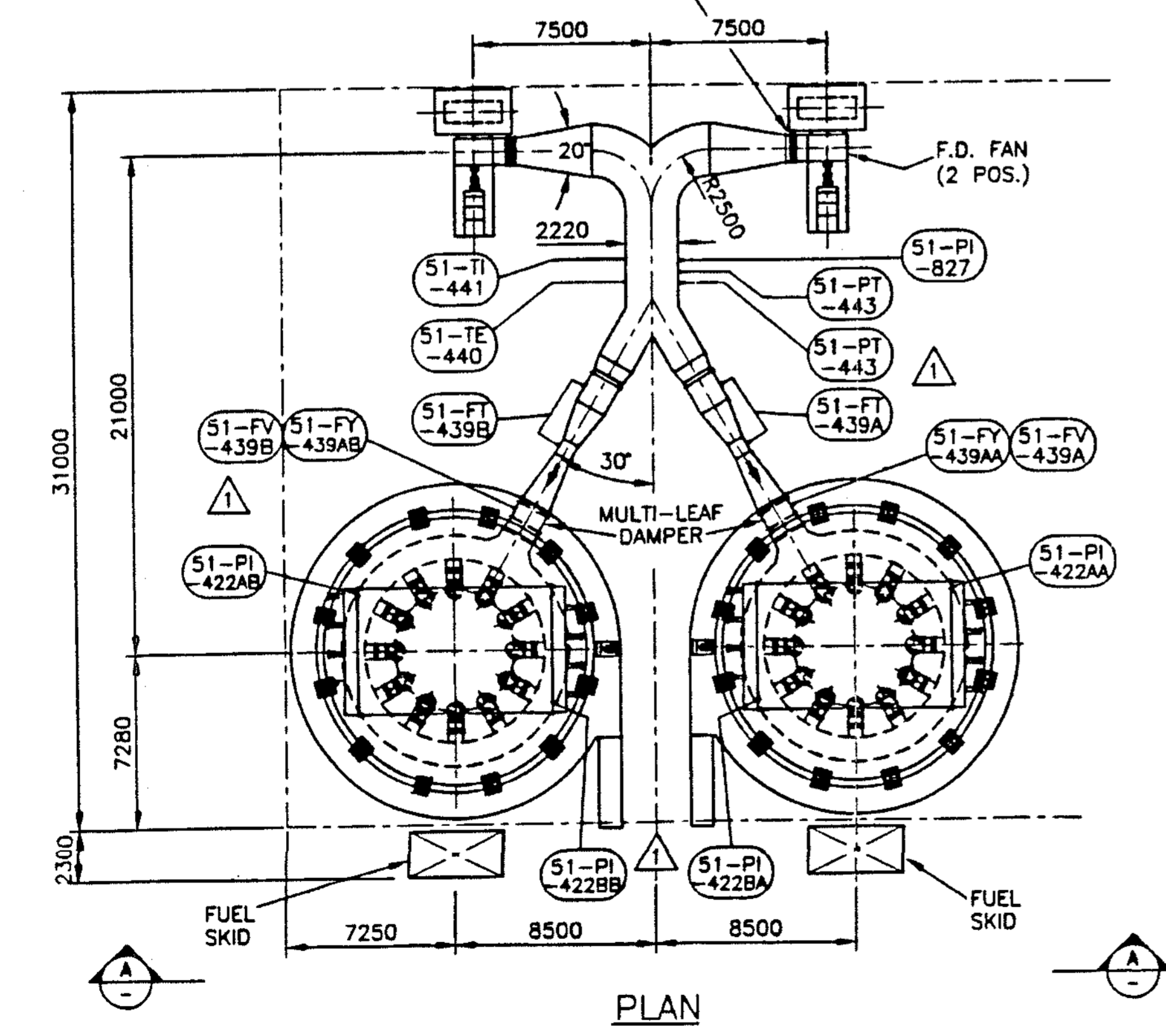
VIEW ON B-B



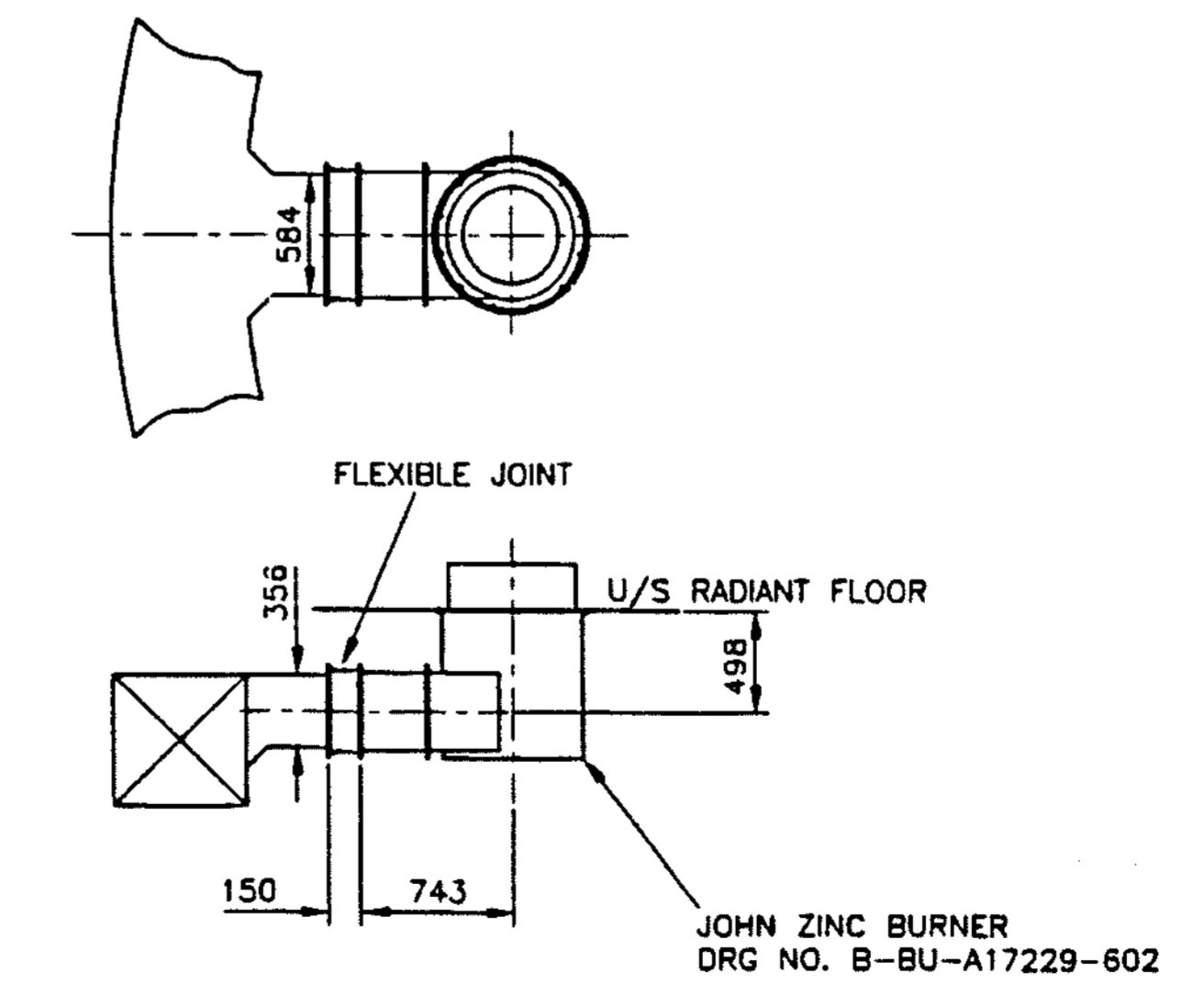
PLENUM DUCT FREE FLOW AREAS
 AT BURNER 1,2,12 : 1.23 m²
 AT BURNER 3,11 : 1.03 m²
 AT BURNER 4,10 : 0.83 m²
 AT BURNER 5,9 : 0.60 m²
 AT BURNER 6,8 : 0.40 m²
 AT BURNER 7 : 0.375 m²

PLAN ON BURNER DUCT

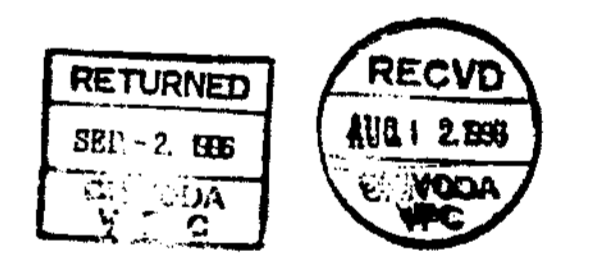
NOTE. ALL DUCT SIZES 1/SIDE STEEL (DUCT UNLINED)



PLAN



BURNER/DUCT DETAIL



| | |
|---|-----------------------------|
| CHYODA | |
| JOB NO. 51048 | IBN RUSHD AROMATICS PROJECT |
| PO NO. | SAYPE0002 |
| REQ NO. | 228540008501 |
| IDENT NO. | 228540008501DW0025 |
| A-NO COMMENTS PROCESSED WITH FABRICATION | SAY TEAM |
| B-PROCEED WITH FABRICATION COMMENTS TO BE CONSIDERED | PLD Rjg/1/96 |
| C-DO NOT PROCEED WITH FABRICATION | DATE 22 Nov 96 |
| PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN OR VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER | |

| | | | | | |
|--|-----------------|----------------|-----------------|----------------|----------------|
| BORN | | | | | |
| DRAWING TITLE OVERALL LAYOUT & PLOT | | | | | |
| SERVICE 51-B-06 STRIPPER REBOILER | | | | | |
| FOR IBN RUSHD 054021 | | | | | |
| DRAWN STEPHENS | DATE JAN '96 | CHECKED G.T | DATE 29.2.96 | APPROVED RG | DATE 7.3.96 |
| JOB No. 2881 | | 2881-51B06-01A | | REV. 1 | |

| | | | | | | | |
|---|----|---------|---------|----|---------|----------|--------|
| REV. 1 BY | RE | 17.7.96 | CHECKED | GT | 28.7.96 | APPROVED | 5/8/96 |
| BURNER PLENUM DETAILS ADDED. FANS RE-POSITIONED. OTHER REVISIONS PER CLIENT RETURN PRINT DATED 21.5.96. BURNER PLENUM CENTRE-LINE DIM'N OF 1676 WAS 1326. | | | | | | | |

NOTE: THIS DRAWING IS THE PROPERTY OF BORN, BRIGHTON, SUSSEX, U.K. AND SHALL NOT BE TRACED, PHOTOGRAPHED, PHOTOSTATED OR REPRODUCED IN ANY MANNER, NOR USED FOR ANY PURPOSE WHATSOEVER EXCEPT BY WRITTEN PERMISSION OF BORN.

FOR RECORD

CLIENT : IBN RUSHD
 PROJECT : PTA & AROMATICS -
 TITLE : AROMATICS
 JOB NO. : 51046
 DOC. NO. : DS-51-D-009 (1/1)

| | | REVISIONS | | | |
|------|--------------------|-------------|-------------|-------------|---|
| MARK | | ① | ② | ③ | ④ |
| APRD | <i>[Signature]</i> | | | | |
| CHKD | <i>[Signature]</i> | | | | |
| MADE | <i>[Signature]</i> | | | | |
| DATE | Mar. 05 '96 | Mar. 27 '96 | Jun. 30 '96 | Jan. 30 '97 | |

UOP
 25 East Algonquin Road • Des. Plaines, Illinois 60017-5017 • USA

PROJECT SPECIFICATION
 560689 - 301 - 0 SHEET 11

| REV | DATE | BY | APVD | REV | DATE | BY | APVD |
|-----|---------|----|------|-----|------|----|------|
| 0 | 5-26-95 | | | | | | |

SERVICE: **LOW PRESSURE SEPARATOR** ITEM NO: **51-D-09**

| | |
|--------------------------------|------------------------------|
| Design | INT 3.5 BAR (g) @ 125 °C |
| Conditions | EXT FULL VACUUM @ 35 °C |
| At Top | Metal Temperature (Min) 9 °C |
| Operating | 35 °C |
| Conditions | °C |
| Radiograph | MR |
| Postweld Heat Treat | MR |
| Joint Efficiency | MR% |
| Material Specifications | |
| Heads | SA516-60 |
| Shell | SA516-60 |

| Shell | Thickness Req'd by Code-mm | Corrosion Allowance mm (Min) |
|--------------|----------------------------|------------------------------|
| | | 3 |
| Heads | | |
| | | 3 |

Vessel Heads TOP = 2:1 ELLIPTICAL
 BOTTOM = 2:1 ELLIPTICAL

Accessories Applied by Fabricator
 Ladder & Platform Clips AS REQUIRED (*)
 Insulation Clips & Rings NO
 Vessel Support YES

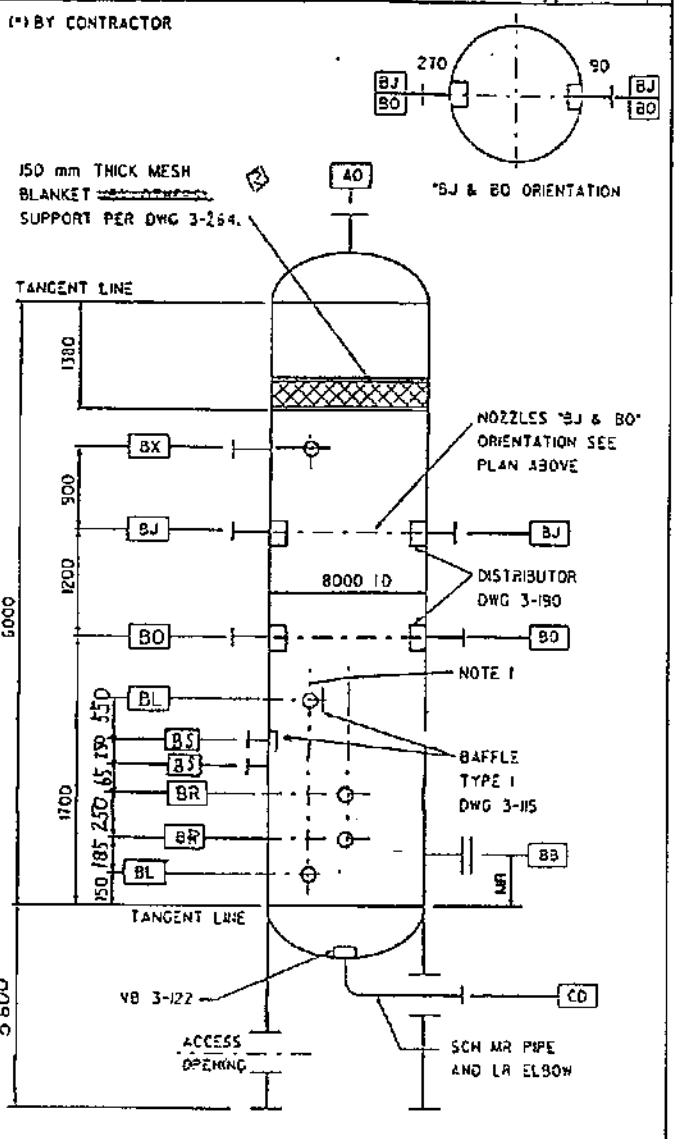
| Nozzles and Manways | | | |
|---------------------|----|-------------|------------------|
| Mark | No | Size Inches | Service |
| AO | 1 | 60 | VAPOR OUT (+), C |
| BB | 1 | 24 | MANWAY |
| BJ | 2 | 36 | INLET (+), C |
| BL | 2 | 1 1/2 | LEVEL |
| BO | 2 | 36 | INLET (+), C |
| BR | 2 | 1 | LLS |
| BS | 2 | 1 | HHS |
| BX | 2 | 1 ID | TI |
| CD | 1 | 8 | OUTLET |

Class- ANSI CL150 (+)- SHEET 2-NOTE A

Facing- RAISED FACE
 C- BEVEL FOR WELDING (OPTIONAL)

Normal Liquid Level- 620 mm ABOVE BOTTOM TANGENT

Specific Gravity = 0.862



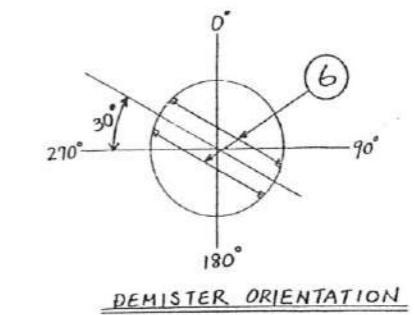
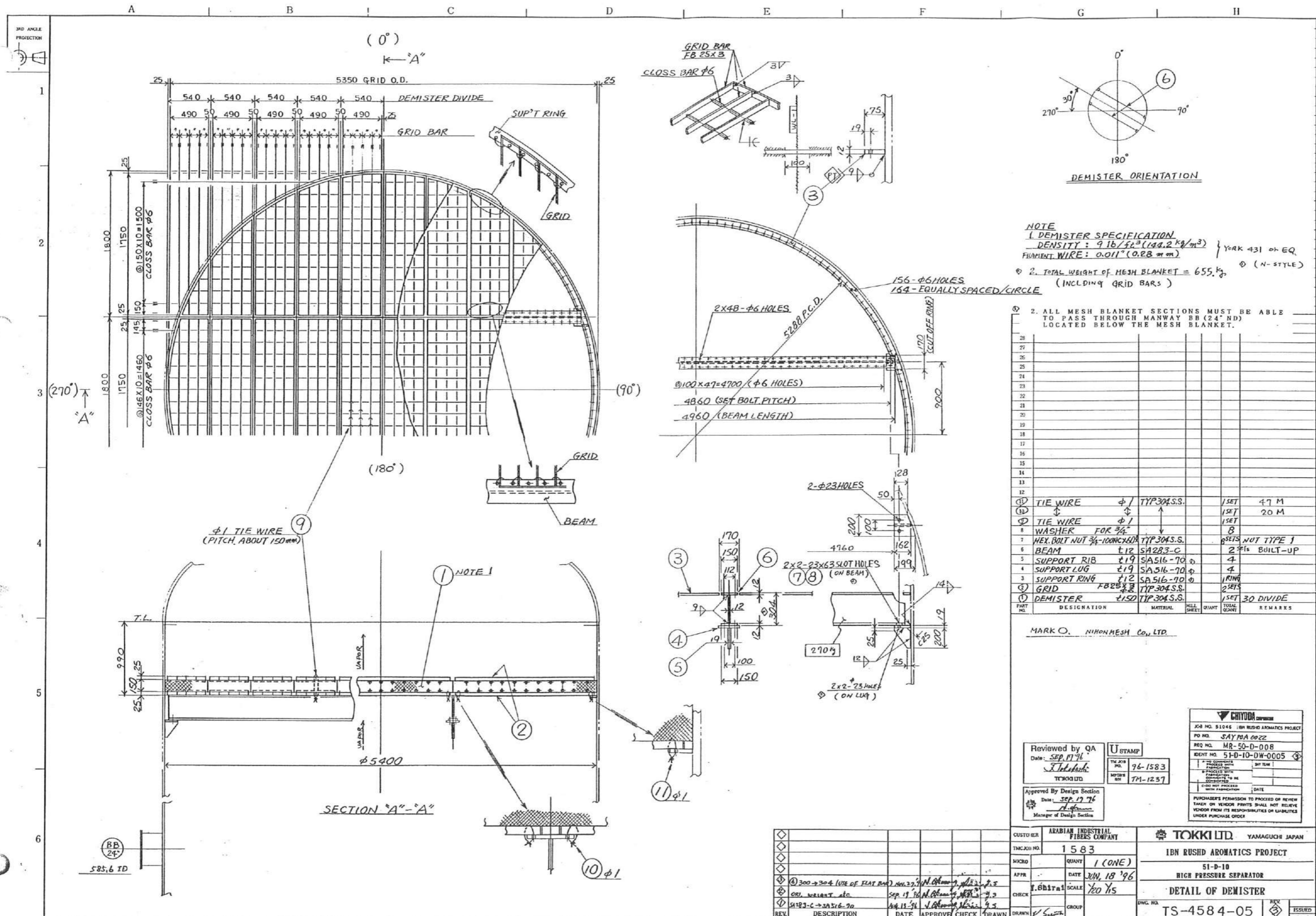
NOTES:
 1) DO NOT LOCATE IN NOZZLE 'BJ & BO' AREA.

Drawings Referred to in this Specification

| | | | |
|---------|---------|---------|---------|
| 3-115-2 | 3-122-0 | 3-190-4 | 3-264-0 |
|---------|---------|---------|---------|

NOTE - These data are confidential and the property of UOP and shall not be disclosed to others or reproduced in any manner or used for any purpose whatsoever except by written permission or as provided in a signed agreement with UOP relating to such data.

560689v109.dgn



NOTE
 1. DEMISTER SPECIFICATION
 DENSITY: $9.16 / ft^3 (144.2 kg/m^3)$ } YORK 431 OR EQ
 FILAMENT WIRE: 0.011" (0.28 mm) } (N-STYLE)
 2. TOTAL WEIGHT OF MESH BLANKET = 655 kg (INCLUDING GRID BARS)

3. ALL MESH BLANKET SECTIONS MUST BE ABLE TO PASS THROUGH MANWAY BB (24" ND) LOCATED BELOW THE MESH BLANKET.

| PART NO. | DESIGNATION | MATERIAL | QTY | TOTAL QTY | REMARKS |
|----------|-----------------------------|----------------------|--------|-----------|------------|
| 1 | TIE WIRE | φ / TYP 304 S.S. | 1 SET | 47 M | |
| 2 | TIE WIRE | φ 1 | 1 SET | 20 M | |
| 3 | WASHER FOR 3/4" | | 8 | | |
| 4 | HEX. BOLT NUT 3/4"-10XNC160 | TYP 304 S.S. | 8 SETS | | NUT TYPE 1 |
| 5 | BEAM | φ 12 SA 283-C | 2 SETS | | BUILT-UP |
| 6 | SUPPORT RIB | φ 19 SA 516-70 | 4 | | |
| 7 | SUPPORT LUG | φ 19 SA 516-70 | 4 | | |
| 8 | SUPPORT RING | φ 12 SA 516-70 | 1 RING | | |
| 9 | GRID | FB 25x3 TYP 304 S.S. | 2 SETS | | |
| 10 | DEMISTER | φ 150 TYP 304 S.S. | 1 SET | 30 DIVIDE | |

MARK O. NIKONMESH Co., LTD.

Reviewed by QA
 Date: SEP 17 76
 T.YOKOJIMA
 TOKKIDU

U STAMP
 TNC JOB NO. 1583
 MGR. NO. TM-1257

Approved By Design Section
 Date: SEP 17 76
 Manager of Design Section

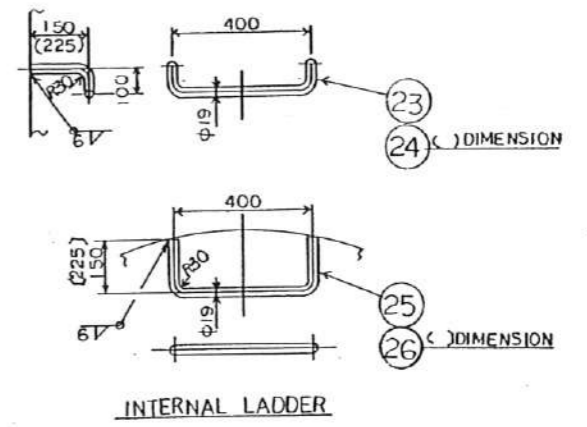
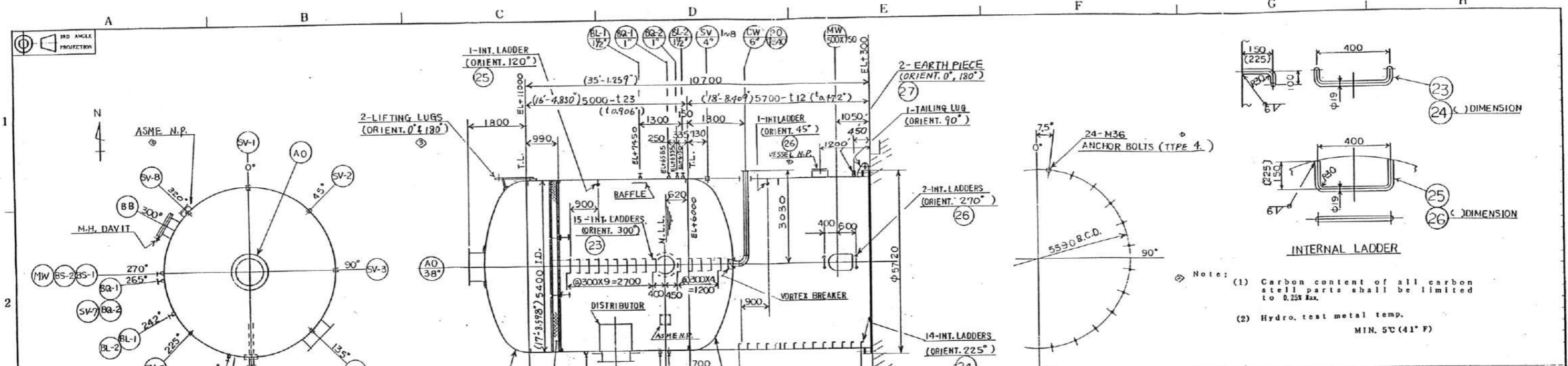
CHIYODA
 JOB NO. 51046 IBN RUSHD AROMATICS PROJECT
 PO NO. SAY PA 0022
 REQ NO. MR-50-D-008
 IDENT NO. 51-D-10-DW-0005

DATE

PURCHASER'S PERMISSION TO PROCEED OR REVIEW TAKEN OR VENDOR PRINTS SHALL NOT RELIEVE VENDOR FROM ITS RESPONSIBILITIES OR LIABILITIES UNDER PURCHASE ORDER

| REV. | DESCRIPTION | DATE | APPROVE | CHECK | DRAWN |
|------|-----------------------------|-----------|---------|-------|-------|
| 1 | 300 → 304 (USE OF FLAT BAR) | SEP 17 76 | | | |
| 2 | ORL WEIGHT etc | SEP 17 76 | | | |
| 3 | SA 283-C → SA 516-70 | SEP 17 76 | | | |

| | | |
|-------------|-----------------------------------|-----------------------------|
| CUSTOMER | ARABIAN INDUSTRIAL FIBERS COMPANY | TOKKI LTD. YAMAGUCHI JAPAN |
| TNC JOB NO. | 1583 | IBN RUSHD AROMATICS PROJECT |
| MICRO | QUANT 1 (ONE) | 51-D-10 |
| APPR | DATE JUN 18 '96 | HIGH PRESSURE SEPARATOR |
| CHECK | SCALE 1/20 1/5 | DETAIL OF DEMISTER |
| DWG. NO. | TS-4584-05 | ISSUED |



Note: (1) Carbon content of all carbon steel parts shall be limited to 0.25% Max.
 (2) Hydro. test metal temp. MIN. 5°C (41°F)

| NO. | DESCRIPTION | MATERIAL | QTY | TOTAL QTY | REMARKS |
|----------|------------------|----------------------|-----|---------------|---------|
| 30 | | | | | |
| 27 | EARTH PIECE | t 12 SA240-304 | 2 | | |
| 26 | INTERNAL LADDER | φ 19 SA 36 | 3 | | |
| 25 | INTERNAL LADDER | φ 19 SA 36 | 1 | | |
| 24 | INTERNAL LADDER | φ 19 SA 36 | 14 | | |
| 23 | INTERNAL LADDER | φ 19 SA 36 | 15 | | |
| 22 | STAY | 6" X SCH 40 SA 106-B | 1 | | |
| 21 | TAILING LUG | t 50 SA 283-C | 1 | | |
| 20 | | | | | |
| 19 | PAD | SA 516-70 | 2 | ORIGINAL t 35 | |
| 18 | PAD | t 27 SA 516-70 | 2 | | |
| 17 | GUSSET | t 40 SA 516-70N | 2 | | |
| 16 | LIFTING LUG | t 90 SA 516-70N | 2 | | |
| 15 | | | | | |
| 14 | SKIRT VENT | 4" X SCH 40 SA 106-B | 8 | | |
| 13 | PIPE OPENING | t 12 SA 283-C | 1 | | |
| 12 | ACCESS OPENING | t 12 SA 283-C | 1 | | |
| 11 | WASHER | t 32 | 24 | | |
| 10 | GUSSET | t 12 | 48 | | |
| 9 | COMPRESSION RING | t 12 | 1 | | |
| 8 | BASE PLATE | t 40 SA 283-C | 1 | | |
| 7 | | | | | |
| 6 | SKIRT | t 12 SA 283-C | 1 | | |
| 5 | SKIRT | t 12 SA 283-C | 1 | | |
| 4 | HEAD | t 23 SA 516-70 | 1 | NORMALIZING | |
| 3 | HEAD | t 23 SA 516-70 | 1 | NORMALIZING | |
| 2 | | | | | |
| 1 | SHELL | t 23 SA 516-70 | 1 | | |
| PART NO. | DESIGNATION | MATERIAL | QTY | TOTAL QTY | REMARKS |

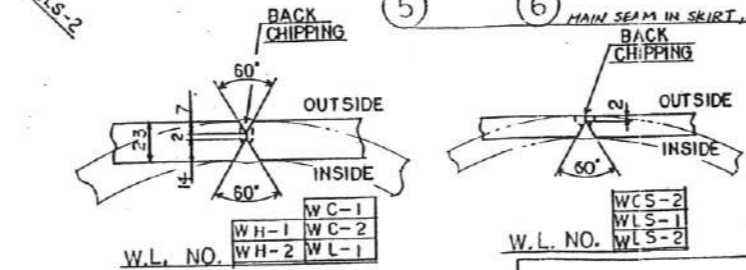
| DESIGN DATA | |
|------------------------------|---------------------------------------|
| CODE/REGULATION/ASME SECT. | ASME DIV. 1 1995 EDITION |
| NO. REQ'D | 1 (ONE) |
| VOLUME | 155.8 |
| FLUID CONTENTS | HYDROCARBON & HYDROGEN |
| DESIGN PRESSURE | 6.7 E.V. BAR G (6.84 M/MG) |
| DESIGN TEMPERATURE | 120/35 °C (248/95°F) |
| OPERATING PRESSURE | BAR G (1 M/MG) |
| OPERATING TEMPERATURE | 35 °C (95°F) |
| HYDRO. TEST PRESSURE | 10.1 BAR G (10.3 M/MG) |
| PNEUMA. TEST PRESSURE | - BAR G (- M/MG) |
| POST WELD HEAT TREATMENT | NO |
| RADIOGRAPHED | SHELL: SPOT/HEAD: FULL |
| JOINT EFFICIENCY | SHELL: 0.85/HEAD: LO |
| CORR. ALLOWANCE | 3 |
| FLUID SP. GRAVITY | 0.823 |
| INSULATION | NO |
| FIRE PROOF (BOTH SIDE) | YES (1) 75 |
| PAINTING SYSTEM | |
| ACCESSORY | |
| SPARE | GASKET: 200% BOLT & NUT: 10% (SUM) |
| MDMT | + 2°C (+35.6°F) |
| IMPACT TEST | NO |
| WEIGHT: ERECTION | 42000 kg |
| WEIGHT: EMPTY (AT INT. DOWN) | 90400 kg |
| WEIGHT: OPERATING | 119000 kg |
| WEIGHT: FULL WATER (AT FLD) | 246100 kg |

U STAMP

Reviewed by QC
 Date: SEP 17 96
 T. H. H. H.
 T. H. H. H.
 T. H. H. H.

CRITON
 JOB NO. 51046 IBN RUSHD AROMATICS PROJECT
 PO NO. SAY PO A0022
 REQ NO. HR-50-D-008
 IDENT NO. 51-D-10-DW0001

| MARK | SIZE | NO. OF REQ'D | NO. OF INST. REQ'D | TYPE | FACING | SCRF | THICK | SERVICE | NOZZLE REIN. PAD | NOZZLE LIST |
|------|-----------|--------------|--------------------|------|--------|------|-------|---------|------------------|----------------------------|
| SV-4 | 4" | 8 | - | - | - | - | - | 40 | SKIRT VENT | - |
| PO | φ 340 | 1 | - | - | - | - | - | t 12 | PIPE OPENING | - |
| MW | 500 x 750 | 1 | - | - | - | - | - | t 12 | ACCESS OPENING | - |
| CW | 6" | 1 | 150 | WN | RF | 80 | - | - | OUTLET LIQ. | SEE DWG. 300 x 23" |
| BS-1 | 1" | 2 | - | LWN | - | - | - | - | HHS | 2880 |
| BQ-2 | 1" | 2 | - | LWN | - | - | - | - | L L S | - |
| BL-1 | 1 1/2" | 2 | 150 | LWN | - | - | - | - | LEVEL | 2880 |
| BJ | 38" | 1 | - | WN | - | - | - | t 12 | INLET | φ 3130 SERIES B 1700 x 23" |
| BC-1 | 1" | 2 | 150 | LWN | - | - | - | - | TI ID | 2880 |
| BB | 24" | 1 | 150 | WN | - | - | - | t 12 | MANWAY (W/DAVIT) | 3030 1150 x 23" |
| AO | 38" | 1 | - | WN | RF | t 12 | - | - | OUTLET VAPOR | SEE DWG. 1700 x 23" |



| DETAIL | NO. |
|----------------------------|-------------|
| DETAIL OF NAME PLATE | TS-4582-06 |
| DETAIL OF FIRE PROOF CLIP | TS-4584-08 |
| PLATFORM LUG | -07 |
| PIPE SUP'T LUG | -06 |
| DEMISTER | -05 |
| MANHOLE | -04 |
| DETAIL OF NOZZLE | TS-4584-02 |
| TITLE | DRAWING NO. |
| LIST OF REFERENCE DRAWINGS | |

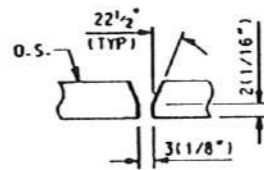
007265

ORDER NO. 56-050-2

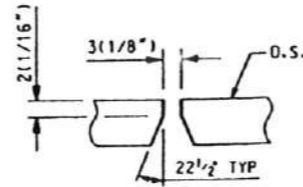
DWG No.: 56-050-2 SHT#2 4

| ITEM | QTY | DESCRIPTION AND SIZE | MAT'L | ADV | REV |
|------|-----|--|-----------|-----|-----|
| 2-1 | 2 | 3900(153 ³ / ₈ " O.D. X 21(1 ¹ / ₈ " MIN. THK ASME 2:1 ELLIP. HEAD W/ 51(2") S.F. PER ASME VIII-DIV 1 UG-79, B1 & UCS-79 EDGE PREP. PER SK "A". DET "B6". REV. 1 | SA-516-70 | A1 | |
| 2-2 | 6 | PL 21(1 ¹ / ₈ " X 2870(9'-5") X 12189(39'-11 ⁷ / ₈ ") LG. C/F (6) PL 21(1 ¹ / ₈ " X 2896(114") X 12243 (482") LG. | SA-516-70 | A2 | 1 |
| 2-3 | 1 | PL 21(1 ¹ / ₈ " X 2777(9'-1 ⁵ / ₈ ") X 12189(39'-11 ⁷ / ₈ ") LG. C/F (1) PL 21(1 ¹ / ₈ " X 2896(114") X 13462 (530") LG. | SA-516-70 | A2A | 1 |

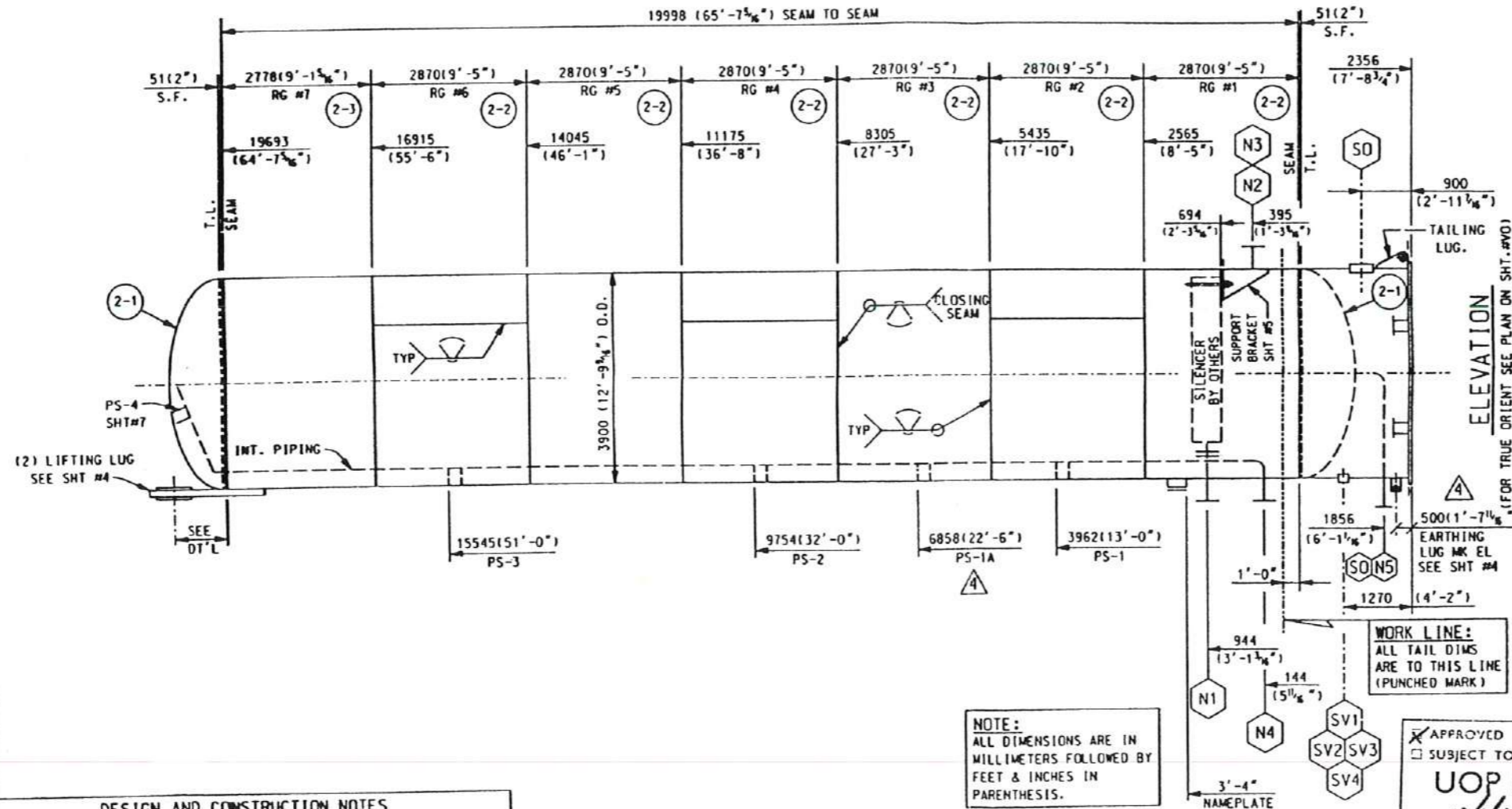
• PER SPEC #PV402-A, PARA. 2.1.6, 2.2.2, 2.2.3.
 ◀ CERTIFICATES TYPE REQUIRED IS DIN 50049-3.1-B
 B/M SHOWN FOR ONE VESSEL; ONE VESSEL REQUIRED.



CIRCUM CLOSING SEAM



TYP LONG & CIRCUM SEAM U.N.



RETURNED
 MAR - 7, 1997
 CHIYODA
 V P C

RECVD
 APR 24, 1997
 CHIYODA
 V P C

AS BUILT

CHYODA CORPORATION
 JOB NO. 51048 (IN RESO. INDICATES PROJECT)
 PO NO. SAYPOA0020
 REQ. NO. MR-SI-Y-002
 DENT. NO. 51-Y-01-DW 0101
 DATE 3/2/97

NOTE:
 ALL DIMENSIONS ARE IN MILLIMETERS FOLLOWED BY FEET & INCHES IN PARENTHESIS.

APPROVED
 SUBJECT TO COMMENT
 UOP N.Y.
 DATE 12/1/96 BY J/S

| NO. | DATE | BY | CHK | REVISIONS |
|------|------|----|-----|-------------------------------|
| 12-9 | 96 | BT | BOB | REVISED AS NOTED SEE DRR-3 |
| 2-15 | 97 | BT | BOB | FINAL AS BUILT- SEE DRR-4 |

- DESIGN AND CONSTRUCTION NOTES**
- DESIGN PER ASME CODE: SECTION VIII DIV 1, 95 ED. A95
 - STRESS RELIEVING: N/A
 - RADIOGRAPH: 100%
 - JOINT EFFICIENCY: HEAD 1.0 SHELL 1.0
 - CORR. ALLOW.: HEAD 1.5(1¹/₈") SHELL 1.5(1¹/₈") NOZZLS 1.5(1¹/₈")
 - MIN. DESIGN METAL TEMP.: 9 °C (49 °F)
 - INT DSG PRESS: 11 BARG(159 PSI) @ 120°C(248°F)
EXT DSG PRESS: 0 BARG(0 PSI) @ 148°C(300°F)
 - M.A.W.P.: 11.8 BARG(171 PSI); MAPIN & C1: 12.8 BARG(186 PSI)
 - OPER. PRESS. 4.7 BARG(68 PSI) @ 37°C (99) °F
 - HYDROSTATIC TEST PRESS. 19.2 BARG(279 PSI)
 - PAINT: YES. SEE DWG 56-050-2 SHT #9

| SCHEDULE OF OPENINGS | | | | |
|----------------------|-----|-------------------|-------------------------|--------|
| MARK | QTY | SIZE | SERVICE | DWG # |
| N1 | 1 | 12" -150# RF | INLET | SHT #5 |
| N2 | 1 | 74" -150# RF | MANWAY W/ DAVIT | SHT #5 |
| N3 | 1 | 2" -150# RF | OUTLET | SHT #5 |
| N4 | 1 | 2" -150# RF | VENT | SHT #7 |
| N5 | 1 | 2" -150# RF | DRAIN | SHT #6 |
| SO | 2 | 21 1/2" X 31 1/2" | SKIRT OPENING | SHT #3 |
| SV1 THRU SV4 | 4 | 4" | SKIRT VENTS | SHT #3 |
| SS | 1 | 4" | SKIRT SLEEVE F/ NOZZ N5 | SHT #6 |

ORDER NO. 56-050-2
 GRAVER TANK & MFG. CO. INC.
 (1) 3859 (151⁵/₈") I.D. X
 20100 (65'-11³/₈") T/T VERT P/V
 (SURGE DRUM) ITEM NO.: 51-D-23
 ELEVATION
 DWN: BT 8-20-96 CUST: UOP / IBN RUSHD
 YANBU, SAUDI ARABIA
 CHK: MB 9-13-96 56-050-2 SHT#2 4
 DWG. NO. REV.

AS BUILT

24" 12"

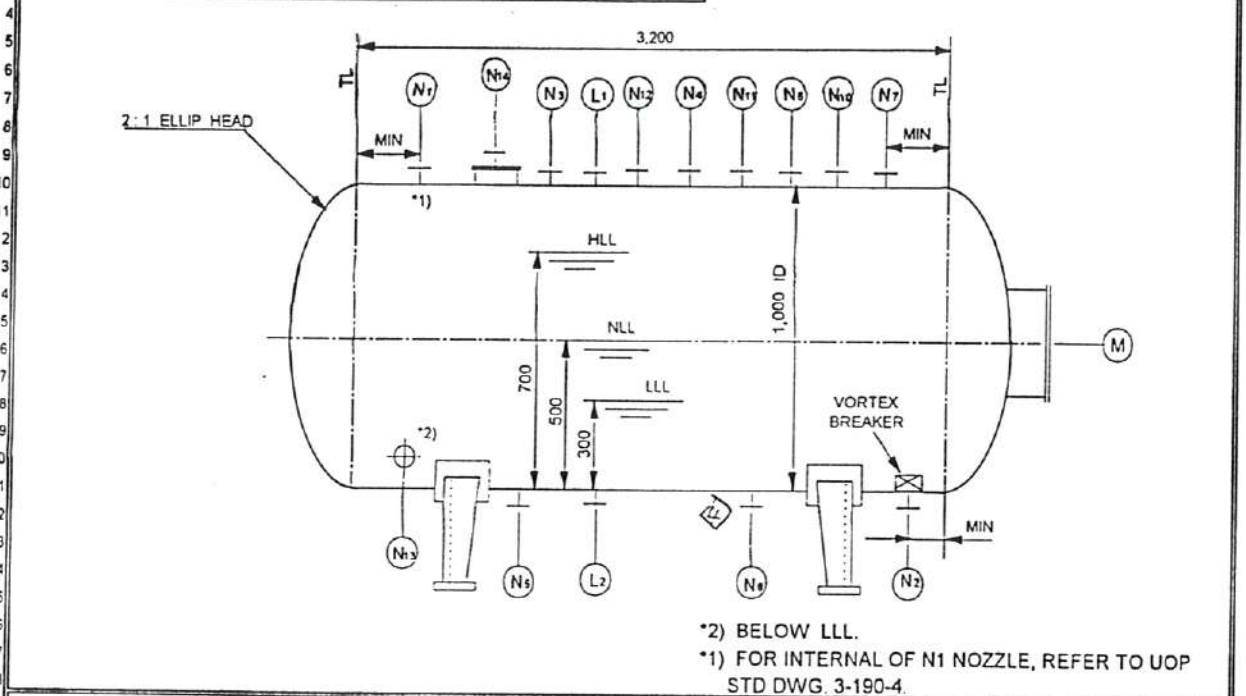
DRUM SPECIFICATION SHEET

FOR RECORD

CLIENT Arabian Industrial Fibers Company
 PROJECT _____
 TITLE Saudi Aromatics Yanbu Projct
 JOB NO. 51046
 DOC. NO. DS-52-D-031 (1 / 1)

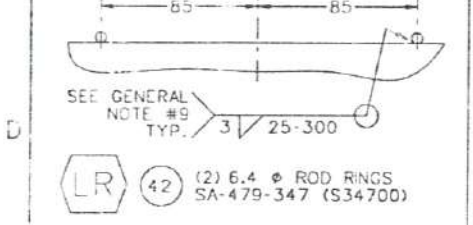
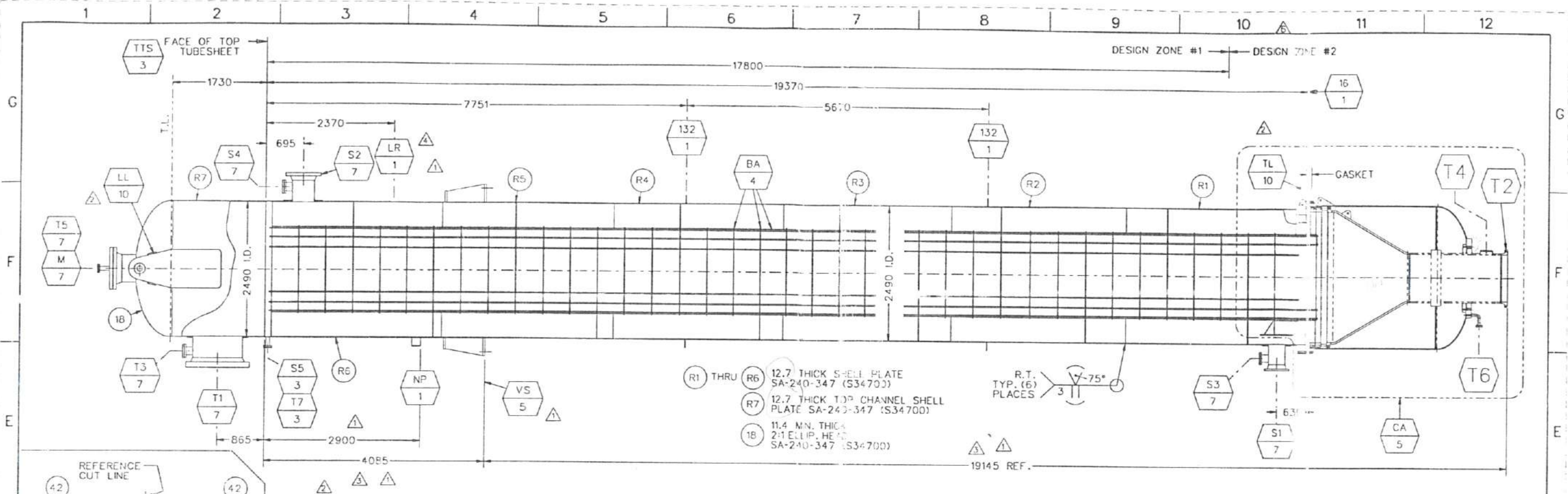
| | | | | | |
|------|--------------------|-----------|--------------------|------|---------------|
| REV | ⑤ | ③ | ④ | MADE | |
| BY | <i>K. Hala</i> | 1 | <i>Sohor</i> | MADE | A.F. |
| CHKD | <i>K.D.</i> | J.T. | <i>J. Teak</i> | CHKD | J.T. |
| APVD | <i>[Signature]</i> | | <i>[Signature]</i> | APVD | G.F. |
| DATE | Feb. 27 '91 | 7/19, '96 | Oct 22 '96 | DATE | Mar., 14, '96 |

| | |
|------------|------------------------------|
| ITEM NO.: | 52-D-31 |
| SERVICE : | CONDENSATE DRUM FOR 52-KS-01 |
| NO. REQD.: | 1 |



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| OPERATING CONDITION | | REMARKS | | | |
|------------------------------|--|--|----------|---------------------|-------------|
| FLUID : | CONDENSATE | | | | |
| PRESSURE : | -0.86 BarG | | | | |
| TEMPERATURE : | 54 °C | L _{1,2} | 2" | LT / LG | 2 150# RF |
| LIQUID DENSITY : | 987 Kg/m ³ | M | 20" | MANHOLE | 1 150# RF |
| TOTAL VOLUME : | 2.8 m ³ | N _{1,4} | 4"X2" | VENT | 1 150# RF |
| NORMAL LIQUID HOLD-UP : | 1.4 m ³ 2.5 min. | N _{1,2} | 1" | TI | 1 150# RF |
| CONTROL RANGE REQUIRED : | 2.6 min., 400 mm | N _{1,2} | 3" | LINE DRAIN | 1 150# RF |
| DESIGN CONDITION | | N _{1,1} | 1 1/2" | DWN INLET | 1 150# RF |
| CODE/REGULATION : | ASME Sec. VIII div. 1, 1995 | N _{1,0} | 3" | PUMP VENT | 1 150# RF |
| INSIDE DIA. & TL-TL LENGTH : | 1,000 mm, 3,200 mm | N ₁ | 2" | COND RTN | 1 150# RF |
| DESIGN PRESS. & TEMP. : | 1.5/FV BarG, 180 °C | N ₁ | 1" | PG | 1 150# RF |
| TEST PRESS. HYDROSTATIC : | 18.22 BarG | N ₁ | 2" | MIN FLOW | 1 150# RF |
| PNEUMATIC : | 3.0 BarG | N ₁ | 2" | DRAIN | 1 150# RF |
| CORROSION ALLOWANCE : | 3.0 mm | N ₁ | 3" | EQUALIZING | 1 150# RF |
| POSTWELD HEAT TREATMENT : | <input checked="" type="checkbox"/> CODE <input type="checkbox"/> YES <input type="checkbox"/> NO | N ₁ | 2" | EJECTOR CONN. | 1 150# RF |
| RADIOGRAPHIC : | <input type="checkbox"/> FULL <input type="checkbox"/> SPOT % <input type="checkbox"/> NO <input checked="" type="checkbox"/> CODE | N ₁ | 6" | CONDENSATE OUTLET | 1 150# RF |
| JOINT EFF. : | SHELL % HEAD % | N ₁ | 6" | CONDENSATE INLET*1) | 1 150# RF |
| MATERIAL | | | | | |
| SHELL : | SA516-70 | MARK | SIZE | SERVICE | Q'TY RATING |
| HEAD : | SA516-70 | | | | |
| NOZZLE SCHEDULE | | | | | |
| FRAY/INTERNAL : | CS | WEIGHT : | ELECTION | 1.911 | Kg |
| SUPPORT : | CS | OPERATION | 4.135 | | Kg |
| NOZZLE FRANGE : | SA105 | FULL WATER | 4.941 | | Kg |
| NECK : | | ACCESSORIES SUPPLIED BY MANUFACTURER | | | |
| GASKET : | SWG (Non Asbst) | LADDER & PLATFORM CLIPS, PIPE SPRT CLIPS, DAVID, LIFTING LUG, CORROSION CAGE POINT, EARTH PIECE, INTERNAL LADDER (SHELL, SKIRT), TEMPLATE, ANCHOR OR SETTING BOLTS, SLIDING PLATE, | | | |
| BOLT & NUT : | EXT. INT. | | | | |
| INSULATION : | <input checked="" type="checkbox"/> NO <input type="checkbox"/> HOT <input type="checkbox"/> COLD <input type="checkbox"/> PP mm | | | | |
| FIRE PROOF : | <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO | | | | |



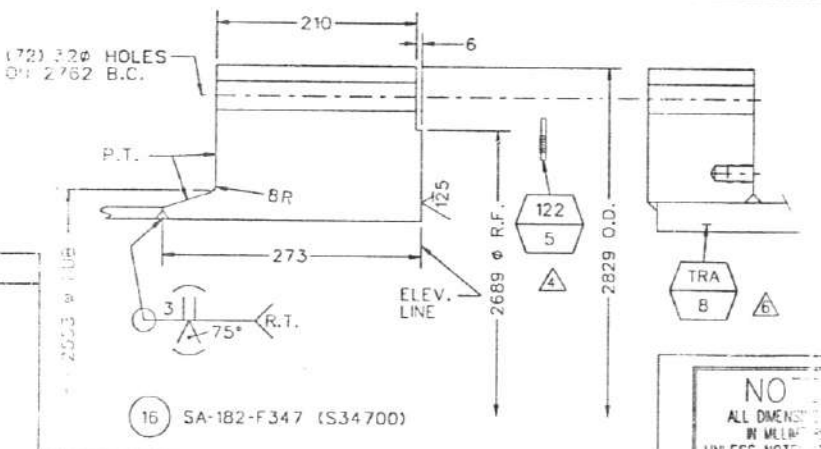
- DRAWING LIST:**
1. MAIN ASSEMBLY
 2. ORIENTATIONS
 3. TUBESHEET DETAILS
 4. TUBE BUNDLE DETAILS
 5. MISCELLANEOUS DETAILS
 6. SHELL COVER AND BOTTOM CHANNEL
 7. NOZZLE DETAILS
 8. INSULATION SUPPORT DETAILS
 9. EXPANSION JOINT (LATER)
 10. LIFTING DETAILS

WEIGHTS:
 EMPTY ----- 151 METRIC TONS
 FULL OF WATER ----- 274 METRIC TONS

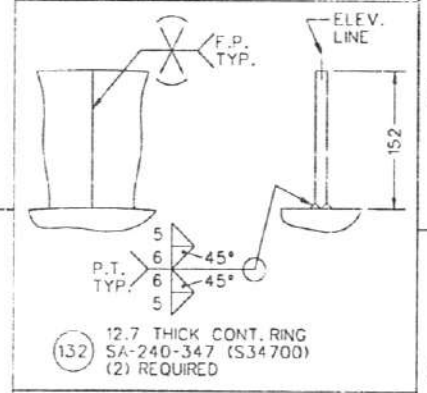
AIR TEST
 SEE NOTES #3, #4, #8
 AND DESIGN BLOCK

GENERAL NOTES

1. ALL BOLT HOLES ARE EQ. SPACED & STRADDLE NATURAL C'LINES.
2. BASIC MATERIALS OF CONSTRUCTION:
 SA-240-347 (S34700) (0.4 MIN. CARBON)
 SHELL COVER & FLOATING CONE ASSY: SA-516-70 (2.25 MAX. CARBON)
3. AFTER COMPLETION OF TUBE BUNDLE, AIR TEST THE SHELL SIDE TO 25 PSIG (1.80 BAR(g)).
4. HELIUM MASS SPECTROMETER TEST SHELL SIDE AT 15 PSIG (1.07 BAR(g)).
5. SHELL SIDE: 129 PSIG (8.9 BAR(g)) & F.V.
 TUBE SIDE: 58 PSIG (4.0 BAR(g)) & F.V.
6. DESIGN ZONE #1:
 SHELL SIDE (INT.): 941°F. (505°C.)
 TUBE SIDE (INT.): 1022°F. (550°C.)
 FULL VAC.: 752°F. (400°C.)
 DESIGN ZONE #2:
 SHELL SIDE (INT.): 550°F. (288°C.)
 TUBE SIDE (INT.): 550°F. (288°C.)
 FULL VAC.: 752°F. (400°C.)
7. SANDBLAST ALL EXTERNAL CARBON STEEL PER SSPC, SP-10, NEAR WHITE, AND PAINT WITH ONE COAT OF CARBOZINC #11 PRIMER. SOLVENT CLEAN EXTERNAL STAINLESS STEEL PER SSPC, SP-1, AND PAINT WITH (2) COATS (1.5-2.0 MILS) OF DAMPNEY THERMALOX 70C.
8. IMMEDIATELY AFTER WELDING, INDIVIDUALLY PRESSURE TEST EACH BACKSIDE WELDED TUBE TO TUBESHEET JOINT WITH 100% HELIUM @ 50 P.S.I.C.
9. DYE-PENETRANT EXAMINATION 10% OF THE LENGTH OF ALL NON-PRESSURE ATTACHMENT WELDS TO PRESSURE PARTS.
10. MAXIMUM FUTURE FIELD HYDRO TEST:
 SHELL SIDE: 167 PSIG (11.5 BAR(g)) (AT TOP OF SHELL) (LIMITED BY SHELL COVER BODY FLANGE)
 TUBE SIDE: 87 PSIG (6.0 BAR(g)) (AT MANWAY "M") (LIMITED BY DESIGN)



| | DESIGN | SHELL SIDE | TUBE SIDE |
|------------------|------------------------------------|----------------------|-------------|
| CODE | 1995 ASME SECT VIII DIV. 1 | | |
| LATEST ADDENDA | ORIGINAL ISSUE & TEMA "R" (7" ED.) | | |
| MAX DESIGN PRESS | SEE NOTE #5 | SEE NOTE #5 | SEE NOTE #5 |
| MAX DESIGN TEMP. | SEE NOTE #6 | SEE NOTE #6 | SEE NOTE #6 |
| JOINT EFF. HEADS | SEAMLESS | 100% | 100% |
| JOINT EFF. SHELL | 100% / 85% | 100% | 100% |
| CORR. ALLOWANCE | 1/8" (3mm) CARBON STEEL | | |
| AR TEST | 162 PSIG (11.2 BAR(g)) | 73 PSIG (5.0 BAR(g)) | |
| EXAMINED BY | DESIGN | DESIGN | |
| HEAT TREATMENT | NONE | NONE | |
| RADIOGRAPHY: | | | |
| SHELL LONG SEAMS | FULL / SPOT X-RAY | FULL X-RAY | |
| HEAD SEAMS | SEAMLESS | SEAMLESS | |
| HEAD/SHELL SEAMS | FULL / SPOT X-RAY | FULL X-RAY | |
| CRG. M. SEAMS | FULL / SPOT X-RAY | FULL / SPOT X-RAY | |



| | |
|---|----------------------|
| CHIYODA COMPANY | |
| JOB NO. 51046 | SAY BY RUSH MEMORIAS |
| PO NO. 5AYPH0004 | |
| REQ NO. MR-50-E-001 Rev. 1.0 | |
| IDENT NO. 51-E-01-DW-0001 | |
| A-FABRICATION MAY PROCEED | SAY TIME |
| B-FABRICATION MAY PROCEED SUBJECT TO COMMENTS NOTED | |
| C-FABRICATION MAY NOT PROCEED | DATE |

NO
 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE

STAMP THE FOLLOWING INFORMATION ON THE CODE NAMEPLATE:

UNIT #1: ITEM #51-E-01A CYCLAR COMBINED FEED EXCHANGER
 UNIT #2: ITEM #51-E-01B CYCLAR COMBINED FEED EXCHANGER
 UNIT #3: ITEM #51-E-01C CYCLAR COMBINED FEED EXCHANGER
 UNIT #4: ITEM #51-E-01D CYCLAR COMBINED FEED EXCHANGER

UNIT #1: 13009
 UNIT #2: 13010
 UNIT #3: 13011
 UNIT #4: 13012

NATIONAL BOARD NO.
 CERTIFIED BY **NOOTER CORPORATION** ST. LOUIS, MISSOURI

PSIG AT T

| | | |
|------------------------------------|------------------------------------|----------------------------------|
| MAXIMUM ALLOWABLE WORKING PRESSURE | SHELL SIDE 129 & F.V. (8.9 BAR(g)) | TUBE SIDE 58 & F.V. (4.0 BAR(g)) |
| RT-4 (S.S.) | MAWP 48 (9°C) | MAWP 48 (9°C) |
| RT-1 (I.S.) | MAWP 48 (9°C) | MAWP 48 (9°C) |

SERIAL NUMBER 965840 YEAR 1996

51-E-01A/D CYCLAR COMBINED FEED EXCHANGER

| | | |
|---------------------|-----------------------|----------------------|
| DESIGN PRESSURE | SHELL SIDE 8.9 BAR(g) | TUBE SIDE 4.0 BAR(g) |
| DESIGN TEMP. ZONE 1 | 505 °C | 550 °C |
| DESIGN TEMP. ZONE 2 | 288 °C | 288 °C |
| HYDRO TEST PRESS. | NONE BAR(g) | NONE BAR(g) |
| PNEUM. TEST PRESS. | 11.2 BAR(g) | 5.0 BAR(g) |
| PHWT & RADIOGRAPHED | NO (FULL) | NO (FULL) |
| WEIGHT EMPTY | 151,000 KG | NO BUNDLE |

NOOTER CORPORATION

NOOTER CORPORATION
 8700 W. 17TH ST. HOUSTON, TEXAS 77058

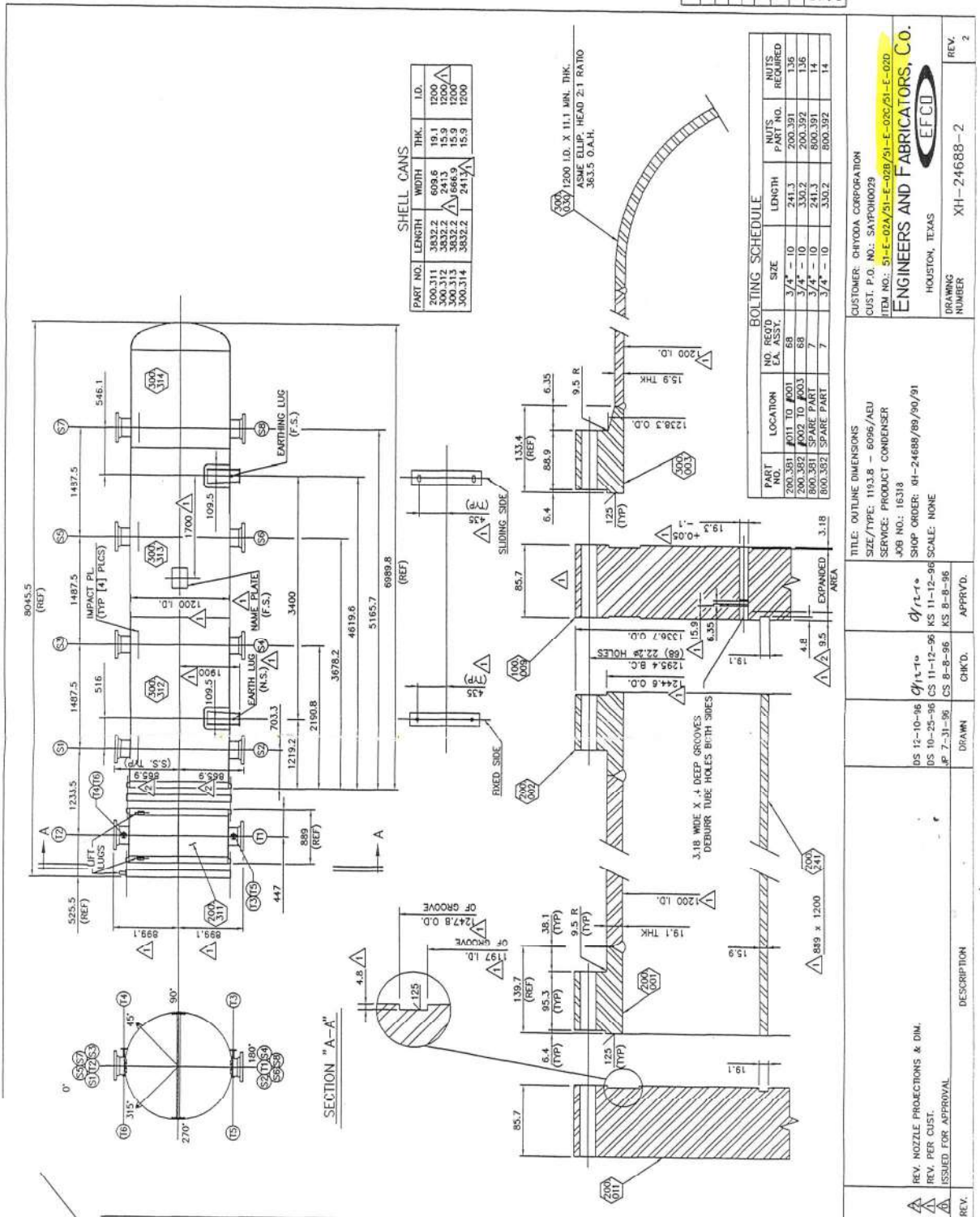
MAIN ASSEMBLY
 - FOR -
 CYCLAR COMBINED FEED EXCHANGER
 ITEM #5: 51-E-01 A/D
 CHIYODA INTERNATIONAL CORP.
 HOUSTON, TEXAS

| | | |
|-----------------------|--------------|-------------------|
| DATE: 9/25/96 | BY: J. Hultz | JOB NO. 965840 |
| CHECKED BY: J. Miller | W.A.S. | DRG. NO. N-D72765 |

SHEET 1 of 10

AS BUILT

FINAL



SHELL CANS

| PART NO. | LENGTH | WIDTH | THK. | I.D. |
|----------|--------|--------|------|------|
| 200.311 | 3832.2 | 609.6 | 19.1 | 1200 |
| 300.312 | 3832.2 | 609.6 | 15.9 | 1200 |
| 300.313 | 3832.2 | 1666.9 | 15.9 | 1200 |
| 300.314 | 3832.2 | 2413.3 | 15.9 | 1200 |

ROLLING SCHEDULE

| PART NO. | LOCATION | NO. REQ'D EA. ASSY. | SIZE | LENGTH | NITS PART NO. | NITS REQUIRED |
|----------|--------------|---------------------|-----------|--------|---------------|---------------|
| 200.381 | #011 TO #201 | 68 | 3/4" - 10 | 241.3 | 200.391 | 136 |
| 200.382 | #202 TO #203 | 68 | 3/4" - 10 | 330.2 | 200.392 | 136 |
| 800.381 | SPARE PART | 7 | 3/4" - 10 | 241.3 | 800.391 | 14 |
| 800.382 | SPARE PART | 7 | 3/4" - 10 | 330.2 | 800.392 | 14 |

CUSTOMER: CHRYSLER CORPORATION
 CUSTOMER P.O. NO.: SAVPH0029
 ITEM NO.: 51-E-02A/51-E-02B/51-E-02C/51-E-02D
ENGINEERS AND FABRICATORS, Co.
 HOUSTON, TEXAS
 DRAWING NUMBER: XH-24688-2
 REV. 2

TITLE: OUTLINE DIMENSIONS
 SIZE/TYPE: 1193.8 - 6096/AEU
 SERVICE: PRODUCT CONDENSER
 JOB NO.: 16318
 SHOP ORDER: 41-24688/89/90/91
 SCALE: NONE

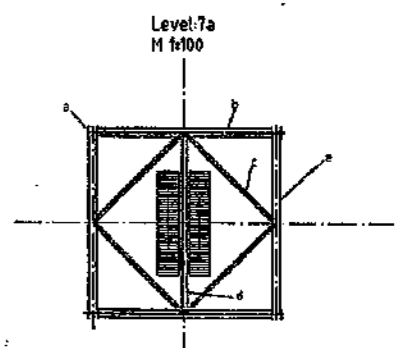
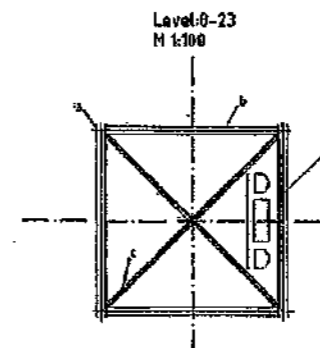
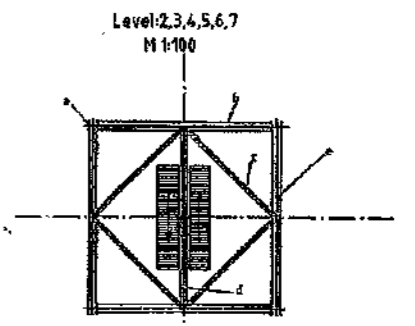
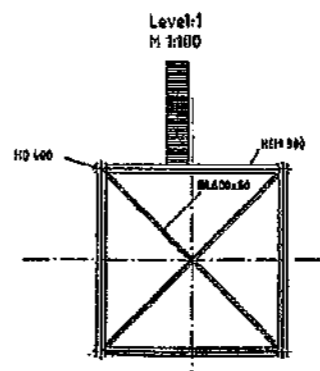
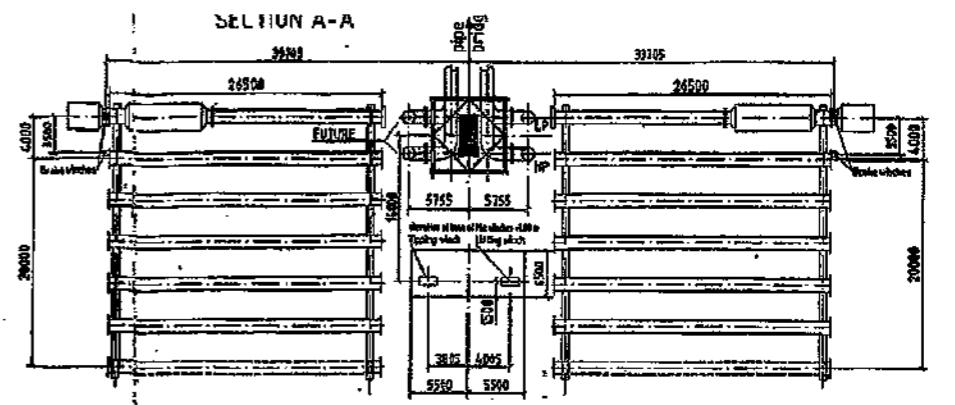
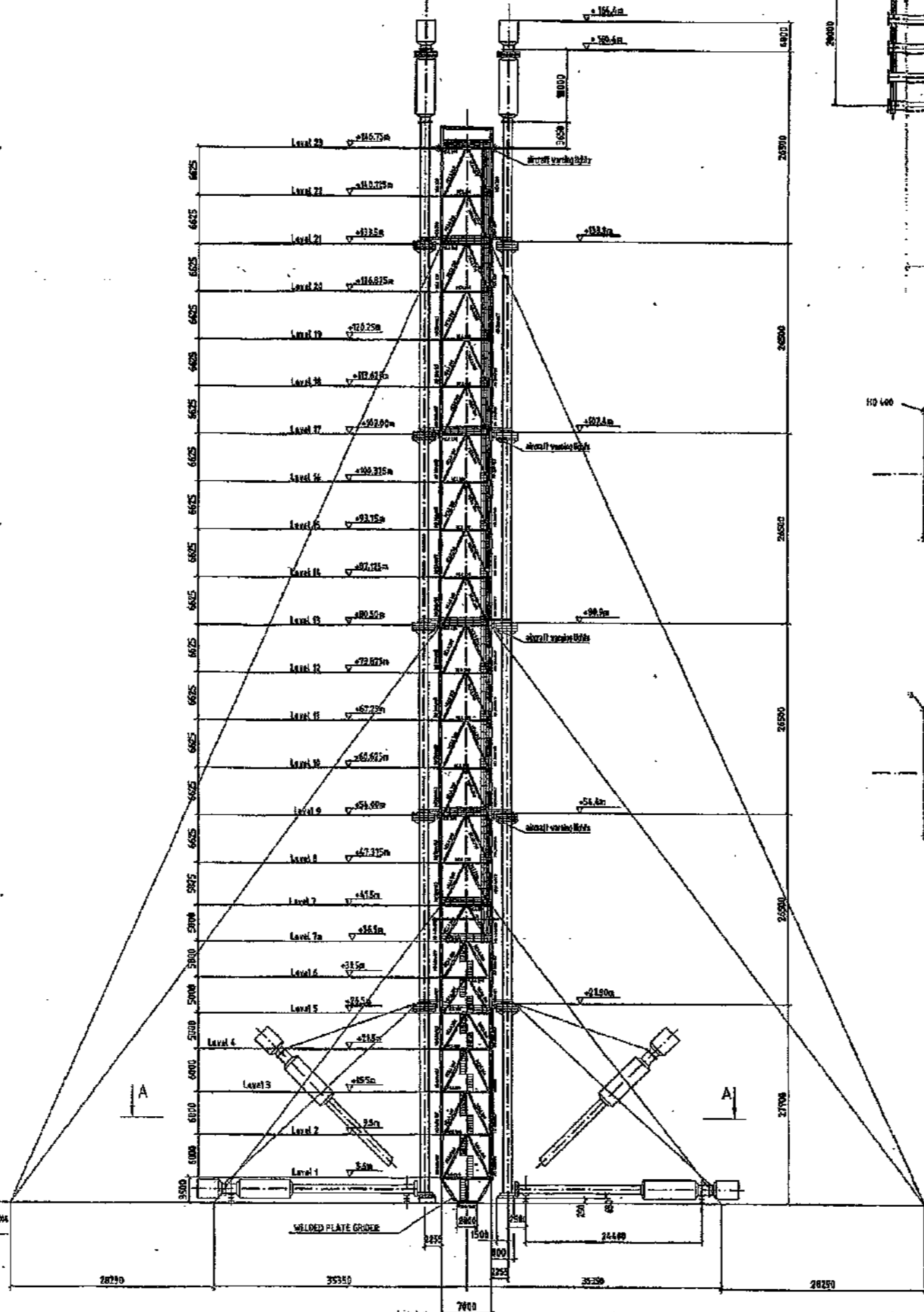
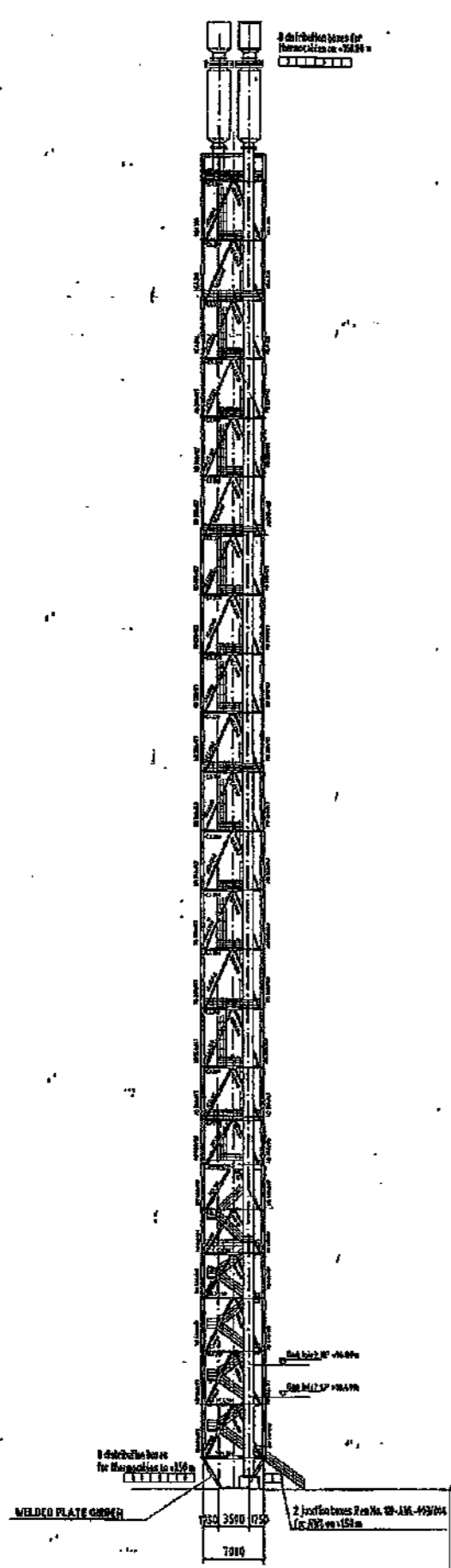
REV. NOZZLE PROJECTIONS & DIM. REV. PER CHST. ISSUED FOR APPROVAL

DS 12-10-96 d/r-t
 DS 10-25-96 CS 11-12-96
 AP 7-31-96 CS 8-8-96

REV. DESCRIPTION

APPROVD. CHKD. DRAWN

ZONE 4



| Level | h | b | c | d | e |
|----------|-----|-----|-----|-----|-----|
| Level 1 | 110 | 110 | 110 | 110 | 110 |
| Level 2 | 110 | 110 | 110 | 110 | 110 |
| Level 3 | 110 | 110 | 110 | 110 | 110 |
| Level 4 | 110 | 110 | 110 | 110 | 110 |
| Level 5 | 110 | 110 | 110 | 110 | 110 |
| Level 6 | 110 | 110 | 110 | 110 | 110 |
| Level 7 | 110 | 110 | 110 | 110 | 110 |
| Level 8 | 110 | 110 | 110 | 110 | 110 |
| Level 9 | 110 | 110 | 110 | 110 | 110 |
| Level 10 | 110 | 110 | 110 | 110 | 110 |
| Level 11 | 110 | 110 | 110 | 110 | 110 |
| Level 12 | 110 | 110 | 110 | 110 | 110 |
| Level 13 | 110 | 110 | 110 | 110 | 110 |
| Level 14 | 110 | 110 | 110 | 110 | 110 |
| Level 15 | 110 | 110 | 110 | 110 | 110 |
| Level 16 | 110 | 110 | 110 | 110 | 110 |
| Level 17 | 110 | 110 | 110 | 110 | 110 |
| Level 18 | 110 | 110 | 110 | 110 | 110 |
| Level 19 | 110 | 110 | 110 | 110 | 110 |
| Level 20 | 110 | 110 | 110 | 110 | 110 |
| Level 21 | 110 | 110 | 110 | 110 | 110 |
| Level 22 | 110 | 110 | 110 | 110 | 110 |
| Level 23 | 110 | 110 | 110 | 110 | 110 |

References-Drawings:
 00-0-107 104 (P & ID for flare)
 00-0-107 106 (P & ID for flare)
 00-0-347 089 (Foundation loading)
 00-0-347 082 (Flare stack connection)
 00-0-347 083 (Flare stack connection)
 00-0-347 040 (Utility pipe connection)
 00-0-347 041 (Utility pipe connection)
 00-0-159 091 (Asst. layout diagram)
 00-0-159 097 (Asst. layout diagram)

| Rev | Description | Date | By | Appr |
|-----|--------------------------|----------|----------|----------|
| 01 | Issued for construction | 03/14/00 | W. H. H. | W. H. H. |
| 02 | Revised for construction | 03/14/00 | W. H. H. | W. H. H. |
| 03 | Revised for construction | 03/14/00 | W. H. H. | W. H. H. |

P.T.A. & AROMATICS PLANT PROJECT
 ARABIAN INDUSTRIAL FIBERS COMPANY LTD (QEN RUSH)

| | | | |
|----------|----------|----------|----------|
| Scale | 1:500 | 1:1000 | 1:2000 |
| Author | W. H. H. | W. H. H. | W. H. H. |
| Checker | W. H. H. | W. H. H. | W. H. H. |
| Designer | W. H. H. | W. H. H. | W. H. H. |

FLARE STACK
 General Arrangement

Scale: 1:500
 00-0-307000

ZONE 5

SUPPLIER COMPLIANT REVIEW

THIS DRAWING IS APPROVED FOR CONSTRUCTION ONLY. IT IS THE RESPONSIBILITY OF THE USER TO OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AUTHORITIES. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AUTHORITIES.

1. DATE OF REVIEW

2. REVIEWED AND APPROVED FOR CONSTRUCTION

3. REVIEWED AND APPROVED FOR CONSTRUCTION

4. REVIEWED AND APPROVED FOR CONSTRUCTION

By: Askep Date: 3/1/76

MACCHI

41-Y-001

22034-1111-Y-001- 1/0

| REV. rev | DATA date | DESCRIZIONE/ description | COMP. prepared | MEC. CON. mech. check | CON. 2 sec. check | VISTO approved |
|----------|--------------|--------------------------|----------------|-----------------------|-------------------|----------------|
| 0 | Jan. 5, 1996 | DISSENO/ issued | Poma | | | |



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Fax. 0331/811377
Telex. 333498 Macchi I

| | | | | |
|----------------|------------------------------|----------------|-------|-------------------------------|
| CLIENTE client | AJFC (IBN RUSHD) | IMPIANTO plant | YANBU | Fg. 1 di Sheet 1 of 14 15 |
| TITOLO/title | WATER TUBE BOILER DATA SHEET | | | REV. 0 |
| | | | | DOC. N. Doc. no. 686-C-270 |

QUESTO DISEGNO E TUTTE LE SUE INFORMAZIONI SONO STRETTAMENTE RISERVATE DI PROPRIETA' MACCHI S.p.A. DA NON UTILIZZARE PER SCOPPI DIVERSI DA QUELLI PER CUI SONO STATE FORNITE.

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ARABIAN INDUSTRIAL FIBERS CO

TITLE PTA AND AROMATICS PLANT PROJECT
 NUMBER 22854
 MEMBER 22854.001-111-Y-001
 IDENTIFICATION NUMBER 111-Y-001/002/003
 IDENTIFICATION TITLE BOILER PACKAGE

NUMBER

APPLICANT DOCUMENT REVIEW

COMMENTS :

WORK MAY PROCEED

REVIEW AND RESUBMIT. WORK MAY PROCEED SUBJECT TO THE INCORPORATION OF THE CHANGES INDICATED

REVIEW AND RESUBMIT. WORK MAY NOT PROCEED

REVIEW NOT REQUIRED. WORK MAY PROCEED

_____ Date
 ECHTEL LIMITED

| | |
|----------|-----|
| P Seq No | REV |
| | |

| | | |
|----------|----------|----------|
| M | L | P |
| | | |

Changes have been emboldened

| | | | | | | |
|------|-------------------------------------|---------------|------------|----------|--------|--------|
| | Issued for Purchase | AJS | | | | |
| | issued for Quotation/Approval | AJS | | | | |
| | Issued for IDC | AJS | | | | |
| DATE | DESCRIPTION | By | Checked By | PROJ ENG | CH ENG | CLIENT |
| | WATER TUBE BOILER DATA SHEET | JOB No. | | | | |
| | | DATA SHEET No | | | | REV |
| | | DS-11 | 1-Y | -00 | 1 | 0 |
| | | SHEET | 2 | OF | 14 | |

Water Tube Boiler Data Sheet

| | | | |
|--|---|---|---|
| Continuous Rating(MCR) Tonnes/Hr: | 280 (1) | Number Required : | Three |
| Rated Steam at Terminal | -Pressure 42 barg -Tolerance ±0.5 bar -Temperature 400 °C -Tolerance ±5 °C | Applicable Specification: Manu Standard subject to approval Altitude above sea level : | 10 |
| Fuel (Gaseous fuel only) | 110% MCR | Sea-air environment : | yes |
| Duration of peak load | 2 Hr/24Hr | Ambient air temperature : Max 50 Design | Min 9°C |
| Uninterrupted operating period | 16000 Hr | Wet bulb design : | °C |
| Load control range: | 25 %MCR to peak load (2) | Wind load design | Refer 22854-SP-000-M-001kN/m ² |
| Temperature range for steam temp: | 25 %MCR to peak load (3) | Earthquake area class | ASCE 7-88, Zone 1 |
| Thermal efficiency at MCR | ** 92% (4) | IP code area classification | As agreed during post award meeting |
| Fuel for above efficiency : | Refer to fuel data | Design code to be used: | ASME I |
| Allowable temperature of metal: | | Plant instr. allowed for use in performance tests: | NO Yes |
| In contact with flue gases : | 110 °C | Steam quality test equipment: | |
| At all loads above : | 50 %MCR | - provided by : | supplier |
| | | - for permanent use : | NO YES |
| | | - for duration of steam purity tests: | yes NO |
| Surge blowdown capacity : | 1 %MCR | | |
| Blowdown vessels allowed : | Yes | SITE ERECTION REQUIREMENTS | |
| Operated with one burner out of operation: | No | Complete erection by supplier | no |
| Operated with other boilers on steam header: | Yes | Only supervision of erection by supplier: | yes |
| Flue gas bypass required : | No | ADDITIONAL PERFORMANCE TESTS | |
| Flue gas bypass capacity : | - | 110% MCR for 2hr : 100% MCR for 72hr : 25% MCR for 8hr | |

ANALYSIS OF STEAM AND WATER (under continuous operation)

| Water | REFER TO 22854-SP-000-D-002 | Feed water and condensate | Feed | Condensate |
|--|-----------------------------|---|---------------|--|
| Total dissolved solids | < ppm | Total dissolved solids | < mg/kg | As per ABMA rules <i>American Boiler Manufacturing Assn.</i> |
| Total alkalinity | < mval/kg | Oxygen as O ₂ | < mg/kg | |
| Silica as SiO ₂ | < ppm | Silica as SiO ₂ | < mg/kg | |
| Phosphate as PO ₄ | < mg/kg | Total iron as Fe | < mg/kg | |
| pH at 25 °C | | Total copper as Cu | < mg/kg | |
| Sulphite as Na ₂ SO ₃ | < | Total carb dioxide as CO ₂ | < mg/kg | |
| Conductivity at 20 °C | < μS/cm | Hardness | < mval/kg | |
| (See annex 1) | | Permanganate No. (KMnO ₄) | < mg/kg | |
| Conductivity at 20 °C | < μS/cm | pH at 25 °C | from/to | |
| (from condensed saturated steam after strong acid cation exchange and CO ₂ removal) | | Oil | < mg/kg | |
| Silica as SiO ₂ | < 0.3 ppm | Conductivity at 25 °C | < μS/cm | |
| Total iron as Fe | < mg/kg | (after strongly acidic cation exchange and CO ₂ removal) | | |
| Total copper as Cu | < mg/kg | Chlorides as Cl | < mg/kg | |
| Sodium and Potassium as Na< | < mg/kg | Hydrazine | from/to mg/kg | |
| Chlorides as Cl | < mg/kg | General condition : clear and colourless | | |

- (1) - Excludes steam consumption for FD fan and atomising equipment
- (2) - Manual control range gas firing 10% MCR to peak with upper burner row out of service
- (3) - Minimum steam temp. at 10% MCR load gas firing 380°C
- (4) - Ref. to 27.5°C ambient temp. and 60% Relative humidity

* Vendor to advise
** Efficiency to be >90% between 70% and 100% MCR

Water Tube Boiler Data Sheet(cont)

Rev. 0 Jan, 5, 1986

OL REQUIREMENTS AT OUTLET SUPERHEATER

- load operation
- Max deviation of steam pressure ±0.5 bar
- Max deviation of steam temperature ±5 °C
- in load decrease from 100 to 90 %MCR *
- Max deviation of steam pressure : ± 1.5 bar
- Max deviation of steam temperature : ± 15 °C
- in load increase from 90 to 100 %MCR *
- Max deviation of steam pressure : ± 1.5 bar
- Max deviation of steam temperature : ± 15 °C
- in load decr/incr from 80 to 100 %MCR in min *
- Max deviation of steam pressure : ± 1 bar
- Max deviation of steam temperature : ± 10 °C

WATER LEVEL IN DRUM *

- Level to remain between low and high levels
- At sudden load decrease from 100 to 90 %MCR
- At sudden load increase from 90 to 100 %MCR
- At linear load decr/incr from 80 to 100 %MCR in 1 min
- At feed water temp sudden decrease from 107 to 96 °C
- At feed water temp sudden increase from 107 to 118 °C

UTILITIES

| US FUEL (S) | Normal | Design |
|---------------------------------------|--------|---------------|
| Heating Value MJ/kg | 57.43 | |
| Weight | 9.75 | |
| Battery limit barg | 3.5 | 10 |
| Battery limit °C | 35 | 85 |
| Water content %vol | | |
| C/H ratio (wt) | 2.15 | |
| Sulphur % wt | | |
| Ash % wt | | |
| Vanadium % wt | | |
| Viscosity at 50 °C cP | | 1.4 |
| Molecular weight | | 132 |
| Inerts %wt | | 2.18 |
| Hydrogen | 59.3 | Normal Backup |
| Methane | 27.56 | |
| C ₂ | 10.6 | |
| C ₃ | 0.84 | 0-100% *** |
| C ₄ | 0.15 | |
| C ₅ | 0.1 | |
| Ethene | 1.37 | |
| Propene | 0.08 | |
| Inerts N ₂ CO ₂ | | |

| LIQUID FUEL (S) | Normal | Design |
|-------------------------------------|--------|--------|
| Lower Heating Value MJ/kg | | 39.4 |
| Density at 50 °C, kg/m ³ | | 956 |
| Press at battery limit barg | 10.2 | |
| Temp at battery limit °C | 80 | 150 |
| Water content %wt | | |
| C/H ratio (wt) | | 10.64 |
| Sulphur % wt | | |
| Ash % wt | | |
| Vanadium % wt | | |
| Viscosity at 50 °C cP | | 1.4 |
| Molecular weight | | 132 |
| Inerts %wt | | 2.18 |

| BOILER FEED WATER | Normal | Design | Min |
|-------------------------------|--------|--------|-----|
| Supply pressure at grade barg | 62.1 | 105 | (6) |
| Temperature °C | 107 | 148 | 102 |

| CONDENSATE | TURBINE | PROCESS(1) | PROCESS(2) |
|----------------------|---------|------------|------------|
| Supply pressure barg | 0.81 | 0.81 | 0.81 |
| Temperature °C | 56 | 100 | 148 |

| STEAM | Max | Design | Min |
|----------------------|--------|--------------|-----|
| Supply pressure barg | Refer | | |
| Temperature °C | 228.54 | SP-000-A-002 | |
| Supply pressure barg | | | |
| Temperature °C | | | |
| Supply pressure barg | | | |
| Temperature °C | | | |
| Supply pressure barg | | | |
| Temperature °C | | | |
| Supply pressure barg | | | |
| Temperature °C | | | |

| INJECTION WATER | N/A |
|-------------------------------|-----|
| Supply pressure at grade barg | |
| Temperature °C | |
| Type | |

| COOLING WATER | Refer |
|---|---------------------|
| Supply pressure barg | Refer |
| Return pressure barg | 228.54-SP-000-A-002 |
| Temperature °C | |
| Max. temp. increase °C | |
| Fouling coefficient W/m ² .K | |
| Type | |

| INSTRUMENT AIR | Refer |
|----------------------|-------|
| Supply pressure barg | Refer |
| Temperature °C | |
| Type | |

ELECTRICITY SUPPLY

| | | | | | |
|--------------------------|---------------------|-------------|--------------|---------------------|-------|
| 3300v - 3 Ph - 60 Hz | V/ph/Hz | Instruments | 220v - 60 Hz | V/ph/Hz | Refer |
| 380v - 3 Ph - 60 Hz | V/ph/Hz | Instruments | VDC | 228.54-SP-000-A-002 | |
| Lighting (Service Power) | 380v - 3 Ph - 60 Hz | V/ph/Hz | | | |

endor *** Back-up fuel to fuel gas system is Propane

see attached fuel data later

FORCED DRAUGHT FAN

Number : 1 per boiler
 Manufacturer : C.B.I. or BOLDROCCHI
 Main drive : Motor & Steam Turbine
 Design capacity per fan: 99.458 kg/s
 Differential pressure at design point: 71.6 mbar
 Manufacturer : Later
 Type : SSS (Electric motor side)

Performance test code : BS 848-Part 1/

INDUCED DRAUGHT FAN

Number : NOT APPLICABLE
 Manufacturer :
 Main drive :
 Design capacity per fan: kg/s
 Differential pressure at design point: mbar
 Manufacturer :
 Type :

Performance test code : BS 848-Part 1/

STACK

Height : 40 m
 Inside diameter at top : 3 m
 Inlet opening : 15.6 m²
 Existing flue gas duty : (100% MCR) 90.558 kg/s
 Existing inlet temperature to stack: 188 °C

AVAILABLE START-UP UTILITIES (400% MCR) (g)

Fuel Type : N. 2 FUEL OIL - 5.621 kg/s
 HP steam (Net) : 280 t/h
 MP steam : 1 t/h
 LLP steam for deaerator : 25.39 t/h
 Boiler feed water : 296.2 t/h (g)
 Condensate : 0 t/h
 Injection water : 0 t/h
 Cooling water (total) : 15.3 t/h
 Tool air : } 915 Nm³/h
 Instrument air : }
 Make-up water : 92.71 t/h
 Electric power supply - HV : 1110 (g)
 - LV : 10.6 (g)
 Electric instr. power - AC/DC : 17.16
 Lighting power : 60 (g)

REFERENCE DRAWINGS

ADDITIONAL INFORMATION

Emission Limits (ref: 3% O₂ by volume in dry gas)

| | Gas | Fuel Oil |
|-----------------|----------|----------|
| Particulates | 43 ng/J | 43 ng/J |
| SO ₂ | 340 ng/J | 340 ng/J |
| NOx | 86 ng/J | 130 ng/J |

for one boiler
 for boiler only (without BFW to Users)
 - Intermittent

Water Tube Boiler Data Sheet(cont)

MAIN DESIGN DATA AT MCR (firing Gas fuel)

| | | |
|-------------------------------|----------|-------------------|
| air inlet/outlet temperatures | 27.5 | N.A. |
| on auto control | 25 ÷ 110 | %MCR (10) |
| assumption (each boiler) | 92 | % |
| | 4.267 | kg/s (11) |
| at MCR | 8 | % stoich. |
| quantity | 90.558 | kg/s |
| in (continuous) | 1 | %MCR |
| volume | 803 | m ³ |
| specific heat release* | 300 | kW/m ³ |
| surface heat release | 547 | kW/m ² |

WATER/STEAM TEMPERATURES

| | | |
|------------------------------|-----|----|
| Economiser outlet | 188 | °C |
| Drum | 262 | °C |
| Primary superheater outlet | 394 | °C |
| Secondary superheater outlet | 400 | °C |

OPERATING PRESSURES

| | | |
|--------------------|-------|-------|
| Drum | 48.27 | barg |
| Superheater outlet | 43.22 | barg |
| FD fan outlet | 48.9 | mbarg |
| Furnace | 30.0 | mbarg |

| Projected surface | Surface m ² | Average heat transfer kW/m ² | Flue gas exit temp. °C |
|-------------------------|------------------------|---|------------------------|
| | 440 | 165 | 1410 |
| | N.A. | - | - |
| | 413 | 110 | 1111 |
| Evaporator (incl walls) | 2570 | 30.2 | 428 |
| | 5300 | 4.9 | 188 |
| | - | - | - |

| PIPING | MATERIAL | WATER VOL m ³ | PITCH mm Long./Transl. | WALL THKN. mm | FLUE GAS MASS VEL kg/m ² s |
|-------------|-----------|--------------------------|------------------------|---------------|---------------------------------------|
| | SA 192 | 21.4 | - / 101 | 4 | 1.01 |
| | N.A. | - | - | 4 | - |
| Superheater | SA213T11 | 2.9 | 101 / 101 | 4 | 6.71 |
| Superheater | SA213T11 | 0.8 | 101 / 202 | 4.5 | 3.94 |
| Evaporator | SA 192 | 22.5 | 140 / 101 | 3.2 | 10.20 |
| | SA 210A-1 | 7.3 | 102 / 105 | 3.2 | 6.60 |
| | N.A. | - | - | - | - |

| INSULATING | MATERIAL | THICKNESS mm |
|--------------|--------------|--------------|
| Inner casing | Mineral Wool | 100 |
| Outer casing | Galv Sheet | 1.2 |
| | Mineral Wool | 100/150 |

BURNERS

| | |
|---|-----------------------|
| Number | 6 |
| Number for MCR | 6 |
| Maker and type | Macchi Low NOx |
| Design capacity | 0.625/0.984 kg/s (12) |
| Turndown at max. combustion air quality | 5 : 1 |

VALVES

| | |
|-------------------------------|------------------|
| 1-Superheater 2- Drum | |
| Type | Later / Spring |
| Capacity acc. to code on drum | 33,056 each kg/s |
| on superheater | 22,222 kg/s |

SOOT BLOWERS

| | |
|----------------|----------------|
| Number | Provision only |
| Maker and type | - |

SHOT CLEANING

| | |
|----------------|------|
| Maker and type | N.A. |
|----------------|------|

DESUPERHEATER

| | |
|------|---------------------------|
| Type | Spraywater (intermediate) |
|------|---------------------------|

LOCAL AND NATIONAL REGULATIONS
 include user list of supply of dual burner system. A burner test demonstrating the change-over between fuels is required.

based on LHV of fuel and including air preheat
 full control range gas firing 10% MCR to peak with upper burner row out of service
 to Normal gas [1] with 56456 kJ/kg L.H.V.

to Normal gas [1] and N.2 fuel Oil

Water Tube Boiler Data Sheet(cont)

| CONSUMPTION FIGURES | | DETAILED DESIGN DATA AT MCR (firing GAS fuel) | | HEAT BALANCE | |
|--------------------------------|---------|--|------|-------------------------------|---------------|
| | | (per boiler) | | | |
| on air at | 100%MCR | 86.292 | kg/s | Heat supplied by fuel | 240'830 kW |
| | 50%MCR | 44.828 | kg/s | Heat to steam | 221'560 kW |
| er (include blowdown) | | 80.912 | kg/s | Heat to dry flue gas | 12'360 kW |
| to BFW pumps | | 3.669 | kg/s | Losses due to moisture in air | 3'800 kW (13) |
| to burners for oil atomisation | | 0.278 | kg/s | Heat to blowdown | 560 kW |
| to Deaerator (each) | | 7.028 | kg/s | Radiation losses | 650 kW |
| water (total) | | 4.250 | kg/s | Unaccounted losses | 1'800 kW |
| at air (+ Tool air) | | 0.325 | kg/s | | |

| | | DRUMS | |
|--------------------------------|---------|-------|------|
| ent blowdown(max) | | 1.614 | kg/s |
| HV 636 | LV 70.6 | | kW |
| at power | | 8.6 | kW |
| as of boiler-the whole package | 2000000 | | kg |

| FURNACE | | DRUM INTERNALS | | | |
|---|------|-------------------|---|------------------|-------|
| 1 local rate of heat absorption | 220 | kW/m ² | - design pressure | 55 | barg |
| of maximum local heat flux | | Side Walls | - water content - high level | 9.05 | tonne |
| pressure at outlet furnace | 30.0 | mbarg | - low level | 6.09 | tonne |
| maximum tube wall temperature | 357 | °C | - low low level | 5.37 | tonne |
| parallel loops | | | - length of shell | 9 | m |
| values in tubes exposed to radiation at : | | | - diameter inside | 1'540 | mm |
| inlet to water walls - temp of water | 251 | °C | - wall thickness of shell | 80 | mm |
| - velocity of water | 0.63 | m/s | - hold-up time between low-water alarm and low-water trip | 7 | s |
| Outlet of water walls - temp steam/water | 262 | °C | - material | SA516-70 | |
| - steam/water ratio | 0.07 | wt | - type | Cyclons + Driers | |
| - superf. velocity steam | 1.3 | m/s | - number | 72 + 27 | |
| - superf. velocity water | 0.66 | m/s | - pressure drop | < 0.1 | bar |

| REFRACTORY | | WATER DRUM | | | |
|---|----|----------------|---------------------------|----------|-------|
| efactory Tiles (42-44% Al ₂ O ₃) | 89 | m ² | - design pressure | 55 | barg |
| refractory | 40 | mm | - water content | 6.57 | tonne |
| of refractory | | | - length of shell | 9 | m |
| | | | - diameter inside | 940 | mm |
| | | | - wall thickness of shell | 55 | mm |
| | | | - material | SA516-70 | |

| SUPERHEATER | | ECONOMISER | | | |
|-----------------------------------|-----------|-------------|---------------------------------------|--------|------|
| PRIMARY | SECONDARY | | | | |
| Heat transferred MW | 29.47 | 15.96 | Feed water pressure at inlet | 49.56 | barg |
| local heat flux kW/m ² | 129 | 156 | Pressure drop water side | 1.06 | bar |
| max outer tube wall temp °C | 485 | 510 | Length of elements | 8 | m |
| of max heat absorption | Outlet | Inlet | Height of fins, if applicable | 18 | mm |
| Drop steam side bar | 2.62 | 1.56 | Spacing of fins | 8.48 | mm |
| steam temperature °C | 262 | 324 | Number of parallel loops | 1 | |
| steam velocity m/s | 25.4 | 37.2 | Headers - outside diameter | 273 | mm |
| steam temperature °C | 394 | 400 | - length | 3.8 | m |
| steam pressure barg | 45.13 | 43.22 | - material | A106-B | |
| steam velocity m/s | 38.8 | 45.6 | Calculated min. outer tube wall temp. | 113 | °C |
| transfer surface m ² | 319 | 94 | Inlet - water temperature | 107 | °C |
| loops (average) m | 3.0 | 3.5 | - water velocity | 1.46 | m/s |
| of parallel loops | 1 | 2 | Outlet - water temperature | 188 | °C |
| of tube supports | SS | SS | - steam/water ratio | 0 | wt |
| outside diameter mm | 406.4 | 406.4/457.2 | - superficial water velocity | 1.51 | m/s |
| wall thickness mm | 26.19 | 26.19/29.36 | - superficial steam velocity | - | m/s |
| length m | 8.8 | 8.8 | | | |
| material | SA 106B | SA 106B | | | |

al velocity = (mass flow) divided by (density x free area of tube)
 plus loss for hydrogen in fuel

Water Tube Boiler Data Sheet(cont)

DOWNCOMERS(see also convective evaporator)

NO EXTERNAL DOWNCOMERS

length m
 diameter mm
 thickness mm
 tube

on ratio 15:1

STEAM TEMPERATURE CONTROL

Spray water

water No
 quantity 7.79 kg/s
 at MCR 5.19 kg/s

water atomisation - source No
 - design quantity - kg/s
 condensation - design quantity - kg/s

AIR PREHEATERS N.A.

medium
 - air side kg/s
 - heating side kg/s
 air side - at inlet °C
 - at outlet °C
 air side - at inlet mbarg
 - at outlet mbarg
 air heating side - at inlet °C
 - at outlet °C
 heating side - at inlet mbarg
 - at outlet mbarg
 metal temperature °C

CONVECTIVE EVAPORATOR

Steam production 40.3 kg/s
 Calculated maximum outer tube wall temp. 281 °C

Riser inlets - superficial velocity of water 0.44 m/s

Riser outlets - steam/water ratio 0.056 wt

Flue gas - pressure in/out 27.7/6.7 mbarg
 - temperature in/out 1111/428 °C

Headers - outside diameter }
 - wall thickness } N.A.
 - length }
 - material }

AIR DUCTS

Inlet height above grade Approx. 7-10 m
 Length 20 m
 Cross sectional area 4.7 m²

FLUE DUCTS

Type of insulation Mineral Wool
 Length 5 m
 Cross sectional area (eco inlet) 10.6 m²
 (stack inlet) 15.6 m²

STACK

Carbon Steel
 wall thickness 6 mm
 diameter at top 3 m
 diameter at bottom 6 m
 diameter at base 40 m
 material N.A.
 weight of flue gas 90.558 kg/s
 temperature of flue gas into stack 188 °C
 velocity of gas 18 m/s

SAFETY VALVES

Superheater - number 1
 - set pressure 46 barg
 - accumulation pressure +1.4 bar
 - blowdown pressure -1.8 bar
 Drum - number 2
 - set pressure 55/56 barg
 - accumulation pressure +1.6 bar
 - blowdown pressure -2.2 bar

SOOTBLOWERS (Provisions only)

Operating pressure barg
 Total steam required kg/s
 Total power required kW
 Total air - for cooling and sealing kg/s
 - for power kg/s

All fans shall have extended shafts and be driven by both an electric motor and a steam turbine. SSS overrun clutches shall be fitted to both shaft extensions.

Burner management system panels, local burner panels, local instrumentation piping and valves and combustion control system will be located in local instrument enclosure local to the boiler. Volt free signals shall be provided to indicate alarm conditions. Provision shall be made to receive an EDS signal from the central DCS system.

Each boiler shall be provided with an individual stack and all necessary ducting.

All galleries, stairs and ladders shall be provided for operation and maintenance.

All services to and from the boiler shall be isolated and controlled where necessary by the supplier.

The packaged unit specification lists recommended suppliers of valves, instruments etc.

A key design sketch of the boiler package shall be supplied. All terminal points shall be fixed at the time of award, no changes will be allowed after contract award.

Burners shall be dual firing low Nox oil and gas burners, complete with pilots, ignitors, and flame monitoring equipment for the fuels listed in the data sheet.

Air intakes shall be suitable for a salt laden and dusty environment. Filters shall be easily cleaned with indicators to show when cleaning is required.

A full list of all utility consumption values shall be submitted.

Two 100% rated deareators shall be supplied as part of the package (refer to D/S 22854-SP-000-D-002).

Two electric motor driven and one back pressure turbine driven boiler feed pumps shall be supplied in compliance with the information listed on the data sheet DS-111-G-001.

Black start shall be by means of fuel oil as detailed on the data sheet.

Static and dynamic foundation loads shall be submitted.

A noise limit of 85dBA shall apply to the package. Both the sound pressure level and power level shall be submitted. No relaxation of this noise limit will be granted. Intermittant noise from for example safety valves are not included in this limit. Intermittant noise level is set at 110dBA.

Inter-connecting pipework between the deareator, boiler feed pumps and the boiler shall be supplied by the buyer. Buyer and seller shall agree the location of the layout within three weeks of the contract award.

All control panels shall be heat soaked for 72hr and then functionally tested.

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WATER TUBE BOILER DATA SHEET

Boiler Expected Performance

| FUEL : | | NORMAL GAS CASE [1] | NORMAL GAS CASE [1] | NORMAL GAS CASE [1] |
|--|----------------------|---------------------------|---------------------------|---------------------------|
| PLANT LOAD : | | 110% | 100% | 70% |
| Superheated steam capacity | kg/h | 317'500 | 288'600 | 192'500 |
| Superheated steam capacity | kg/h | 308'000 | 280'000 | 186'600 |
| Superheater water flow | kg/h | 20'100 | 18'700 | 13'900 |
| Water temperature at superheater outlet | °C | 400 | 400 | 400 |
| Water temperature at Eco inlet | °C | 107 | 107 | 107 |
| Efficiency on H.H.V. | % | 81.78 | 82.14 | 83.19 |
| Efficiency on L.H.V. | % | 91.60 | 92.00 | 93.18 |
| Oil H.H.V. | kcal/kg | — | — | — |
| Oil L.H.V. | kcal/kg | — | — | — |
| Gas H.H.V. | kcal/kg | 15'103 | 15'103 | 15'103 |
| Gas L.H.V. | kcal/kg | 13'484 | 13'484 | 13'484 |
| Oil consumption | kg/h | — | — | — |
| Gas consumption | kg/h | 16'973 | 15'360 | 10'115 |
| Ambient air temperature | °C | 27.5 | 27.5 | 27.5 |
| Water temperature at burners | °C | 27.5 | 27.5 | 27.5 |
| Excess air in furnace | % | 8 | 8 | 8 |
| Moisture content in dry flue gas | % vol. | 1.74 | 1.74 | 1.74 |
| SO ₂ content in dry flue gas | % vol. | 9.37 | 9.37 | 9.37 |
| Water flow | kg/h | 343'280 | 310'650 | 204'570 |
| Gas flow | kg/h | 360'210 | 326'000 | 214'680 |
| Heat released on E.P.R.S. | kcal/hm ² | 520'260 | 470'830 | 310'050 |
| Heat released on volume | kcal/hm ³ | 285'100 | 258'010 | 169'910 |
| Heat absorption in furnace (on E.P.R.S.) | kcal/hm ² | 148'680 | 141'980 | 113'300 |
| Flue gas exit temperature | °C | 1'438 | 1'410 | 1'296 |
| Water temperature at superheater outlet | °C | 1'144 | 1'111 | 982 |
| Water temperature at economizer inlet | °C | 445 | 428 | 369 |
| Water temperature at economizer outlet | °C | 197 | 188 | 158 |
| Water temperature at economizer inlet | °C | 107 | 107 | 107 |
| Water temperature at economizer outlet | °C | 191 | 188 | 177 |
| Saturated steam temperature | °C | 264 | 262 | 258 |
| Steam temperature at Primary SH outlet | °C | 393 | 394 | 394 |
| Steam temperature at Final SH inlet | °C | 326 | 324 | 317 |
| Final steam temperature | °C | 400 | 400 | 400 |
| Pressure at F.D.fan intake | mmH ₂ O | - 48 | - 40 | - 18 |
| Pressure at F.D.fan delivery | mmH ₂ O | 617 | 489 | 207 |
| Pressure in furnace | mmH ₂ O | 383 | 306 | 122 |
| Pressure at superheater outlet | mmH ₂ O | 354 | 283 | 113 |
| Pressure at boiler outlet | mmH ₂ O | 86 | 69 | 28 |
| Pressure at economizer outlet | mmH ₂ O | 28 | 23 | 10 |
| Steam pressure at B.L. | bar g | 42.00 | 42.00 | 42.00 |
| Final SH outlet pressure | bar g | 43.45 | 43.22 | 42.64 |
| Primary SH inlet pressure | bar g | 48.86 | 47.75 | 44.99 |
| Steam drum pressure | bar g | 49.48 | 48.27 | 45.26 |
| Economizer outlet pressure | bar g | 49.71 | 48.50 | 45.47 |
| Economizer inlet pressure | bar g | 50.98 | 49.56 | 46.02 |
| FW pressure at B.L. | bar g | 62.10 | 62.10 | 62.10 |

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WATER TUBE BOILER DATA SHEET
Boiler Expected Performance

| FUEL : | FUEL OIL | | |
|---------------------------------------|----------------------|----------|---------|
| | N.2 | FUEL OIL | |
| PLANT LOAD : | 100% | 70% | |
| Superheated steam capacity | kg/h | 289'700 | 193'600 |
| Superheated steam capacity | kg/h | 280'000 | 185'600 |
| Superheater water flow | kg/h | 11'600 | 9'700 |
| Temperature at superheater outlet | °C | 400 | 400 |
| Temperature at Econ inlet | °C | 107 | 107 |
| Efficiency on HHV | % | 86.60 | 87.73 |
| Efficiency on LHV | % | 92.00 | 93.21 |
| Calorific value HHV | kcal/kg | 10'916 | 10'916 |
| Calorific value LHV | kcal/kg | 10'275 | 10'275 |
| Calorific value as HHV | kcal/kg | — | — |
| Calorific value as LHV | kcal/kg | — | — |
| Oil consumption | kg/h | 20'235 | 13'346 |
| Gas consumption | kg/h | — | — |
| Inlet air temperature | °C | 27.5 | 27.5 |
| Temperature at burners | °C | 27.5 | 27.5 |
| Gas air in furnace | % | 10 | 10 |
| Content in dry flue gas | % vol. | 2.01 | 2.01 |
| Content in dry flue gas | % vol. | 14.18 | 14.18 |
| Water flow | kg/h | 318'410 | 210'010 |
| Gas flow | kg/h | 338'640 | 223'350 |
| Heat released on E.P.R.S. | kcal/hm ² | 472'630 | 311'720 |
| Heat released on volume | kcal/hm ³ | 259'000 | 170'820 |
| Absorption in furnace (on E.P.R.S.) | kcal/hm ² | 156'560 | 120'580 |
| Temperature at exit | °C | 1'383 | 1'280 |
| Temperature at superheater outlet | °C | 1'110 | 989 |
| Temperature at economizer inlet | °C | 442 | 380 |
| Temperature at economizer outlet | °C | 189 | 159 |
| Temperature at economizer inlet | °C | 107 | 107 |
| Temperature at economizer outlet | °C | 188 | 177 |
| Superheated steam temperature | °C | 262 | 258 |
| Temperature at Primary SH outlet | °C | 374 | 377 |
| Temperature at Final SH inlet | °C | 332 | 325 |
| Superheated steam temperature | °C | 400 | 400 |
| Pressure at F.D.fan intake | mmH ₂ O | - 42 | - 18 |
| Pressure at F.D.fan delivery | mmH ₂ O | 517 | 213 |
| Pressure in furnace | mmH ₂ O | 312 | 124 |
| Pressure at superheater outlet | mmH ₂ O | 289 | 115 |
| Pressure at boiler outlet | mmH ₂ O | 69 | 28 |
| Pressure at economizer outlet | mmH ₂ O | 24 | 11 |
| Pressure at B.L. | bar g | 42.00 | 42.00 |
| SH outlet pressure | bar g | 43.22 | 42.64 |
| Primary SH inlet pressure | bar g | 47.75 | 44.99 |
| Drum pressure | bar g | 48.27 | 45.26 |
| Economizer outlet pressure | bar g | 48.50 | 45.47 |
| Economizer inlet pressure | bar g | 49.56 | 46.02 |
| Pressure at B.L. | bar g | 62.10 | 62.10 |

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FUELS DATA**GASEOUS FUELS**NORMAL FUEL NORMAL FUEL NORMAL FUEL BACK-UP
GAS CASE [1] GAS CASE [2] GAS CASE [3] PROPANE

Chemical Analysis

| | | | | |
|---|--------------|--------------|--------------|--------------|
| • Hydrogen (H ₂) | 56.64 % vol. | 59.05 % vol. | 60.26 % vol. | ----- |
| • Methane (CH ₄) | 28.65 % vol. | 27.71 % vol. | 27.05 % vol. | ----- |
| • Ethane (C ₂ H ₆) | 12.08 % vol. | 10.65 % vol. | 9.79 % vol. | 2.90 % vol. |
| • Ethene | 1.12 % vol. | 1.37 % vol. | 1.66 % vol. | ----- |
| • Propane (C ₃ H ₈) | 1.29 % vol. | 0.87 % vol. | 0.75 % vol. | 94.80 % vol. |
| • Propene | 0.06 % vol. | 0.08 % vol. | 0.10 % vol. | ----- |
| • Buthane (C ₄ H ₁₀) | ----- | ----- | ----- | 2.30 % vol. |
| • i C ₄ | 0.03 % vol. | 0.13 % vol. | 0.26 % vol. | ----- |
| • i C ₅ | ----- | 0.01 % vol. | ----- | ----- |
| • n C ₆ | 0.13 % vol. | 0.13 % vol. | 0.13 % vol. | ----- |
| Total | 100 % | 100 % | 100 % | 100 % |
| • H ₂ S | 100 ppm vol | 100 ppm vol | 100 ppm vol | 7 ppm wt |
| • S | ----- | ----- | ----- | 30 ppm wt |
| • H.H.V. (kJ/kg) | 63'235 | 64'283 | 64'750 | 50'408 |
| • H.H.V. (kJ/Nm ³) | 29'341 | 28'220 | 27'713 | 98'951 |
| • L.H.V. (kJ/kg) | 56'456 | 57'304 | 57'690 | 46'377 |
| • L.H.V. (kJ/Nm ³) | 26'195 | 25'156 | 24'691 | 91'038 |
| • M.W. | 10.408 | 9.834 | 9.599 | 44.01 |
| • Density (kg/Nm ³) | 0.464 | 0.439 | 0.428 | 1.964 |

FUEL OIL N. 2

| | | |
|----------------------------|--------------------------|--------------|
| • Carbon | 86.40 % wt | |
| • Hydrogen | 12.185 % wt | |
| • Oxygen | 0.15 % wt | |
| • Nitrogen | 0.05 % wt | |
| • CO ₂ & Inerts | 0.515 % wt | |
| • Sulphur | 0.70 % wt | |
| • H.H.V. | 10'916 kcal/kg | 45'703 kJ/kg |
| • L.H.V. | 10'275 kcal/kg | 43'019 kJ/kg |
| • Specific gravity @ 60 °F | 0.865 kg/dm ³ | |
| • Viscosity @ 100 °F | 2.68 cSt | |

FUELS DATA

C10+ (LIQUID FUEL)

| | | |
|--------------------------------|-------------------------------------|--------------|
| • Paraxylene | (C ₈ H ₈) | 0.00 % mol. |
| • Metaxylene | (C ₈ H ₈) | 0.00 % mol. |
| • Orthoxylene | (C ₈ H ₈) | 0.00 % mol. |
| • Methyl Normal Propyl Benzene | (C ₁₀ H ₁₄) | 0.25 % mol. |
| • Di-Ethyl Benzene | (C ₁₀ H ₁₄) | 1.37 % mol. |
| • Di-Methyl Ethyl Benzene | (C ₁₀ H ₁₄) | 1.27 % mol. |
| • Tetra-Methyl Benzene | (C ₁₀ H ₁₄) | 2.28 % mol. |
| • C ₁₀ Aromatic | (C ₁₀ H ₁₀) | 11.66 % mol. |
| • Naphtalene | (C ₁₀ H ₈) | 72.78 % mol. |
| • Tri-Methyl Ethyl Benzene | (C ₁₁ H ₁₆) | 0.18 % mol. |
| • Penta-Methyl Benzene | (C ₁₁ H ₁₆) | 0.03 % mol. |
| • C ₁₁ Aromatic | (C ₁₁ H ₁₀) | 5.48 % mol. |
| • C ₁₂ + Aromatics | (--) | 4.70 % mol. |

Total 100 %

| | |
|------------------------------|-----|
| • M.W. | 132 |
| • RON No. Clear | 112 |
| • MON No. Clear | 100 |
| • ASTM D86 Distillation (°C) | |
| • IBP | 185 |
| • 10 % | 189 |
| • 30 % | 191 |
| • 50 % | 194 |
| • 70 % | 207 |
| • 90 % | 210 |
| • EP | 259 |

Net Calorific Value 39'368 kJ/kg 9'403 kcal/kg

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FUELS DATA

C6 / C7 LIQUID FUEL

| | | |
|------------------------|------------------------------------|---------------|
| • Hexane | (C ₆ H ₁₄) | 6.60 % mol. |
| • Methyl Cyclo Pentane | (C ₆ H ₁₄) | 1.20 % mol. |
| • Benzene | (C ₆ H ₆) | 50.60 % mol. |
| • Toluene | (C ₇ H ₈) | 35.26 % mol. |
| • Methyl CycloHexane | (C ₇ H ₁₄) | 0.92 % mol. |
| • Octane | (C ₈ H ₁₈) | 1.69 % mol. |
| • Paraxylene | (C ₈ H ₈) | 1.21 % mol. |
| • Metaxylene | (C ₈ H ₈) | 2.36 % mol. |
| • Ethyl-Benzene | (C ₈ H ₁₀) | 0.08 % mol. |
| • O-Xylene | (C ₈ H ₈) | 0.08 % mol. |
| • M.W. | | 85.5 |
| Net Calorific Value | 40'332 kJ/kg | 9'633 kcal/kg |

December 11th, 1995 - 1/1

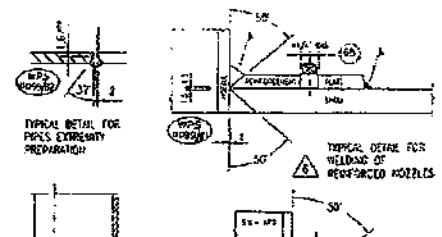
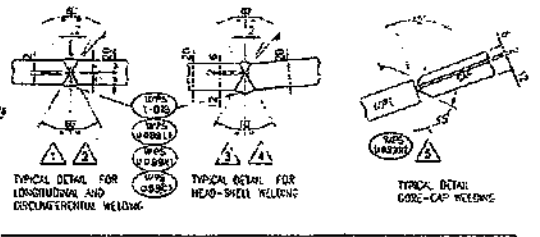
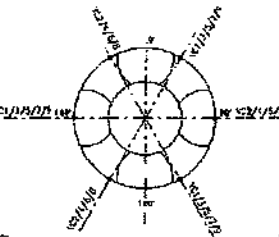
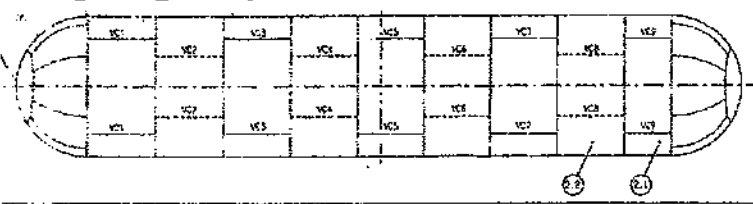
RECOMMENDED STEAM PURITY AT TURBINE INLET

Subject : Arabian Industrial Fibers Company Limited
 PTA & Aromatics Plant Project
 22854-111-Y-001-LAC
OurJob No. : 686-687-688-689

| | | | | | | |
|---|---|--|-------------------------------------|-------------------|-------------------|-------------------------------------|
| Conductivity at 25 °C (measured after acid cationic exchanger) | <0.20 μS/cm | | | | | |
| Silica | SiO ₂ | <0.020 mg/Kg | | | | |
| Total iron | Fe | <0.020 mg/Kg | | | | |
| Sodium | Na | <0.010 mg/Kg | | | | |
| Total copper | Cu | <0.003 mg/Kg | | | | |
| CONVERSION TABLE | | | | | | |
| | CaCO ₃ , parts per million (p.p.m.) | CaCO ₃ , grains per U.S. gallons | English or Clark's degrees | French degrees | German degrees | Equivalent p/million (e.p.m.) |
| 1 part per million ppm | 1.00 | 0.0583 | 0.07 | 0.1 | 0.056 | 0.02 |
| 1 milligram per liter | 1.00 | 0.0583 | 0.07 | 0.1 | 0.056 | 0.02 |
| 1 grain per U.S. gallon | 17.1 | 1.00 | 1.2 | 1.71 | 0.956 | 0.342 |
| 1 english or Clark's degree | 14.3 | 0.833 | 1.00 | 1.43 | 0.80 | 0.286 |
| 1 french degree | 10 | 0.583 | 0.7 | 1.00 | 0.56 | 0.2 |
| 1 german degree | 17.9 | 1.04 | 1.24 | 1.79 | 1.00 | 0.357 |
| 1 equivalent per million epm | 50. | 2.92 | 3.50 | 5 | 2.80 | 1.00 |
| $e.p.m. = \frac{p.p.m. \text{ of a substance}}{\text{equivalent weight of the same substance}}$ | | | | | | |
| $\text{Equivalent weight} = \frac{\text{Molecular weight}}{\text{Metal valence}}$ | | | | | | |

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WELDING MAP (ALL WELDING SHOWN SHALL BE EXECUTE IN FIELD)



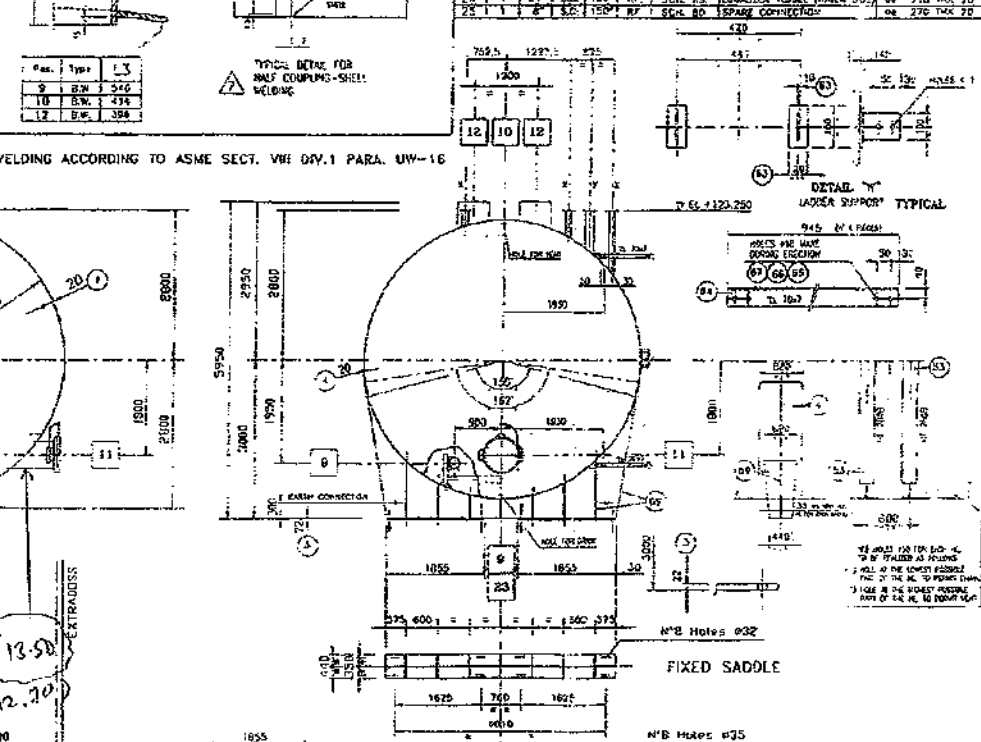
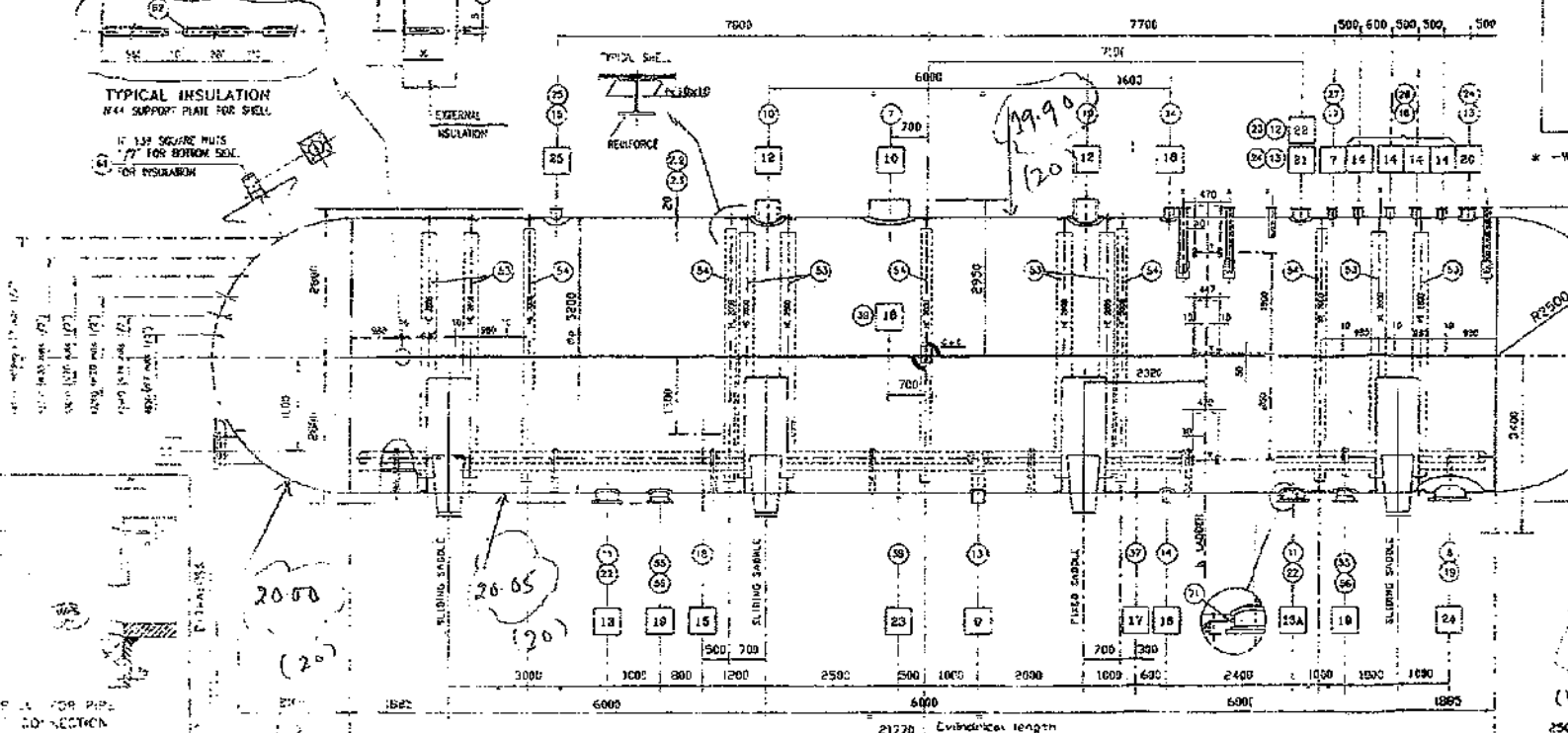
CONNECTIONS LIST

| Pos. | Qty | DN | Type | Rating | Sched. | SERVICE | Reinforcement |
|------|-----|----|------|--------|--------|---------------|-----------------|
| 1 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 2 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 3 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 4 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 5 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 6 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 7 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 8 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 9 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 10 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 11 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 12 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 13 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 14 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 15 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 16 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 17 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 18 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 19 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 20 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 21 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 22 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 23 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 24 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |
| 25 | 1 | 2" | FL | 150 | 40 | STEAM HEATING | 1/2" 200 1/4 20 |

REFERENCE DRAWINGS

| NO. | DESCRIPTION | DATE |
|-----|-----------------------------------|----------|
| 1 | ASSEMBLY GENERAL WATER | 11/15/00 |
| 2 | STEAM HEATING HEATER CONSTRUCTION | 11/15/00 |
| 3 | DESIGN DATA | 11/15/00 |
| 4 | OPERATING PRESSURE | 11/15/00 |
| 5 | DESIGN TEMPERATURE | 11/15/00 |
| 6 | DESIGN PRESSURE | 11/15/00 |
| 7 | DESIGN WIND SPEED | 11/15/00 |
| 8 | DESIGN SEISMIC | 11/15/00 |
| 9 | DESIGN CORROSION ALLOWANCE | 11/15/00 |
| 10 | DESIGN WIND SPEED | 11/15/00 |
| 11 | DESIGN SEISMIC | 11/15/00 |
| 12 | DESIGN CORROSION ALLOWANCE | 11/15/00 |

TO BE VERIFIED BY CUSTOMER HEAD MANUFACTURER

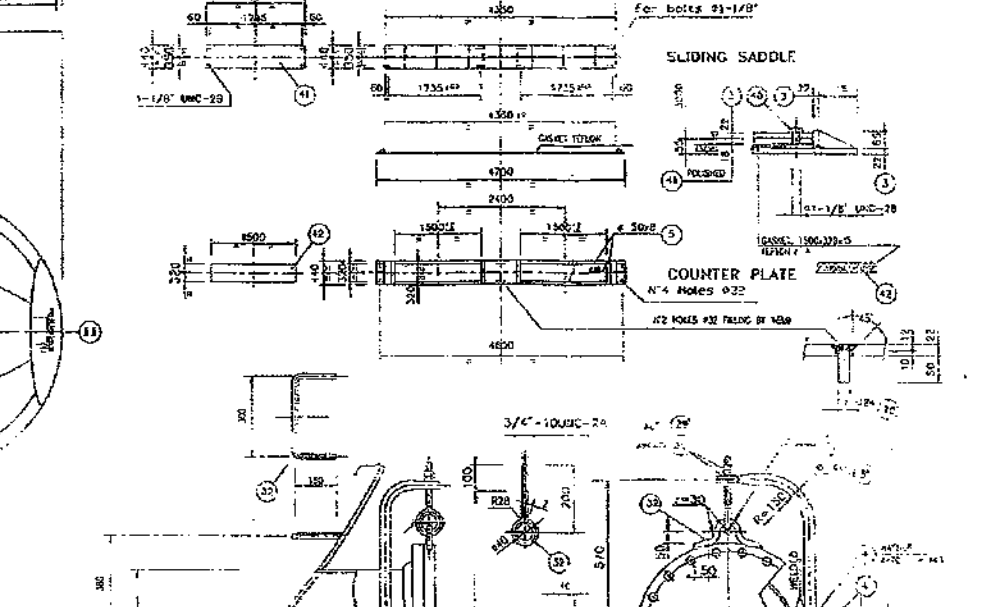
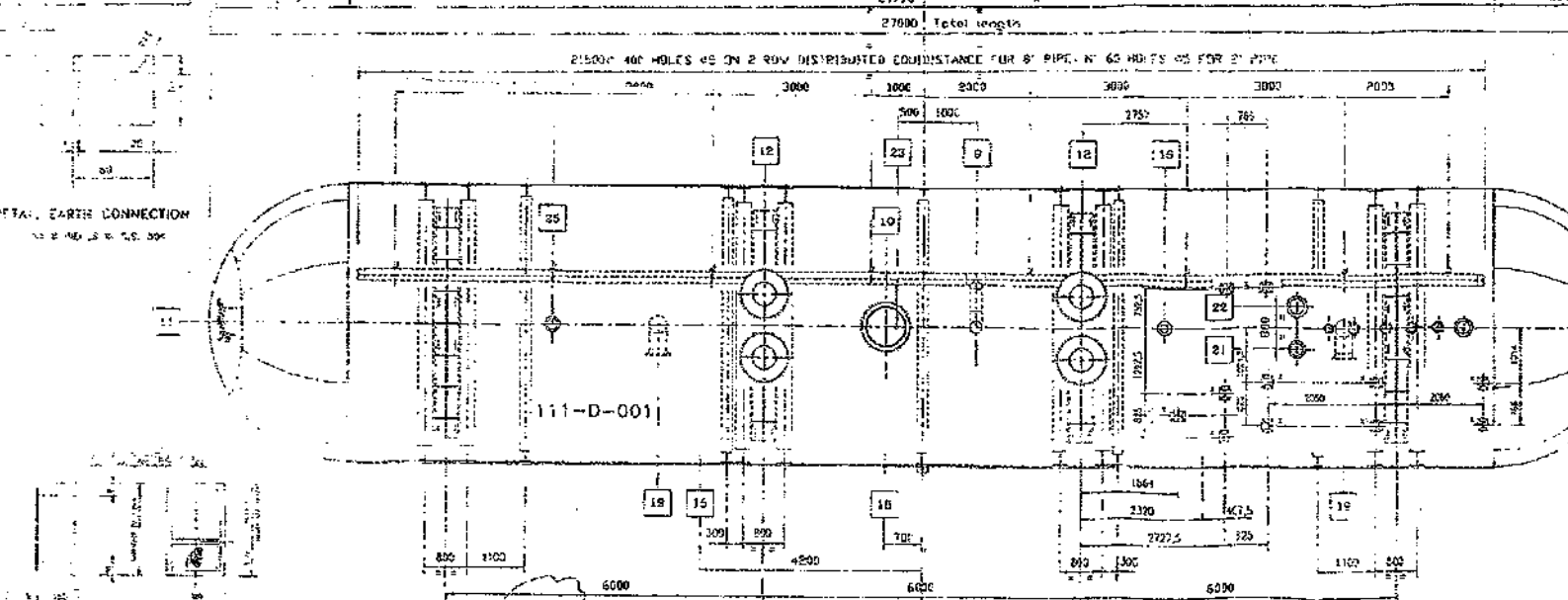


STATIC LOAD

| NO. | DESCRIPTION | VALUE |
|-----|-------------------------------|----------|
| 1 | WEIGHT OF VESSEL | 10000 LB |
| 2 | WEIGHT OF CONTENTS | 20000 LB |
| 3 | WEIGHT OF INSULATION | 5000 LB |
| 4 | WEIGHT OF WIND | 15000 LB |
| 5 | WEIGHT OF SEISMIC | 10000 LB |
| 6 | WEIGHT OF CORROSION ALLOWANCE | 5000 LB |

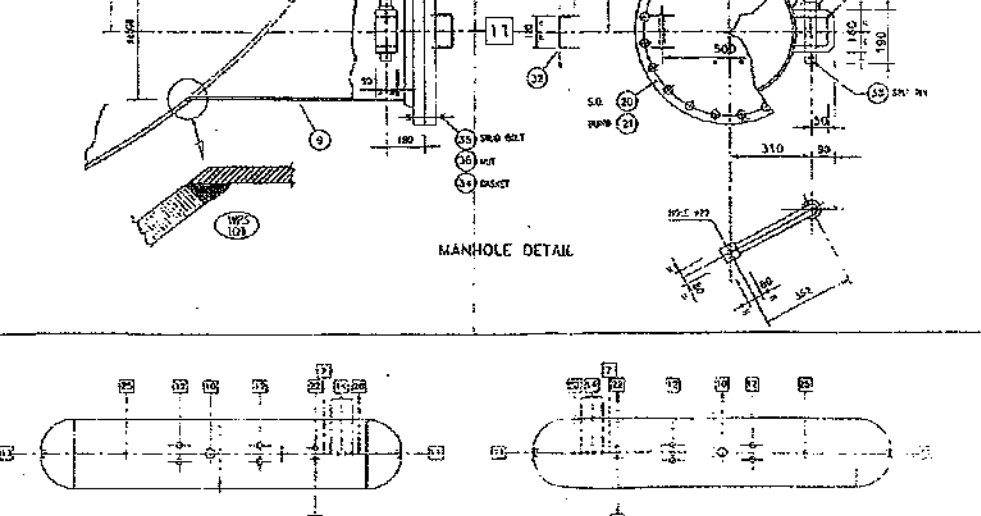
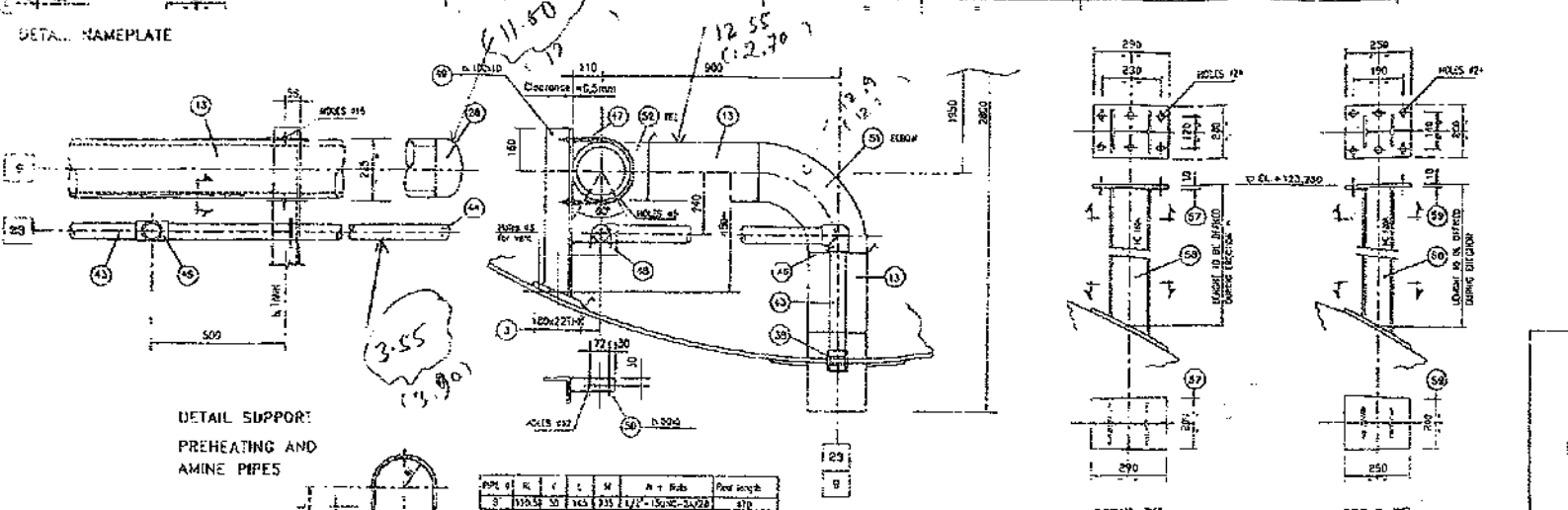
VESEL CONSTRUCTION MATERIALS

| ITEM | DESCRIPTION | QTY | MATERIAL |
|------|--------------------------|-----|--------------------|
| 1 | SHIELD | 1 | A 516 GR 50 |
| 2 | HEAD | 1 | A 516 GR 50 |
| 3 | EXTERNAL END BOLTS/PLATE | 1 | A 516 GR 50 |
| 4 | INTERNAL END BOLTS/PLATE | 1 | A 516 GR 50 |
| 5 | FLANGE | 1 | A 516 GR 50 |
| 6 | GASKET | 1 | ASTM A 193 CLASS 2 |



GENERAL NOTES FOR DWG:

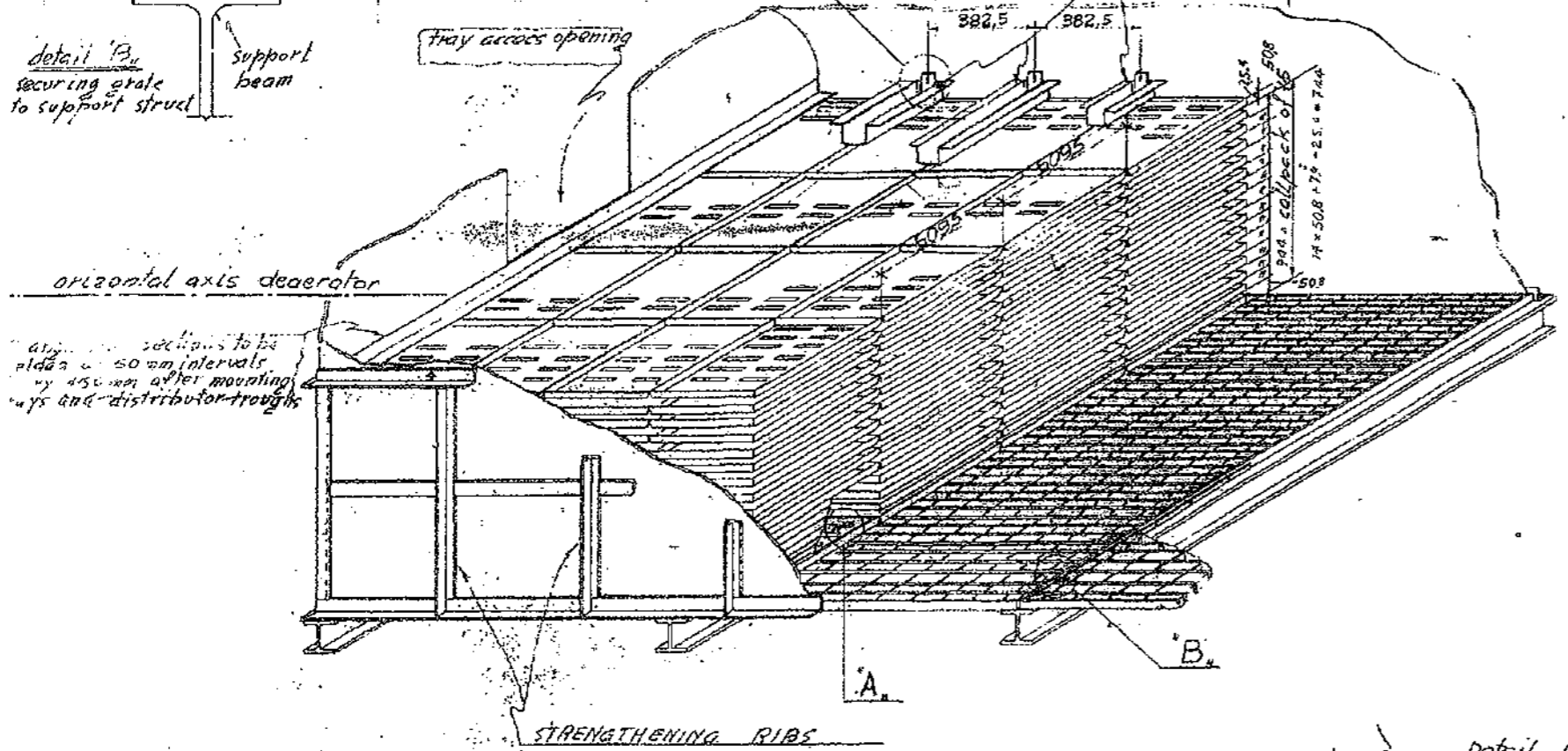
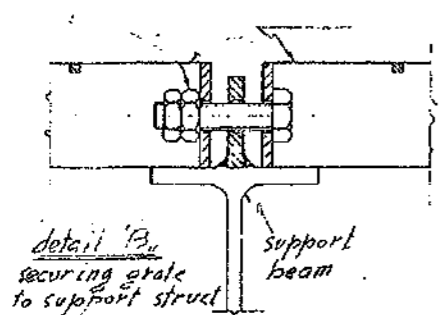
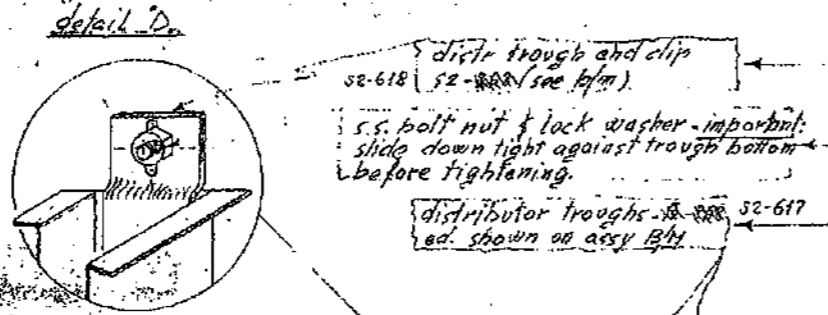
- THIS DRAWING MUST BE CONSIDERED FOR THE TOTAL WEIGHT OF THE VESSEL.
- ALL WELDING SHALL BE AS SHOWN ON THIS DRAWING.
- NO TO BE WELDED DURING THE LIFETIME.
- REMOVE FIELD WELDING.
- ALL GASKETS MUST BE REPLACED WHEN THE VESSEL IS RE-INSULATED.
- FOR MORE INFO SEE SPEC. AND DRAWING 111-D-001.



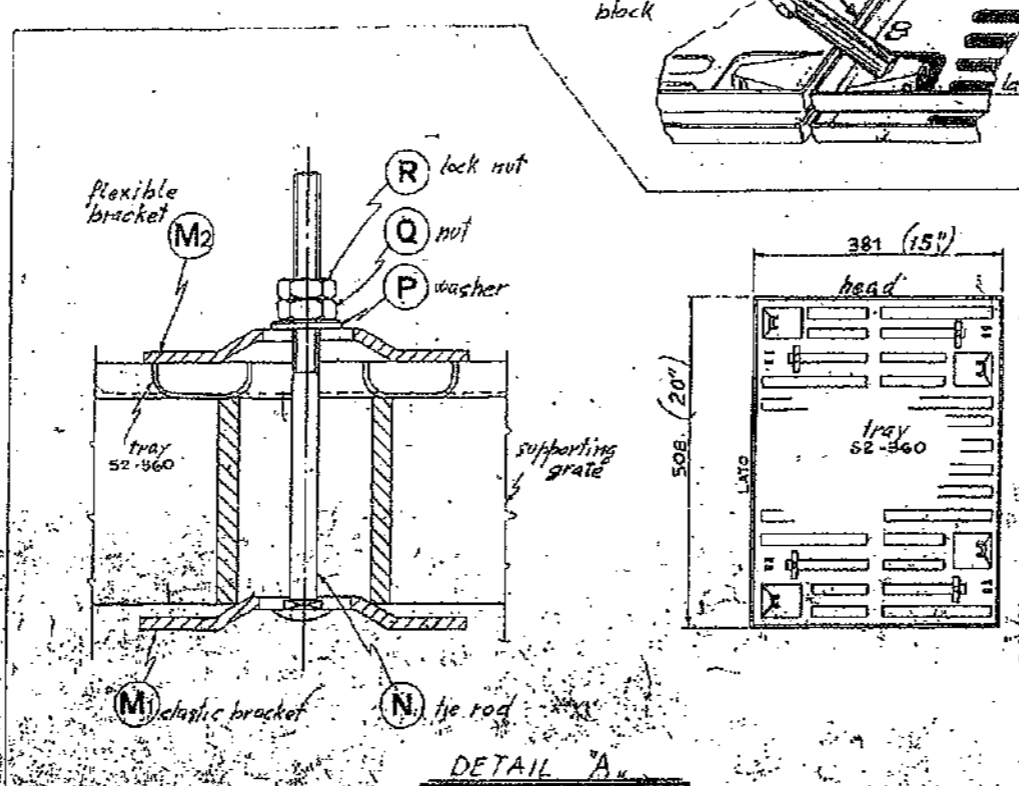
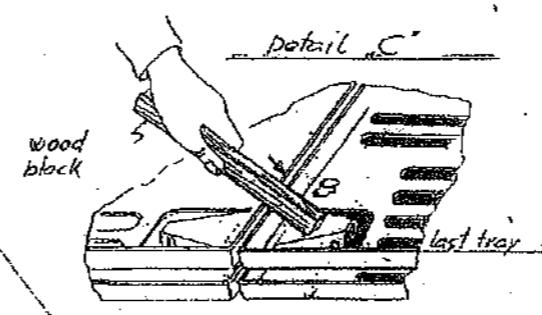
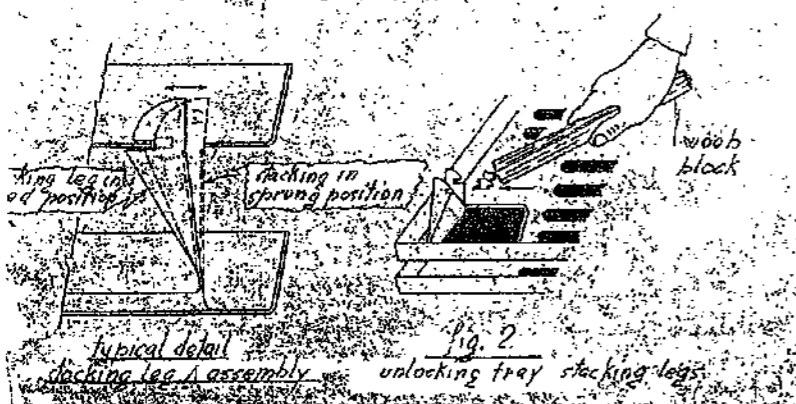
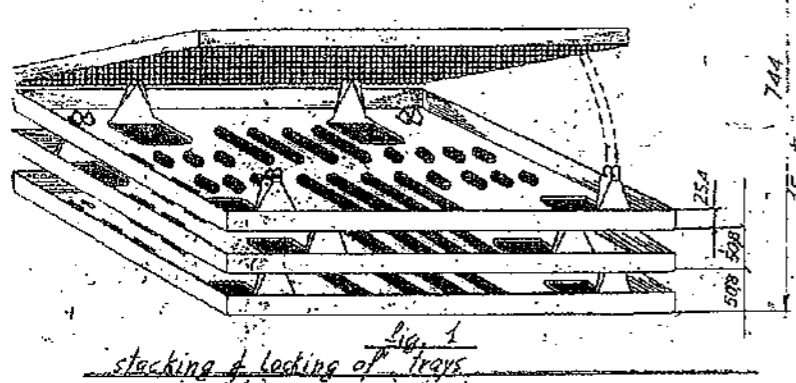
GENERAL NOTES FOR DWG:

- THIS DRAWING MUST BE CONSIDERED FOR THE TOTAL WEIGHT OF THE VESSEL.
- ALL WELDING SHALL BE AS SHOWN ON THIS DRAWING.
- NO TO BE WELDED DURING THE LIFETIME.
- REMOVE FIELD WELDING.
- ALL GASKETS MUST BE REPLACED WHEN THE VESSEL IS RE-INSULATED.
- FOR MORE INFO SEE SPEC. AND DRAWING 111-D-001.

Turn this nut slightly and lock in with the lock nut - make sure grate rests evenly on supports



any sections to be placed at 50 mm intervals by 450 mm after mounting trays and distributor troughs



INSTRUCTIONS FOR INSTALLATION OF TRAYS AND ACCESSORIES

- 1) If the grate is not welded to the supporting structure, make sure it is secured as shown in detail "B".
- 2) Fit up the first layer of trays, proceeding as follows: (see detail "A")
Set the tray in 4 positions as close as possible to the stacking legs by inserting bracket (M) supported by tie rod (N) and turning by 90° so that it lodges between grate supports; insert the second bracket (M2) which must rest above the grate; introduce washer (P) and screw down the first nut (Q) to the maximum possible extent by hand. Screw the nut by an additional turn with a wrench and lock it in position with the lock nut.
Do not use electric or pneumatic tools for the above operations.
- 3) Introduce trays into the deaerator, through access opening
- 4) The trays must be stacked up on the first row previously secured to the grating, with the stacking legs pointing upward.
Rotate the trays alternately by 180° horizontally, so that the legs of the underlying tray match in position with the slots of the upper tray.
Push tray downward until the legs of the underlying tray are lodged in the slots.
For correct positioning of the stacks consult the assembly drawings relating to the job and which specifies quantity and type of trays to be used.
The present drawing shows a 15 layer stack.
- 5) Complete insertion by bending down stacking legs inwardly on the tray as shown on detail "C".
Mount distribution troughs 52-618 and secure them with brackets 52-617 as shown in detail "D".
Weld the two terminal beams as shown on completion of the last stack of trays.
- 6) To remove trays disengage the stacking legs from the upper cell, using a wood block, as shown in fig. 2

OTHER NOTES

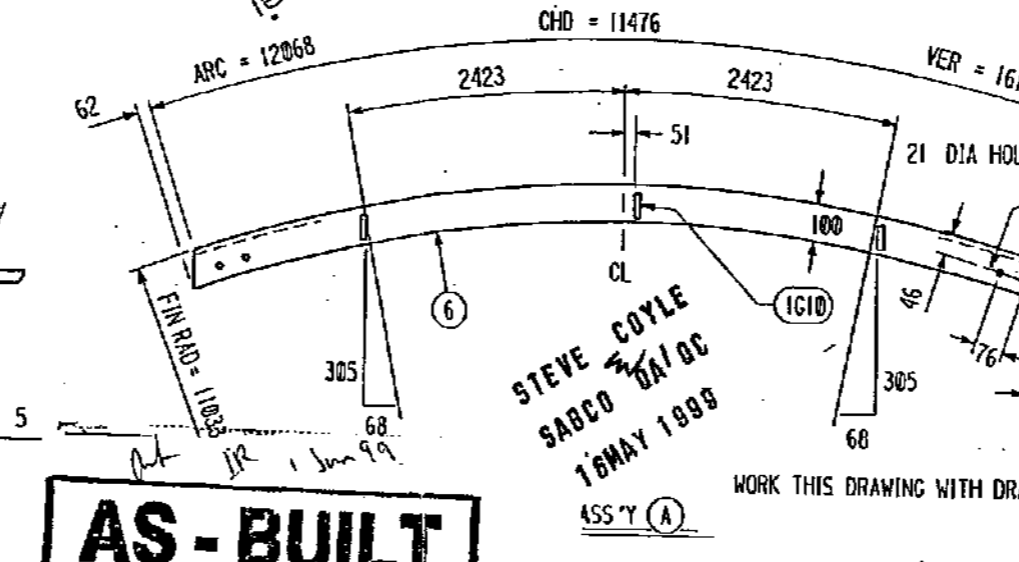
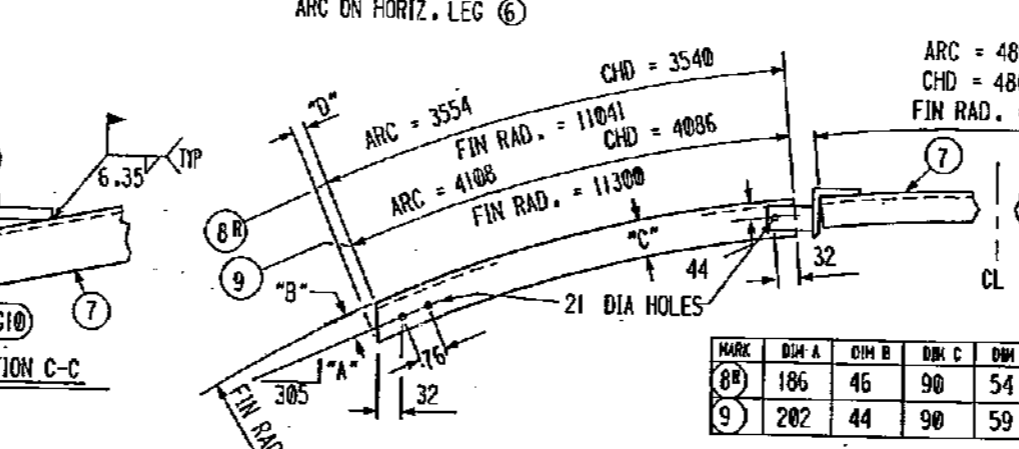
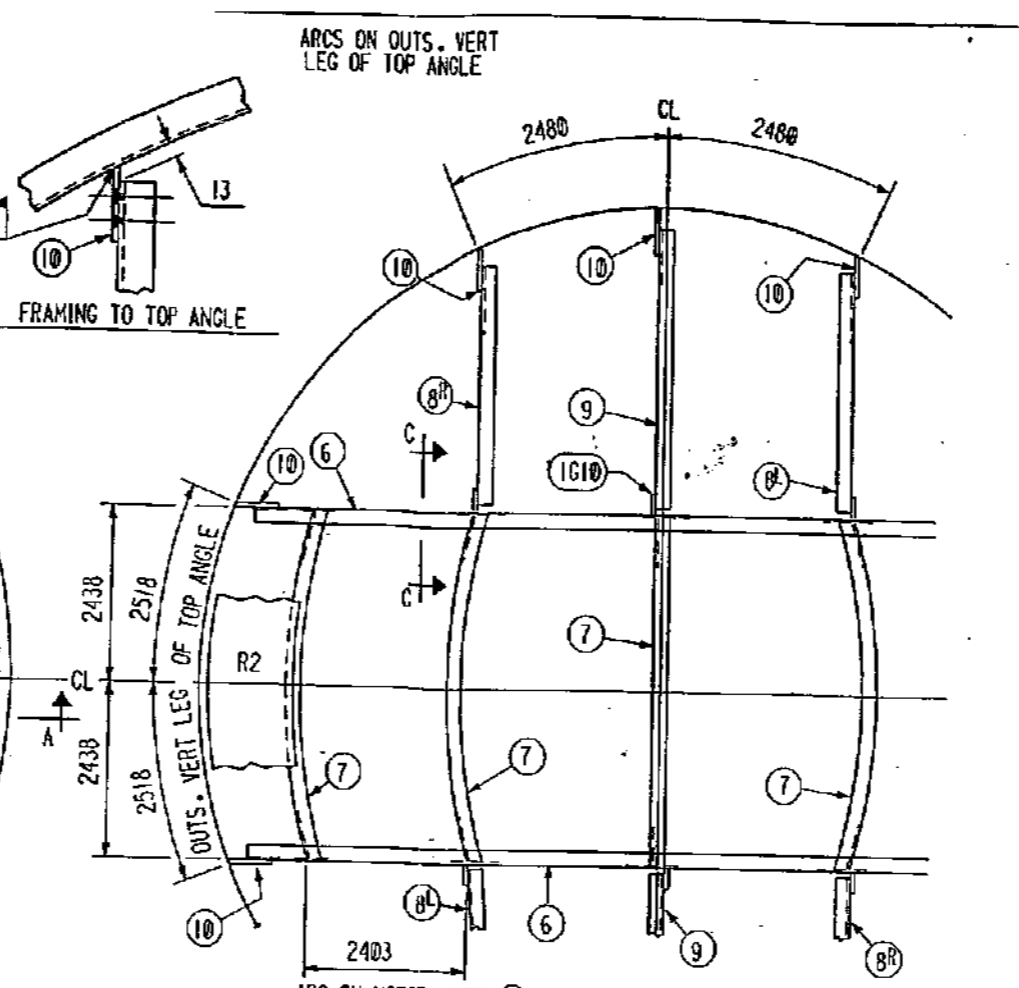
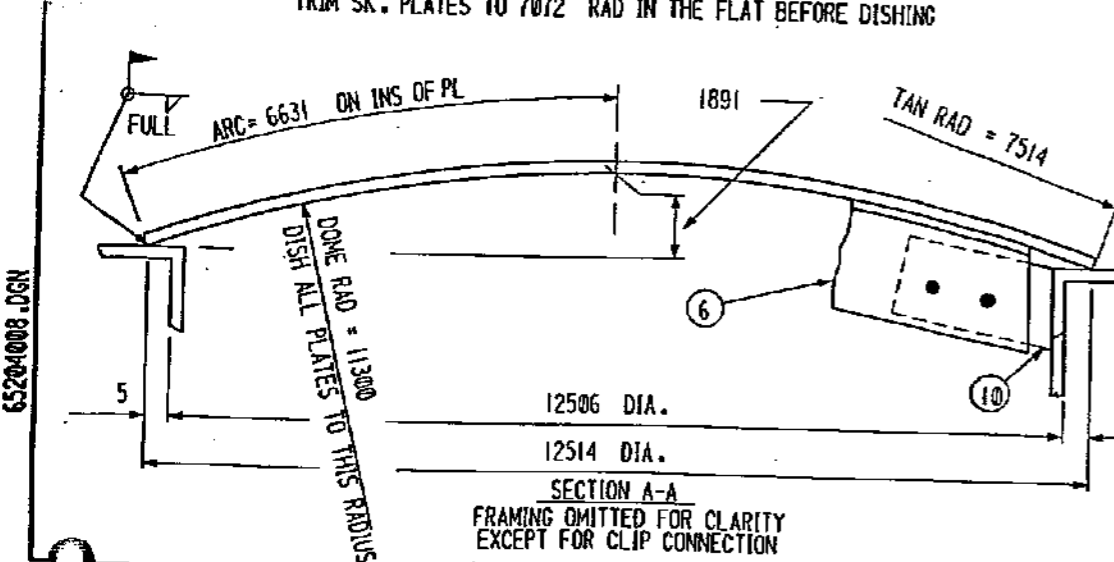
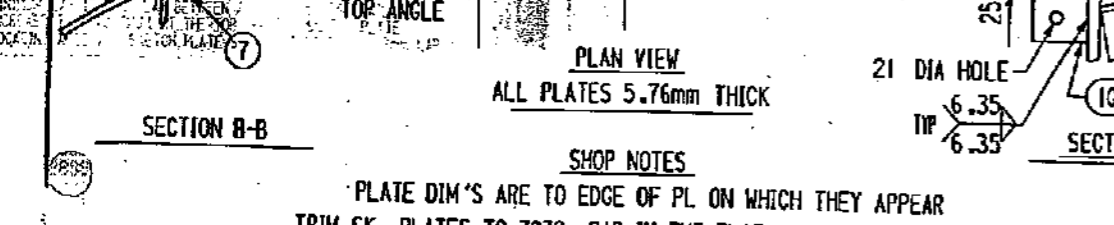
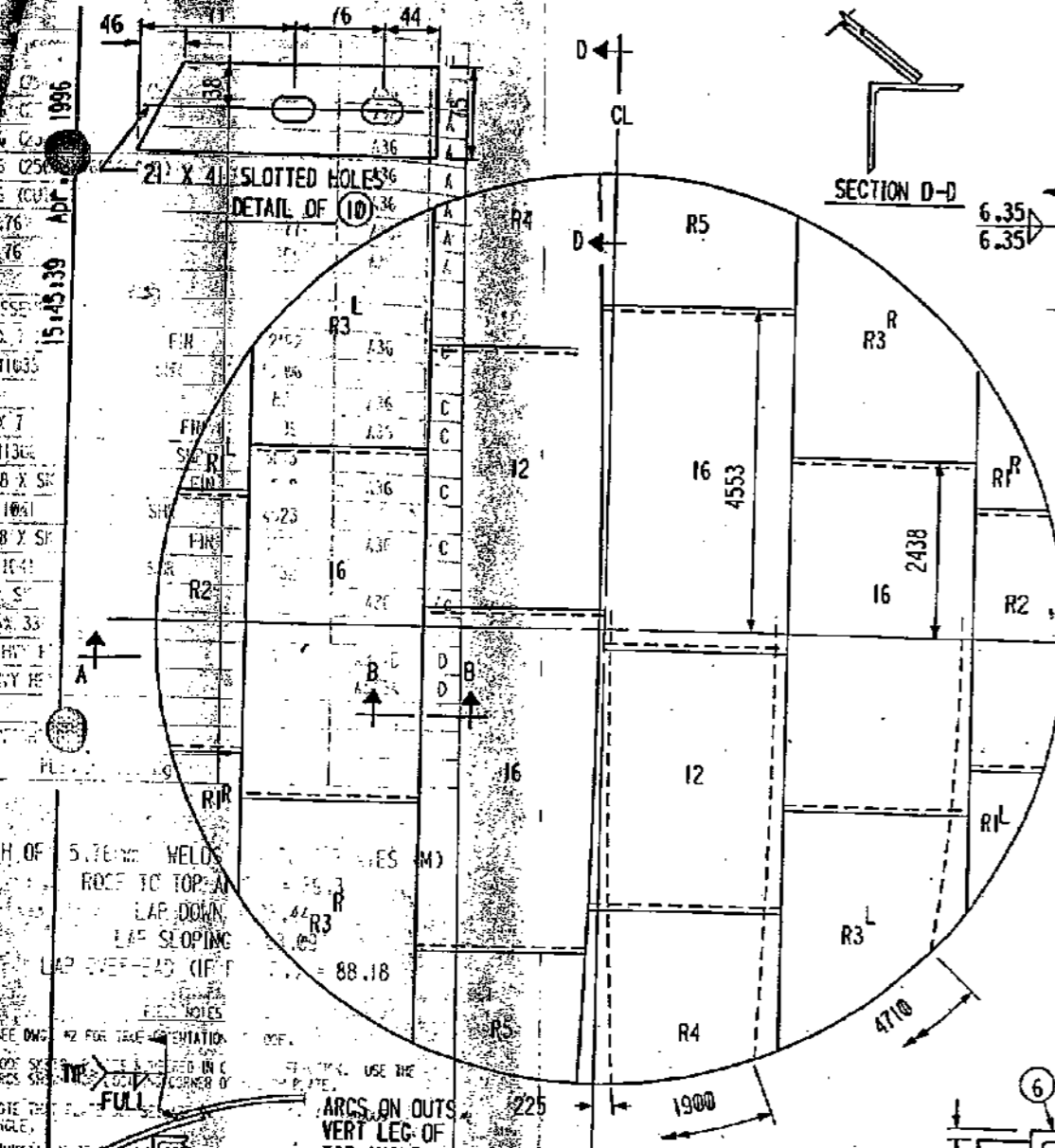
- a) The tray is formed from a single stainless steel plate; these trays are neither riveted nor welded.
- b) Shipment of the trays should be in accordance with drawing 52-360/1, i.e., 18 trays stacked up and packed in a suitable box.
- c) If the grate is 2038 mm. wide, set the trays in 4 rows, adjacent to each other.
If 1528 mm. wide, set the trays in 3 rows, adjacent to each other.

IMPORTANT :

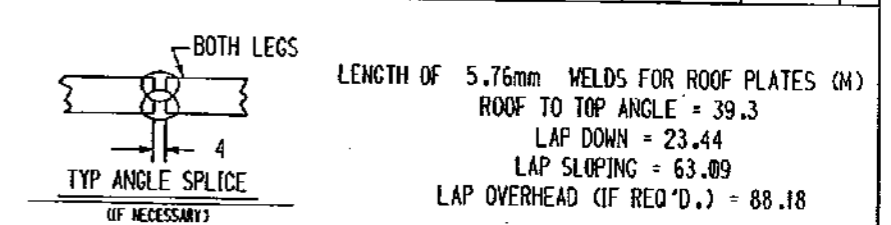
These instructions apply both to horizontal deaerating heaters (as shown on drawing) and vertical type heaters. The above mentioned instructions have general character. For the mounting see "Bill of material" of assembly drawing of each deaerator.

| | | | |
|--|--|--------|----------------------------|
| TERMOKIMIK CORPORATION | | | |
| MILANO IMPIANTI E PROCEDIMENTI INDUSTRIALI | | | |
| Diagn. <i>Quaranta</i> | Complazzo: <i>SPRAY-TRAY DEAERATING HEATER</i> | | Posit. N. <i>72</i> |
| Controll. | Particolato: <i>INSTRUCTIONS FOR INSTALLATION OF TRAYS AND ACCESSORIES</i> | | Modif. <i>01</i> |
| Rep. <i>2</i> | Mod. N. <i>52-360/1</i> | Mater. | Commessa N. |
| Dist. <i>29-01-87</i> | Page. | Trat. | Disegno N. <i>52-360/1</i> |
| *A termine di legge, si riserviamo le proprietà di questo nostro disegno con diritto di riproduzione di ogni natura, senza autorizzazione qualsiasi, seppur copiativa. | | | |

MODIFICAZIONE IL PRESENTE ANNULLA IL PRECEDENTE 52-360/1 N° DEL 15/12/81



| SLIP PC | MARK | ASSEMBLY PC | DESCRIPTION | LENGTH MM | SPEC | ID |
|---|---------|-------------|--------------------------------|-----------|-------|---------|
| 4 | R1 R/L | | PL SK X 5.76 (2500 X 6096 C/4) | | A36 | A |
| 2 | R2 | | PL SK X 5.76 (2500 X 6096) | | A36 | A |
| 4 | R3 R/L | | PL SK X 5.76 (2500 X 4877) | | A36 | A |
| 2 | R4 | | PL SK X 5.76 (2500 X 6096 C/2) | | A36 | A |
| 2 | R5 | | PL SK X 5.76 (CUTS WITH R2) | | A36 | A |
| 4 | 16 | | PL 2500 X 5.76 | 4877 | A36 | A |
| 2 | 12 | | PL 2500 X 5.76 | 3658 | A36 | A |
| MAIN ANGLE ASSEMBLY | | | | | | |
| 2 | 8-A | | L 100 X 100 X 7 X SK | FIN | 12192 | A36 C |
| | 8-B | 2 | FIN ON RAD= 11033 | SHR | 13106 | |
| | 10 | 6 | BAR 65 X 10 | | 89 | A36 C |
| 5 | 8-7 | | L 100 X 100 X 7 | FIN | 4899 | A36 C |
| | | | FIN ON RAD= 11300 | SHR | 5813 | |
| 4 | 8-8 R/L | | L 90 X 90 X 8 X SK | FIN | 3600 | A36 C |
| | | | FIN ON RAD= 11041 | SHR | 4523 | |
| 2 | 8-9 | | L 90 X 90 X 8 X SK | FIN | 4167 | A36 C |
| | | | FIN ON RAD= 11041 | SHR | 5082 | |
| 10 | 8-10 | | BAR 75 X 10 X SK | | | A36 AC |
| | | | (BAR 75 X 10 X 338 C/2) | | | |
| 28 | 8-11 | | BOLT 3/4 DIA HYV HEX | | 38 | A307B D |
| 28 | 8-12 | | NUT 3/4 DIA HYV HEX | | | A563A D |
| THEORETICAL WEIGHT OF APPLIED MATERIAL FOR SK. PLS. = 4955 Kg | | | | | | |



- FIELD NOTES**
- SEE DWG. #2 FOR TRUE ORIENTATION OF ROOF.
 - ROOF SKETCH PLATES NUMBERED IN ORDER OF ERECTION. USE THE ARCS SHOWN FOR LOCATING CORNER OF SKETCH PLATE.
 - NOTE THAT PLATE COURSES ARE 90° TO THE LONG CONTINUOUS ANGLE.
 - MINIMUM LAP IS 25. LAP BETWEEN ADJACENT COURSES WILL INCREASE TO A MAXIMUM AT THE TOP ANGLE. SKETCH PLATE LOCATING ARCS AND SKETCH PLATE SIZES ARE BASED ON 38mm LAP.
 - BEFORE COMPLETING ERECTION OF FRAMING, 181 Kg TOTAL IS THE MAXIMUM PERMISSIBLE CONCENTRATED LOAD ON THE FRAMING.
 - AFTER ROOF PLATES ARE COMPLETELY WELDED, MAKE CUT-OUT AT CENTER FOR VENT. CUT AWAY EXPOSED PORTION OF HORIZONTAL LEG OF ANGLE (AS SHOWN CROSS HATCHED IN SKETCH E) BUT LEAVE VERTICAL LEG OF ANGLE INTACT.

"OWNER WARNING" THE ROOF FRAMING MAY FAIL IF LOADS ARE ATTACHED TO THE FRAMING SUCH AS PAINTER'S RIGGING, HOIST EQUIPMENT OR OTHER TEMPORARY OR PERMANENT EQUIPMENT THE ROOF FRAMING HAS NOT BEEN DESIGNED TO SUPPORT LOADS OF THIS TYPE. DO NOT USE THE FRAMING FOR THE PURPOSE OF SUPPORTING LOADS SUCH AS PAINTER'S RIGGING, HOIST EQUIPMENT OR OTHER TEMPORARY OR PERMANENT EQUIPMENT.

STEAM CONDENSATE STORAGE TANK
BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

| NO. | DATE | BY | CHKD | DATE | REVISIONS |
|-----|------|----|------|------|-----------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

ARABIAN CBI LTD.
DOMESTIC ROOF
12.5 m DIA. X 12.0 m HIGH SSRT
IBN RUSHD PTA AND AROMATICS PLANT PROJECT
ARABIAN INDUSTRIAL FIBERS CO. LTD
YANBU, SAUDI ARABIA

ITEM NO. 111-F-001
BY MSTG CHKD RLB DATE 4-10-96
R L HERBERT
ENGINEERING SUPERVISOR

CONTRACT NO. ED 965204
DWG. 8
REV. 0

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AS-BUILT
KIT ACB

STEVE COYLE
SABCO DA/DC
16 MAY 1999
ASS'Y (A)

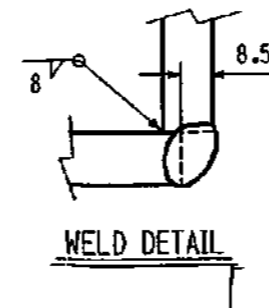
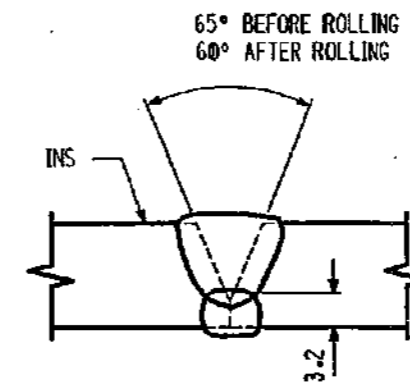
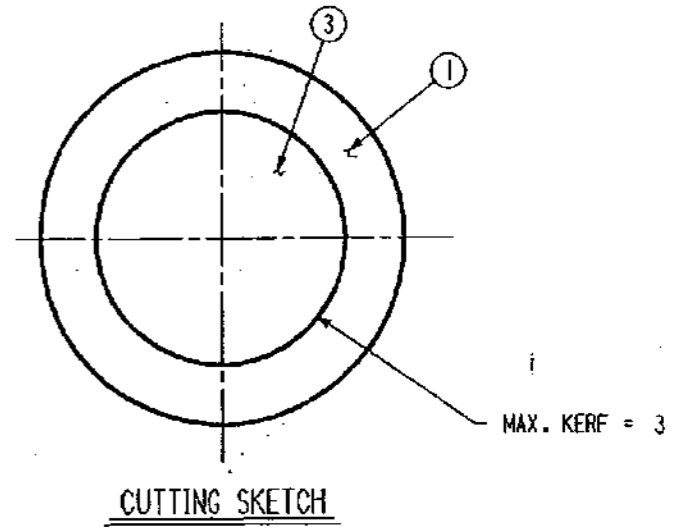
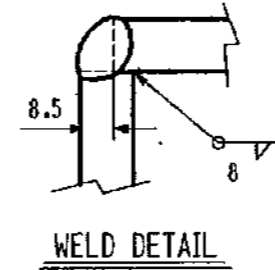
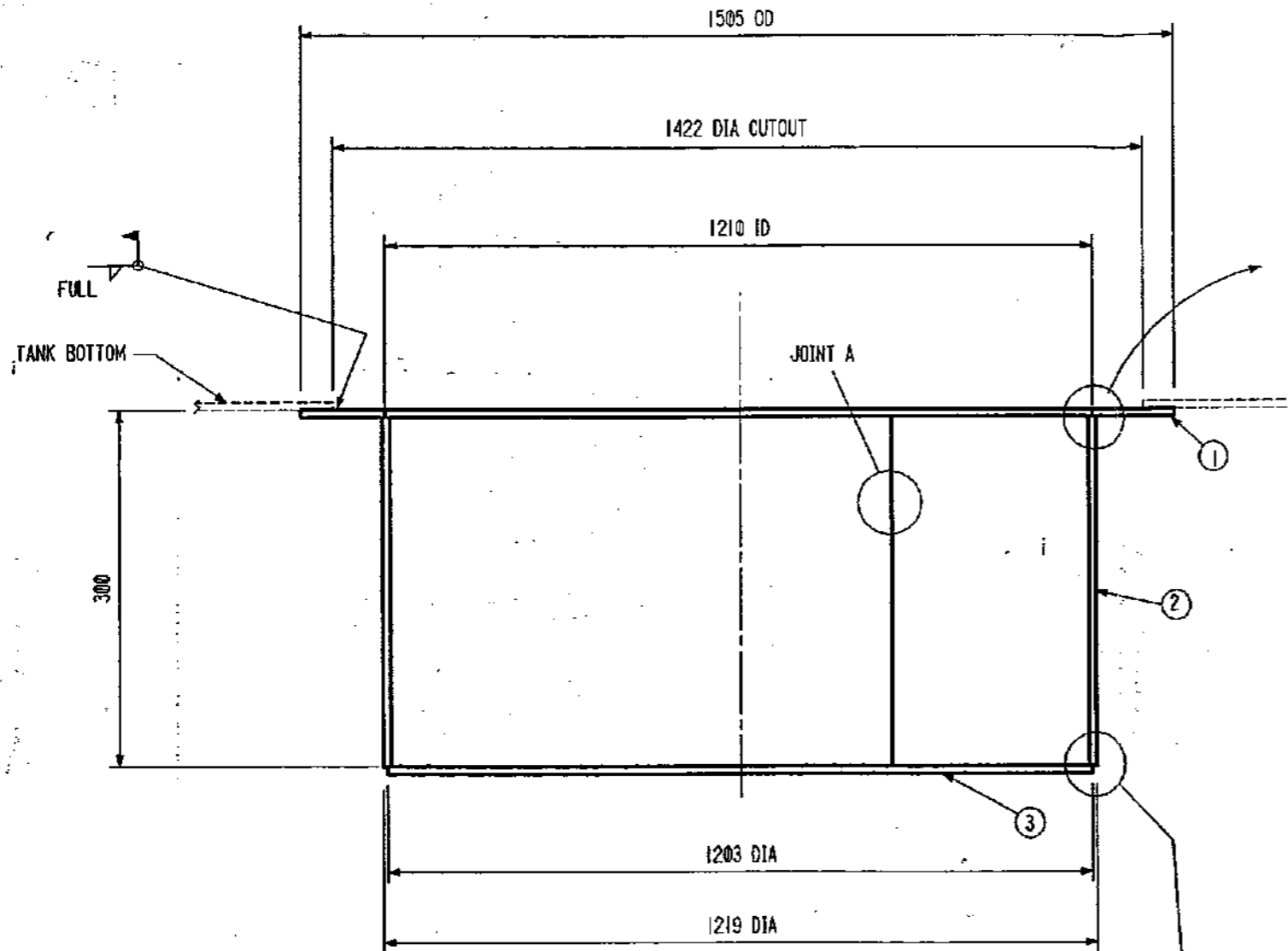
WORK THIS DRAWING WITH DRAWING #9

▶ INDICATES CHANGE FROM PREVIOUS ISSUE

09:58:14 Jun. 18, 1996

65204017 JGN

| SHP PC | MARK | ASST PC | DESCRIPTION | LENGTH (M) | SPEC | D |
|--------|------|---------|------------------------------|------------|------|----|
| 1 | 17-A | | 1219 DIA API 650 SUMP | | | |
| | 17-1 | 1 | PL 1505 OD x 12.70 x 1210 ID | | A36 | Ac |
| | 17-2 | 1 | PL 287 x 12.70 ROLL | 3790 | A36 | Ac |
| | 17-3 | 1 | PL 1203 DIA x 12.70 | | A36 | Ac |
| | | | (C/A 17-1) | | | |



-FIELD NOTE-

BE SURE THAT CONTOUR OF GROUND IS SHAPED TO PROVIDE AS FIRM A SUPPORT FOR THE SUMP AND THE BOTTOM ADJACENT TO THE SUMP AS IS PROVIDED FOR THE REMAINDER OF THE BOTTOM.

BILLED AND DETAILED FOR (1) TANK -- (1) REQUIRED

STEAM CONDENSATE STORAGE TANK

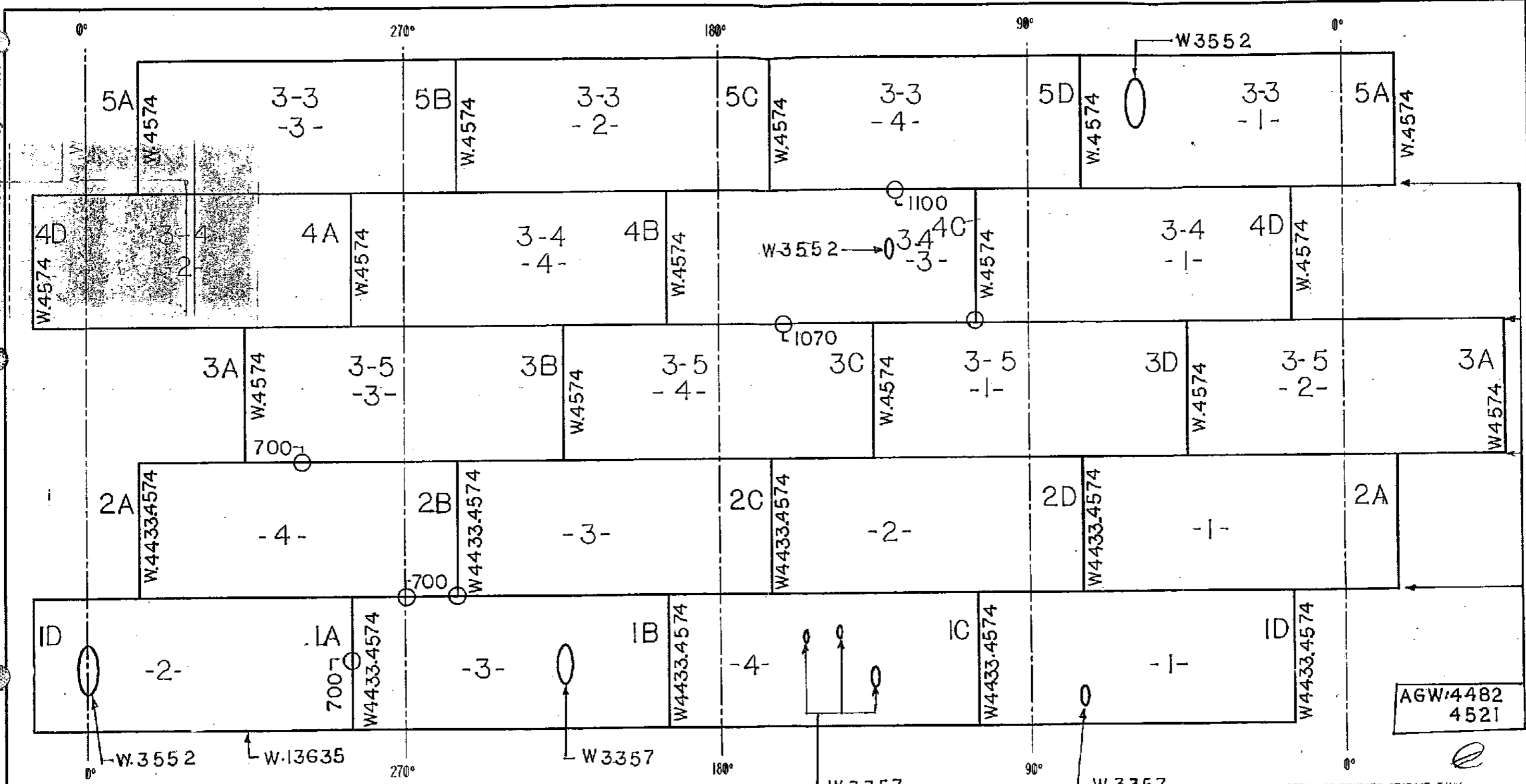
BECHTEL LTD CONTRACT No. 22854-LCC-005 (22854-000-F-001)

And IR 1 Jun 99
STEVE COYLE
 BABBED DA/DC
 15 MAY 1999

AS-BUILT
 ICTT ALBR

| | |
|--|---|
| ARABIAN CBI LTD. (48" DIA.) 1219 DIA. API 650 SUMP 12.5 m DIA. X 12.0 m HIGH SSDRT IEN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO 111-F-001 BY ZH CHKD MSTG DATE 4/18/96 R L HERBERT ENGINEERING SUPERVISOR | CONTRACT NO ED 965204 DWG 17 REV SHIT |
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INDICATES CHANGE FROM PREVIOUS ISSUE



STEAM CONDENSATE STORAGE TANK
 BECHTEL LTD CONTRACT No. 22854-LCC-005

| NAME OF WELDER | I.D. | NAME OF WELDER | I.D. |
|----------------|-------|----------------|------|
| T. HUSSAIN | 4133 | K. HAMEED | 4574 |
| M. SARIK | 3552 | N. AHMED | 3357 |
| S. KHAN | 4482 | M. SAIFERAOZ | 4521 |
| E. H. MARTIN | 13635 | | |

- FOREMAN:**
- RECORD WELDERS' I.D. ON EACH JOINT.
 - RECORD JOINT ID AND RT INTERVALS (FIRST & LAST FOR 100%) OR LOCATION FOR SPOT RADIOGRAPHS OR PLUGS.

SHELL STRETCHOUT
 (OUTSIDE VIEW)

FOR CONSTRUCTION

WHEN COMPLETE

FOREMAN:
 SEND CONSTRUCTION OFFICE ONE LEGIBLE COPY AND WORK COPIES IF ANY

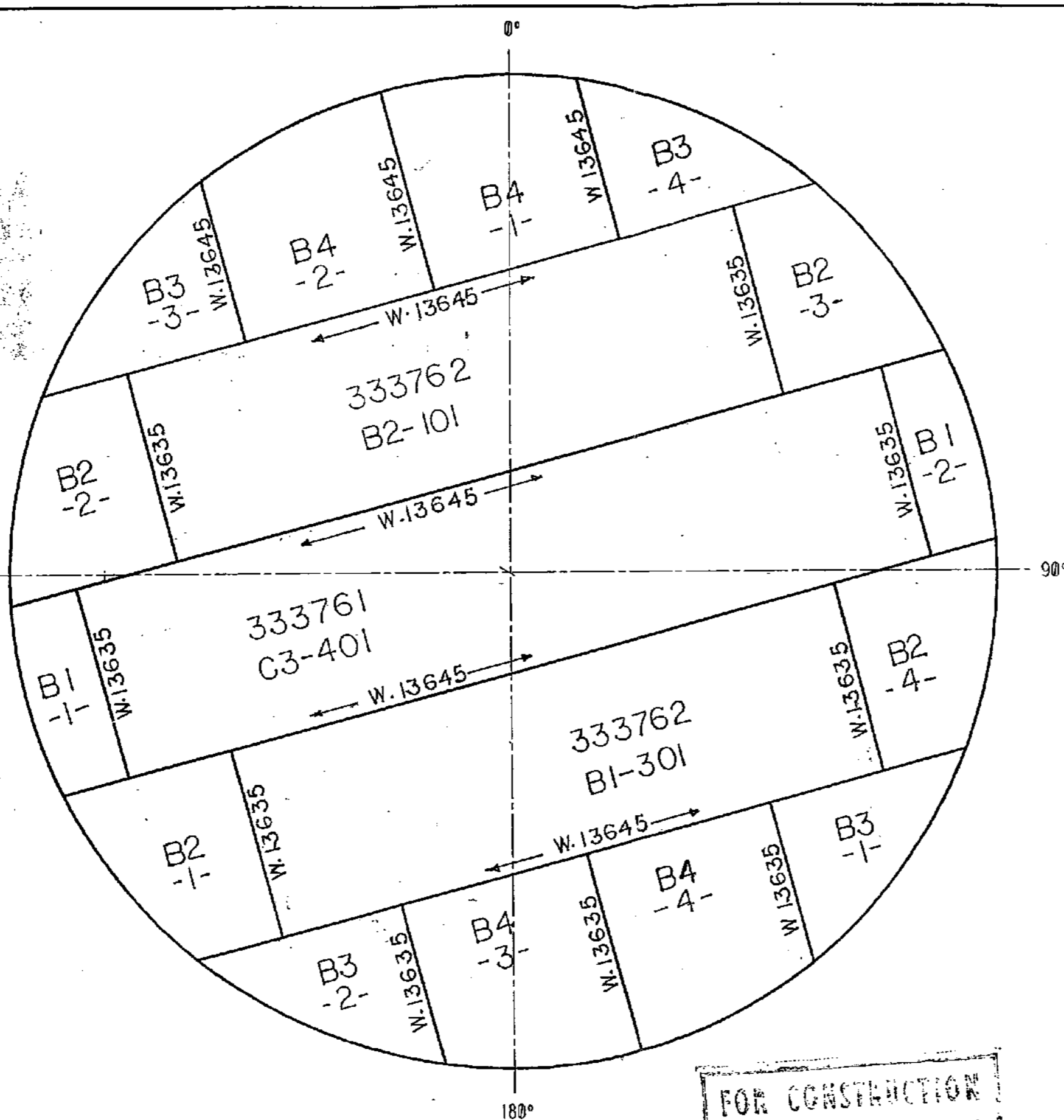
| | | | |
|----------------------|--------------------------|---|--------------------------------|
| | | ARABIAN CBI LTD. | |
| | | SHELL STRETCHOUT 12.5 m DIA. X 12.0 m HIGH SSRT IBN RUSHO PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO 111-F-001 | CONTRACT NO ED 965204 | BY ZM R. L. HERBERT ENGINEERING SUPERVISOR | DATE 7/9/96 DWG RI REV 0 |

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09:31:04 Jul. 9, 1996



270°



BOTTOM STRETCHOUT

FOR CONSTRUCTION

| NAME OF WELDER | I.D. |
|----------------|-------|
| E. M. MARTIN | 13635 |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

- FOREMAN:**
1. RECORD WELDERS' I.D. ON EACH JOINT.
 2. RECORD JOINT ID AND RT INTERVALS (FIRST & LAST FOR 100%) OR LOCATION FOR SPOT RADIOGRAPHS OR PLUGS.

WHEN COMPLETE

FOREMAN:
SEND CONSTRUCTION OFFICE ONE LEGIBLE COPY AND WORK COPIES IF ANY

STEAM CONDENSATE STORAGE TANK
BECHTEL LTD CONTRACT No. 22854-LCC-005

| | | | |
|--|---|--|---|
| | | ARABIAN CBI LTD. | |
| | | BOTTOM STRETCHOUT 12.5 m DIA. X 12.0 m HIGH SSRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO. III-F-001 BY JW CHKD RLH DATE 7/9/96 R.L. HERBERT ENGINEERING SUPERVISOR | CONTRACT NO. ED 965204 DWG R2 REV 0 | REVISIONS NO. DATE BY 1 2 | This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden. |

INDICATES CHANGE FROM PREVIOUS ISSUE

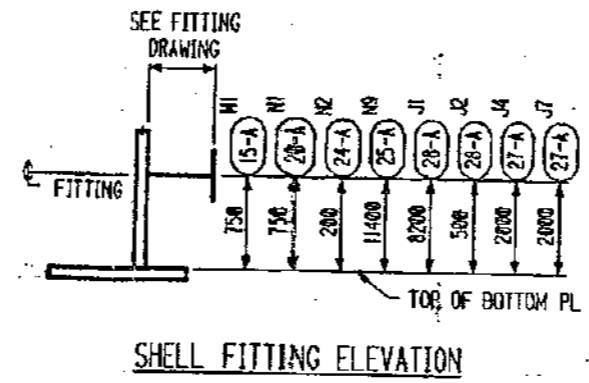
6520402.DGN

TECHNICAL & CONSTRUCTION INFORMATION

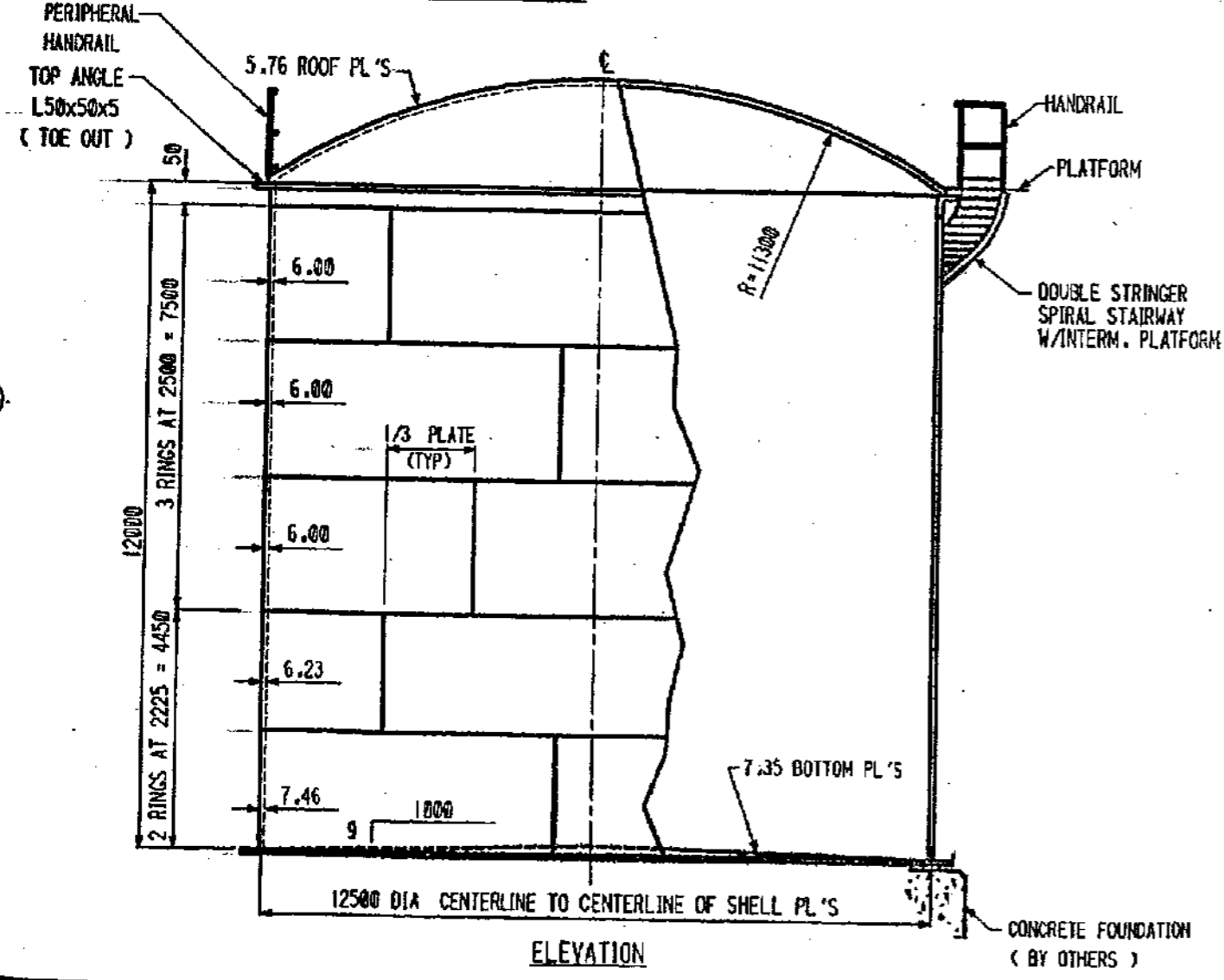
| SPECIFICATIONS | | API 650-9th ED. (1993/94 ADD.) |
|------------------------|--|--------------------------------|
| SPECIFIC GRAVITY | | 1.0 |
| SERVICE | | STEAM CONDENSATE |
| MAX DESIGN METAL TEMP. | | 110°C |
| MIN DESIGN METAL TEMP. | | 17°C |
| DESIGN PRESSURE | | ATMOSPHERIC |
| DESIGN VACUUM | | ATMOSPHERIC |
| DESIGN LIQUID LEVEL | | 12000 mm |
| DESIGN WIND VELOCITY | | 140 km/h (PER API 650) |
| SEISMIC | | ZONE I (I=1.0, S=1.0) |
| ROOF LIVE LOAD | | 1.2 KPa |
| NOMINAL CAPACITY | | 1472 m ³ |
| PUMP IN RATE | | 615 m ³ /hr |
| PUMP OUT RATE | | 615 m ³ /hr |
| FOUNDATION | | BY OTHERS |
| CONSTRUCTION | | BY ARABIAN CBI |
| CORROSION ALLOWANCE | | |
| BOTTOM | | 1.0 mm |
| SHELL | | 1.0 mm |
| ROOF | | 1.0 mm |
| STRUCTURAL | | 1.0 mm |

| MATERIAL SPEC | |
|---------------------|-------------------|
| BOTTOM RECT. | A36 |
| BOTTOM SKETCHES | A36 |
| SHELL PLATES | A36 |
| ROOF PLATES | A36 |
| STRUCTURAL | A36 / RSt 37-2 |
| FLANGES | A105 |
| NOZZLE NECKS | A106B |
| INTERNAL PIPE | A106B |
| INSPECTION - MILL | CTR'S |
| SHOP | ACBI |
| FIELD | ACBI & CUSTOMER |
| SURFACE PREPARATION | |
| PAINING | YES |
| PHWT | NO |
| INSULATION | YES |
| MISC. | |
| GASKETS | REINZ-AFM37 |
| BOLTS & NUTS | A193-B7 & A194-2H |
| RADIOGRAPHY | PER CODE |
| JOINT EFFICIENCY | 0.85 |

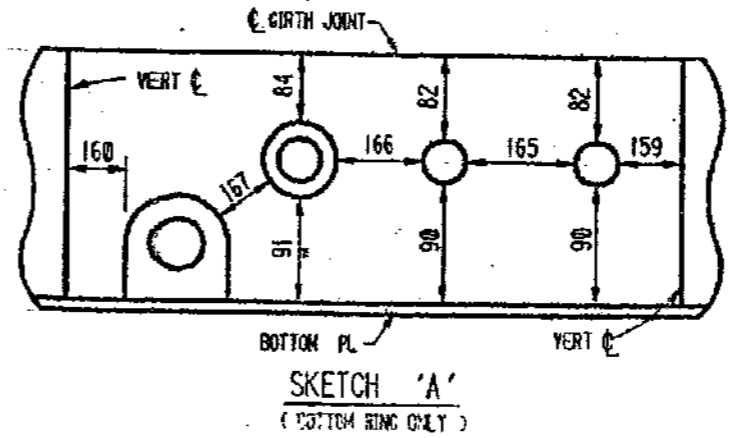
| RING NO. | CORR. ALLOW. mm | DESIGN FOR PRODUCT STRESS S _p = 1.0 | | DESIGN FOR TEST STRESS S _t = 1.0 | | THK. USED mm | MATERIAL SPECIFICATION | API MAT'L GROUP NO. |
|----------|-----------------|--|------------------|---|------------------|--------------|------------------------|---------------------|
| | | ALLOWABLE STRESS MPa | REQUIRED THK. mm | ALLOWABLE STRESS MPa | REQUIRED THK. mm | | | |
| 1 | 1.0 | 110.89 | 7.46 | 123.07 | 5.82 | 7.46 | A36 | I |
| 2 | 1.0 | 110.89 | 6.23 | 123.07 | 4.71 | 6.23 | A36 | I |
| 3 | 1.0 | 110.89 | 5.00 | 123.07 | 3.61 | 6.00 | A36 | I |
| 4 | 1.0 | 110.89 | 3.62 | 123.07 | 2.36 | 6.00 | A36 | I |
| 5 | 1.0 | 110.89 | 2.24 | 123.07 | 1.12 | 6.00 | A36 | I |



| LIST OF FITTINGS | | | | | |
|------------------|-----------|-------|------|--------|---------------------------------------|
| CUST. MARK | ACBI MARK | QUANT | SIZE | RATING | DESCRIPTION |
| M2 | 30-A | 1 | 24" | API | ROOF MANWAY |
| M1 | 15-A | 1 | 24" | API | SHELL MANHOLE |
| N1 | 20-A | 1 | 16" | 150 RF | SHELL NOZZ PUMP SUCTION W/VORTEX BRKR |
| N2 | 24-A | 1 | 4" | 150 RF | SHELL NOZZLE DRAIN W/INT. |
| N3 | 31-A | 1 | 8" | 150 RF | ROOF NOZZLE DEMIN. M/U |
| N6 | 32-A | 1 | 8" | 150 RF | ROOF NOZZLE MP COND. W/INT. |
| N7 | 33-A | 1 | 12" | 150 RF | ROOF NOZZLE VENT W/INSECT SCREEN |
| N8 | 34-A | 1 | 6" | 150 RF | ROOF NOZZLE PUMP SPILLBACK W/INT. |
| N9 | 25-A | 1 | 24" | 150 RF | SHELL NOZZLE OVERFLOW |
| N10 | 36-A | 1 | 24" | 150 RF | ROOF NOZZLE DEAERATOR W/INT. |
| J1 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LIC |
| J2 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LT |
| J4 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE TI |
| J7 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE TI |
| | 17-A | 1 | 48" | | SSP |
| | DWG#18 | 1 | | | NAMEPLATE |
| | | 1 | | | PERIPHERAL HANDRAIL |
| | DWG#50 | 1 | | | SPIRAL STAIRWAY |
| | DWG#29 | 4 | | | GROUNDING LUG |
| | DWG#12/13 | | | | INSULATION SUPPORTS |
| | | 1 SET | | | CATHODIC PROTECTION (EXT.) |



AS - BUILT



- GENERAL NOTES:
- FITTINGS TO BE LOCATED AS SHOWN ON ORIENTATION DRAWING(S). IF LOCATIONS ARE NOT GIVEN, LOCATE IN FIELD TO SUIT CUSTOMER MAINTAINING MINIMUM SPACING SHOWN IN SKETCH 'A'. DIMENSIONS GIVEN ARE FROM EDGE TO EDGE OF REINFORCING PL OR FROM CL OF BUTT WELD TO EDGE OF REINFORCING PL.
 - FLANGE BOLT HOLES TO STRADDLE VERTICAL CENTERLINE FOR SHELL NOZZLES.
 - FLANGE BOLT HOLES TO STRADDLE 0-180° CENTERLINE FOR ROOF NOZZLES.
 - SEE SHEETS 800 & 802 FOR MATERIAL MANAGEMENT

STEAM CONDENSATE STORAGE TANK
 BOCHELT LTD CONTRACT NO. 2001/100/005
 (22854-000-001)

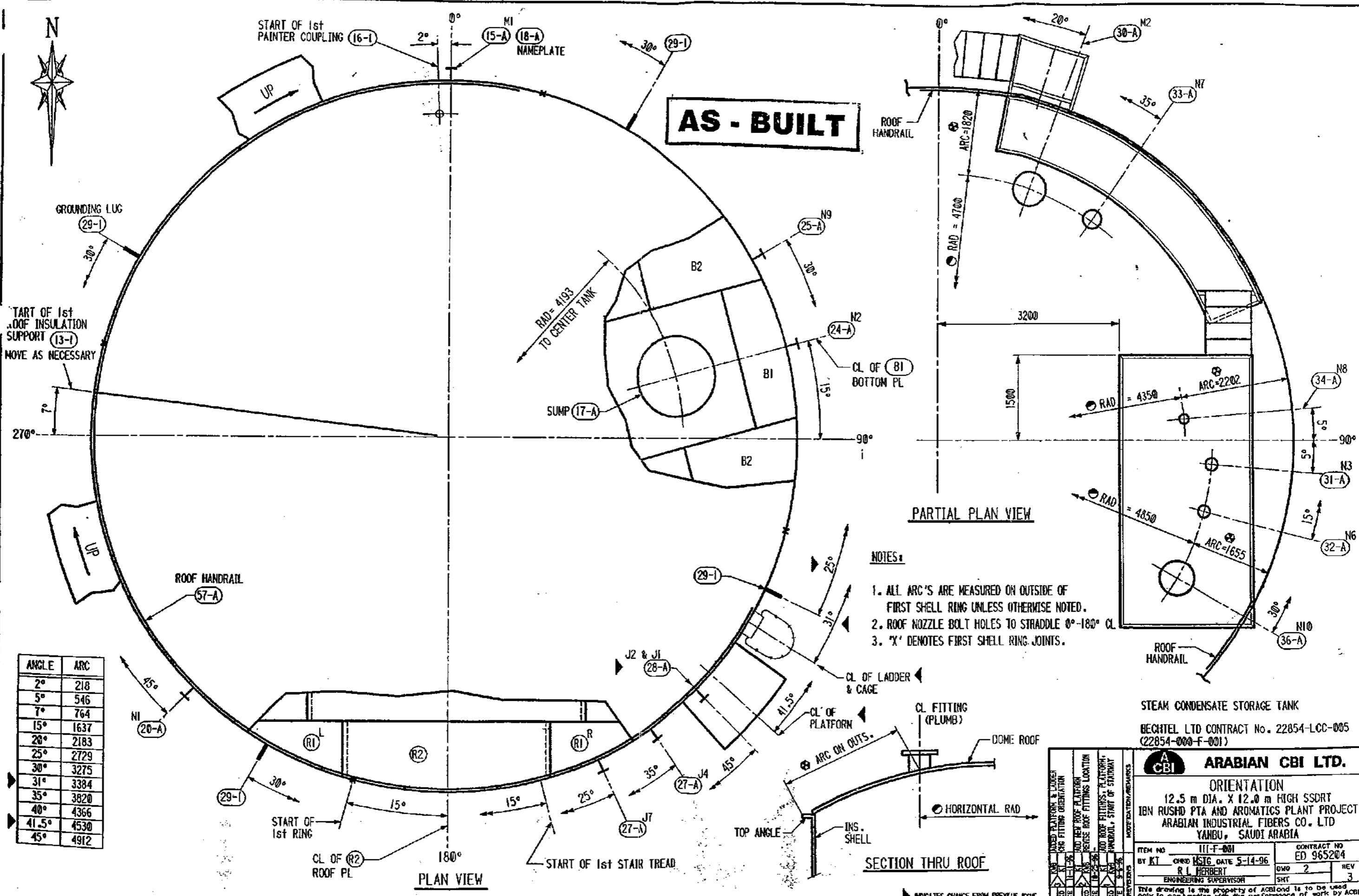
| | | | |
|---|---------------------------|-------------------------|-----------|
| | | ARABIAN CBI LTD. | |
| GENERAL ARRANGEMENT 12.5 m DIA. X 12.0 m HIGH SSRT IBN RUSHD FEA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD HANBU, SAUDI ARABIA | | | |
| ITEM NO | 111-F-001 | CONTRACT NO | ED 965204 |
| BY | KEY. CHD SIG DATE 3/15/96 | DWG | 1 |
| BY | R.L. HERBERT | REV | 5 |
| BY | ENGINEERING SUPERVISOR | SHT | |

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INDICATES CHANGE FROM PREVIOUS ISSUE



AS - BUILT



| ANGLE | ARC |
|-------|------|
| 2° | 218 |
| 5° | 546 |
| 7° | 764 |
| 15° | 1637 |
| 20° | 2183 |
| 25° | 2729 |
| 30° | 3275 |
| 31° | 3384 |
| 35° | 3820 |
| 40° | 4366 |
| 41.5° | 4530 |
| 45° | 4912 |

NOTES:

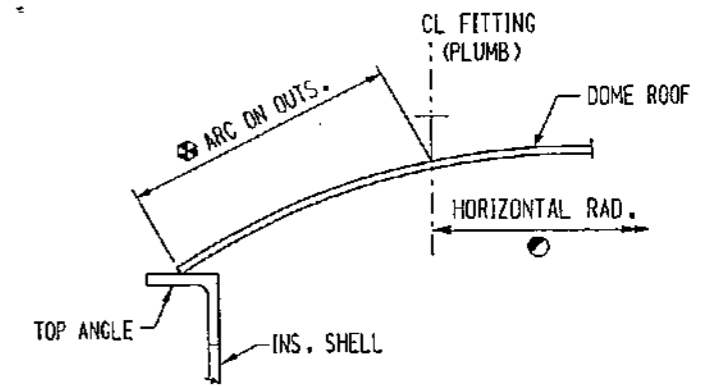
1. ALL ARC'S ARE MEASURED ON OUTSIDE OF FIRST SHELL RING UNLESS OTHERWISE NOTED.
2. ROOF NOZZLE BOLT HOLES TO STRADDLE 0°-180° CL.
3. 'X' DENOTES FIRST SHELL RING JOINTS.

STEAM CONDENSATE STORAGE TANK
 BECHTEL LTD CONTRACT No. 22854-LCC-005
 (22854-000-F-001)

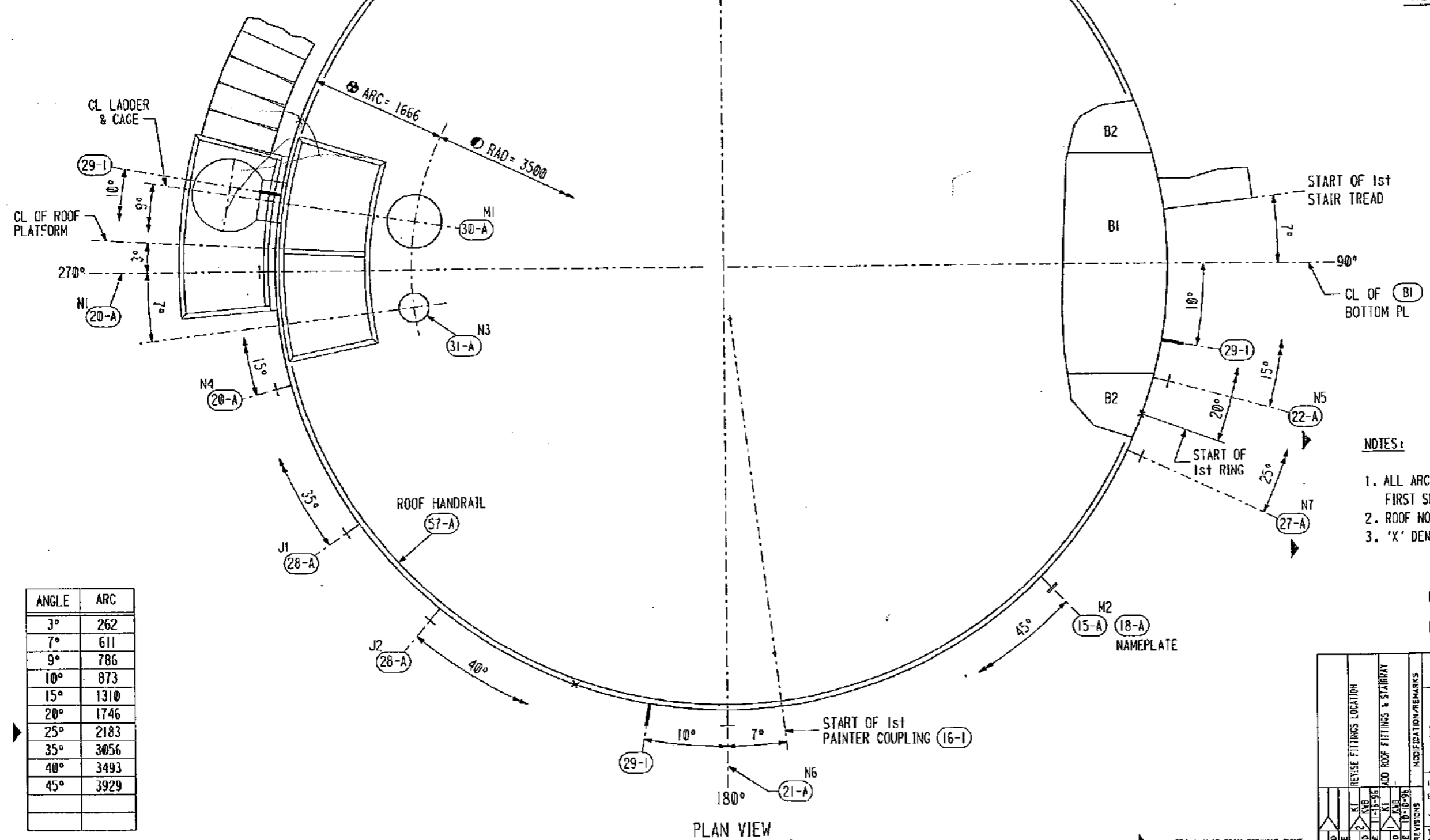
| | |
|--|----------------------------------|
| ARABIAN CBI LTD. | |
| ORIENTATION 12.5 m DIA. X 12.0 m HIGH SSDRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO III-F-001 | CONTRACT NO ED 965204 |
| BY KT R.L. HERBERT ENGINEERING SUPERVISOR | DATE 5-14-96 SHEET 2 REV 3 |
| <small>This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden.</small> | |



CL OF ROOF PL (R1) 0° 10° GROUNDING LUG (29-1)



ROOF FITTING LOCATION



PLAN VIEW

SUPPLIER DOCUMENT REVIEW
 Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods or materials developed or selected by supplier and does not relieve supplier from full compliance with contractual obligations.

1. WORK MAY PROCEED
 REVISION AND RESUBMIT, WORK MAY PROCEED SUBJECT TO INCORPORATION OF CHANGES INDICATED.

2. SUBJECT TO INCORPORATION OF CHANGES INDICATED.

3. REVISION AND RESUBMIT, WORK MAY NOT PROCEED.

4. REVIEW NOT REQUIRED, WORK MAY PROCEED.

By: *[Signature]* Date: 6/1/97
 BECHTEL LIMITED

Category Code: B2
 Equipment No. 114-F-001
 Job No. M.R. No. 22854-LCC-005
 Group: J M L P
 Reviewed: [] [] [] []

NOTES:

1. ALL ARC'S ARE MEASURED ON OUTSIDE OF FIRST SHELL RING UNLESS OTHERWISE NOTED.
2. ROOF NOZZLE BOLT HOLES TO STRADDLE 0°-180° CL
3. 'X' DENOTES FIRST SHELL RING JOINTS.

POTABLE WATER STORAGE TANK
 BECHTEL LTD CONTRACT No. 22854-LCC-005
 (22854-000-F-001)

| ANGLE | ARC |
|-------|------|
| 3° | 262 |
| 7° | 611 |
| 9° | 786 |
| 10° | 873 |
| 15° | 1310 |
| 20° | 1746 |
| 25° | 2183 |
| 35° | 3056 |
| 40° | 3493 |
| 45° | 3929 |

ARABIAN CBI LTD.

ORIENTATION
 10.0 m DIA. X 10.05 m HIGH SS DRT
 IBN RUSHD PTA AND AROMATICS PLANT PROJECT
 ARABIAN INDUSTRIAL FIBERS CO. LTD
 YANBU, SAUDI ARABIA

ITEM NO. 114-F-001 CONTRACT NO. ED 965206
 BY KI CHKD. DATE 5-28-96
 R L HERBERT
 ENGINEERING SUPERVISOR

REV 2
 SHT 2

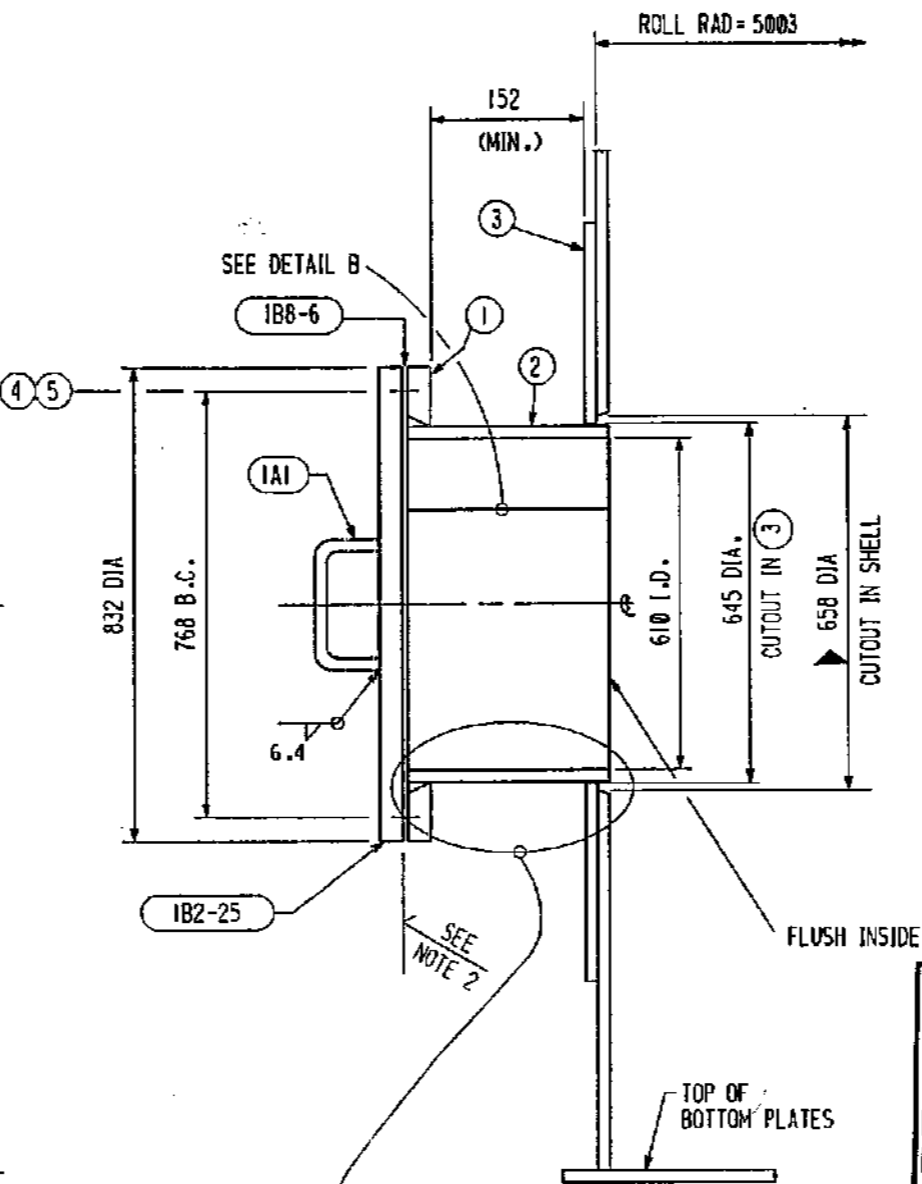
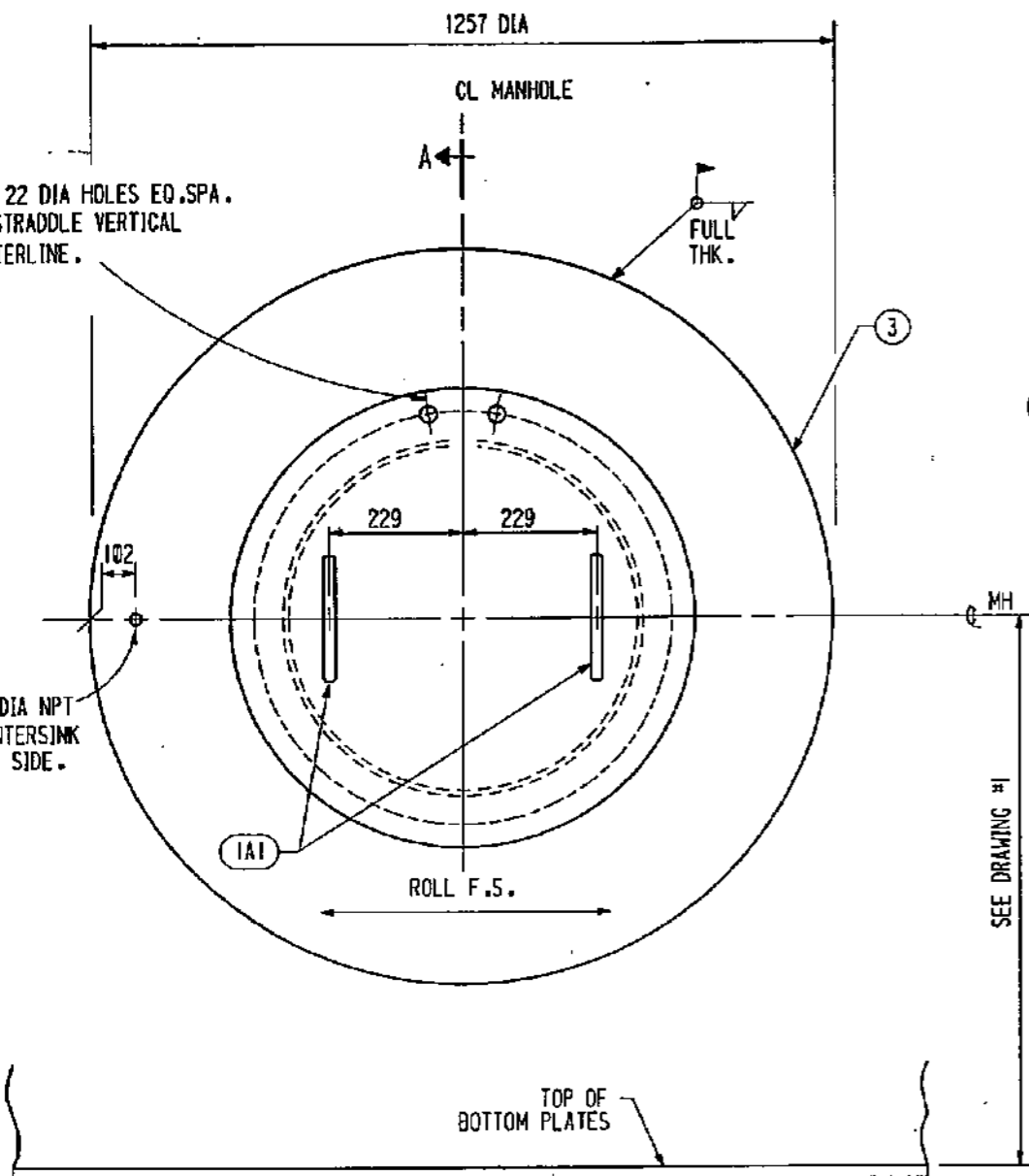
This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden.

INDICATES CHANGE FROM PREVIOUS ISSUE

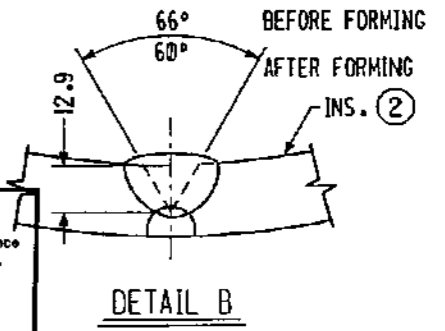
14 130 22 AUG. 21, 1996

28- 22 DIA HOLES EQ.SPA. TO STRADDE VERTICAL CENTERLINE.

1/4" DIA NPT COUNTERSINK FAR SIDE.



| SHIP FC | MARK | ASST FC | DESCRIPTION | LENGTH MM | SPEC | D |
|---------|--------|---------|---------------------------------|-----------|---------|---|
| 1 | 15-A | | 24" DIA. SHELL MANHOLE | | | |
| | 15-1 | 1 | PL SK X 18.96 (845 X 25 X 845) | | A36 | A |
| | 15-2 | 1 | PL 250 X 15.88 ROLL | 1966 | * | A |
| | 182-25 | 1 | PL SK X 25 (845 X 845) | | A36 | A |
| | | | BOLT FOR SHIPMENT W/4 BOLTS | | | |
| | IAI | 2 | RODS 5/8 DIA. BENT | 304 | A36 | C |
| 1 | 15-3 | | PL SK X 6.00 (1270 X 1270) ROLL | | A36 | A |
| 1 | 188-6 | | GASKET 745 D.D. X 3 X 610 I.D. | | ** | - |
| 30 | 15-4 | | STUD 3/4" DIA. TFL | 95 | A193-B7 | C |
| 60 | 15-5 | | NUT 3/4" DIA. HWY HEX | | A194-2H | C |
| | | | * A36 MOD | | | |
| | | | ** REINZ-AFM 37 | | | |



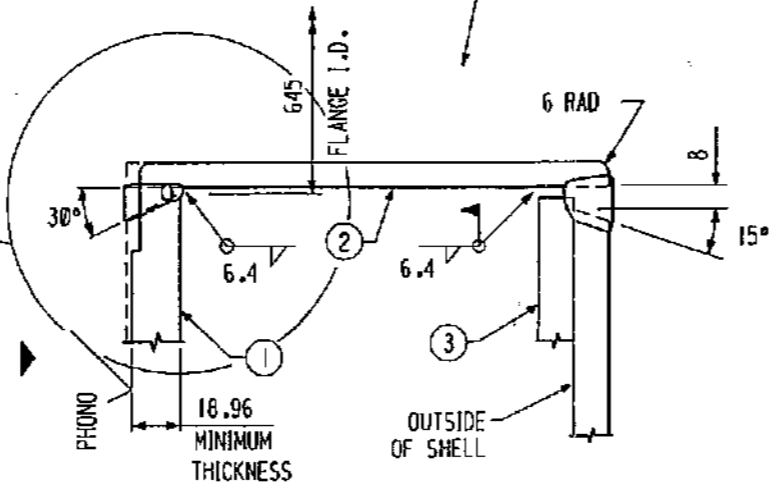
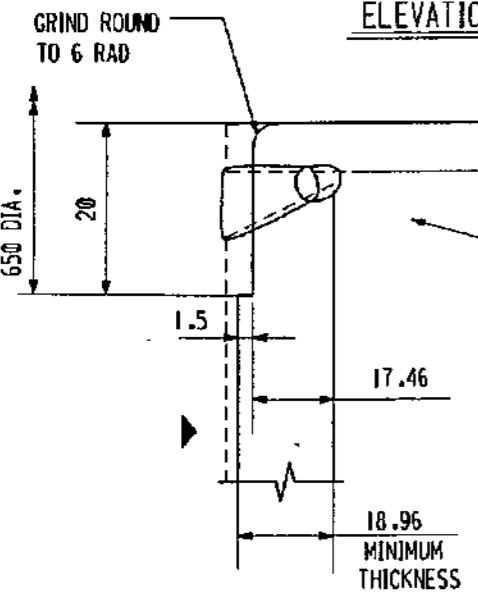
SUPPLIER DOCUMENT REVIEW
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 2. REVISE AND RESUBMIT. WORK MAY PROCEED SUBJECT TO INCORPORATION OF CHANGES INDICATED.
 3. REVISE AND RESUBMIT. WORK MAY NOT PROCEED
 4. REVIEW NOT REQUIRED. WORK MAY PROCEED

By: *[Signature]* Date: 12/9/96
 BECHTEL LIMITED

| | | | | |
|---------------|-----------|----------|------|---|
| Category Code | F-1 | | | |
| Equipment No. | 11A-F-001 | | | |
| Job No. | M.R. No. | Req. No. | Rev. | |
| 22854-LCC-005 | | 210/1 | | |
| Group | J | M | L | P |
| Reviewed | | | | |

POTABLE WATER STORAGE TANK
 BECHTEL LTD CONTRACT No. 22854-LCC-005 (22854-000-F-001)



- GENERAL NOTES**
1. LEAVE TELLTALE HOLE IN REINFORCING PLATE OPEN AFTER AIR TEST.
 2. FINISH FACE OF COVER, PHONO TO 20.6 THK. LEAVING 585 DIA. ROUGH.

INDICATES CHANGE FROM PREVIOUS ISSUE

ARABIAN CBI LTD.
 24" DIA SHELL MANHOLE (M2)
 10.0 m DIA. X 10.05 m HIGH SS DRT
 IBN RUSHD PTA AND AROMATICS PLANT PROJECT
 ARABIAN INDUSTRIAL FIBERS CO. LTD
 YANBU, SAUDI ARABIA

ITEM NO: 11A-F-001
 CONTRACT NO: ED 965206
 BY: ZW
 CHKD HSTC DATE: 5/31/96
 R L HERBERT
 ENGINEERING SUPERVISOR

DATE: 5/20/96
 DATE: 5/20/96
 DATE: 5/20/96
 DATE: 5/20/96

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65206015.DGN

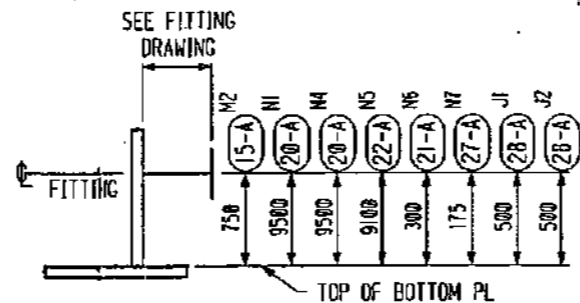
11/42/25 Aug. 15, 1996

TECHNICAL & CONSTRUCTION INFORMATION

| | |
|------------------------|-------------------------------|
| SPECIFICATIONS | API 650-9th ED.(1993/94 ADD.) |
| SPECIFIC GRAVITY | 1.00 |
| SERVICE | POTABLE WATER |
| MAX DESIGN METAL TEMP. | 85°C |
| MIN DESIGN METAL TEMP. | 17°C |
| DESIGN PRESSURE | ATMOSPHERIC |
| DESIGN VACUUM | ATMOSPHERIC |
| DESIGN LIQUID LEVEL | 10050 mm |
| DESIGN WIND VELOCITY | 140 km/h (PER API 650) |
| SEISMIC | ZONE I (I=1.0 , S=1.2) |
| ROOF LIVE LOAD | 1.2 KPa |
| NOMINAL CAPACITY | 789 m ³ |
| PUMP IN RATE | 5 m ³ /hr |
| PUMP OUT RATE | 40 m ³ /hr |
| FOUNDATION | BY OTHERS |
| CONSTRUCTION | BY ARABIAN CBI |
| CORROSION ALLOWANCE | |
| BOTTOM | 1.0 mm |
| SHELL | 1.0 mm |
| ROOF | 1.0 mm |
| STRUCTURAL | 1.0 mm |

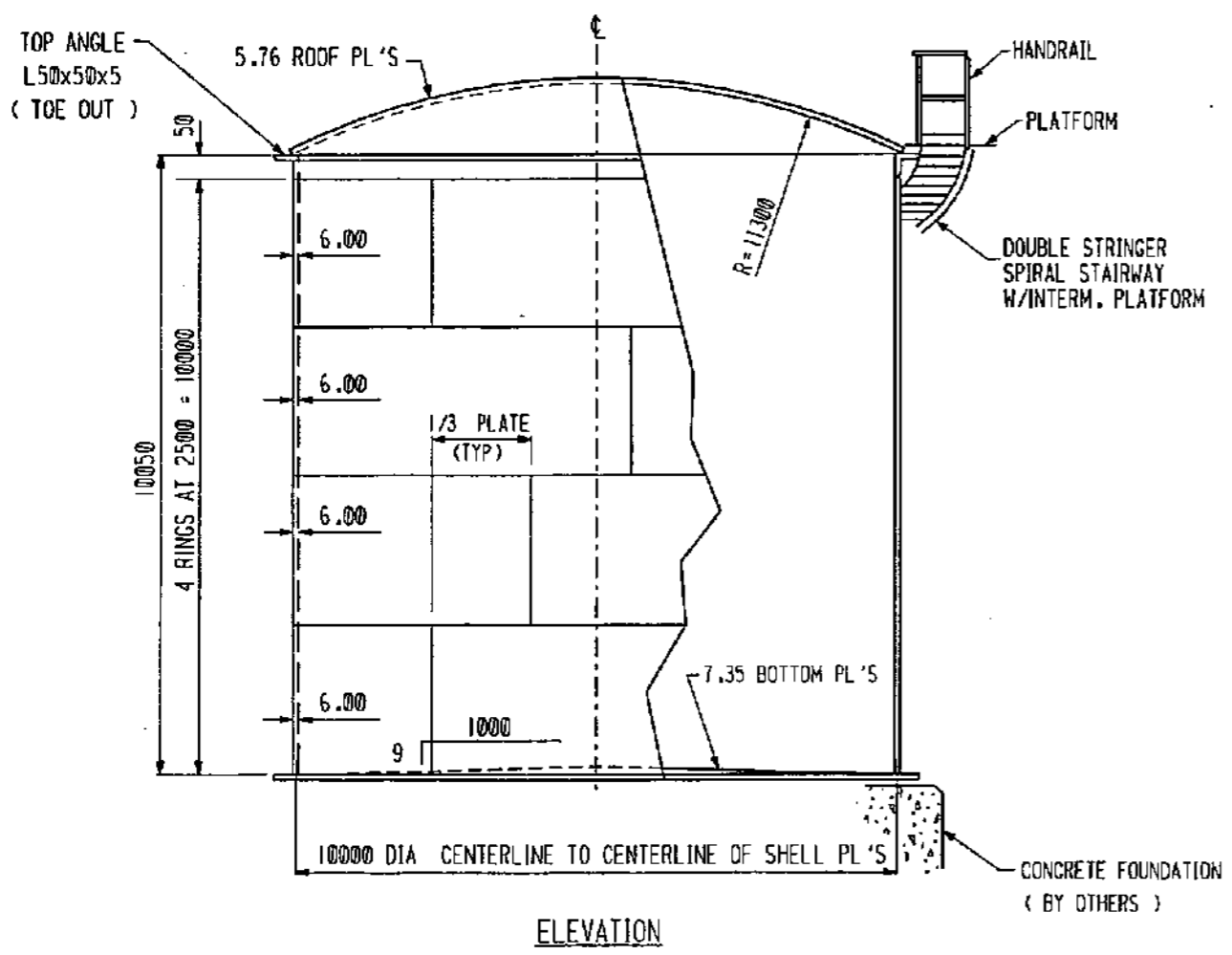
| | |
|---------------------|-------------------|
| MATERIAL SPEC | |
| BOTTOM RECT. | A36 |
| BOTTOM SKETCHES | A36 |
| SHELL PLATES | A36 |
| ROOF PLATES | A36 |
| STRUCTURAL | A36/RS+ 37-2 |
| FLANGES | A105 |
| NOZZLE NECKS | A106B |
| INTERNAL PIPE | A106B |
| INSPECTION - MILL | CTR'S |
| SHOP | ACBI |
| FIELD | ACBI & CUSTOMER |
| SURFACE PREPARATION | YES |
| PAINTING | YES |
| PWHT | NONE |
| INSULATION | NONE |
| MISC. | |
| GASKETS | REINZ-AMF37 |
| BOLTS & NUTS | A193-B7 & A194-2H |
| RADIOGRAPHY | PER CODE |
| JOINT EFFICIENCY | 0.85 |

| RING NO. | CORR. ALLOW. (mm) | DESIGN FOR PRODUCT SG = 1.0 | | DESIGN FOR TEST SG = 1.0 | | THK. USED (mm) | MATERIAL SPECIFICATION | API MAT'L GROUP NO. |
|----------|-------------------|-----------------------------|--------------------|--------------------------|--------------------|----------------|------------------------|---------------------|
| | | ALLOWABLE STRESS (MPa) | REQUIRED THK. (mm) | ALLOWABLE STRESS (MPa) | REQUIRED THK. (mm) | | | |
| 1 | 1.0 | 123.07 | 4.88 | 123.07 | 3.88 | 6.00 | A36 | I |
| 2 | 1.0 | 123.07 | 3.89 | 123.07 | 2.89 | 6.00 | A36 | I |
| 3 | 1.0 | 123.07 | 2.89 | 123.07 | 1.89 | 6.00 | A36 | I |
| 4 | 1.0 | 123.07 | 1.89 | 123.07 | 0.89 | 6.00 | A36 | I |

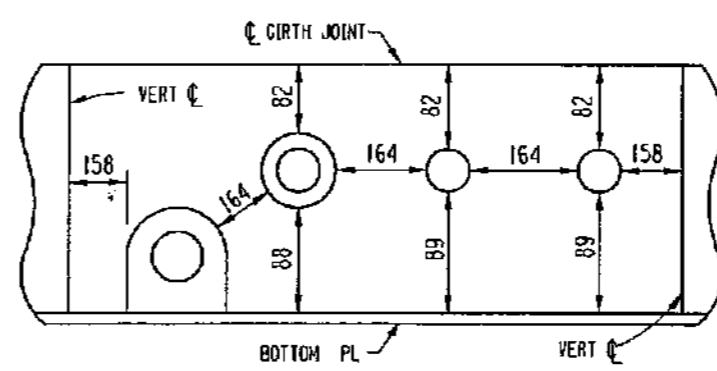


SHELL FITTING ELEVATION

| CUST. MARK | ACBI MARK | QUANT | SIZE | RATING | DESCRIPTION |
|------------|-----------|-------|------|--------|----------------------------------|
| M1 | 30-A | 1 | 24" | API | ROOF MANWAY |
| M2 | 15-A | 1 | 24" | API | SHELL MANHOLE |
| N1 | 20-A | 1 | 2" | 150 RF | SHELL NOZZLE WATER FILL |
| N3 | 31-A | 1 | 12" | 150 RF | ROOF NOZZLE VENT W/INSECT SCREEN |
| N4 | 20-A | 1 | 2" | 150 RF | SHELL NOZZLE PUMP SPILLBACK |
| N5 | 22-A | 1 | 4" | 150 RF | SHELL NOZZLE WATER OVERFLOW |
| N6 | 21-A | 1 | 6" | 150 RF | SHELL NOZZLE PUMP SUCTION |
| N7 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE DRAIN |
| J1 | 20-A | 1 | 4" | 150 RF | SHELL NOZZLE LIC |
| J2 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LSL |
| DWC#18 | | 1 | | | NAMEPLATE |
| DWC#50 | | 1 | | | PERIPHERAL HANDRAIL |
| DWC#29 | | 4 | | | SPIRAL STAIRWAY |
| | | | | | GROUNDING LUG |
| | | | | 1 SET | CATHODIC PROTECTION (EXT./INT.) |



ELEVATION



SKETCH 'A' (BOTTOM RING ONLY)

GENERAL NOTES:

- FITTINGS TO BE LOCATED AS SHOWN ON ORIENTATION DRAWING(S). IF LOCATIONS ARE NOT GIVEN, LOCATE IN FIELD TO SUIT CUSTOMER MAINTAINING MINIMUM SPACING SHOWN IN SKETCH 'A'. DIMENSIONS GIVEN ARE FROM EDGE TO EDGE OF REINFORCING PL OR FROM CL OF BUTT WELD TO EDGE OF REINFORCING PL.
- FLANGE BOLT HOLES TO STRADDLE VERTICAL CENTERLINE FOR SHELL NOZZLES.
- FLANGE BOLT HOLES TO STRADDLE 0°-180° CENTERLINE FOR ROOF NOZZLES.
- SEE SHEETS 000 & 002 FOR MATERIAL MANAGEMENT.

SUPPLIER DOCUMENT REVIEW

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1. WORK MAY PROCEED

2. REVISE AND RESUBMIT. WORK MAY PROCEED SUBJECT TO INCORPORATION OF CHANGES INDICATED.

3. REVISE AND RESUBMIT. WORK MAY NOT PROCEED

4. REVIEW NOT REQUIRED. WORK MAY PROCEED.

By: *Ali* Date: 12/9/96

BECHTEL LIMITED

Category Code: B2

Equipment No.: 114-F-001

Job No.: M.R. No.: Seq. No. Rev.

22854-LCC-005-17/2

Group: J M L P

Reviewed: [] [] [] [] [] [] [] [] [] []

POTABLE WATER STORAGE TANK

BECHTEL LTD CONTRACT No. 22854-LCC-005 (22854-000-F-001)

ARABIAN CBI LTD.

GENERAL ARRANGEMENT

10.0 m DIA. X 10.05 m HIGH SS DRT

IBN RUSHD PTA AND AROMATICS PLANT PROJECT

ARABIAN INDUSTRIAL FIBERS CO. LTD

YANBU, SAUDI ARABIA

ITEM NO: 114-F-001 CONTRACT NO: ED 965206

BY: Key CHKD HSTC DATE 3/15/96

R I HERBERT DWG 1 REV 2

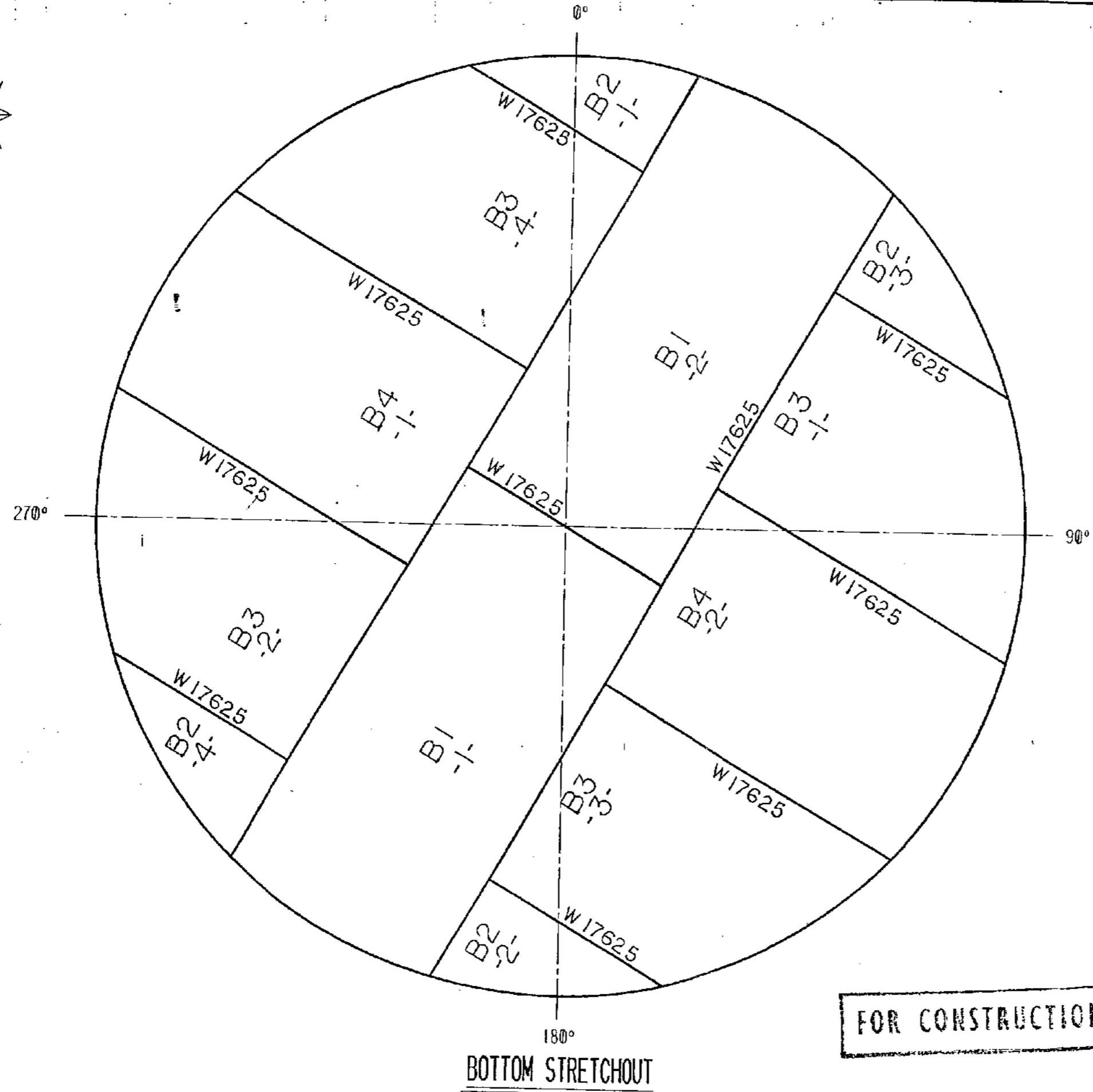
ENGINEERING SUPERVISOR SMT

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65206001.DGN

INDICATES CHANGE FROM PREVIOUS ISSUE

| NAME OF WELDER | I.D. |
|----------------|-------|
| J. H. PATEL | 17625 |
| | |
| | |
| | |
| | |
| | |
| | |



FOREMAN :

1. RECORD WELDERS' I.D. ON EACH JOINT.
2. RECORD JOINT ID AND RT INTERVALS (FIRST & LAST FOR 100%) OR LOCATION FOR SPOT RADIOGRAPHS OR PLUGS.

WHEN COMPLETE

FOREMAN :
 SEND CONSTRUCTION OFFICE ONE LEGIBLE COPY AND WORK COPIES IF ANY

N.A. UNAIKH
SARCO

CAUSTIC STORAGE TANK
 BECHTEL LTD CONTRACT No. 22854-LCC-005

FOR CONSTRUCTION

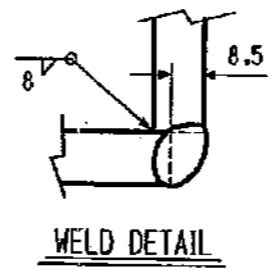
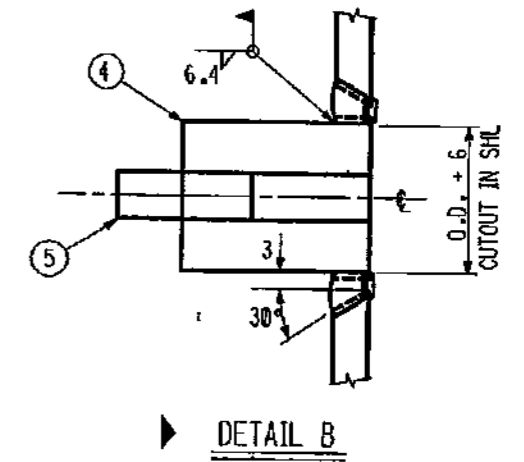
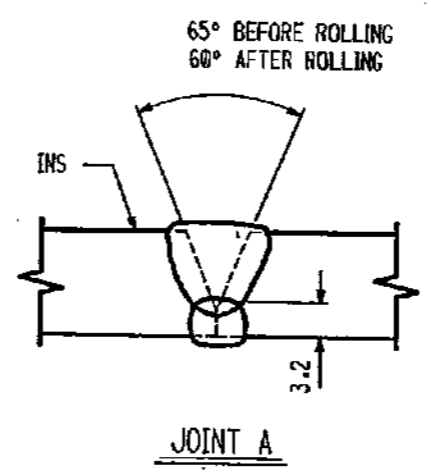
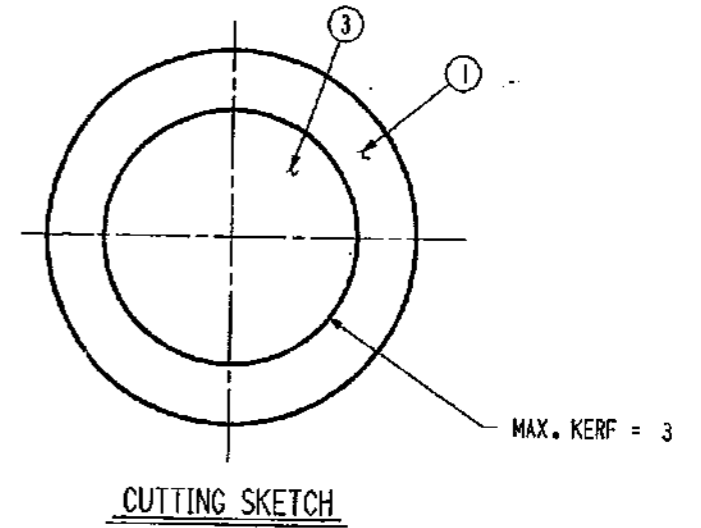
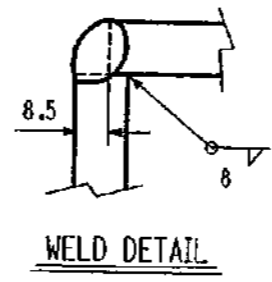
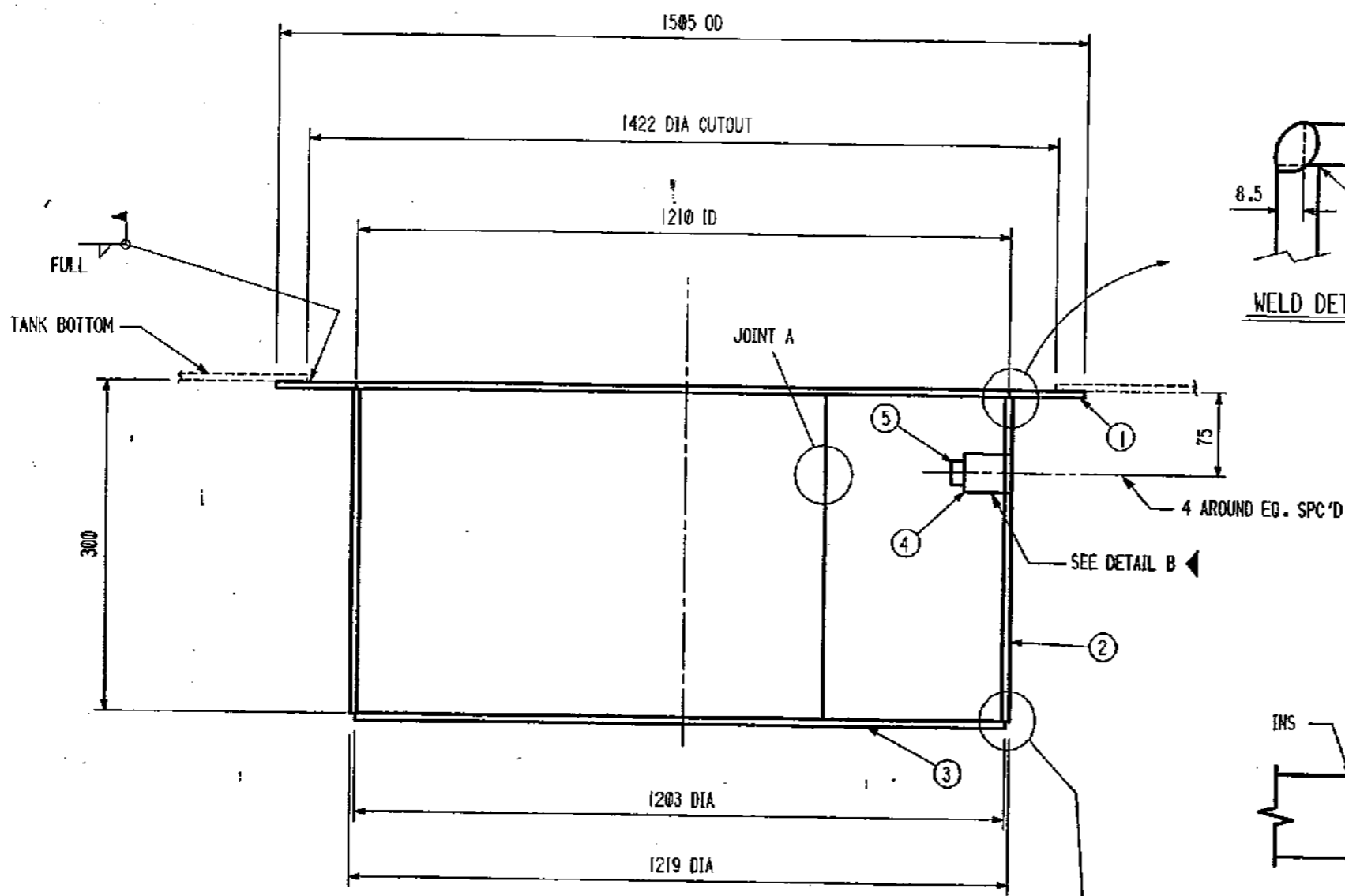
BOTTOM STRETCHOUT

| | | | |
|---|-------------------------|--|-----------|
| | | ARABIAN CBI LTD. | |
| | | BOTTOM STRETCHOUT 10.0 m DIA. X 13.0 m HIGH SSRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO | 124-F-001 | CONTRACT NO | ED 965203 |
| BY | ZH CHKD RLH DATE 7/8/96 | DWG | B2 |
| ENGINEERING SUPERVISOR | R L HERBERT | REV | 0 |
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INDICATES CHANGE FROM PREVIOUS ISSUE

JAN 11 1991

| SHIP PC | MARK | ASST PC | DESCRIPTION | LENGTH MM | SPEC | ID |
|---------|------|---------|-----------------------------------|-----------|------|----|
| 1 | 17-A | | 1219 DIA API 650 SUMP | | | |
| | 17-1 | 1 | PL 1505 OD x 12.70 x 1210 ID | | A36 | Bc |
| | 17-2 | 1 | PL 287 x 12.70 ROLL | 3790 | A36 | Bc |
| | 17-3 | 1 | PL 1203 DIA x 12.70 (C/W 17-1) | | A36 | Bc |
| | 17-4 | 4 | HALF CPLG 1" DIA 3000 CLASS THRD | | A105 | Bc |
| | 17-5 | 4 | 1" THRD PIPE PLUG | | CS | C |



-FIELD NOTE-
BE SURE THAT CONTOUR OF GROUND IS SHAPED TO PROVIDE AS FIRM A SUPPORT FOR THE SUMP AND THE BOTTOM ADJACENT TO THE SUMP AS IS PROVIDED FOR THE REMAINDER OF THE BOTTOM.

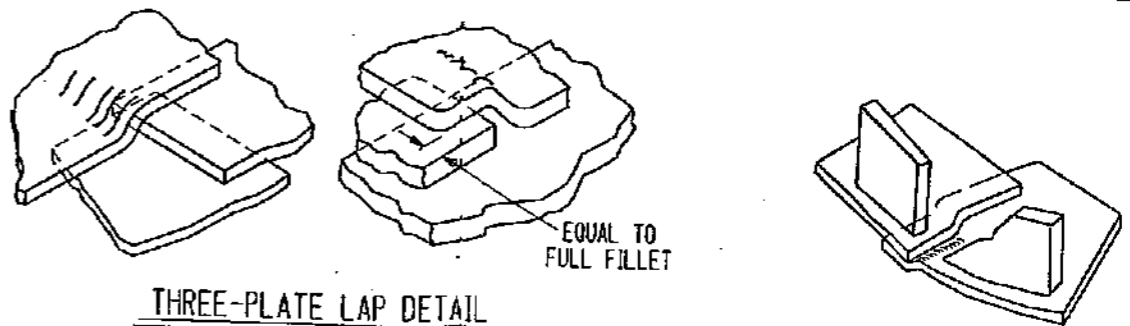
STEVE COYLE
SABCO QA/DC
16 MAY 1990

AS-BUILT
KTI AC/BJ

CAUSTIC STORAGE TANK
BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

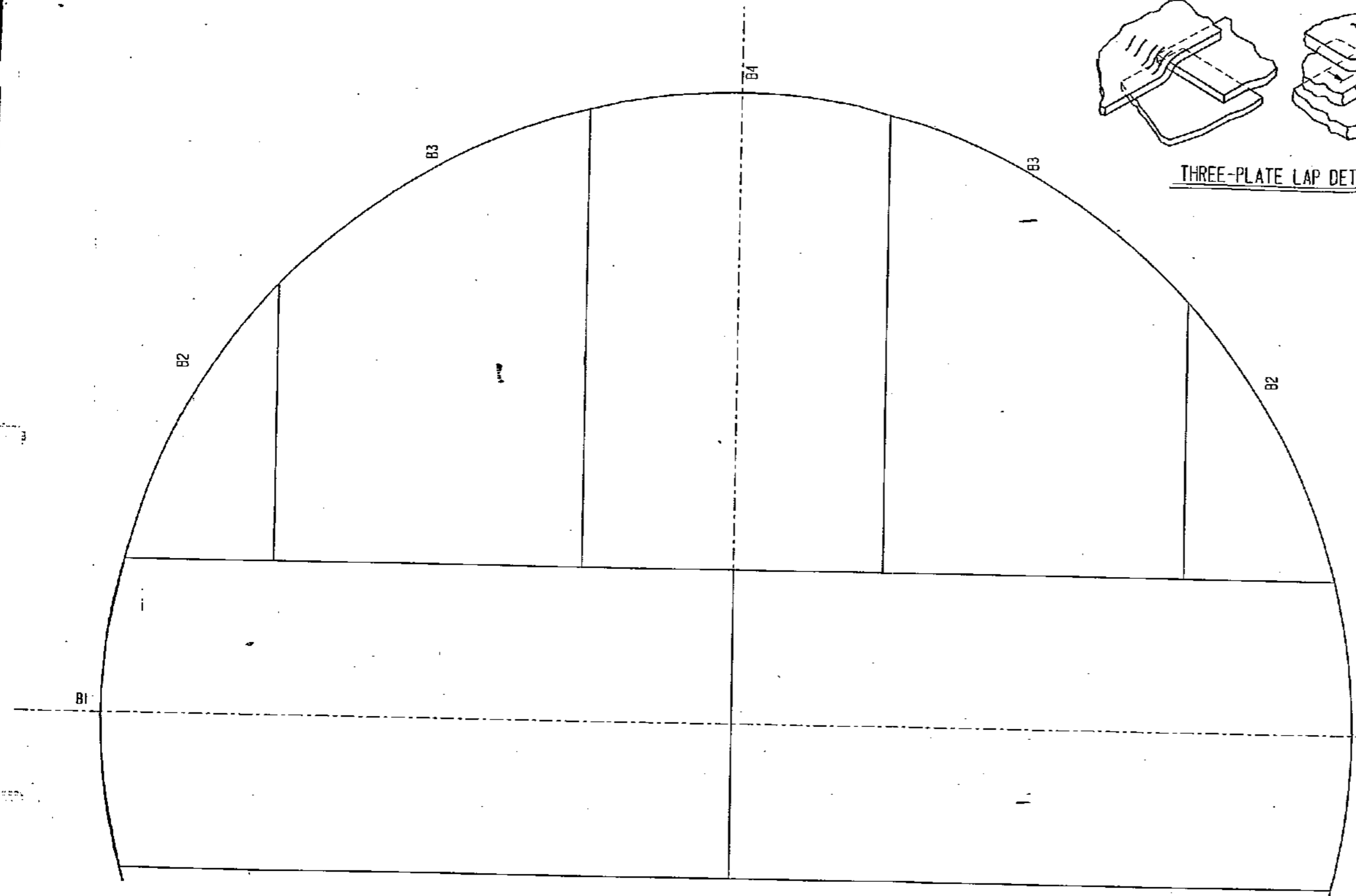
| | | | |
|---|--------------------------|---|-----------|
| | | ARABIAN CBI LTD. | |
| (48" DIA.) 1219 DIA. API 650 SUMP 10.0M DIA. X 13.0M HIGH SSDRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | | | |
| ITEM NO 124-F-001 | CONTRACT NO ED 965203 | BY ZW CHKD HSTG DATE 4/18/96 | ENG 17 |
| ENGINEERING SUPERVISOR R L HERBERT | SHIT 2 | This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden. | |

INDICATES CHANGE FROM PREVIOUS ISSUE



THREE-PLATE LAP DETAIL

BREAKDOWN LAP OF SKETCH PLATE



AS-BUILT
RTT AZP

at
IR
1 Jun 99

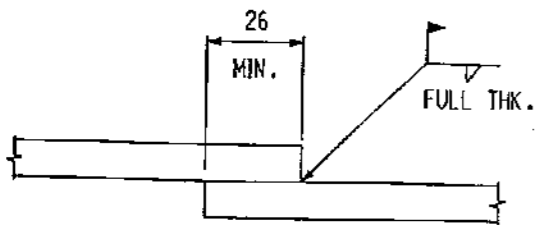
STEVE COYLE
SABCO QA/QC
16 MAY 1999

SYMMETRICAL ABOUT CL

WORK THIS DRAWING WITH DRAWING #6

CAUSTIC STORAGE TANK

BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)



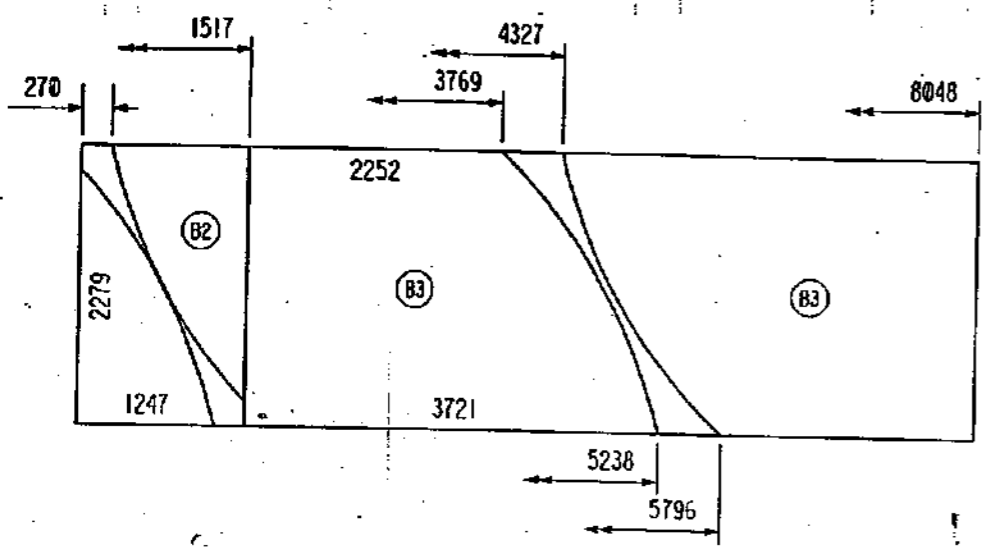
TYP SECTION THRU LAP

HALF PLAN OF BOTTOM
ALL LAPS 26 MM
46 METERS OF 7.35 LAP WELD
DIMENSIONS ARE TO EDGE OF PLATE
ON WHICH THEY APPEAR
BURN & TAN RAD = 5094

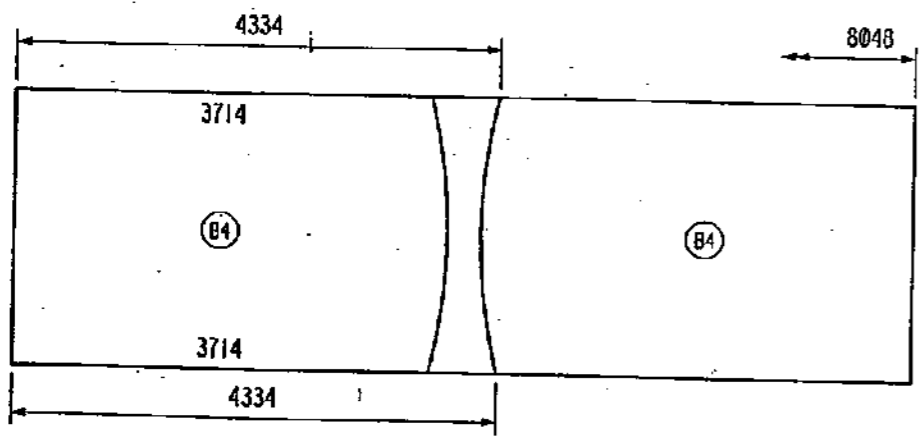
INDICATES CHANGE FROM PREVIOUS ISSUE

| | | | |
|---|---------------|-------------------------|-----------|
| | | ARABIAN CBI LTD. | |
| BOTTOM ASSEMBLY 10.0M DIA. X 13.0M HIGH SSORT 1BN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | | | |
| ITEM NO | 124-F-001 | CONTRACT NO | ED 965203 |
| BY | MSTC CHKD KWB | DATE | 4-12-96 |
| BY | R L HERBERT | DWG | 5 |
| ENGINEERING SUPERVISOR | | SHT | 0 |
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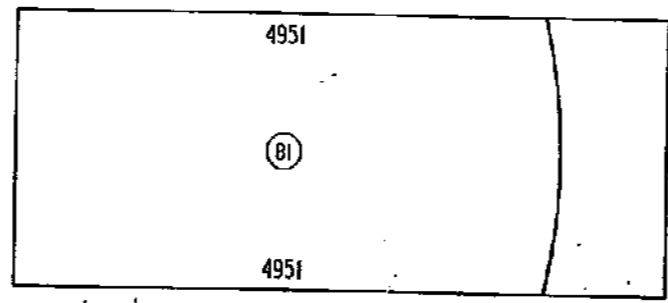
14:59:15 APR 23 1996



80 (2) REQUIRED



80 (1) REQUIRED



61 (2) REQUIRED

WORK THIS DRAWING WITH DRAWING #5
BURN RAD = 5094

| SHIP PC | MARK | ASSN PC | DESCRIPTION | LENGTH MM | SPEC | ID |
|---------|------|---------|--------------|-----------|------|----|
| | | | --SKETCHES-- | | | |
| 2 | B1 | | PL-SK X 7.35 | | A36 | A |
| 4 | B2 | | PL-SK X 7.35 | | A36 | A |
| 4 | B3 | | PL-SK X 7.35 | | A36 | A |
| 2 | B4 | | PL-SK X 7.35 | | A36 | A |

THEORETICAL WT OF APPLIED MATERIAL
FOR CUTTING SKETCHES = 5241
TOTAL MATERIAL REQUIRED FOR SKETCHES
(3) - PL-2500 X 7.35 X 8048
(2) - PL-2500 X 7.35 X 6096

STEVE COYLE
SABCO QA/QC
16 MAY 1999

IR
1 Jun 99

AS-BUILT
KTT ACBI

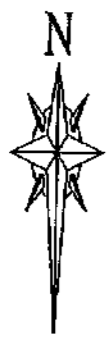
CAUSTIC STORAGE TANK
BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

| | | | |
|---|-----------------------|-------------------------|-----------|
| | | ARABIAN CBI LTD. | |
| BOTTOM SKETCHES 10.0M DIA. X 13.0M HIGH SSDRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | | | |
| ITEM NO | 124-F-001 | CONTRACT NO | ED 965203 |
| BY | MSIG CHKD R L HERBERT | DATE | 4-12-96 |
| ENGINEERING SUPERVISOR | R L HERBERT | DWG | 6 |
| REVISIONS | | SHT | 0 |
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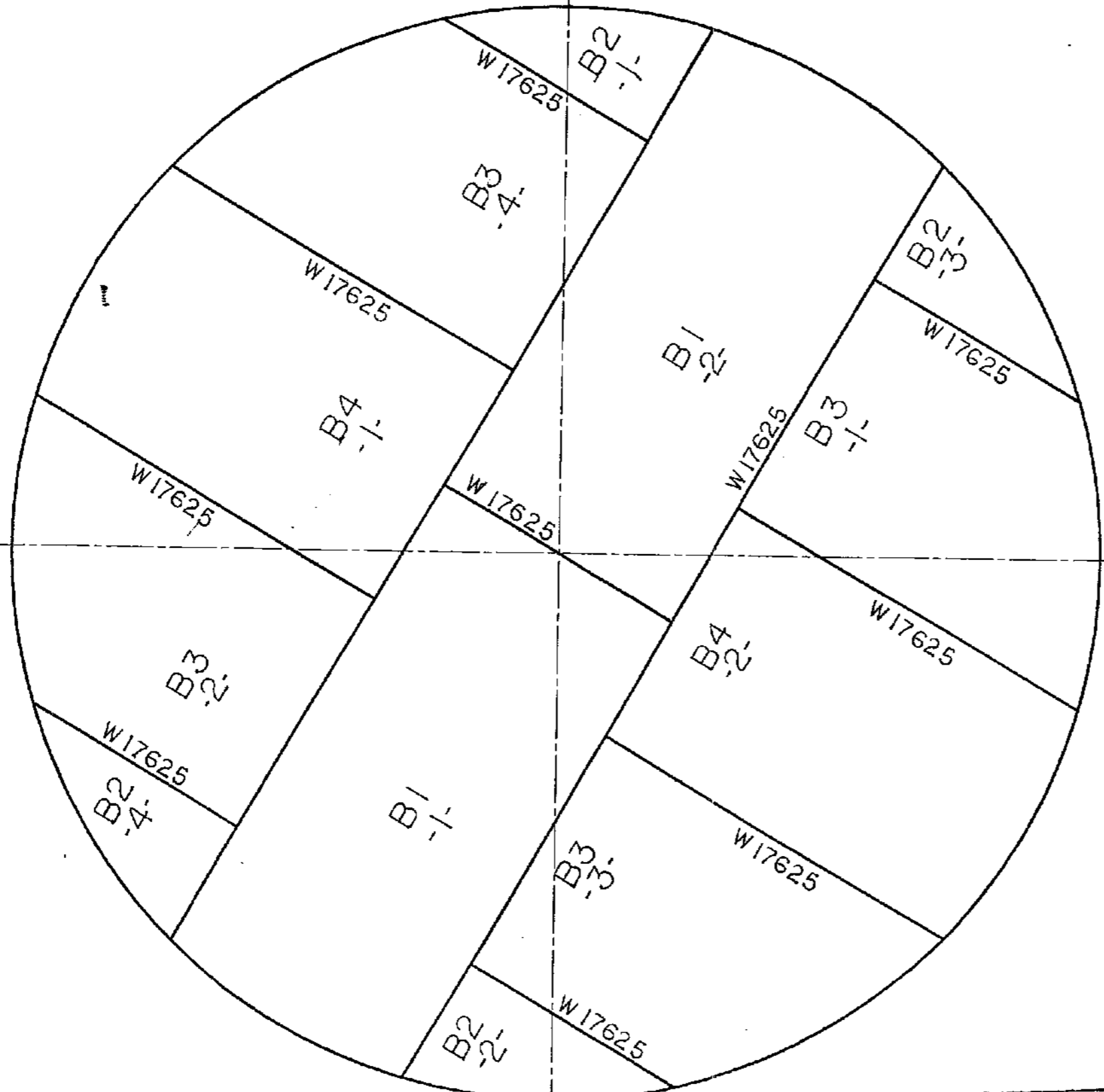
INDICATES CHANGE FROM PREVIOUS ISSUE

65203006.DGN

| NAME OF WELDER | I.D. |
|----------------|-------|
| J. H. PATEL | 17625 |
| | |
| | |
| | |
| | |
| | |
| | |



270°



FOREMAN:

1. RECORD WELDERS' I.D. ON EACH JOINT.
2. RECORD JOINT ID AND RT INTERVALS (FIRST & LAST FOR 100%) OR LOCATION FOR SPOT RADIOGRAPHS OR PLUGS.

WHEN COMPLETE

FOREMAN:
SEND CONSTRUCTION OFFICE ONE LEGIBLE COPY AND WORK COPIES IF ANY

N.A. UMAYYON
SARCO

CAUSTIC STORAGE TANK
BECHTEL LTD CONTRACT No. 22854-LCC-005

FOR CONSTRUCTION

180°
BOTTOM STRETCHOUT

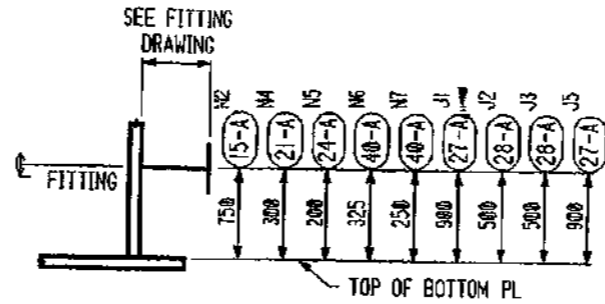
INDICATES CHANGE FROM PREVIOUS ISSUE

| | | | |
|-----------|-------------|---|-----------|
| | | ARABIAN CBI LTD. | |
| | | BOTTOM STRETCHOUT 10.0 m DIA. X 13.0 m HIGH SSDRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| ITEM NO | 124-F-001 | CONTRACT NO | ED 965203 |
| BY | ZH | CHKD | RLH |
| DATE | 7/8/96 | DATE | |
| BY | R L HERBERT | ENG | R2 |
| DATE | | SHT | 0 |
| REVISIONS | | ENGINEERING SUPERVISOR | |
| BY | | This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden. | |
| DATE | | | |

TECHNICAL & CONSTRUCTION INFORMATION

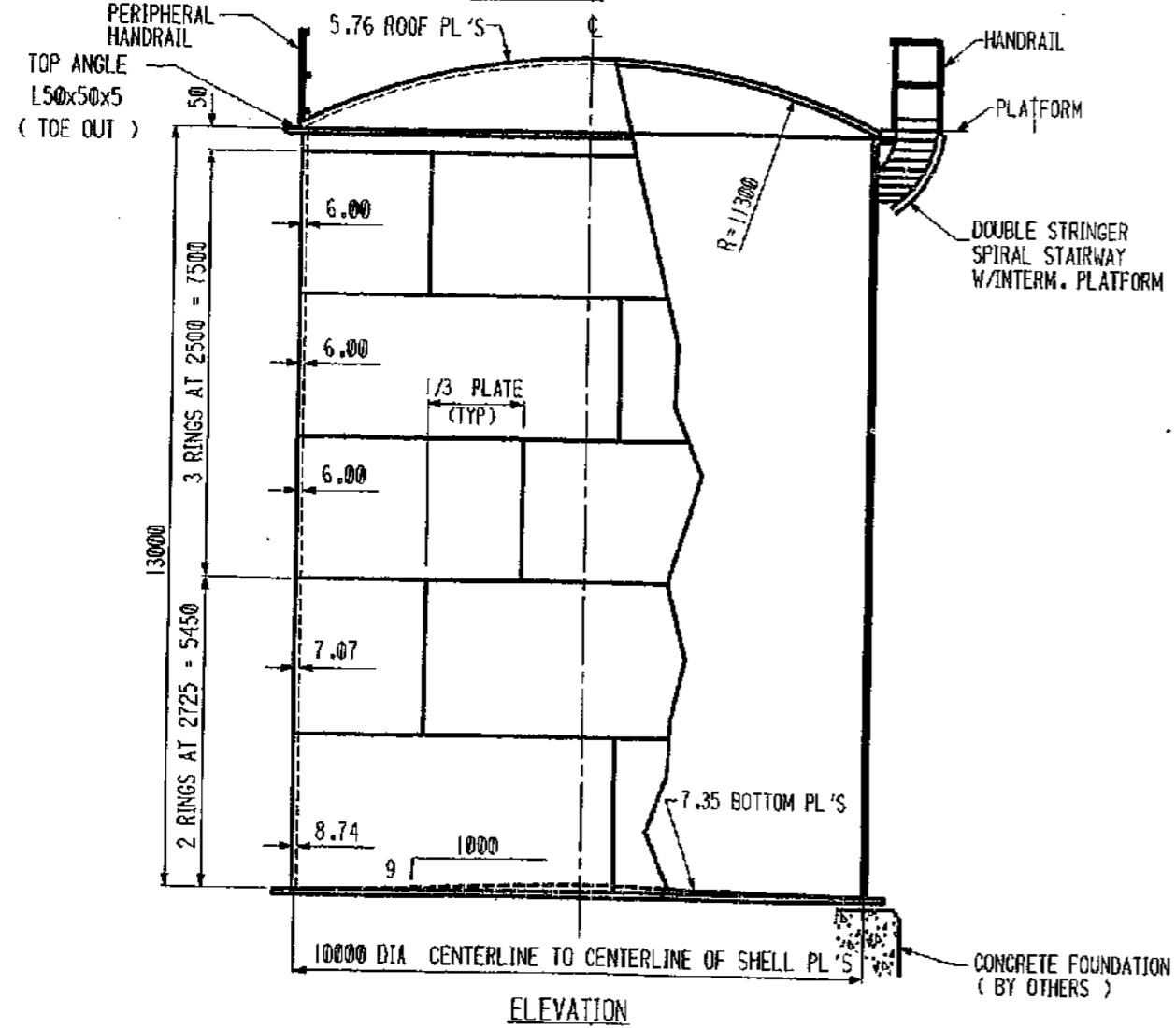
| SPECIFICATIONS | API 650-9th ED. (1993/94 ADD.) | MATERIAL SPEC |
|------------------------|--------------------------------|---------------------------------|
| SPECIFIC GRAVITY | 1.53 | BOTTOM RECT. — A36 |
| SERVICE | 50% CAUSTIC | BOTTOM SKETCHES — A36 |
| MAX DESIGN METAL TEMP. | 85°C | SHELL PLATES — A36 |
| MIN DESIGN METAL TEMP. | 17°C | ROOF PLATES — A36 |
| DESIGN PRESSURE | ATMOSPHERIC | STRUCTURAL — A36 / RSt 37-2 |
| DESIGN VACUUM | ATMOSPHERIC | FLANGES — A105 |
| DESIGN LIQUID LEVEL | 13000 mm | NOZZLE NECKS — A106B |
| DESIGN WIND VELOCITY | 140 Km/h (PER API 650) | INTERNAL PIPE — A106B ; MONEL |
| SEISMIC | ZONE I (I=1.25 , S=1.2) | INSPECTION - MILL — CTR'S |
| ROOF LIVE LOAD | 1.2 KPa | SHOP — ACBI |
| NOMINAL CAPACITY | 1018 m ³ | FIELD — ACBI & CUSTOMER |
| PUMP IN RATE | 50 m ³ /hr | SURFACE PREPARATION — YES |
| PUMP OUT RATE | 21 m ³ /hr | PAINTING — YES |
| FOUNDATION | BY OTHERS | PWHT — YES (FIELD) |
| CONSTRUCTION | BY ARABIAN CBI | INSULATION — YES |
| ERROSTION ALLOWANCE | | MISC. |
| BOTTOM | 1.0 mm | BOLT & NUTS — A193-B7 & A194-2H |
| SHELL | 1.0 mm | GASKETS — REINZ-AMF34 |
| ROOF | 1.0 mm | RADIOGRAPHY — PER CODE |
| STRUCTURAL | 1.0 mm | JOINT EFFICIENCY — 0.85 |

| RING NO. | CORR. ALLOW. (mm) | DESIGN FOR PRODUCT STRESS MPa | | DESIGN FOR TEST STRESS MPa | | THK. USED (mm) | MATERIAL SPECIFICATION | API MAT'L GROUP NO. |
|----------|-------------------|-------------------------------|----------|----------------------------|----------|----------------|------------------------|---------------------|
| | | ALLOWABLE | REQUIRED | ALLOWABLE | REQUIRED | | | |
| 1 | 1.0 | 123.07 | 8.74 | 123.07 | 5.06 | 8.74 | A36 | 1 |
| 2 | 1.0 | 123.07 | 7.07 | 123.07 | 3.97 | 7.07 | A36 | 1 |
| 3 | 1.0 | 123.07 | 5.41 | 123.07 | 2.89 | 6.00 | A36 | 1 |
| 4 | 1.0 | 123.07 | 3.89 | 123.07 | 1.89 | 6.00 | A36 | 1 |
| 5 | 1.0 | 123.07 | 2.37 | 123.07 | 0.89 | 6.00 | A36 | 1 |

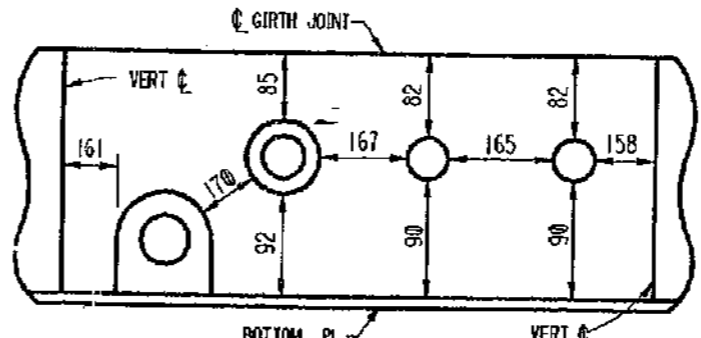


SHELL FITTING ELEVATION

| LIST OF FITTINGS | | | | | |
|------------------|-----------|-------|-------|--------|----------------------------------|
| CUST. MARK | ACBI MARK | QUANT | SIZE | RATING | DESCRIPTION |
| M1 | 30-A | 1 | 24" | API | ROOF MANWAY |
| M2 | 15-A | 1 | 24" | API | SHELL MANHOLE |
| N1 | 32-A | 1 | 3" | 150 RF | ROOF NOZZLE CAUSTIC FILL |
| N2 | 33-A | 1 | 2" | 150 RF | ROOF NOZZLE PUMP SPILLBACK |
| N3 | 31-A | 1 | 12" | 150 RF | ROOF NOZZLE VENT W/INSECT SCREEN |
| N4 | 21-A | 1 | 6" | 150 RF | SHELL NOZZLE PUMP SUCTION |
| N5 | 24-A | 1 | 4" | 150 RF | SHELL NOZZLE DRAIN W/INT. |
| N6 | 40-A | 1 | 8"/2" | 150 RF | SHELL NOZZLE STEAM COIL INLET |
| N7 | 40-A | 1 | 8"/2" | 150 RF | SHELL NOZZLE STEAM COIL OUTLET |
| J1 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE TIC |
| J2 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LT |
| J3 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LSHH |
| J5 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE TI |
| DWG#18 | | 1 | | | NAMEPLATE |
| | | 1 | | | PERIPHERAL HANDRAIL |
| DWG#50 | | 1 | | | SPIRAL STAIRWAY |
| DWG#29 | | 4 | | | GROUNDING LUG |
| DWG#41 | | | | | HEATER COIL |
| 17-A | | 1 | 48" | | SUMP |
| DWG#12-13 | | | | | INSULATION SUPPORT |
| | | | | | ROOF PLATFORM |
| | | 1 SET | | | CATHODIC PROTECTION (EXT.) |



ELEVATION



SKETCH 'A'
(BOTTOM RING ONLY)

- GENERAL NOTES:
- FITTINGS TO BE LOCATED AS SHOWN ON ORIENTATION DRAWING(S) . IF LOCATIONS ARE NOT GIVEN, LOCATE IN FIELD TO SUIT CUSTOMER MAINTAINING MINIMUM SPACING SHOWN IN SKETCH 'A'. DIMENSIONS GIVEN ARE FROM EDGE TO EDGE OF REINFORCING PL OR FROM CL OF BUTT WELD TO EDGE OF REINFORCING PL.
 - FLANGE BOLT HOLES TO STRADDLE VERTICAL CENTERLINE FOR SHELL NOZZLES.
 - FLANGE BOLT HOLES TO STRADDLE 0°-180° CENTERLINE FOR ROOF NOZZLES.
 - SEE SHEETS 800 & 802 FOR MATERIAL MANAGEMENT.

Aut
IR
15 Jun 99

STEVE COYLE
SABCO QA/QC
16 MAY 1999

AS-BUILT
RTT ACBI

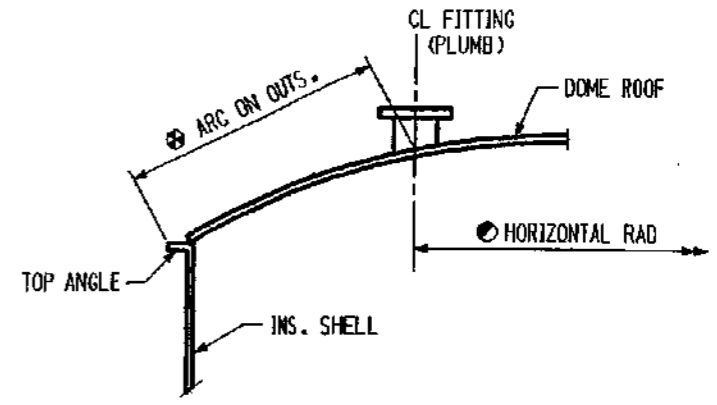
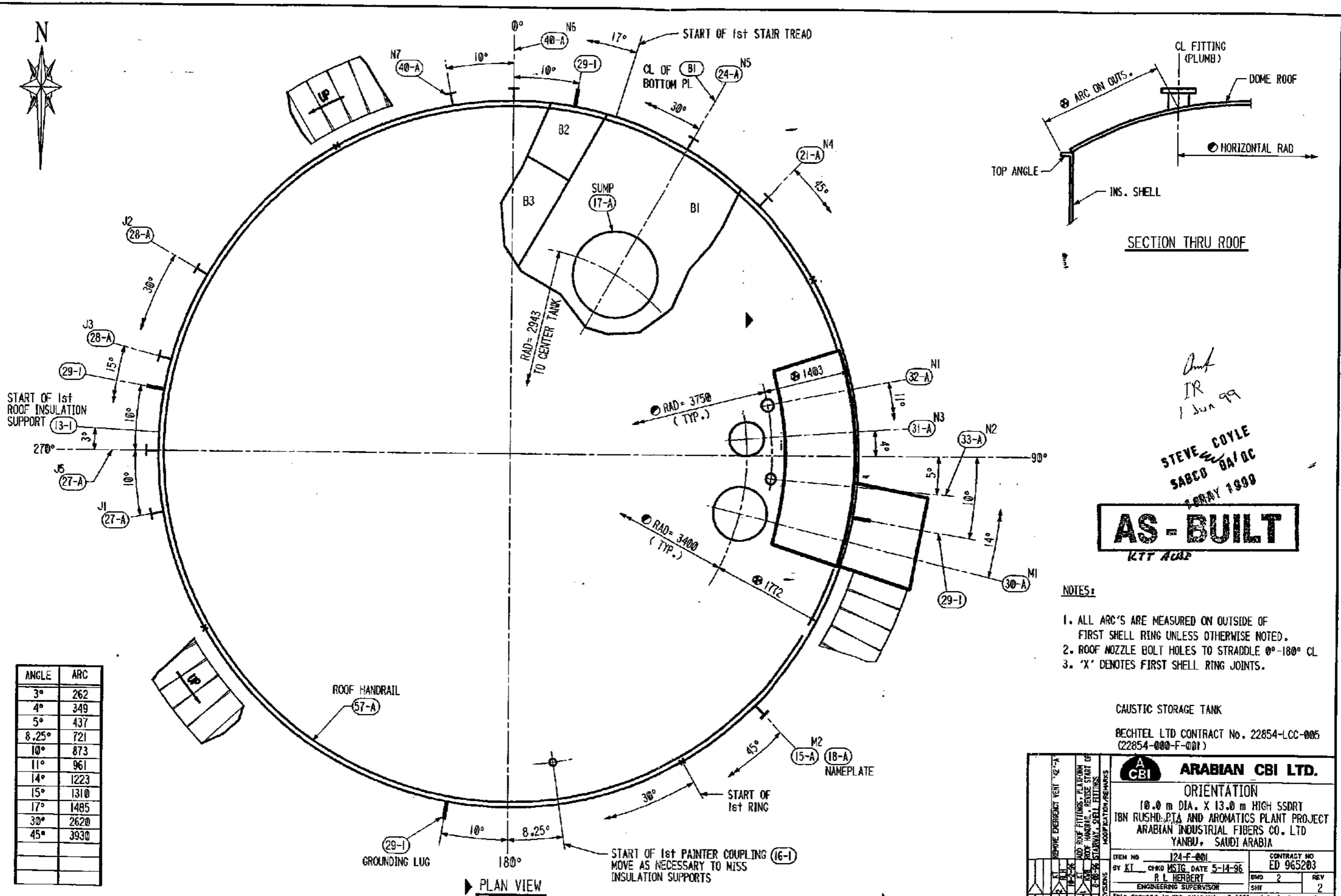
CAUSTIC STORAGE TANK
BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

| REVISIONS | | MODIFICATION/REMARKS | |
|-----------|------|----------------------|------|
| BY | DATE | BY | DATE |
| BY | DATE | BY | DATE |
| BY | DATE | BY | DATE |
| BY | DATE | BY | DATE |

| | | | |
|---------|---------------------------|-------------|-----------|
| ITEM NO | 124-F-001 | CONTRACT NO | ED 965203 |
| BY | Key CHD MSTG DATE 3-15-96 | DWG | 1 |
| | R L HERBERT | REV | 5 |
| | ENGINEERING SUPERVISOR | SHT | |

This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden.

INDICATES CHANGE FROM PREVIOUS ISSUE



SECTION THRU ROOF

Ant
IR
1 Jun 99
STEVE COYLE
SABCO BA/DC
MAY 1999

AS-BUILT
KTT ACB

- NOTES:
1. ALL ARC'S ARE MEASURED ON OUTSIDE OF FIRST SHELL RING UNLESS OTHERWISE NOTED.
 2. ROOF NOZZLE BOLT HOLES TO STRADDLE 0°-180° CL.
 3. 'X' DENOTES FIRST SHELL RING JOINTS.

| ANGLE | ARC |
|-------|------|
| 3° | 262 |
| 4° | 349 |
| 5° | 437 |
| 8.25° | 721 |
| 10° | 873 |
| 11° | 961 |
| 14° | 1223 |
| 15° | 1310 |
| 17° | 1485 |
| 30° | 2620 |
| 45° | 3930 |
| | |
| | |

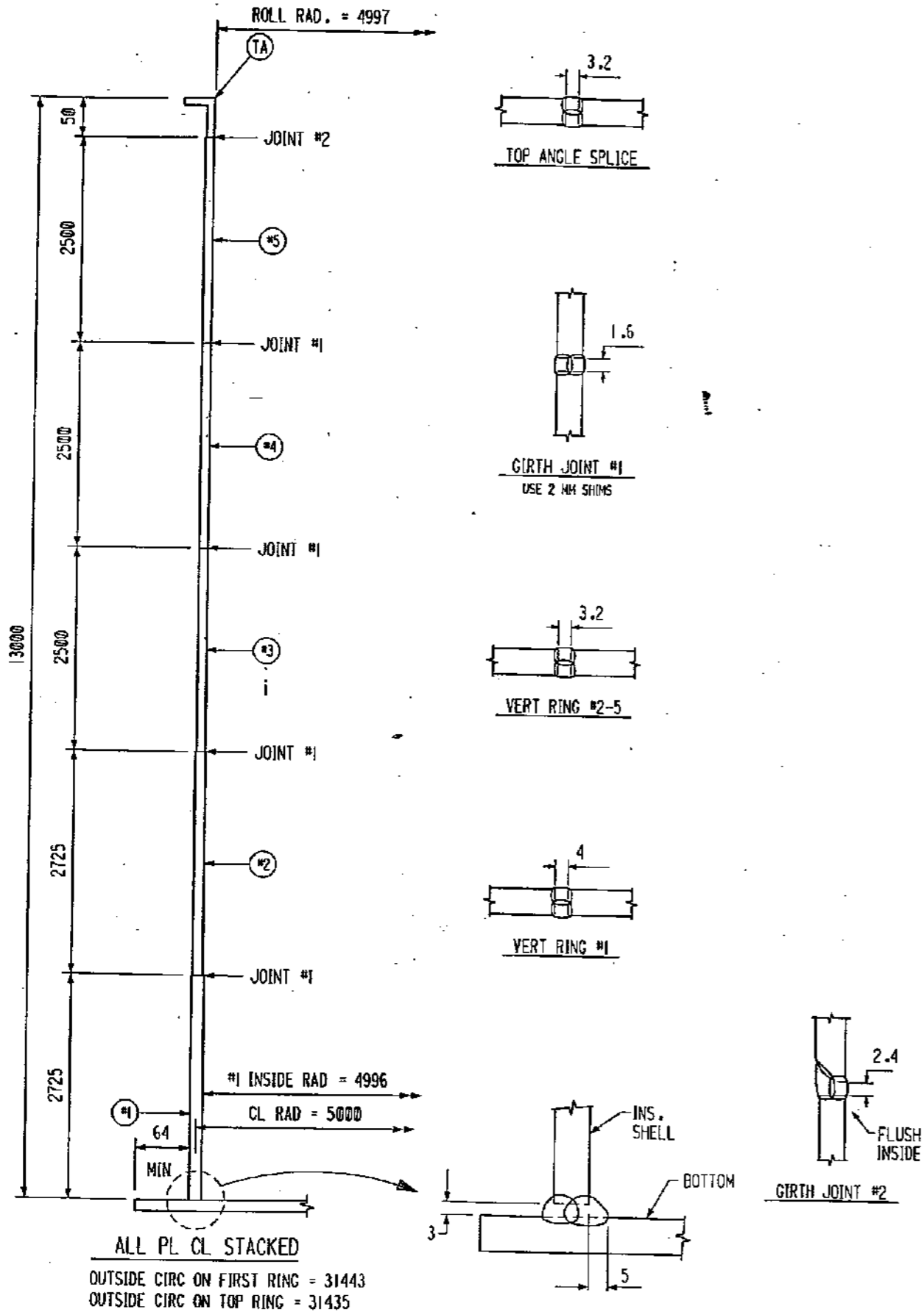
CAUSTIC STORAGE TANK
BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

| | | | |
|---|--------------------------|-------------------------|-----------------|
| | | ARABIAN CBI LTD. | |
| ORIENTATION | | | |
| 10.0 m DIA. X 13.0 m HIGH SSORT IBN RUSHD. PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | | | |
| ITEM NO 124-F-001 | CONTRACT NO ED 965203 | BY R. L. HERBERT | DATE 5-14-96 |
| CHECKED R. L. HERBERT | DATE 5-14-96 | REV 2 | REV 2 |
| ENGINEERING SUPERVISOR | | | |
| This drawing is the property of ACBL and is to be used only in conjunction with the performance of work by ACBL. Reproduction in whole or in part is expressly forbidden. | | | |

INDICATES CHANGE FROM PREVIOUS ISSUE

14154110 Apr 3, 1996

65203003.DGN

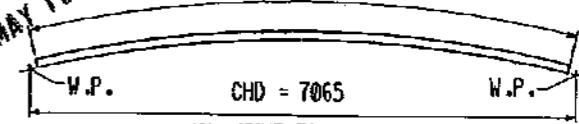


| SHIP PC | MARK | ASSEM PC | DESCRIPTION | LENGTH MM | SPEC | D |
|---------|-------|----------|--|-----------|------|----|
| 4 | #1 | | SHELL SECTION PL 2725 x 8.74 (2741 x 7868) | 7852 | A36 | A |
| 4 | #2 | | PL 2725 x 7.07 (2741 x 7868) | 7852 | A36 | A |
| 12 | #3-#5 | | PL 2500 x 6.0 (2516 x 7868) | 7852 | A36 | A |
| 1 | TA | | L 50 x 50 x 5 * RUN ROLL SHR ** | 31733 | *** | AC |
| | | | * 305 MM INCLUDED FOR FIELD TRIM | | | |
| | | | ** ADD 914 MM TO EA. PIECE FOR SHEAR | | | |
| | | | *** A36/RSt 37-2 | | | |

AS-BUILT
KTT ACBP

STEVE COYLE
SABCO DA/OC
18 MAY 1999

ARC = 7859 ON OUTSIDE



TYP SHELL PLATE #1 DETAIL

*Chk
1 Jun 99
JR*

GENERAL NOTES :

1. BILLED PLATE LENGTHS ARE FINISHED 2 MM SHORTER THAN THEORETICAL LENGTH.
2. SHOP PUNCH MARK INSIDE TOP EDGE OF PLATES 2617 MM FROM EACH END.

CAUSTIC STORAGE TANK

BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

ARABIAN CBI LTD.
SHELL SECTION
10.0M DIA. X 13.0M HIGH SSRT
IBN RUSHD PTA AND AROMATICS PLANT PROJECT
ARABIAN INDUSTRIAL FIBERS CO. LTD
YANBU, SAUDI ARABIA

ITEM NO 124-F-001 CONTRACT NO ED 965203
By Key CHKD DATE 3/2/96
R L HERBERT
ENGINEERING SUPERVISOR

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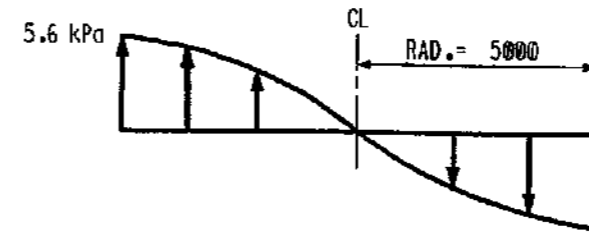
08 151 125 May. 14, 1996

NOTES:

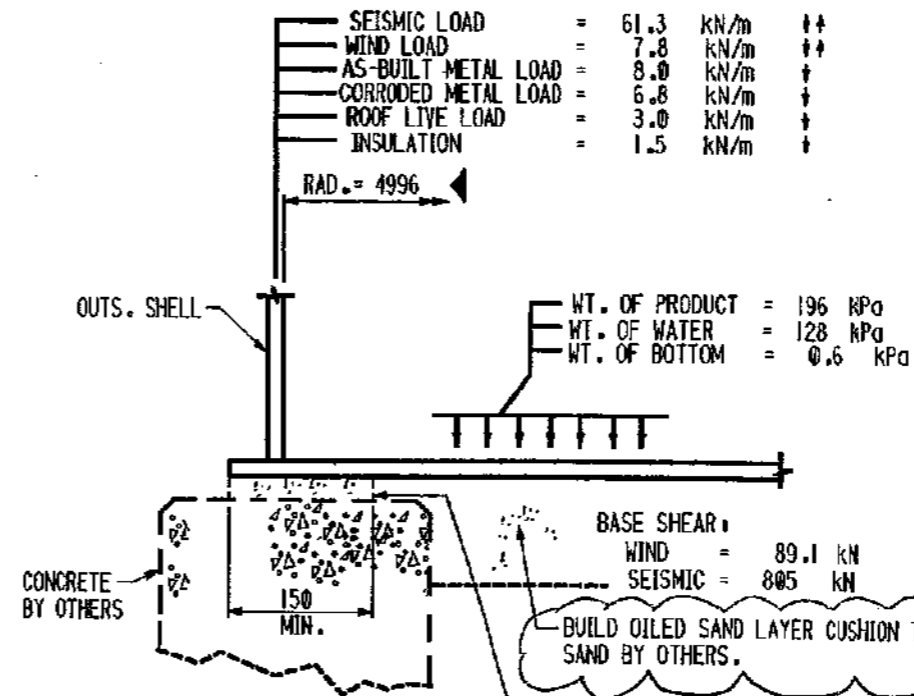
1. FOUNDATION LOADS DO NOT INCLUDE WEIGHT OF LINING OR CUSTOMER EQUIP.
2. THE MAXIMUM COMBINATION OF FOUNDATION LOADS SHOULD BE USED FOR DESIGN OF FOUNDATION, TANK ANCHORAGE, CHECKING BEARING STRESSES ON THE FOUNDATION AND FOR DESIGN OF PIPE VAULTS, IF ANY, BENEATH THE TANK SHELL.
3. THE FOLLOWING OVERTURNING MOMENTS SHOULD BE USED FOR CHECKING OVERALL FOUNDATION STABILITY AND SOIL BEARING PRESSURES.
 - WIND RINGWALL FOUNDATION MOMENT = 609 kN-m
 - SEISMIC RINGWALL FOUNDATION MOMENT = 4820 kN-m
 - SEISMIC SLAB MOMENT = 5360 kN-m

4. DESIGN DATA FOR FOUNDATION LOADS :

PRODUCT DESIGN SPECIFIC GR. = 1.530
 WIND = 140 Km/H
 SEISMIC = ZONE I, S: 1.200, I: 1.250, Z: 0.075
 ROOF LIVE LOAD = 1.2 kPa



MAX. PRESSURE DISTRIBUTION FROM HYDRODYNAMIC SEISMIC LOADS ACTING ON TANK BOTTOM



FOUNDATION:

1. TOP OF FOUNDATION SHALL BE LEVEL WITHIN ± 3 mm WITHIN ANY 9200 mm ARC AND ± 6 mm AROUND ENTIRE RING.
2. THE MINIMUM REQUIRED COMPRESSIVE STRENGTH OF THE CONCRETE $f'c$, SHALL BE 20.7 MPa IN 28 DAYS.

FOUNDATION LOADS

AS-BUILT
 KTT ACIBD

STEVE COYLE
 SABCO BA/DC
 18 MAY 1996

Not Applicable
 (Cancelled)
 DETAILED FOR (1) TANK -- (1) REQUIRED

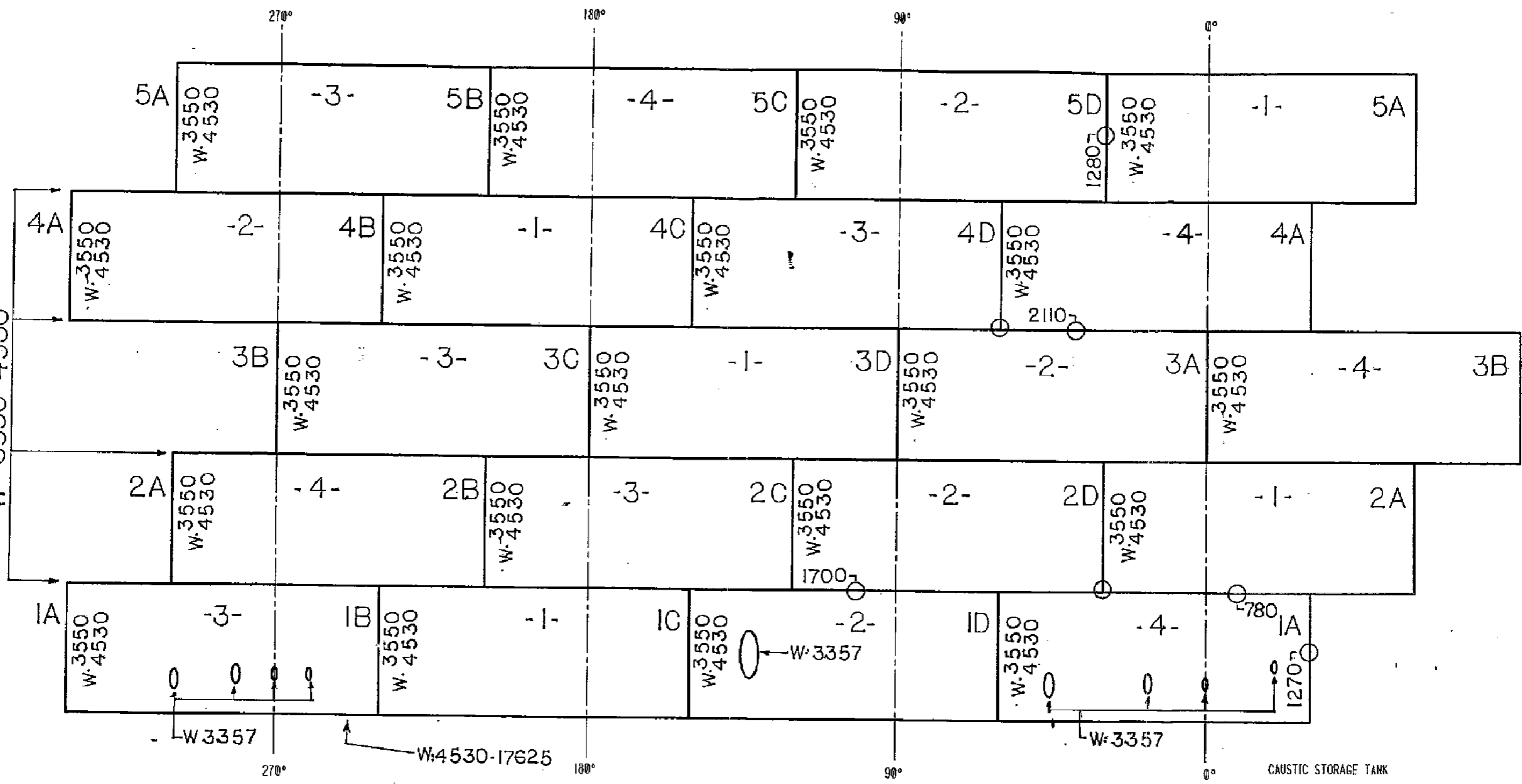
CAUSTIC STORAGE TANK
 BECHTEL LTD CONTRACT No. 22854-LCC-005
 (22854-000-F-001)

| | | | |
|--|--|---|---|
| A CBI ARABIAN CBI LTD. | | FOUNDATION LOADING 10.0M DIA. X 13.0M HIGH SSRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | |
| | | ITEM NO 124-F-001 BY KT CHKD MSIG DATE 3/15/96 R L HERBERT ENGINEERING SUPERVISOR | CONTRACT NO ED 965203 DWG FI REV SWT 4 |
| This drawing is the property of ACIBD and is to be used only in conjunction with the performance of work by ACIB. Reproduction in whole or in part is expressly forbidden. | | | |

652030F1 JGDN

INDICATES CHANGE FROM PREVIOUS ISSUE

W-3550-4530



CAUSTIC STORAGE TANK
BECHTEL LTD CONTRACT No. 22854-LCC-005

| NAME OF WELDER | I.D. | NAME OF WELDER | I.D. |
|----------------|------|----------------|-------|
| | | N. AHMED | 3357 |
| | | H. KHAN | 3550 |
| | | H. MIR | 4520 |
| | | J.H. PRYEL | 17625 |
| | | | |
| | | | |

- FOREMAN:**
- RECORD WELDERS' I.D. ON EACH JOINT.
 - RECORD JOINT ID AND RT INTERVALS (FIRST & LAST FOR 100%) OR LOCATION FOR SPOT RADIOGRAPHS OR PLUGS.

SHELL STRETCHOUT
(OUTSIDE VIEW)
FOR CONSTRUCTION

WHEN COMPLETE
FOREMAN:
SEND CONSTRUCTION OFFICE ONE LEGIBLE COPY AND WORK COPIES IF ANY

N.A. UM ALKAW
SARCO 23-10-96
INDICATES CHANGE FROM PREVIOUS ISSUE

| | | | |
|---|--------------------------|-------------------------|----------------|
| | | ARABIAN CBI LTD. | |
| SHELL STRETCHOUT 10.0 m DIA. X 13.0 m HIGH SSRT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | | | |
| ITEM NO 124-E-001 | CONTRACT NO ED 965203 | BY ZW | CHKD RLH |
| DATE 7/8/96 | DATE 7/8/96 | BY R L HERBERT | DATE 7/8/96 |
| ENGINEERING SUPERVISOR | | SHT | |
| This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden. | | | |

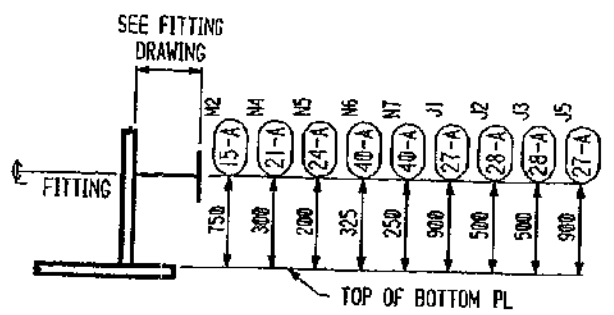
16 004 157 Oct. 1, 1996

TECHNICAL & CONSTRUCTION INFORMATION

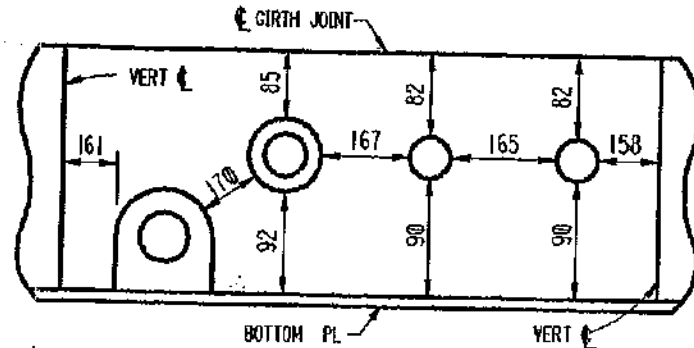
| SPECIFICATIONS | | MATERIAL SPEC | |
|------------------------|-------------------------|---------------------|-------------------|
| SPECIFIC GRAVITY | 1.53 | BOTTOM RECT. | A36 |
| SERVICE | 50% CAUSTIC | BOTTOM SKETCHES | A36 |
| MAX DESIGN METAL TEMP. | 85°C | SHELL PLATES | A36 |
| MIN DESIGN METAL TEMP. | 17°C | ROOF PLATES | A36 |
| DESIGN PRESSURE | ATMOSPHERIC | STRUCTURAL | A36 / RSt 37-2 |
| DESIGN VACUUM | ATMOSPHERIC | FLANGES | A105 |
| DESIGN LIQUID LEVEL | 13000 mm | NOZZLE NECKS | A106B |
| DESIGN WIND VELOCITY | 140 km/hr (PER API 650) | INTERNAL PIPE | A106B, MONEL |
| SEISMIC | ZONE 1 (I=1.25, S=1.2) | INSPECTION - MILL | CTR'S |
| ROOF LIVE LOAD | 1.2 KPa | SHOP | ACBI |
| NOMINAL CAPACITY | 1018 m ³ | FIELD | ACBI & CUSTOMER |
| PUMP IN RATE | 50 m ³ /hr | SURFACE PREPARATION | YES |
| PUMP OUT RATE | 21 m ³ /hr | PAINTING | YES |
| FOUNDATION | BY OTHERS | PKWT | YES (FIELD) |
| CONSTRUCTION | BY ARABIAN CBI | INSULATION | YES |
| CORROSION ALLOWANCE | | MISC. | |
| BOTTOM | 1.0 mm | BOLT & NUTS | A193-B7 & A194-2H |
| SHELL | 1.0 mm | GASKETS | REINZ-AMF34 |
| ROOF | 1.0 mm | RADIOGRAPHY | PER CODE |
| STRUCTURAL | 1.0 mm | JOINT EFFICIENCY | 0.85 |

| RING NO. | CORR. ALLOW. mm | DESIGN FOR PRODUCT SC=1.53 | | DESIGN FOR TEST SC=1.0 | | THK. USED mm | MATERIAL SPECIFICATION | API NAT'L GROUP NO. |
|----------|-----------------|----------------------------|------------------|------------------------|------------------|--------------|------------------------|---------------------|
| | | ALLOWABLE STRESS MPa | REQUIRED THK. mm | ALLOWABLE STRESS MPa | REQUIRED THK. mm | | | |
| 1 | 1.0 | 123.07 | 8.74 | 123.07 | 5.06 | 8.74 | A36 | 1 |
| 2 | 1.0 | 123.07 | 7.07 | 123.07 | 3.97 | 7.07 | A36 | 1 |
| 3 | 1.0 | 123.07 | 5.41 | 123.07 | 2.89 | 6.00 | A36 | 1 |
| 4 | 1.0 | 123.07 | 3.89 | 123.07 | 1.89 | 6.00 | A36 | 1 |
| 5 | 1.0 | 123.07 | 2.37 | 123.07 | 0.89 | 6.00 | A36 | 1 |

| LIST OF FITTINGS | | | | | |
|------------------|-----------|-------|-------|--------|----------------------------------|
| CUST. MARK | ACBI MARK | QUANT | SIZE | RATING | DESCRIPTION |
| M1 | 30-A | 1 | 24" | API | ROOF MANWAY |
| M2 | 15-A | 1 | 24" | API | SHELL MANHOLE |
| N1 | 32-A | 1 | 3" | 150 RF | ROOF NOZZLE CAUSTIC FILL |
| N2 | 33-A | 1 | 2" | 150 RF | ROOF NOZZLE PUMP SPILLBACK |
| N3 | 31-A | 1 | 12" | 150 RF | ROOF NOZZLE VENT W/INSECT SCREEN |
| N4 | 21-A | 1 | 6" | 150 RF | SHELL NOZZLE PUMP SUCTION |
| N5 | 24-A | 1 | 4" | 150 RF | SHELL NOZZLE DRAIN W/INT. |
| N6 | 40-A | 1 | 8"/2" | 150 RF | SHELL NOZZLE STEAM COIL INLET |
| N7 | 40-A | 1 | 8"/2" | 150 RF | SHELL NOZZLE STEAM COIL OUTLET |
| J1 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE TIC |
| J2 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LT |
| J3 | 28-A | 1 | 4" | 150 RF | SHELL NOZZLE LSLL /LSHH |
| J5 | 27-A | 1 | 2" | 150 RF | SHELL NOZZLE TI |
| DWC#18 | | 1 | | | NAMEPLATE |
| | | 1 | | | PERIPHERAL HANDRAIL |
| DWC#50 | | 1 | | | SPIRAL STAIRWAY |
| DWC#29 | | 4 | | | GROUNDING LUG |
| DWC#41 | | | | | HEATER COIL |
| 17-A | | 1 | 48" | | SUMP |
| DWC#12-13 | | | | | INSULATION SUPPORT |
| | | | | | ROOF PLATFORM |
| | | 1 SET | | | CATHODIC PROTECTION (EXT.) |



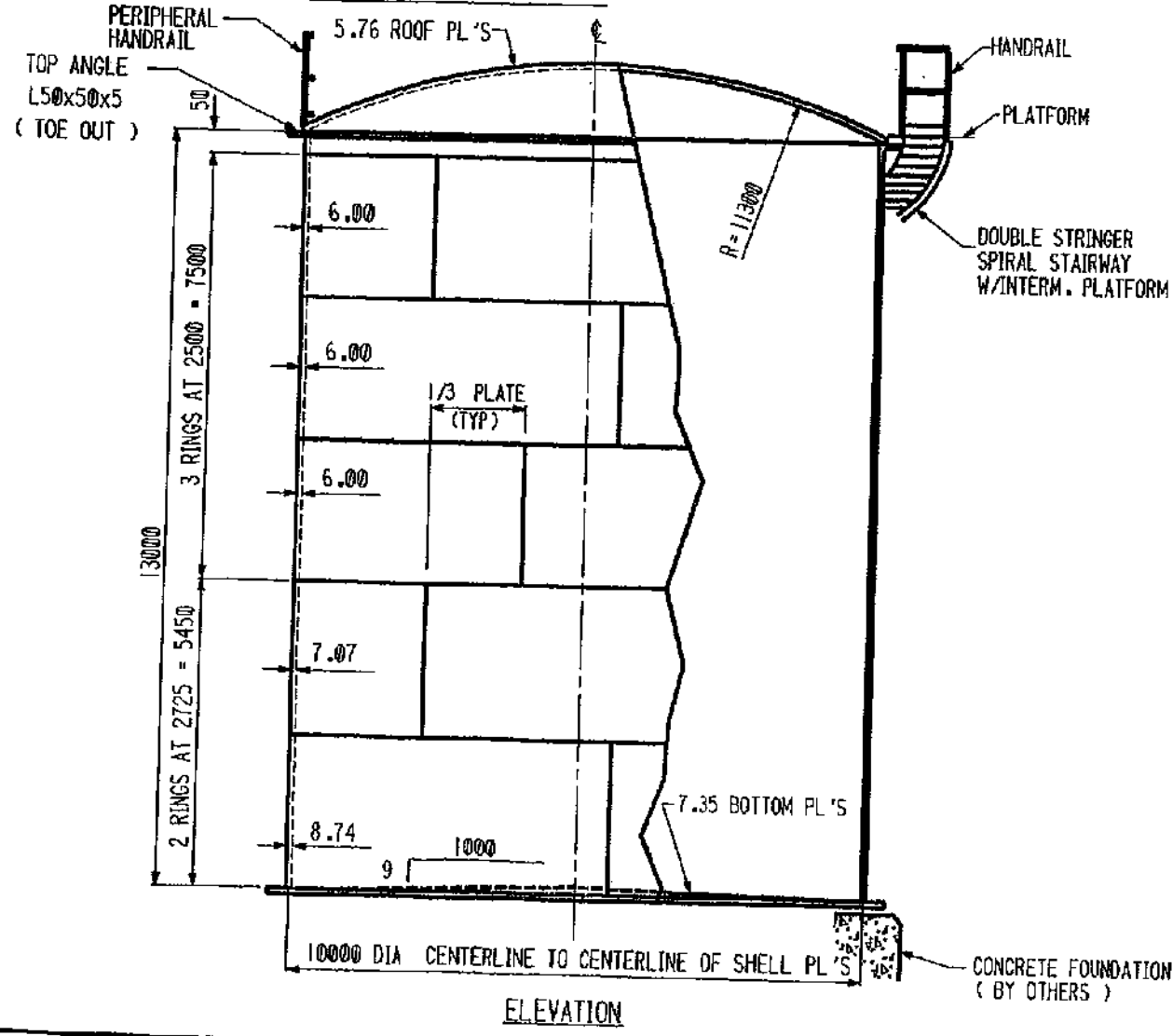
SHELL FITTING ELEVATION



SKETCH 'A' (BOTTOM RING ONLY)

GENERAL NOTES:

- FITTINGS TO BE LOCATED AS SHOWN ON ORIENTATION DRAWING(S). IF LOCATIONS ARE NOT GIVEN, LOCATE IN FIELD TO SUIT CUSTOMER MAINTAINING MINIMUM SPACING SHOWN IN SKETCH 'A'. DIMENSIONS GIVEN ARE FROM EDGE TO EDGE OF REINFORCING PL OR FROM CL OF BUTT WELD TO EDGE OF REINFORCING PL.
- FLANGE BOLT HOLES TO STRADDLE VERTICAL CENTERLINE FOR SHELL NOZZLES.
- FLANGE BOLT HOLES TO STRADDLE 0°-180° CENTERLINE FOR ROOF NOZZLES.
- SEE SHEETS 800 & 802 FOR MATERIAL MANAGEMENT.

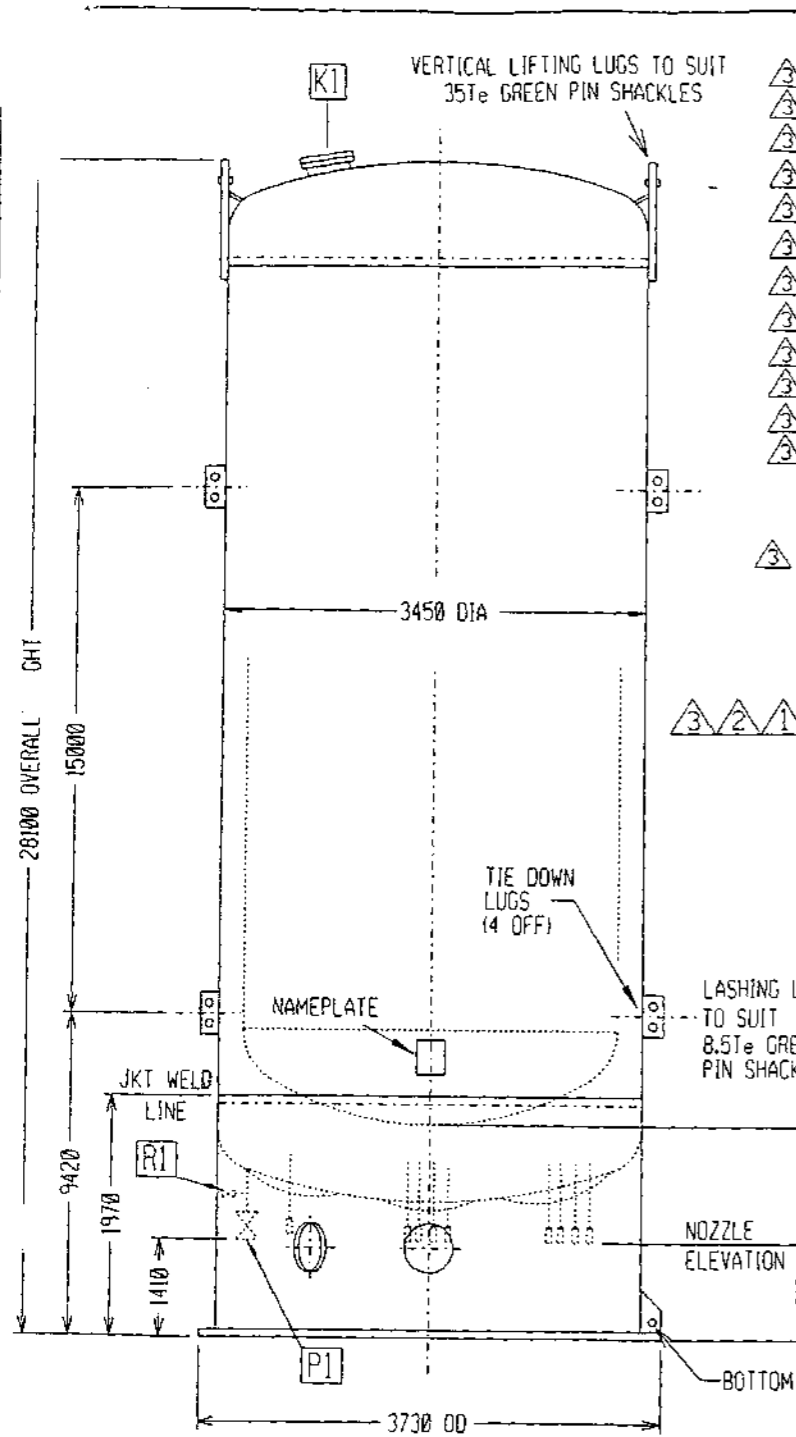


AS - BUILT

CAUSTIC STORAGE TANK
BECHTEL LTD CONTRACT No. 22854-LCC-005
(22854-000-F-001)

| | | | |
|--|--------------------------|---|--|
| | | ARABIAN CBI LTD. | |
| GENERAL ARRANGEMENT 10.0 m DIA. X 13.0 m HIGH SSORT IBN RUSHD PTA AND AROMATICS PLANT PROJECT ARABIAN INDUSTRIAL FIBERS CO. LTD YANBU, SAUDI ARABIA | | | |
| ITEM NO 124-F-001 | CONTRACT NO ED 965203 | BY Key CHD MSTG DATE 3-15-96 R. L. HERBERT ENGINEERING SUPERVISOR | |
| DWG 1 | REV 5 | This drawing is the property of ACBI and is to be used only in conjunction with the performance of work by ACBI. Reproduction in whole or in part is expressly forbidden. | |

65203001.DGN

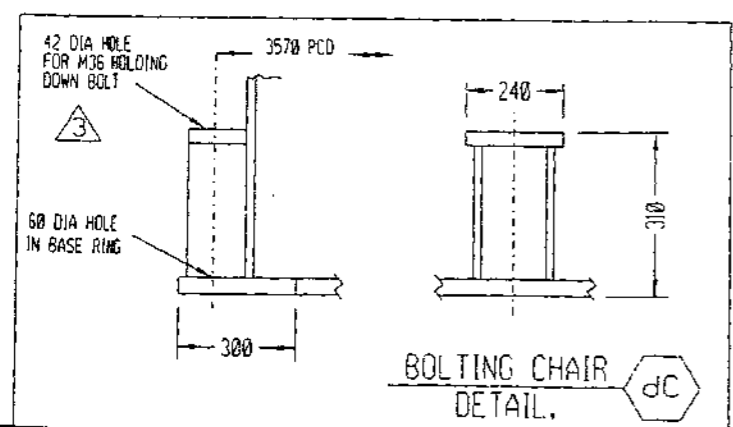
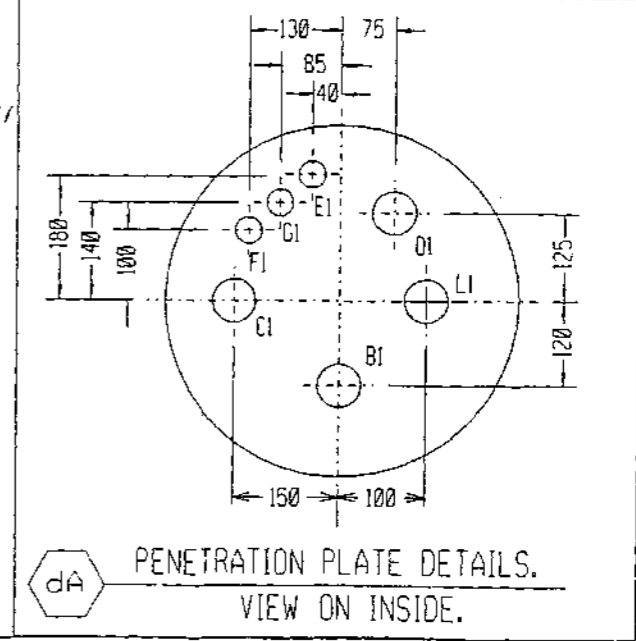
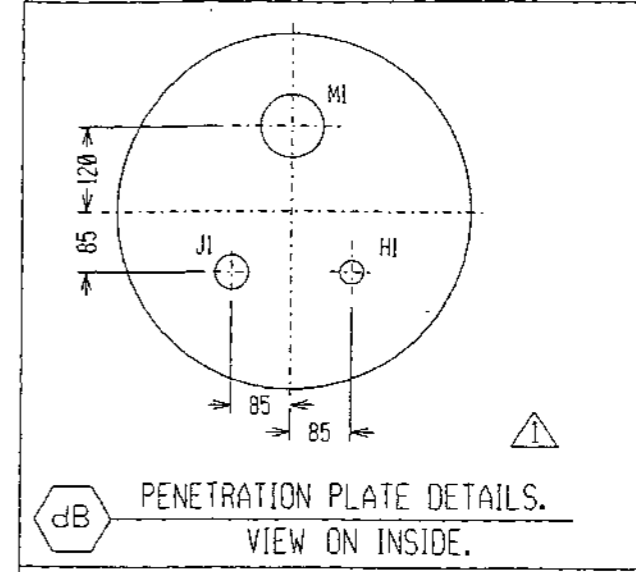
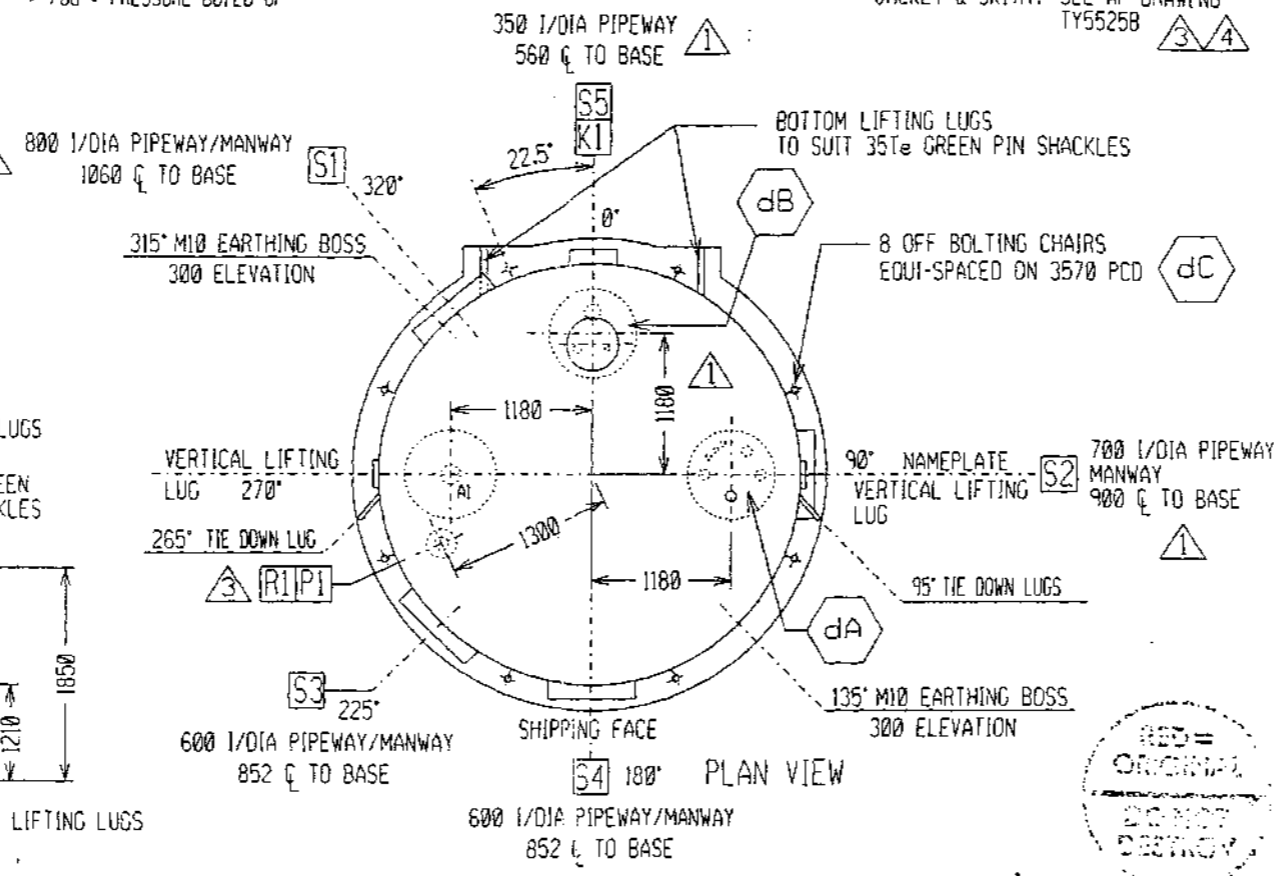


| NOZZLE | SIZE | SERVICE | END CONNECTION |
|--------|-----------|-----------------------------|--------------------------|
| AI | 3" NB | LIQUID WITHDRAWAL | BW FOR 3" NB SCH40S PIPE |
| BI | 1.1/2" NB | BOTTOM FILL/PBU FEED * | SW FOR 1.1/2" NB PIPE |
| CI | 2" NB | TOP FILL/PBU RETURN * | BW FOR 2" NB SCH10S PIPE |
| DI | 2" NB | VAPOUR VENT | BW FOR 2" NB SCH10S PIPE |
| EI | 1/2" OD | TRYCOCK | SW FOR 1/2" NB PIPE |
| FI | 1/2" OD | UPPER LIQUID LEVEL | SW FOR 1/2" NB PIPE |
| GI | 1/2" OD | LOWER LIQUID LEVEL | SW FOR 1/2" NB PIPE |
| HI | 1" NB | PUMP THERMOSYPHON | SW FOR 1" NB PIPE |
| JI | 1.1/2" NB | PUMP RECYCLE INLET | SW FOR 1.1/2" NB PIPE |
| KI | 6" NB | OUTER TANK EMERGENCY VENT | TO ATMOSPHERE |
| LI | 2" NB | VAPOUR VENT | BW FOR 2" NB SCH10S PIPE |
| MI | 3" NB | LIQUID WITHDRAWAL | BW FOR 3" NB SCH40S PIPE |
| PI | 1.1/2" NB | EVACUATION VALVE CONNECTION | 150# ANSI FLANGE |
| RI | | VACUUM GAUGE CONNECTION | KF FLANGE DIN28403 |

* PBU = PRESSURE BUILD-UP

- NOTES**
- ALL OPEN CONNECTIONS TO BE SUITABLY BLANKED AGAINST THE WEATHER AND TO MAINTAIN CLEANLINESS.
 - ALL DIMENSIONS ARE APPROXIMATE AND ARE MM UNLESS OTHERWISE STATED.
 - EXTERNAL TREATMENT - PRIMER: AIR PRODUCTS STANDARD M03. TOP COAT: AIR PRODUCTS STANDARD M04. FINISH COLOUR: WHITE.
 - FOR SHIPPING & LIFTING COMPLY WITH DRAWING TY5526C.
 - TANK TO BE PRESSURISED FOR SHIPPING USING CLEAN DRY AIR TO 0.4 BAR.
 - FOR JACKET DRAWING SEE TY5525B.
 - MATERIALS:**
PRESSURE VESSEL: SEE AP DRAWING TY5523B
PIPING: ASTM A312 TP304L
JACKET & SKIRT: SEE AP DRAWING TY5525B

| | |
|---|----------------------------|
| TOTAL WEIGHT OF TANK IN KG | TANK EMPTY - 56000 |
| | 97% FULL OF LIN - 198700 |
| MAXIMUM SHEAR FORCE DUE TO SEISMIC LOADING = 100.51 KN | WIND LOADING = 49.83 KN |
| MAX. OVERTURNING MOMENT DUE TO SEISMIC LOADING = 1882.85 KN-M | WIND LOADING = 700.07 KN-M |



| REV | DESCRIPTION | DATE | DRAWN | APPD |
|-----|--|----------|-------|-------|
| 4 | NOTE 7: PV WAS 92% Ni STEEL, JKT AND SKIRT WERE C/STL. | 26.11.96 | DRT | BCD |
| 3 | SEE ECN 1472 | 21.08.96 | DRT | BCD |
| 2 | PIPEWAY S1 WAS AT 320° | 26.07.96 | DRT | BCD |
| 1 | 180°, 225° & 270° DB PEN PLATE ROTATED 180° ABOUT TANK CENTRE. PROJECT BLOCK ADDED. MANWAYS WERE 600 ID, 652 EL. AT 0°, 90°. | 20.06.96 | DRT | BCD |
| 0 | ORIGINAL ISSUE | 24.05.96 | DRT | M. E. |

EQUIPMENT TAG: 109-D-001/2/3

PROJECT : NITROGEN GENERATOR PACKAGE FOR PTA & AROMATICS PLANT PROJECT
P. ORDER NO. : 22854-109-Y-001-LAC
CLIENT : A. I. F. C., YANBU, SAUDI ARABIA

GENERAL ARRANGEMENT FOR 182KL VERTICAL LIQUID NITROGEN STORAGE TANK FOR AIFC

AIR PRODUCTS

SCALE : N.T.S. ORG. No. TY5521D/04 SHEET 1 OF 1

DRAWN: [Signature] APPD: M. Evars PROJECT No. C1265

DATE : 24.05.96

ZONE 7

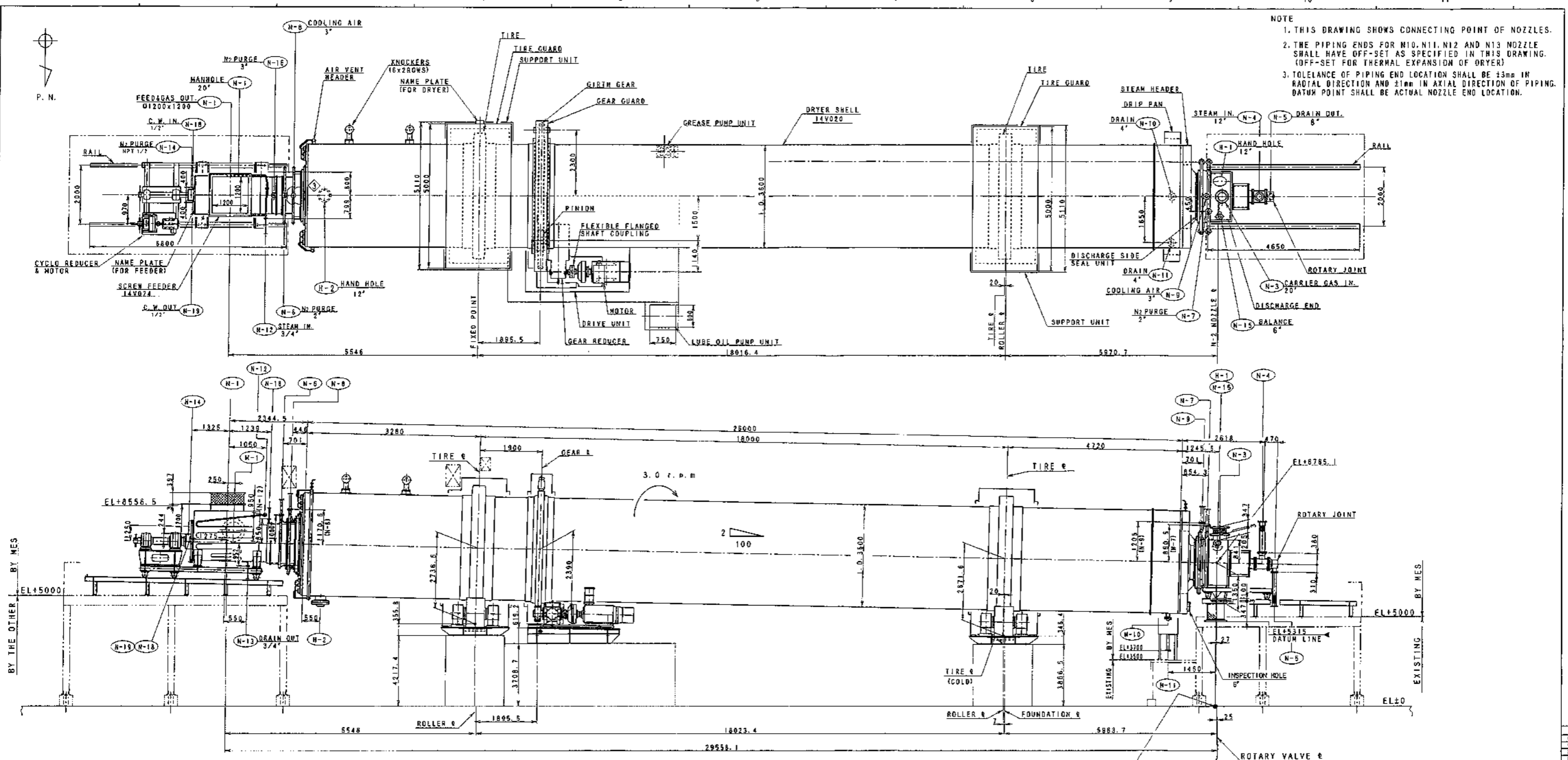
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| | | | |
|---|----------|--------------------------------------|----------|
| IR-II PTA DBN Project | | | |
| PROJECT NO.: 10A/E/P/C/K0542A01 | | | |
| P.O NO.: 10P0542A01-F0007 | | | |
| Req. NO.: 10P0542A01-FM9A.02 | | Equip. Item No. : 14V020 / 14V024 | |
| Document Title: GENERAL ARRANGEMENT DRAWING | | | |
| CTCI Doc. NO.: F0007-DR-14-VD-5032 | | | |
| Vendor Doc. No.: CK81313-003 | | | Rev.: 3 |
| STATUS CODE | ENGINEER | DEPT. | DATE |
| A | Leo for | EQ | 2012-5-7 |
| COMMENT STATUS CODE | | | |
| <input checked="" type="checkbox"/> A – Approved, work can be proceed. <input type="checkbox"/> AW – Approved with comments. Revise per comments and resubmit. <input type="checkbox"/> B – Disapproved, vendor need to resubmit before manufacture. <input type="checkbox"/> I – For information only | | | |
| Submit / Resubmit within _____ Calendar Days | | | |
| Note: Release of drawings in no way absolves vendors from responsibility for their accuracy, or for the design, construction and performance of the equipment. | | | |



| | | | | | | | | |
|---|---|-----|------|-------|-----------------|--|--|--------------------|
| | | | | | | ابن رشد ibn.rushd | ARABIAN INDUSTRIAL FIBERS COMPANY YANBU, KINGDOM OF SAUDI ARABIA | CTCI Corp. Ltd |
| 3 | Revised per corrected errors. | S.H | ✓ | N.F | APR.12, 2012 | CERTIFIED | | |
| 2 | Revised per customer's comments and corrected errors. | S.H | ✓ | N.F | MAR.29, 2012 | | | |
| 1 | Revised per customer's comments and design changes. | S.H | ✓ | N.F | Jan.27, 2012 | PROJ. _____ MGR _____ DATE _____ CLIENT _____ DATE _____ | | |
| 0 | Issue For Approval. | S.H | ✓ | N.F | Sep.22, 2011 | | | |
| REV. | DESCRIPTION | BY | CHK. | APPR. | DATE | | | |
| MITSUI ENGINEERING & SHIPBUILDING CO., LTD. MACHINERY FACTORY MACHINERY & SYSTEMS HEADQUARTERS | | | | | | PAGE 1 OF 1 | | |

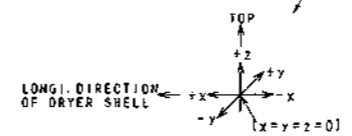
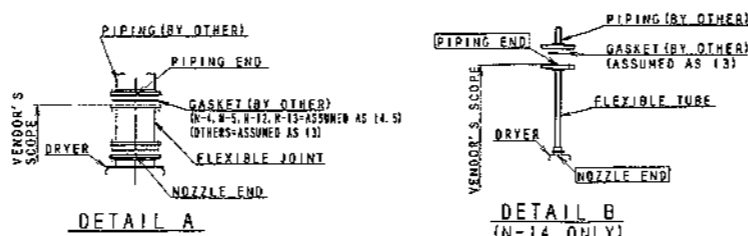


NOTE
 1. THIS DRAWING SHOWS CONNECTING POINT OF NOZZLES.
 2. THE PIPING ENDS FOR N10, N11, N12 AND N13 NOZZLE SHALL HAVE OFF-SET AS SPECIFIED IN THIS DRAWING. (OFF-SET FOR THERMAL EXPANSION OF DRYER)
 3. TOLERANCE OF PIPING END LOCATION SHALL BE 33mm IN RADIAL DIRECTION AND 21mm IN AXIAL DIRECTION OF PIPING. DATUM POINT SHALL BE ACTUAL NOZZLE END LOCATION.

NOZZLE END & PIPING END LOCATION

| NOZZLE NO. | PIPING END (SEE DETAIL A&B) | | | PIPING END (SEE DETAIL A&B) | | | FLANGE FACE | NOZZLE NO. | PIPING END (SEE DETAIL A&B) | | | LENGTH OF PIPING AT PIPING END | FLANGE FACE | | | |
|------------|-----------------------------|-------|-------|-----------------------------|-------|-------|-------------|------------|-----------------------------|------|-------|--------------------------------|-------------|------|-------|------------|
| | x | y | z | x | y | z | | | x | y | z | | | | | |
| N-1 | 29533 | 0 | +8557 | 29533 | 0 | +8957 | HORIZONTAL | N-16 | 30832 | 0 | +8182 | 500 | +28287 | 0 | +8685 | HORIZONTAL |
| N-2 | -27 | 0 | +5315 | -27 | 0 | +4962 | HORIZONTAL | N-18 1/2" | +30832 | -400 | +7382 | 397 | +30832 | -800 | +7382 | VERTICAL |
| N-3 | -98 | 0 | +7810 | -98 | 0 | +8160 | HORIZONTAL | N-19 1/2" | +30832 | +400 | +7382 | 397 | +30832 | +800 | +7382 | VERTICAL |
| N-4 | -1402 | 0 | +7118 | -1402 | 0 | +8122 | HORIZONTAL | | | | | | | | | |
| N-5 | -1856 | 0 | +6419 | -1856 | 0 | +5414 | HORIZONTAL | | | | | | | | | |
| N-6 | +27894 | 0 | +8324 | +27894 | 0 | +8827 | HORIZONTAL | | | | | | | | | |
| N-7 | +215 | -450 | +7661 | +215 | -450 | +8164 | HORIZONTAL | | | | | | | | | |
| N-8 | +27625 | 0 | +8508 | +27625 | 0 | +9011 | HORIZONTAL | | | | | | | | | |
| N-9 | +513 | 0 | +7981 | +513 | 0 | +8984 | HORIZONTAL | | | | | | | | | |
| N-10 | +1458 | 0 | +4826 | | | | HORIZONTAL | | | | | | | | | |
| N-11 | +1450 | +1650 | +3700 | | | | HORIZONTAL | | | | | | | | | |
| N-12 3/4" | +28488 | -800 | +8286 | +28488 | -1304 | +8286 | VERTICAL | | | | | | | | | |
| N-13 3/4" | +29087 | 0 | +6343 | +29087 | 0 | +5639 | HORIZONTAL | | | | | | | | | |
| N-14 | +30882 | 0 | +7827 | +30882 | 0 | +8827 | HORIZONTAL | | | | | | | | | |
| N-15 | -41 | +701 | +7466 | -67 | +1057 | +7821 | | | | | | | | | | |

(*) THE LOCATION OF N-10 NOZZLE END IS CALCULATED IN CASE THAT THE NOZZLE LOCATES AT 180° (BOTTOM SIDE).



SET TO BE MANUFACTURED

CUSTOMER'S APPROVAL: [Signature]

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 MACHINERY FACTORY MACHINERY & SYSTEMS HEADQUARTERS

Arabian Industrial Fibers Company (Ibn Rushd)
 IBN RUSHD-11 PROJECT
 14V020 CTA DRYER
 GENERAL ARRANGEMENT DRAWING

REV. NO. 1
 DATE: JAN. 27, 2012
 DESCRIPTION: REVISED PER CUSTOMER'S COMMENTS AND DESIGN CHANGES.

REV. NO. 2
 DATE: MAR. 19, 2012
 DESCRIPTION: REVISED PER CUSTOMER'S COMMENTS AND CORRECTED ERRORS.

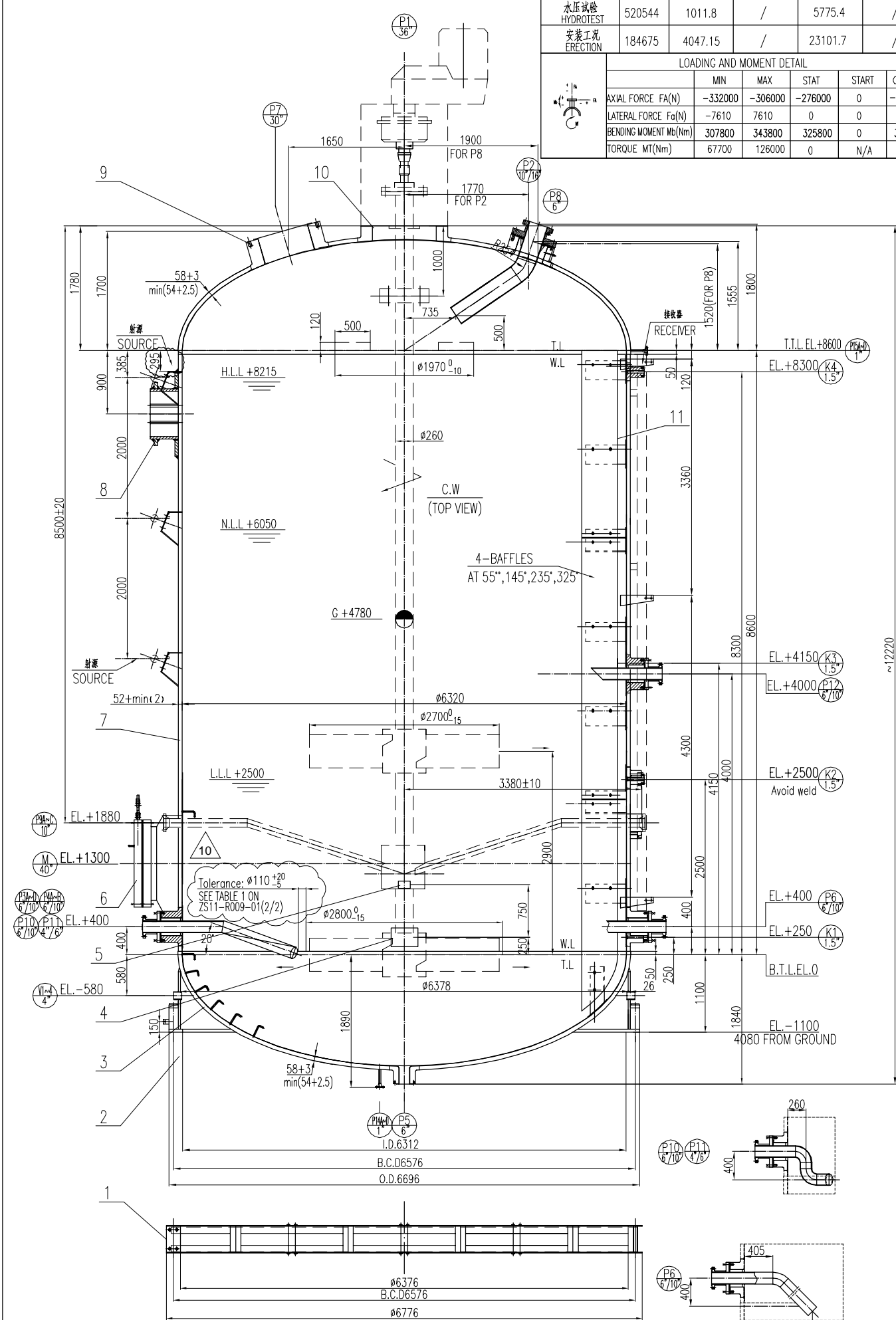
REV. NO. 3
 DATE: APR. 12, 2012
 DESCRIPTION: REVISED PER CORRECTED ERRORS.

GROUP: TX01
 USER: SRD
 CADD NO: TK2564CKB1313003_0301

| | | |
|-----|------|-------------|
| NO. | DATE | DESCRIPTION |
| 1 | | |
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| 20 | | |

| 工况 CASES | | 重力 WEIGHTS kgf | 剪力 WIND SHEAR | 地震剪力 EARTHQUAKE SHEAR | 弯矩 WIND MOMENT | 地震弯矩 EARTHQUAKE MOMENT |
|----------------|--------|----------------|---------------|-----------------------|----------------|------------------------|
| 操作工况 OPERATION | 499141 | 4047.15 | 4991.41 | 23101.7 | 26157.1 | |
| 水压试验 HYDROTEST | 520544 | 1011.8 | / | 5775.4 | / | |
| 安装工况 ERECTION | 184675 | 4047.15 | / | 23101.7 | / | |

| 设计数据 DESIGN DATA | | ASME CODE SEC. VIII Div.1.2010 ED. | U STAMP YES |
|---|---|------------------------------------|-------------|
| 设计规范 DESIGN CODE | ADDITIONAL SPECIFICATION: SEE TABLE BELOW | | |
| 介质名称 CONTENTS | PX,HAC,TA,WATER | | |
| 介质密度 CONTENTS DENSITY(OPERATING/DESIGN) Kg/m ³ | 610/1000 | | |
| 介质特性 FLUID TYPE | Non-Lethal | | |
| 设计压力 DESIGN PRESSURE(Int/Ext) bar(g) | 20.59 | | |
| 设计温度 DESIGN TEMPERATURE(Max/Min) °C | 230 | | |
| 工作压力 OPERATING PRESSURE bar(g) | 12.09 | | |
| 工作温度 OPERATING TEMPERATURE °C | 189.2 | | |
| 最小设计金属温度 MDMT. °C | 8°C @ 21.54 bar(g) | | |
| 最大许用工作压力 | MAWP bar(g) | 21.54 @ 230°C Limited By Cylinder | |
| | MAP bar(g) | 22.34 @ 230°C Limited By Cylinder | |
| 水压试验压力 HYDROTEST PRESSURE | 制造厂水压试验(卧式) SHOP HYDROTEST(HOR.NEEN AND COIL) | 28.42 (UG-99c) | |
| | 现场水压试验(立式) FUTURE HYDROTEST(VERT.HOT AND COIL) | 28.00 (UG-99b) | |
| 水压试验温度 HYDROTEST TEMPERATURE | Q01-S01 | | |
| 腐蚀裕度 CORROSION ALLOWANCE(Int/Ext) mm | 0.4(FOR SHELL)/2.0(FOR TI CLAD)/2.0(FOR SKIRT AND BASE PLATE) | | |
| 设计寿命 DESIGN LIFE YEAR | 20 | | |
| 基本风速 BASIC SPEED WIND Km/h | 140 | | |
| 风荷载 WIND LOAD | ASCE-98/02/05/IBC-03 | | |
| 地震荷载 SEISMIC DATA | IBC2009 Ss=0.183,S1=0.048,IMPORANCE FACTOR=1.25,SITE CLASS"C" | | |
| 循环荷载和疲劳要求 CYCLIC LOADING & FATIGUE REQUIREMENT | YES | | |
| 容积 VESSEL VOLUME m ³ | 335.9 | | |
| 射线检验 RT | FULL | | |
| 焊接接头系数 JOINT EFFICIENCY | 1.0 | | |
| 焊后热处理 PWHT | YES | | |
| 冲击试验 Ibar(g)/CT TEST | N/A | | |
| 搅拌器型式 ADITATOR TYPE | HWL2000 N/S | | |
| 搅拌器转速 AGITATOR SPEED | 70~75rpm | | |
| 电机功率/防爆等级 B.H.P./ENCLOSURE TYPE | 780 KW / EX II 3G ex nA II A/B T3 | | |
| 保温厚度 INSULATION/THK. mm | HOT / 190 | | |
| 防火厚度(内/外) FIREPROOF THK.(INT./EXT.) mm | 50 (IN & OUTSIDE) | | |
| 油漆及表面处理 PAINTING & SURFACE PREPARATION | SP-10-LA-5007 | | |
| 包装及运输要求 PACKING & SHIPPING REQUIREMENT | Q01-S01 & Z01-G07 | | |
| 制造重量 FABRICATION WEIGHT Kg | 156000 (Agitator weight: 24000kg not include) | | |
| 操作重量 OPERATING WEIGHT Kg | 475141 (Agitator weight: 24000kg not include) | | |
| 充水重量 WEIGHT FULL OF WATER Kg | 496544 (Agitator weight: 24000kg not include) | | |
| 设备重量 EMPTY WEIGHT Kg | 160675 (Agitator weight: 24000kg not include) | | |
| 吊钩重量 LIFTING WEIGHT Kg | 160675 (Agitator weight: 24000kg not include) | | |
| 管口 接管板 视镜 支座等方位 ORIENTATION | AS PER THIS DRAWING | | |



| 管口表 NOZZLE SCHEDULE | | | | | | | | | | |
|---------------------|--------|---------|---------|----------------|-----------|-----------|-------------|---------------------------------------|--------------------|----------|
| 接管号 MARK | 数量 NO. | 规格 N.D. | 壁厚 THK. | 法兰 FLANGE | 接管颈 CLASS | 接管型式 TYPE | 接管方位 FACING | 法兰密封面至设备水平中心线的距离 PROJ FROM LEVEL C.L. | 用途或名称 SERVICE | 备注 NOTES |
| P1 | 1 | ID.880 | - | ASME B16.47(A) | 300 | PAD | RF | SEE DWG. | AGITATOR CONN. | |
| P2 | 1 | 10"/16" | - | ASME B16.5 | 300 | PAD | RF | SEE DWG. | TOP REFLUX(13E031) | |
| P3A-0 | 4 | 6"/10" | - | ASME B16.5 | 300 | PAD | RF | 3604.5 | AIR FEED | |
| P4A-0 | 2 | 6"/10" | - | ASME B16.5 | 300 | PAD | RF | 3604.5 | PROCESS INLET | |
| P5 | 1 | ID150 | - | ASME B16.5 | 300 | PAD | RF | SEE DWG. | DRAIN | |
| P6 | 1 | 6"/10" | - | ASME B16.5 | 300 | PAD | RF | 3604.5 | DRAIN | |
| P7 | 1 | 30" | - | ASME B16.47(A) | 300 | PAD | RF | SEE DWG. | VAPOR OUT(13E031) | |
| P8 | 1 | 6" | - | ASME B16.5 | 300 | PAD | RF | SEE DWG. | INSPECTION | W/B&N |
| P9A-C | 3 | 10" | - | ASME B16.5 | 300 | PAD | RF | 3380 | STEADY BRG SUPPORT | |
| P10 | 1 | 6"/10" | - | ASME B16.5 | 300 | PAD | RF | 3604.5 | BTM REFLUX(13E032) | |
| P11 | 1 | 4"/6" | - | ASME B16.5 | 300 | PAD | RF | 3704.5 | BTM REFLUX(13E033) | |
| P12 | 1 | 6"/10" | - | ASME B16.5 | 300 | PAD | RF | 3604.5 | SLURRY OUTLET | |
| P14A-0 | 4 | 1" | Sch80 | ASME B16.5 | 300 | WN | RF | SEE DWG. | HOT OIL INLET | |
| P15A-0 | 4 | 1" | Sch80 | ASME B16.5 | 300 | WN | RF | 3650 | HOT OIL OUTLET | |
| K1~4 | 4 | 1.5" | - | ASME B16.5 | 300 | PAD | RF | 3365 | TI CONN | |
| M | 1 | ID950 | - | ASME B16.47(A) | 300 | WN | RF | 3725 | MANHOLE | W/Davit |
| V1~4 | 4 | 4" | Sch80 | / | / | / | / | / | VENT HOLE | |

| 主要材料表 MATERIAL DATA | |
|-----------------------------------|--|
| 壳体, 封头 SHELL, HEADS | SA-516 Gr.70N + SB-265 Gr.1 |
| 接管法兰 NOZZLE NECK & NOZZLE FLANGES | SA-105N / SB-265 Gr.1 LINING |
| 法兰盖 BLIND FLANGES | SA-105N/SA-516 Gr.70N+ SB-265 Gr.1 |
| 接管 NOZZLE NECK | SA-105N / SB-265 Gr.1 LINING |
| 裙座 SKIRT | SA-516 Gr.70 |
| 保温支撑 INSULATION SUPPORT | SA-516 Gr.70 |
| 尾耳 TAILING LUGS | SA-516 Gr.70 |
| 吊耳 LIFTING LUGS | SA-516 Gr.70 |
| 外部螺栓/螺母 EXTERNAL BOLTS/NUTS | SA-193 Gr.B7/SA-194 Gr.2H HOT DIP ZINC |
| 内部螺栓/螺母 INTERNAL BOLTS/NUTS | SB348 Gr2 |
| 外部垫片 EXTERNAL GASKETS | SPIRAL WOUND GASKET:TYPE 88 -HOOP: Ti -FILLER: GRAPHITE -INNER RING: Ti -OUTER RING:316L SS |
| 内部垫片 INTERNAL GASKETS | - |
| 内部接管 INTERNAL PIPES | SB-265 Gr.2 |
| 内部支撑 INTERNAL SUPPORT | SB348 Gr2 |
| 接地片 EARTH PIECE | SA-240 316L |
| 铭牌 NAMEPLATE | SA-240 304 / SA-516 Gr.70 |

| 图样目录 DRAWING LISTS | |
|--|-------------------|
| 图样名称 DWG. NAME | 图号 DWG. NO. |
| 氧化反应器总图 CTA OXIDATION REACTOR GENERAL DRAWING | ZS11-R009-01(1/2) |
| 氧化反应器总图 CTA OXIDATION REACTOR GENERAL DRAWING | ZS11-R009-01(2/2) |
| 氧化反应器壳体图 CTA OXIDATION REACTOR DETAIL OF BODY | ZS11-R009-02 |
| 氧化反应器裙座图 CTA OXIDATION REACTOR DETAIL OF SKIRT | ZS11-R009-03 |
| 氧化反应器人孔图 CTA OXIDATION REACTOR DETAIL OF MANHOLE | ZS11-R009-04 |
| 氧化反应器模板图 CTA OXIDATION REACTOR DETAIL OF TEMPLATE | ZS11-R009-05 |
| 氧化反应器名称牌图(1) CTA OXIDATION REACTOR DETAIL OF NAMEPLATE(1) | ZS11-R009-06 |
| 氧化反应器名称牌图(2) CTA OXIDATION REACTOR DETAIL OF NAMEPLATE(2) | ZS11-R009-07 |
| 氧化反应器零件图 CTA OXIDATION REACTOR PART DRAWING | ZS11-R009-08 |
| 氧化反应器搅拌器图 CTA OXIDATION REACTOR DETAIL OF AGITATOR MOUNT | ZS11-R009-09 |
| 氧化反应器隔板图 CTA OXIDATION REACTOR DETAIL OF BAFFLE | ZS11-R009-10 |
| 氧化反应器喷嘴图(1) CTA OXIDATION REACTOR DETAIL OF NOZZLE(1) | ZS11-R009-11 |
| 氧化反应器喷嘴图(2) CTA OXIDATION REACTOR DETAIL OF NOZZLE(2) | ZS11-R009-12 |
| 氧化反应器喷嘴图(3) CTA OXIDATION REACTOR DETAIL OF NOZZLE(3) | ZS11-R009-13 |
| 氧化反应器喷嘴图(4) CTA OXIDATION REACTOR DETAIL OF NOZZLE(4) | ZS11-R009-14 |
| 氧化反应器喷嘴图(5) CTA OXIDATION REACTOR DETAIL OF NOZZLE(5) | ZS11-R009-15 |
| 氧化反应器喷嘴图(6) CTA OXIDATION REACTOR DETAIL OF NOZZLE(6) | ZS11-R009-16 |
| 氧化反应器喷嘴图(7) CTA OXIDATION REACTOR DETAIL OF NOZZLE(7) | ZS11-R009-17 |
| 氧化反应器喷嘴图(8) CTA OXIDATION REACTOR DETAIL OF NOZZLE(8) | ZS11-R009-18 |
| 氧化反应器保温图(1) CTA OXIDATION REACTOR DETAIL OF INSULATION (1) | ZS11-R009-19 |
| 氧化反应器保温图(2) CTA OXIDATION REACTOR DETAIL OF INSULATION (2) | ZS11-R009-20 |
| 氧化反应器加热盘管图 CTA OXIDATION REACTOR DETAIL OF HEATING COIL(1) | ZS11-R009-21 |
| 氧化反应器加热盘管图 CTA OXIDATION REACTOR DETAIL OF HEATING COIL(2) | ZS11-R009-22 |
| 氧化反应器夹片图 DETAIL OF CLIP | ZS11-R009-23 |
| 氧化反应器支架图 DETAIL OF MOUNTING BRACKET CLIP | ZS11-R009-24 |

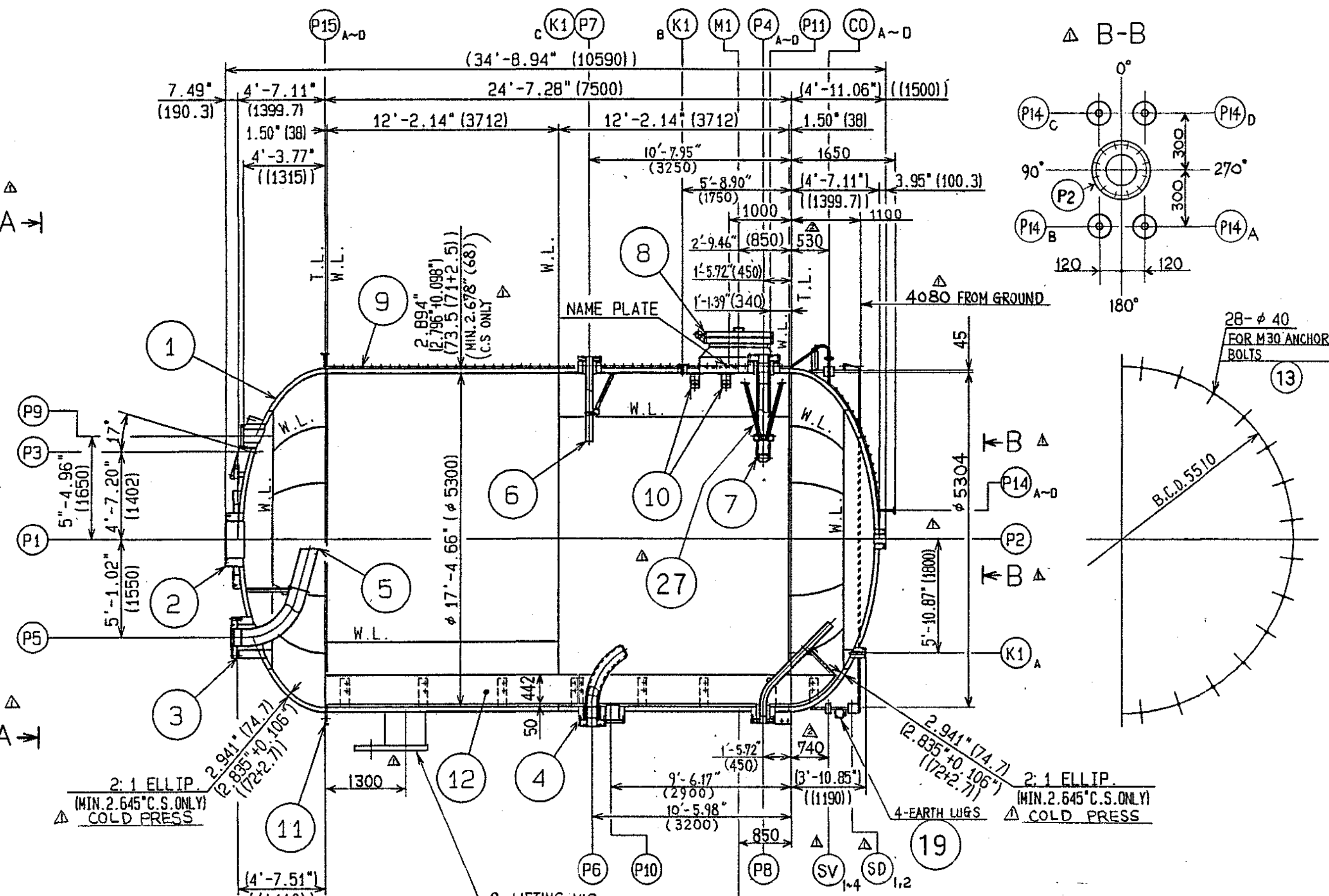
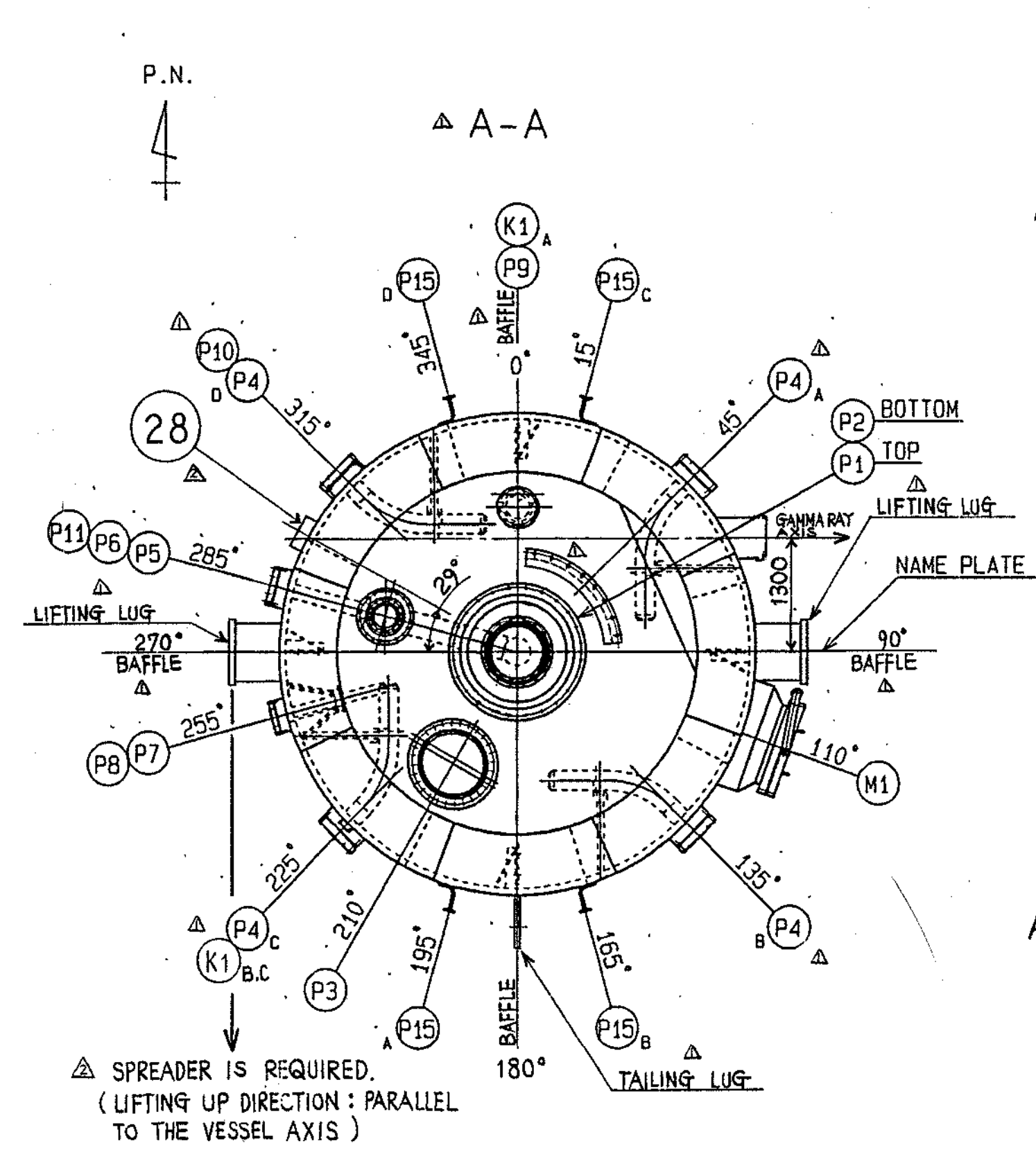
| PERFORMANCE OF THE EQUIPMENT | | | | | | |
|----------------------------------|---------|--------|---------|---------|---------|--|
| NOZZLE LOADING AND MOMENT DETAIL | | | | | | |
| AS PER 22854-SP-000-0-001 | | | | | | |
| NOZZLE | NPS | FA(N) | ML(N-m) | MC(N-m) | MR(N-m) | |
| P11 | 4"/6" | -5600 | 1460 | 1120 | | |
| P4A/P4B/P4C | 6"/10" | -8400 | 3280 | 2520 | | |
| P2 | 10"/16" | -14000 | | | 11480 | |
| P8 | 6" | -8400 | | | 4130 | |

| NOZZLE NO. | NPS | CASE | FA(KN) | FC(KN) | FL(KN) | MT(KN-M) | ML(KN-M) | MC(KN-M) | FR(KN) | MR(KN-M) | |
|------------|--------|------|--------|--------|--------|----------|----------|----------|--------|----------|---|
| P5 | ID150 | HYD | -7.5 | - | - | 0.2 | - | - | -0.8 | 2.8 | |
| | | DW | -8.1 | - | - | 0.2 | - | - | -0.8 | 2.9 | |
| | | TH | 5.0 | - | - | -0.7 | - | - | 7.1 | 7.5 | |
| | | SX | - | - | - | - | - | - | - | - | - |
| | | SZ | - | - | - | - | - | - | - | - | - |
| P7 | 30" | WX | ±0.4 | - | - | ±0.3 | - | - | ±1.6 | ±2.3 | |
| | | WZ | ±0.5 | - | - | ±0.3 | - | - | ±0.3 | ±1.0 | |
| | | HYD | - | - | ±11 | ±4.5 | - | ±22.5 | - | - | - |
| | | DW | -1 | - | ±2 | ±5.5 | - | ±17.5 | - | - | - |
| | | TH | -37 | - | ±15.5 | ±30 | - | ±80 | - | - | - |
| P12 | 6"/10" | SX | - | - | ±3 | ±5 | - | ±19 | - | - | |
| | | SZ | - | - | ±2.5 | ±3.5 | - | ±17 | - | - | |
| | | WX | - | - | ±12 | ±2 | - | ±45 | - | - | |
| | | WZ | -3.5 | - | ±11.5 | ±24 | - | ±41 | - | - | |
| | | HYD | 0.3 | 0.3 | -4.1 | 0.4 | 2.6 | 0.5 | | | |
| P12 | 6"/10" | DW | 0.7 | 0.3 | -3.2 | 0.6 | 0.8 | 0.4 | | | |
| | | TH | 2.3 | -1.2 | -0.7 | -0.8 | 2.1 | 4.9 | | | |
| | | SX | - | - | - | - | - | - | | | |
| | | SZ | - | - | - | - | - | - | | | |
| | | WX | ±1.4 | ±0.2 | ±0.3 | ±0.1 | ±0.2 | ±0.2 | | | |
| WZ | ±0.3 | ±0.6 | - | ±0.2 | - | ±0.4 | | | | | |

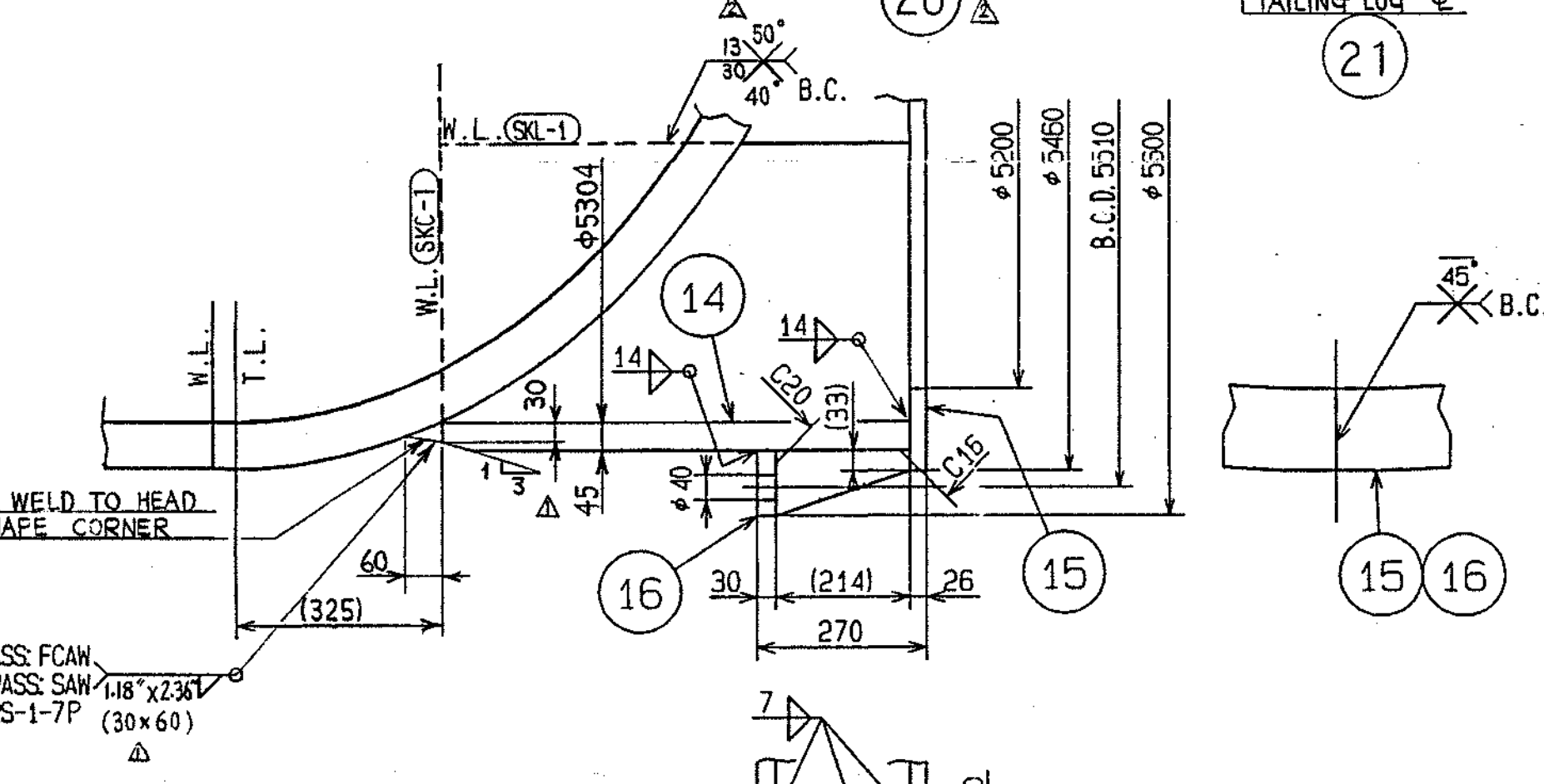
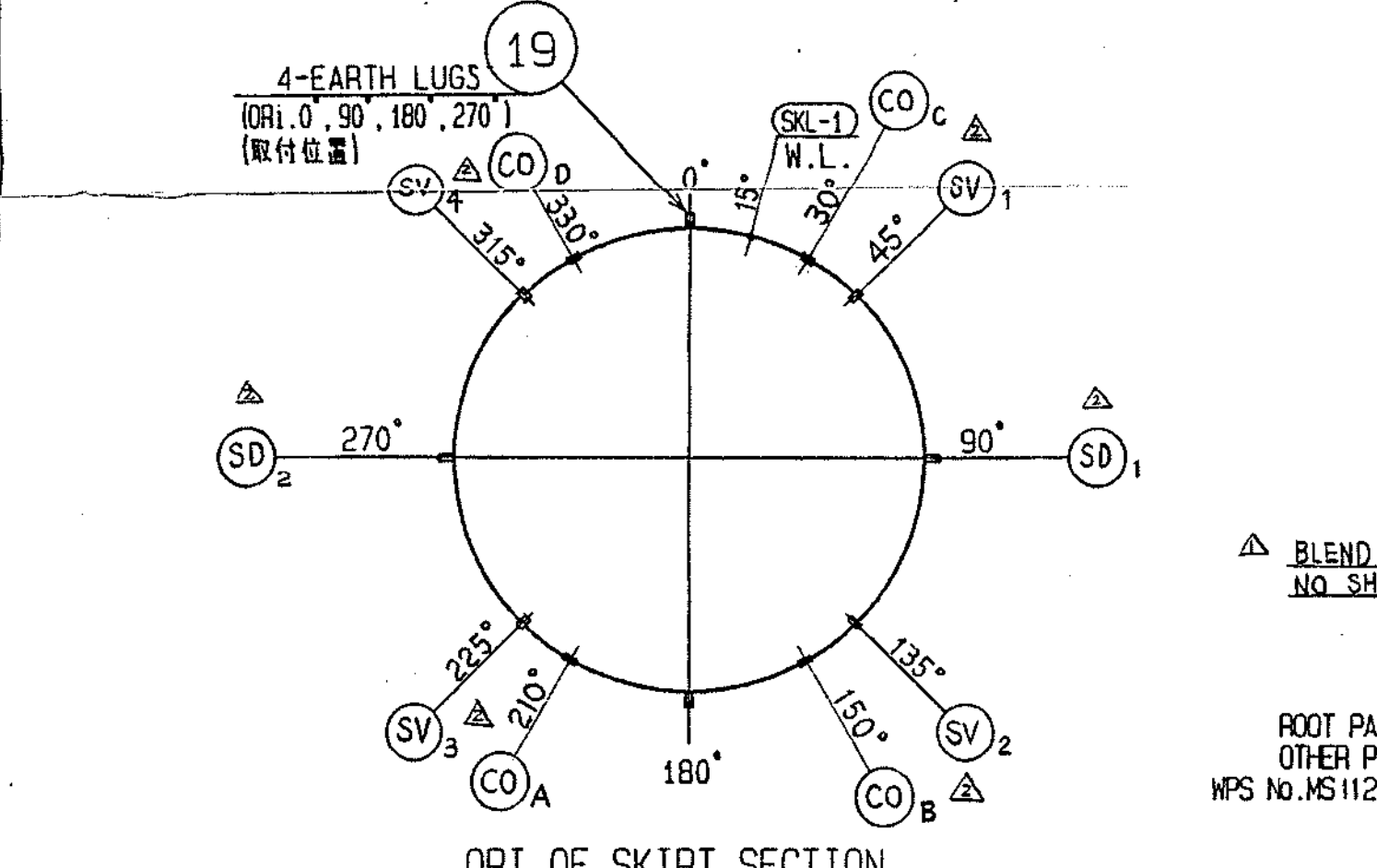
| REV | DESCRIPTION | DESIGNED | CHECKED | APPROVED | DATE |
|-----|----------------------------|----------|---------|----------|------------|
| 10 | AS BUILT | 庄 | 庄 | 庄 | 30/12/2013 |
| 9 | AS BUILT | 庄 | 庄 | 庄 | 2012.05.18 |
| 8 | ISSUE FOR REVIEW | 庄 | 庄 | 庄 | 2012.02.28 |
| 7 | ISSUE FOR REVIEW | 庄 | 庄 | 庄 | 2012.01.31 |
| 6 | ISSUE FOR REVIEW | 庄 | 庄 | 庄 | 2011.11.22 |
| 5 | ISSUE FOR REVIEW | 庄 | 庄 | 庄 | 2011.10.17 |
| 4 | ISSUE FOR REVIEW | 庄 | 庄 | 庄 | 2011.8.18 |
| 3 | ISSUE FOR REVIEW | 庄 | 庄 | 庄 | 2011.7.22 |
| 2 | ISSUE FOR REVIEW | 庄 | 庄 | 庄 | 2011.6.17 |
| 1 | FOR MAIN MATERIAL PURCHASE | 庄 | 庄 | 庄 | 2011.6.1 |

| DESIGNED | CHECKED | APPROVED | DATE |
|----------|---------|----------|------------|
| 庄 | 庄 | 庄 | 2012.05.18 |
| 庄 | 庄 | 庄 | 2012.05.18 |
| 庄 | 庄 | 庄 | 2012.05.18 |

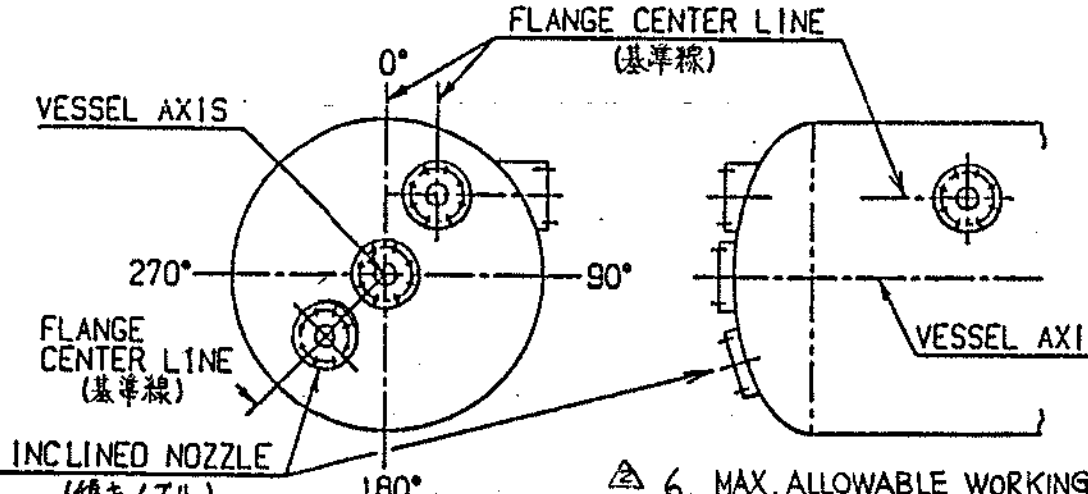
| DESIGN STAGE | AS BUILT |
|-------------------|----------|
| ZS11-R009-01(1/2) | |



| GROUP | QTY | REV | SHOP | PT. NO. | NAME OF PARTS | CLASS CODE | SIG. NO. STD. PT. CODE | MATERIAL |
|-------|-----|-----|------|---------|------------------------------------|------------|------------------------|----------|
| 1 | 1 | | | | SHELL & HEAD | | 1-716308 | ASSEMBLY |
| 2 | 1 | | | | AGITATOR-MOUNT | | 1-716354 | " |
| 3 | 1 | | | | NOZZLE (1/2) | | 1-716351 | " |
| 4 | 1 | | | | NOZZLE (2/2) | | 1-716352 | " |
| 5 | 1 | | | | INS. NOZZLE (1/3) | | 1-716426 | " |
| 6 | 1 | | | | INS. NOZZLE (2/3) | | 1-716428 | " |
| 7 | 1 | | | | INS. NOZZLE (3/3) | | 1-716429 | " |
| 8 | 1 | | | | MANHOLE | | 1-716353 | " |
| 9 | 1 | | | | HEATING COIL | | 1-716457 | " |
| 10 | 1 | | | | BEARING SUPPORT | | 2-715875 | " |
| 11 | 1 | | | | EXTERNAL ATTACHMENT | | 1-716562 | " |
| 12 | 1 | | | | BAFFLE | | 1-716407 | " |
| 13 | 1 | | | | TEMPLATE | | 2-715766 | ASSEMBLY |
| 14 | 1 | | | | SKIRT | | SA516Gr.70 | |
| 15 | 1 | | | | BASE PLATE | | " | |
| 16 | 1 | | | | SUPPORT RING | | " | |
| 17 | 1 | | | | RIB | | SA516Gr.70 | |
| 18 | 1 | | | | COIL OPENING | | SA106Gr.B | |
| 19 | 1 | | | | EARTH LUG | | SUS 304 | |
| 20 | 1 | | | | LIFTING LUG | | 1-716562 | ASSEMBLY |
| 21 | 1 | | | | TAILING LUG | | 1-716562 | ASSEMBLY |
| 22 | 1 | | | | SKIRT VENT | | SA106Gr.B | |
| 23 | 1 | | | | SKIRT DRAIN | | SA516Gr.70 | |
| 24 | 1 | | | | BOLT 1/2"-13UNC x 40 | | SUS 304 | |
| 25 | 1 | | | | NUT 1/2"-13UNC | | SUS 304 | |
| 26 | 1 | | | | F-WASHER M12 | | SUS 304-CP | |
| 27 | 1 | | | | PIPE SUPPORT | | 1-716433 | ASSEMBLY |
| 28 | 1 | | | | SOURCE HOLDERS & DETECTORS SUPPORT | | 1-716612 | ASSEMBLY |
| 29 | 1 | | | | SKIRT ASSEMBLY | | | |



5. LOCATION OF FLANGE BOLT HOLES SHALL BE AS FOLLOWING SKETCH.



- NOTES
1. THE DESIGN FABRICATION INSPECTION AND TESTING SHALL COMPLY WITH REQUIREMENTS OF THE CODE AND PURCHASER.
 2. REFER TO SHEET NO. "96C01021 Rev.2" FOR N.D.E. PROCEDURE AND DIMENSIONAL TOLERANCE.
 3. HYDRO-C TEST SHOULD BE DONE AT MIN. 76.4°F (24.7°C) TEMP.
 4. IMPACT TEST : NONE (REFER TO DOCUMENT NO DVK-M37-V501 REV.4 "DESIGN CALCULATION")

6. MAX. ALLOWABLE WORKING PRESSURE

: 424.08 PsiG (29.24 barG)
AT 491°F
MAX. ALLOWABLE PRESSURE
: 435.26 PsiG (30.01 barG)
AT 76.4°F

7. HYDRO-C TEST PRESSURE

1) SHOP HYD. TEST (BASED ON M.A.P.)
: 638.5 PsiG, 44.91 kg/cm² (44.0 barG)
AT VERTICAL POSITION
2) FIELD HYD. TEST (BASED ON M.A.W.P.)
: 436.12 PsiG (43.86 barG)
AT VERTICAL POSITION.

VESSEL DESIGN DATA

| SECTION | SHELL | COIL |
|---------------------------------|---|-------------------------------|
| REQ'D NO. | 2 | SETS |
| CONTAINING CAPACITY | ~ 204.5 m ³ | ~ 0.085 x 4 m ³ |
| FLUID NAME | ETA CRYSTAL | HOT OIL |
| LETHAL SUBSTANCE(S) | (NONE) | (NONE) |
| FLUID DENSITY | 950 kg/m ³ | 805 kg/m ³ |
| CODE | ASME SECT. III DIV. 1 | |
| DESIGN PRESS. | 1995 ED. (W/NO ADDENDA) | |
| DESIGN TEMP. | 181.5°C | 94.4°C |
| OPERATING PRESS. | 22.319 MPa (323.1 bar) | 6.75 MPa (97.5 bar) |
| OPERATING TEMP. | 119.5°C | 60.1°C |
| HYDRO-C TEST PRESS. | NOTE 7 | NOTE 7 |
| HYDRO-C TEST PRESS. | N/A | N/A |
| POST WELD HEAT TREATMENT | YES | NONE |
| RADIOGRAPH | FULL | FULL |
| JOINT EFFICIENCY | 1.00 | 1.00 |
| CORR. ALLOWANCE | 0.0015" (0.0381mm) | 0.0015" (0.0381mm) |
| INSPECTION AUTHORITY | AT | NONE |
| CODE STAMP | YES | NONE |
| INSULATION (BY OTHER) | CELLULAR GLASS / 160 mm THK | |
| PAINTING | AS PER (MTO SPEC. NO. DVE-M37-V009) | |
| SURFACE FINISH (INT.) | ACCORDING TO BUYER SPEC. | |
| CORR. INHIBITOR | NONE | |
| SCREW THREAD | UNIFIED SCREW | |
| EMPTY WEIGHT (VESSEL ONLY) | 313057LB (142000kg) | |
| OPERATING WEIGHT | 753902LB (346500kg) | |
| TESTING WEIGHT | 753902LB (346500kg) | |
| SPARE (S) | AS PER SPARE PARTS LIST | |
| ACCESSORIES | TEMPLATE FOR FOUNDATION | |
| SAFETY VALVE | PRESSURE RELIEF VALVE TO BE PROVIDED AND INSTALLED ON PIPING CONNECTING WITH NOZZLE (S) BY USER | |
| VACUUM LEAK TEST | NONE | |
| MIN DESIGN METAL TEMP. | 46.4°F (8°C) | 46.4°F (8°C) |
| IMPACT TESTING | NOTE 4 | |
| UT | | |
| N.D.E | NOTE 2 | |
| MT | | |
| PT | | |
| MAX. ALLOWABLE WORKING PRESSURE | NOTE 6 | 21755 PsiG (15 barG) AT 644°F |
| INSTALLATION | | OUTDOOR |



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| | | | | | |
|------------------------------|--------------------------|-------------|-------------|--------------|--------------------|
| Hitachi, Ltd. Tokyo Japan | | 3121-716400 | | VERIFICATION | |
| YEAR | 1996 | JOB | 91907 | WORK NUMBER | 83253 |
| PLANT | PTA-YANBU SAUDI ARABIA | REV. | 2 | SCALE | 1:60 |
| SERVICE | OXIDATION REACTOR | DATE | 13/01/97 | DESIGNER | YANBU SAUDI ARABIA |
| DRAWN BY | J. YANAGI | APPROVED | T. KAKITA | DATE | SEP 30 1996 |
| PURCHASER | TECHNOMINT | DATE | SEP 30 1996 | SHEET | 6/14 |
| PURCHASER ORDER | WJ040255NG 2743CR-MR-005 | DATE | SEP 30 1996 | REVISION | |

| REV. NO. | DATE | DESCRIPTION | BY | CHECKED | APPROVED |
|----------|------|-------------|----|---------|----------|
| 1 | | | | | |
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| 12 | | | | | |

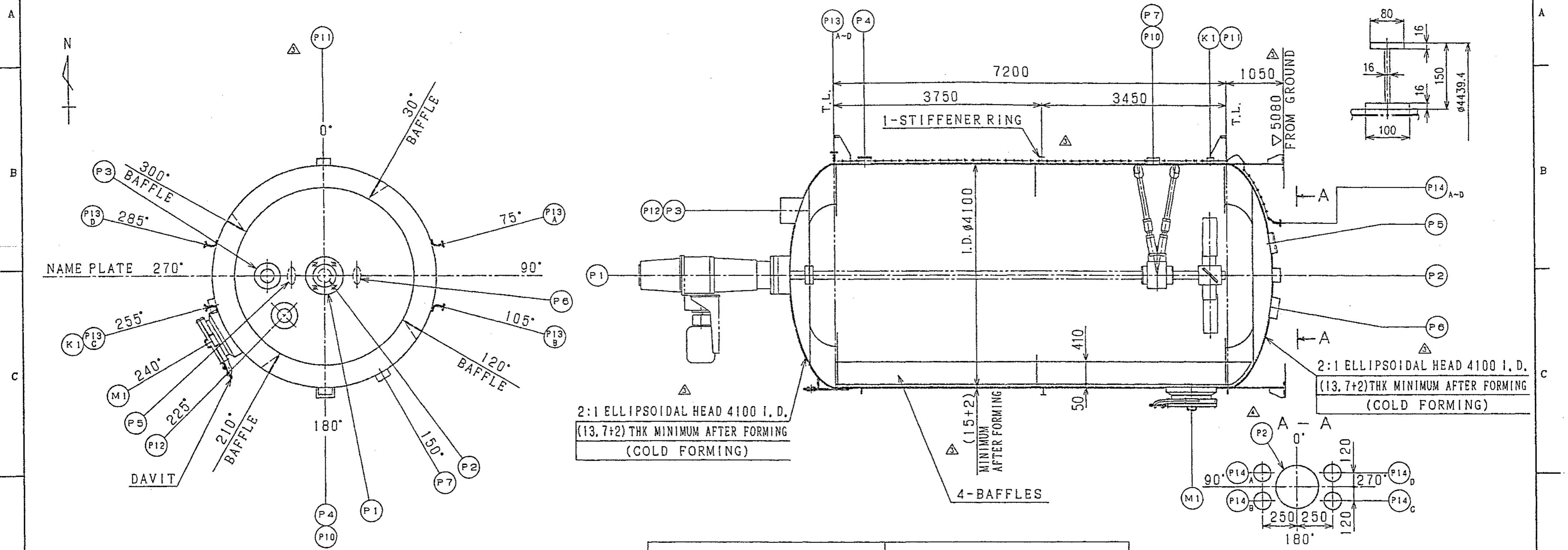
| MARK | SIZE | REQ'D | NO. | PAID | SPECIAL | AGITATOR MOUNT | FROM | REMARKS |
|------|---------|-------|-----|------|---------|----------------|------|---------|
| 28 | 16/10" | 1 | | | | | | |
| 11 | 12/6" | 4 | | | | | | |
| 3 | 8" | 1 | | | | | | |
| 7 | 8 1/4" | 1 | | | | | | |
| 1 | 8 1/4" | 1 | | | | | | |
| 1 | 10 1/8" | 1 | | | | | | |
| 1 | 16/10" | 1 | | | | | | |
| 1 | 12/6" | 4 | | | | | | |
| 1 | 28" | 1 | | | | | | |
| 1 | 6" | 1 | | | | | | |
| 1 | 1.0.500 | 1 | | | | | | |

| REV. NO. | DATE | DESCRIPTION | DRAWN UP | CHECKED | APPROVED |
|----------|------|-------------|----------|---------|----------|
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|------------------------------|--|---------------|--|----------------|--|
| Hitachi, Ltd. Tokyo Japan | | 130011/130021 | | SHELL ASSEMBLY | |
| KASADO WORKS DWG. NO. | | 3121-716400 | | REV. 4 | |

3122-715116

△ STIFFENER RING



| MATERIAL SPECIFICATION | | VESSEL DESIGN DATA | |
|----------------------------|----------------------------|---|---|
| | VESSEL | COIL | |
| SHELL (EXPLOSIVELY BONDED) | SA516Gr. 70+SB265Gr. 1CLAD | - | REQ'D NO. 1 SET |
| HEAD (EXPLOSIVELY BONDED) | SA516Gr. 70+SB265Gr. 1CLAD | - | VOLUME m ³ ~113.5 ~0.039x4 |
| NOZZLE FLANGE | SA105 | SA106Gr. B | FLUID NAME CTA CRYSTAL+CH ₂ COOH+H ₂ O STEAM+CONDENSATE |
| NOZZLE NECK | SA105+SB265Gr. 7 | SA106Gr. B | FLUID DENSITY kg/m ³ 1045 1000 |
| MANHOLE | SA105+SB265Gr. 18Gr. 7 | | DESIGN CODE ASME SECT. VIII DIV. 1 (1995ED), (W/NO ADD.) |
| VESSEL SUPPORT | SA516 Gr. 70 | | DESIGN PRESS. F.V. at 100°C & 2.5 barg F.V. at 100°C & 2.5 barg |
| BOLT & NUT (PRESS. PART) | SA193Gr. B7 & SA194Gr. 2H | | DESIGN TEMP. 175 °C 230 °C |
| BOLT & NUT (INTERNAL) | Ti | | OPERATING PRESS. 3 barg 18 barg |
| GASKET | SHELL △ | SPIRAL WOUND TI / GRAPHITE WITH INT. RING AND 316 L.S. EXT. RING | OPERATING TEMP. 153 °C 210 °C |
| | COIL | SPIRAL WOUND 316 S.S. / GRAPHITE WITH 316 S.S. INT. RING AND C.S. EXT. RING | HYDRO'C TEST PRESS. △ NOTE 2 (34,50Y AIR) 31rg |
| INTERNALS | Ti | | PNEUM'C TEST PRESS. - |
| EXTERNALS | C. S. | | POST WELD H. T. NO NO |
| MANHOLE COVER | SA105+SB265Gr. 7 | | RADIOGRAPH FULL △ FULL |
| | | | CORR. ALLOWANCE INSIDE 2mm (TI) INSIDE 1.0mm |
| | | | INSPECTION AUTHORITY AI - |
| | | | CODE STAMP YES NO |
| | | | INSULATION / THK (BY OTHERS) MINERAL WOOL / 100mm |
| | | | PAINTING ACCORDING TO TCM SPEC. NO. 2743-VV-SG-001 |
| | | | SURFACE FINISH (INT.) ACCORDING TO DUPONT SPEC. SWIP (100Y IRON FREE) |
| | | | SCREW THREAD UNIFIED |
| | | | FIRE PROOFING (BY OTHERS) YES 50mm THK |
| | | | MINIMUM DESIGN METAL TEMPERATURE °C +8 +8 |
| | | | SPARE (S) SEE SPARE PARTS LIST |
| | | | ACCESSORIES TEMPLATE |
| | | | INSTALLATION OUTDOOR |
| | | | MAX. ALLOWABLE WORKING PRESSURE NOTE 1 |

Hitachi, Ltd.
Tokyo Japan

MANUFACTURER'S TRADE MARK

MANUFACTURER'S DRAWING NO. 3122-715116

TECHNIMONT

CLIENT ARABIAN IND. FIBERS CO. LTD.

PLANT LOCATION YANBU SAUDI ARABIA

JOB NO. 14D002

SCALE 1:50

DATE NOV. 11 1996

PURCHASER TECHNIMONT

MATERIAL REQUISITION WO40255NG 2743CR-VR-005

| REV. No. | DATE | DESCRIPTION | DRAWN UP | CHECKED | APPROVED |
|---|-------------|-------------|----------|---------|----------|
| SCALE | | JOB No. | | | |
| <p>ARABIAN INDUSTRIAL FIBERS CO. (IBN RUSHDI) YANBU SAUDI ARABIA</p> <p>IBN RUSHDI PTA PLANT YANBU SAUDI ARABIA 350000 MT/Y PTA PLANT</p> | | | | | |
| Plant Unit | DRAWING No. | SHEET | REVISION | | |

| MARK | SIZE | NO. REQ'D | NOZZLE SCHED | RATING | SERVICE | FLANGE TYPE | REMARKS |
|------|--------|-----------|--------------|------------|-------------------|-------------|------------------------|
| K1 | 1-1/2" | 1 | | ANSI150#RF | TEMP. CONN. | PAD | |
| M1 | 700" | 1 | | SPECIAL | MANHOLE | | W/DAVIT AND B. FL. |
| P14A | 1" | 4 | | ANSI300#RF | CONDENSATE OUTLET | WN | |
| P13A | 1" | 4 | | ANSI300#RF | STEAM INLET | WN | |
| P12 | 6" | 1 | | ANSI150#RF | SPARE | PAD | W/B.FL. |
| P11 | 4" | 1 | | ANSI150#RF | SPARE | PAD | W/B.FL. |
| P10 | 6" | 1 | | ANSI300#RF | SLURRY INLET | PAD | |
| P7 | 6" | 1 | | ANSI300#RF | SPARE | PAD | W/B.FL. |
| P6 | 5" | 1 | | ANSI150#RF | SPARE | PAD | W/B.FL. |
| P5 | 5" | 1 | | ANSI150#RF | SLURRY OUTLET | PAD | |
| P4 | 3" | 1 | | ANSI150#RF | SPARE | PAD | W/B.FL. |
| P3 | 10" | 1 | | ANSI150#RF | VAPOR TO 16COOI | PAD | LINE WITH SAFETY VALVE |
| P2 | 4" | 1 | | ANSI150#RF | DRAIN | PAD | |
| P1 | 370" | 1 | | SPECIAL | AGITATOR MOUNT | PAD | |

NOTE

1. MAX. ALLOWABLE WORKING PRESSURE : 6.6 barG AT 347 °F
MAX. ALLOWABLE PRESSURE : 7.46 barG AT 76.4 °F

2. HYDRO'C TEST PRESSURE
1) SHOP HYD. TEST (BASED ON M.A.P.) : 10.8 barG AT HORIZONTAL POSITION
2) FIELD HYD. TEST (BASED ON M.A.W.P.) : 10.04 barG AT VERTICAL POSITION

| REV. | DATE | BY | CHKD. | APPD. | REVISIONS |
|------|----------|------------|------------|----------|---|
| | 96-11-11 | H.MIZUKI | H.KANE | T.TAKATA | FOR FINAL |
| | 96-05-28 | H.MIZUKI | S.MORITA | H.KANE | REVISED IN ACC WITH TCM'S COMMENTS & OTHERS |
| | 96-01-20 | H.MIZUKI | Y.MIZUSEKI | T.TAKATA | GENERAL REVISION |
| | 95-11-25 | T.KAWAMURA | T.TAKATA | | GENERAL REVISION |

Hitachi, Ltd.
Tokyo Japan

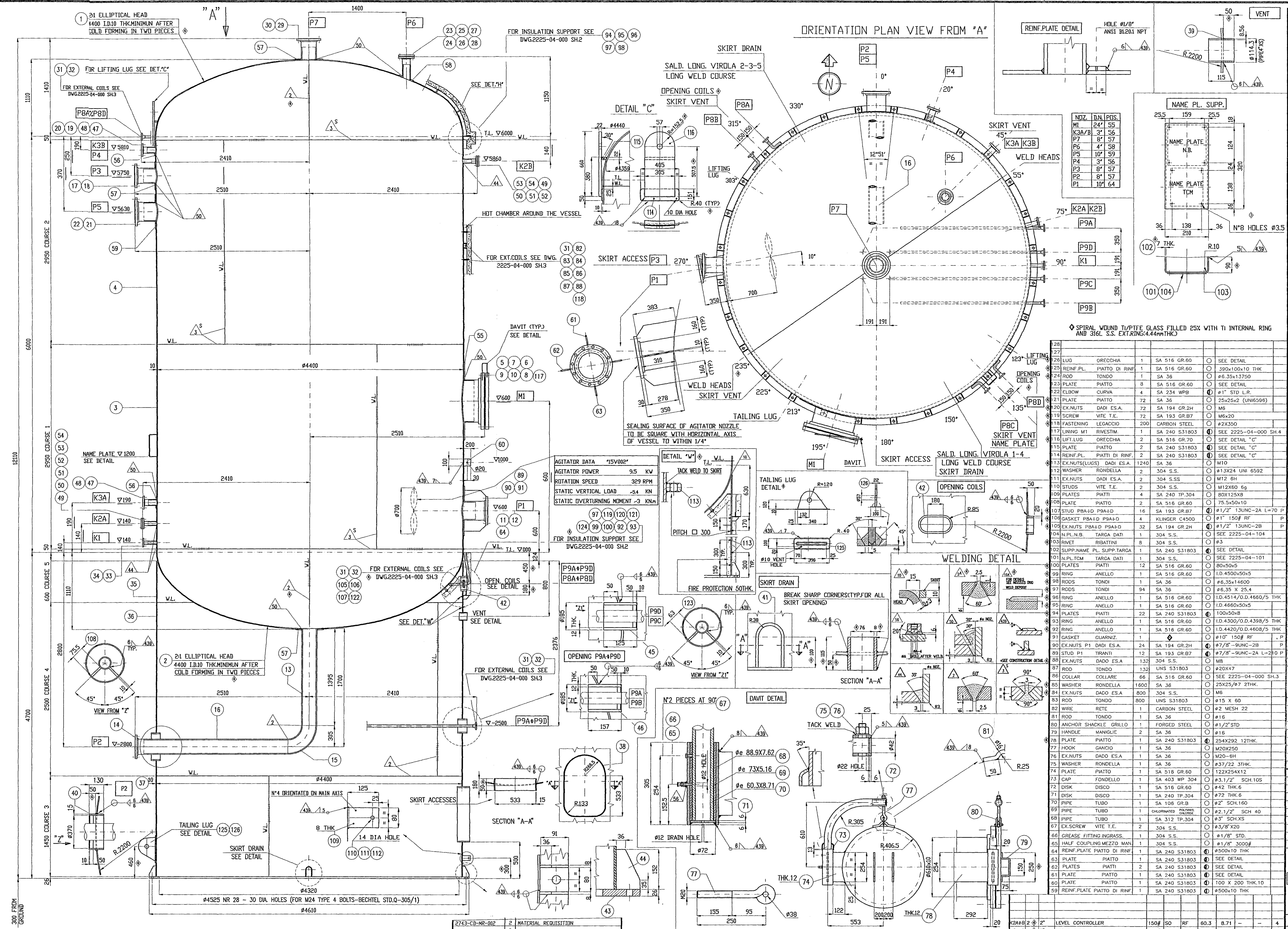
PROJECTION

SCALE 1:50

TITLE SECOND CTA CRYSTALLIZER (VESSEL) 14D002

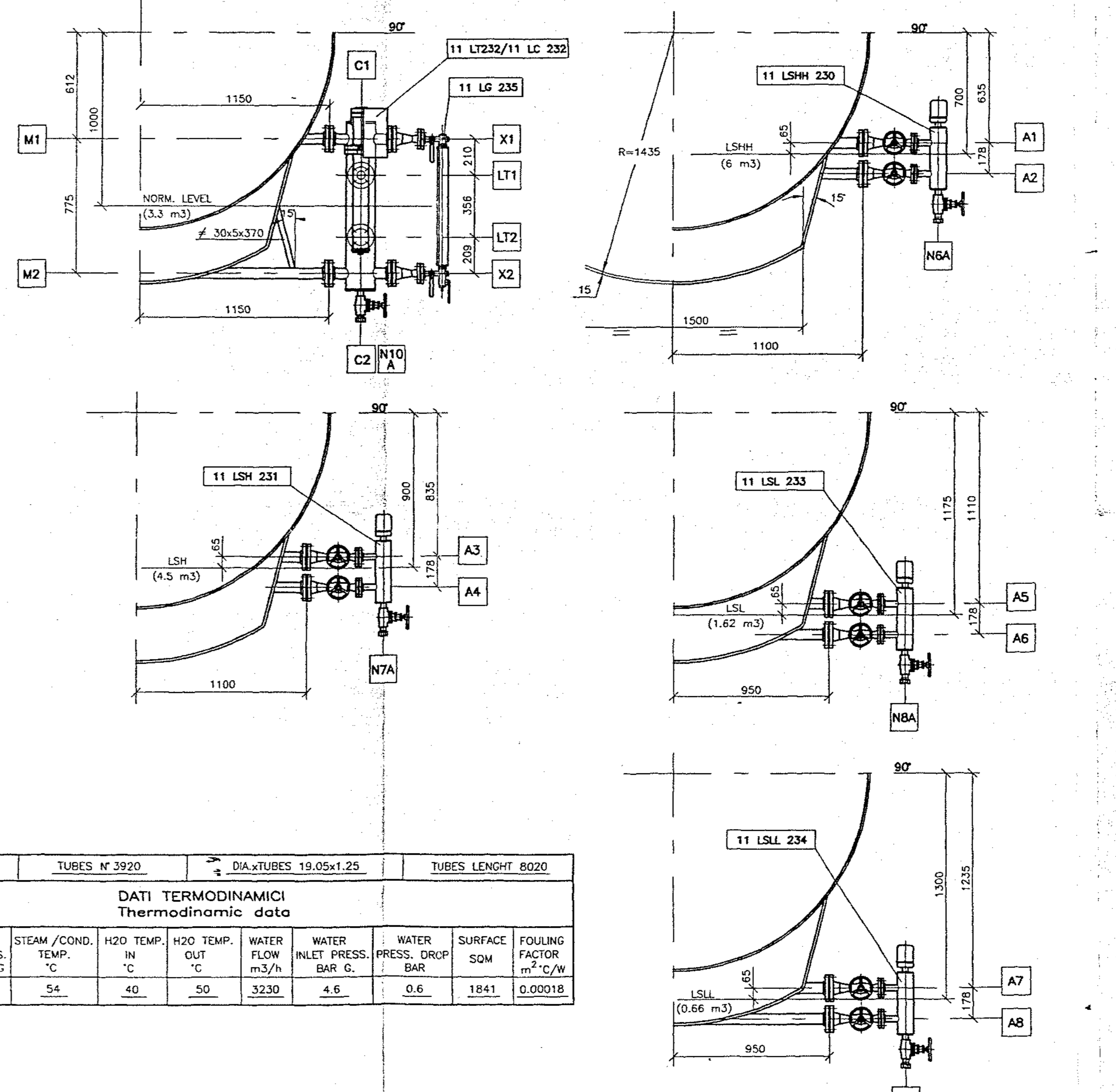
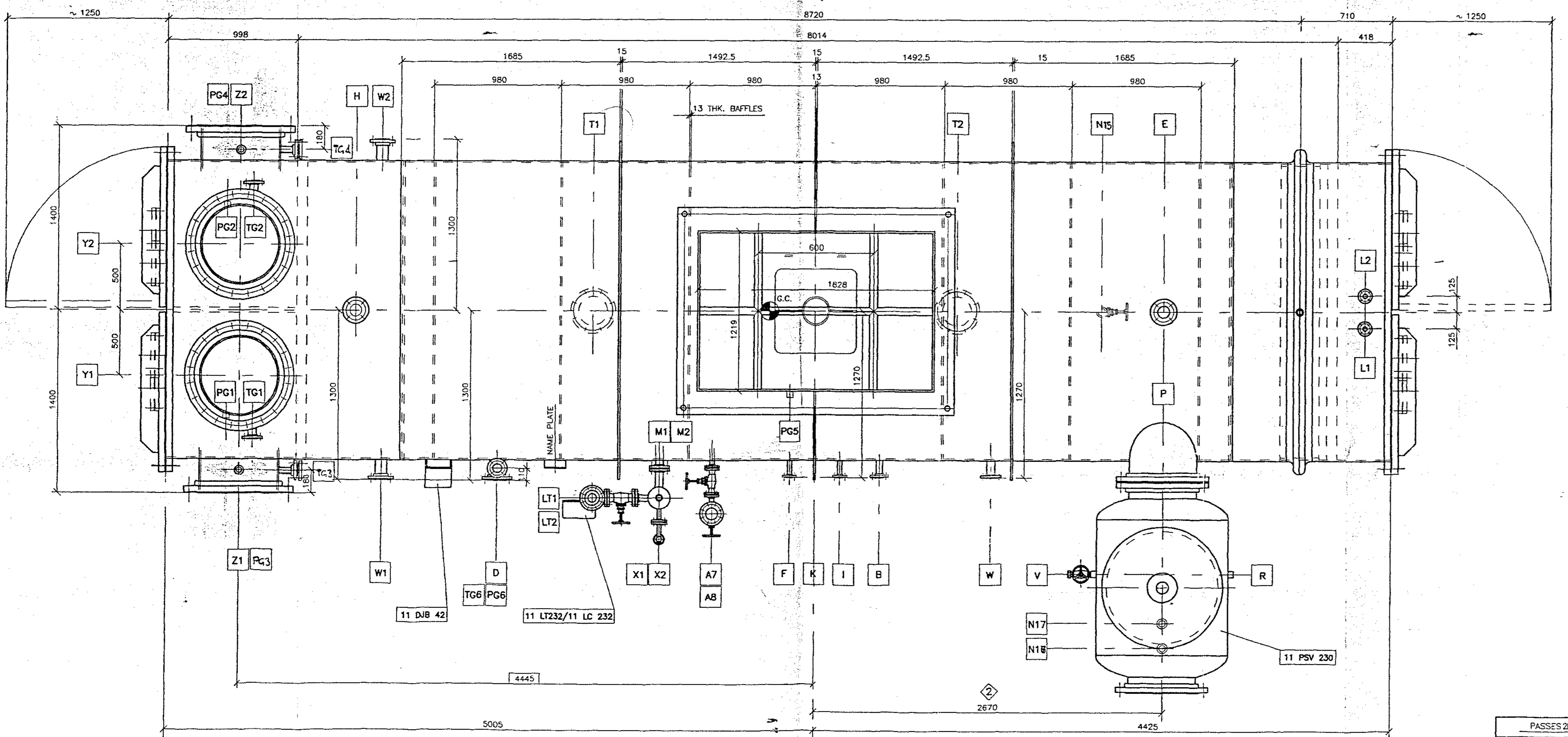
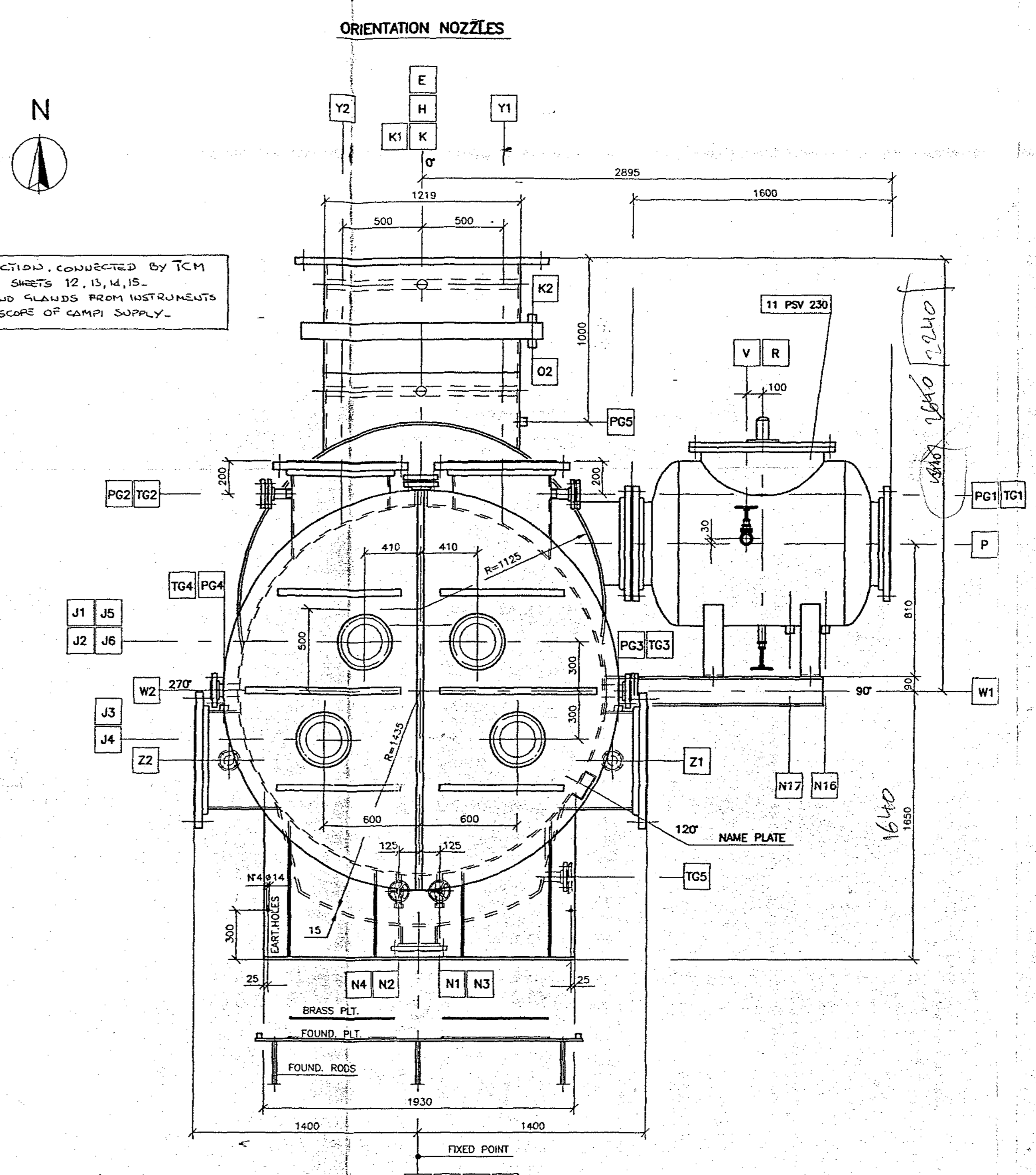
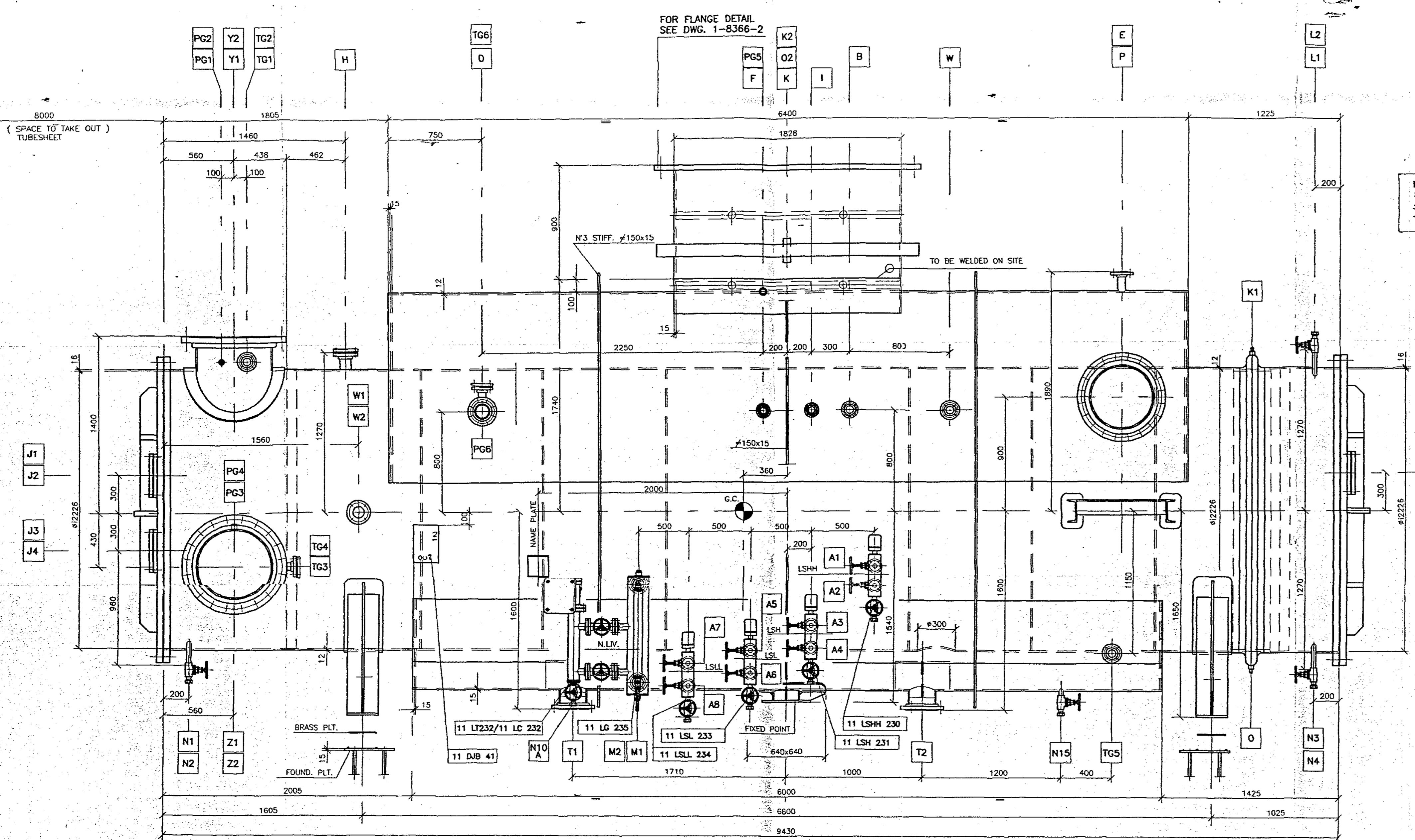
KASADO WORKS DWG. NO. 3122-715116

REV. 4



| NO. | DESCRIPTION | QTY | UNIT | SA | SP | RF | REMARKS |
|-----|----------------------------|-----|------|-----|--------|----|------------------------|
| 1 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #210x10 THK |
| 2 | REIN.FLATE PIATTO DI RINF. | 3 | SA | 240 | S31803 | Ø | #400x10 THK |
| 3 | REIN.FLATE PIATTO DI RINF. | 3 | SA | 240 | S31803 | Ø | #160x10 THK |
| 4 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #1120x10 THK |
| 5 | FLANGE K2A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #2" 150# SO-RF |
| 6 | PIPE K2A/B TUBO | 2 | SA | 790 | S31803 | Ø | #2" SCH. 160 |
| 7 | BL.FLG. K2A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #2" 150# RF |
| 8 | GASKET K2A/B GUARNIZ. | 2 | Ø | | | | #2" 150# RF |
| 9 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=90 P |
| 10 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 11 | FLANGE K3A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #3" 150# SO-RF |
| 12 | PIPE K3A/B TUBO | 2 | SA | 790 | S31803 | Ø | #3" SCH. XS |
| 13 | BL.FLG. K3A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #3" 150# RF |
| 14 | GASKET K3A/B GUARNIZ. | 2 | Ø | | | | #3" 150# RF |
| 15 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 16 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 17 | FLANGE K4A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #4" 150# SO-RF |
| 18 | PIPE K4A/B TUBO | 2 | SA | 790 | S31803 | Ø | #4" SCH. XS |
| 19 | BL.FLG. K4A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #4" 150# RF |
| 20 | GASKET K4A/B GUARNIZ. | 2 | Ø | | | | #4" 150# RF |
| 21 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 22 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 23 | FLANGE K5A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #5" 150# SO-RF |
| 24 | PIPE K5A/B TUBO | 2 | SA | 790 | S31803 | Ø | #5" SCH. XS |
| 25 | BL.FLG. K5A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #5" 150# RF |
| 26 | GASKET K5A/B GUARNIZ. | 2 | Ø | | | | #5" 150# RF |
| 27 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 28 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 29 | FLANGE K6A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #6" 150# SO-RF |
| 30 | PIPE K6A/B TUBO | 2 | SA | 790 | S31803 | Ø | #6" SCH. XS |
| 31 | BL.FLG. K6A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #6" 150# RF |
| 32 | GASKET K6A/B GUARNIZ. | 2 | Ø | | | | #6" 150# RF |
| 33 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 34 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 35 | FLANGE K7A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #7" 150# SO-RF |
| 36 | PIPE K7A/B TUBO | 2 | SA | 790 | S31803 | Ø | #7" SCH. XS |
| 37 | BL.FLG. K7A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #7" 150# RF |
| 38 | GASKET K7A/B GUARNIZ. | 2 | Ø | | | | #7" 150# RF |
| 39 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 40 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 41 | FLANGE K8A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #8" 150# SO-RF |
| 42 | PIPE K8A/B TUBO | 2 | SA | 790 | S31803 | Ø | #8" SCH. XS |
| 43 | BL.FLG. K8A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #8" 150# RF |
| 44 | GASKET K8A/B GUARNIZ. | 2 | Ø | | | | #8" 150# RF |
| 45 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 46 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 47 | FLANGE K9A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #9" 150# SO-RF |
| 48 | PIPE K9A/B TUBO | 2 | SA | 790 | S31803 | Ø | #9" SCH. XS |
| 49 | BL.FLG. K9A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #9" 150# RF |
| 50 | GASKET K9A/B GUARNIZ. | 2 | Ø | | | | #9" 150# RF |
| 51 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 52 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 53 | FLANGE K10A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #10" 150# SO-RF |
| 54 | PIPE K10A/B TUBO | 2 | SA | 790 | S31803 | Ø | #10" SCH. XS |
| 55 | BL.FLG. K10A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #10" 150# RF |
| 56 | GASKET K10A/B GUARNIZ. | 2 | Ø | | | | #10" 150# RF |
| 57 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 58 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 59 | FLANGE K11A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #11" 150# SO-RF |
| 60 | PIPE K11A/B TUBO | 2 | SA | 790 | S31803 | Ø | #11" SCH. XS |
| 61 | BL.FLG. K11A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #11" 150# RF |
| 62 | GASKET K11A/B GUARNIZ. | 2 | Ø | | | | #11" 150# RF |
| 63 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 64 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 65 | FLANGE K12A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #12" 150# SO-RF |
| 66 | PIPE K12A/B TUBO | 2 | SA | 790 | S31803 | Ø | #12" SCH. XS |
| 67 | BL.FLG. K12A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #12" 150# RF |
| 68 | GASKET K12A/B GUARNIZ. | 2 | Ø | | | | #12" 150# RF |
| 69 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 70 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 71 | FLANGE K13A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #13" 150# SO-RF |
| 72 | PIPE K13A/B TUBO | 2 | SA | 790 | S31803 | Ø | #13" SCH. XS |
| 73 | BL.FLG. K13A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #13" 150# RF |
| 74 | GASKET K13A/B GUARNIZ. | 2 | Ø | | | | #13" 150# RF |
| 75 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 76 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 77 | FLANGE K14A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #14" 150# SO-RF |
| 78 | PIPE K14A/B TUBO | 2 | SA | 790 | S31803 | Ø | #14" SCH. XS |
| 79 | BL.FLG. K14A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #14" 150# RF |
| 80 | GASKET K14A/B GUARNIZ. | 2 | Ø | | | | #14" 150# RF |
| 81 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 82 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 83 | FLANGE K15A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #15" 150# SO-RF |
| 84 | PIPE K15A/B TUBO | 2 | SA | 790 | S31803 | Ø | #15" SCH. XS |
| 85 | BL.FLG. K15A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #15" 150# RF |
| 86 | GASKET K15A/B GUARNIZ. | 2 | Ø | | | | #15" 150# RF |
| 87 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 88 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 89 | FLANGE K16A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #16" 150# SO-RF |
| 90 | PIPE K16A/B TUBO | 2 | SA | 790 | S31803 | Ø | #16" SCH. XS |
| 91 | BL.FLG. K16A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #16" 150# RF |
| 92 | GASKET K16A/B GUARNIZ. | 2 | Ø | | | | #16" 150# RF |
| 93 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 94 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 95 | FLANGE K17A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #17" 150# SO-RF |
| 96 | PIPE K17A/B TUBO | 2 | SA | 790 | S31803 | Ø | #17" SCH. XS |
| 97 | BL.FLG. K17A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #17" 150# RF |
| 98 | GASKET K17A/B GUARNIZ. | 2 | Ø | | | | #17" 150# RF |
| 99 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 100 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 101 | FLANGE K18A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #18" 150# SO-RF |
| 102 | PIPE K18A/B TUBO | 2 | SA | 790 | S31803 | Ø | #18" SCH. XS |
| 103 | BL.FLG. K18A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #18" 150# RF |
| 104 | GASKET K18A/B GUARNIZ. | 2 | Ø | | | | #18" 150# RF |
| 105 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 106 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 107 | FLANGE K19A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #19" 150# SO-RF |
| 108 | PIPE K19A/B TUBO | 2 | SA | 790 | S31803 | Ø | #19" SCH. XS |
| 109 | BL.FLG. K19A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #19" 150# RF |
| 110 | GASKET K19A/B GUARNIZ. | 2 | Ø | | | | #19" 150# RF |
| 111 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 112 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 113 | FLANGE K20A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #20" 150# SO-RF |
| 114 | PIPE K20A/B TUBO | 2 | SA | 790 | S31803 | Ø | #20" SCH. XS |
| 115 | BL.FLG. K20A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #20" 150# RF |
| 116 | GASKET K20A/B GUARNIZ. | 2 | Ø | | | | #20" 150# RF |
| 117 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 118 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 119 | FLANGE K21A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #21" 150# SO-RF |
| 120 | PIPE K21A/B TUBO | 2 | SA | 790 | S31803 | Ø | #21" SCH. XS |
| 121 | BL.FLG. K21A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #21" 150# RF |
| 122 | GASKET K21A/B GUARNIZ. | 2 | Ø | | | | #21" 150# RF |
| 123 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 124 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |
| 125 | FLANGE K22A/B FLANGIA | 2 | SA | 182 | S31803 | Ø | #22" 150# SO-RF |
| 126 | PIPE K22A/B TUBO | 2 | SA | 790 | S31803 | Ø | #22" SCH. XS |
| 127 | BL.FLG. K22A/B FL. CIECA | 2 | SA | 182 | S31803 | Ø | #22" 150# RF |
| 128 | GASKET K22A/B GUARNIZ. | 2 | Ø | | | | #22" 150# RF |
| 129 | STUDS TIRANTI | 8 | SA | 193 | GR.87 | Ø | #5/8" 11UNC-2A L=100 P |
| 130 | EX.NUTS DADI ESA. | 16 | SA | 194 | GR.2H | Ø | #5/8" 11UNC-2B P |

| NO. | DESCRIPTION | QTY | UNIT | SA | SP | RF | REMARKS |
|-----|----------------------------|-----|------|-----|--------|----|--------------|
| 129 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #200x10 THK |
| 130 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #500x10 THK |
| 131 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #100x10 THK |
| 132 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #150x10 THK |
| 133 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #200x10 THK |
| 134 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #250x10 THK |
| 135 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #300x10 THK |
| 136 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #350x10 THK |
| 137 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #400x10 THK |
| 138 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #450x10 THK |
| 139 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #500x10 THK |
| 140 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #550x10 THK |
| 141 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #600x10 THK |
| 142 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #650x10 THK |
| 143 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #700x10 THK |
| 144 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #750x10 THK |
| 145 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #800x10 THK |
| 146 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #850x10 THK |
| 147 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #900x10 THK |
| 148 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #950x10 THK |
| 149 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #1000x10 THK |
| 150 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #1050x10 THK |
| 151 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #1100x10 THK |
| 152 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #1150x10 THK |
| 153 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #1200x10 THK |
| 154 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #1250x10 THK |
| 155 | REIN.FLATE PIATTO DI RINF. | 1 | SA | 240 | S31803 | Ø | #1300x10 THK |
| 156 | REIN.FLATE PIATTO DI RINF. | | | | | | |



ELENCO MATERIALI - Material list

| DESCRIPTION | QUANTITY | UNIT | NOTE |
|----------------------------|--|------|------|
| SHELL 12 THK. AND 15 THK. | SA 516 Gr. 70 | | |
| EXPANSION BELLOW | SA 240 Tp. 304 | | |
| WATER BOX COVERS | SA 516 Gr. 70 | | |
| WATER BOX FLANGES | SA 516 Gr. 70 | | |
| TUBESHEETS | SA 516 Gr. 70 | | |
| PLATE NOZZLES | SA 516 Gr. 70 | | |
| NOZZLES REINFORCING PLATES | SA 516 Gr. 70 | | |
| PIPE NOZZLES | SA 106 Gr. B | | |
| FLANGES NOZZLES | SA 105 | | |
| HALF COUPLING | SA 105 | | |
| SADDLES | SA 285 Gr. C | | |
| REINFORCING SADDLES | SA 516 Gr. 60 | | |
| BAFFLES 13 THK. | SA 516 Gr. 60 | | |
| TUBES | B 111 C 44300 (Admir. brass) | | |
| BOTTLE | SA 106 Gr. B | | |
| STUD BOLTS | SA 193 Gr. B7 | | |
| NUTS | SA 194 Gr. 2H | | |
| GASKETS | NON ASB SYNTHETIC FIBER KLINGER C 4430, 3 mm. THK. | | |
| FOUNDATION BOLTS | Fe 430 B UNI 7070 | | |

ELENCO CONNESSIONI - List of connections

| NO. | SIZE | TYPE | DESCRIPTION | NOTE |
|--------|----------|------|------------------------------|------|
| A1/2 | 2" | Z | LSH | |
| A3/4 | 2" | Z | LSH | |
| A5/8 | 2" | Z | LSL | |
| A7/8 | 2" | Z | LSL | |
| B | 1 1/2" | Z | CONDENSATE FROM VACUUM COND. | |
| C1 | 1 3/4" | Z | BOTTLE DRAIN | |
| D | 1 4" | Z | CONDENSATE INLET | |
| H | 1 3" | Z | SPARE | |
| I | 1 1" | Z | CONDENS. FROM VACUUM | |
| K1-2 | 2 1/2" | Z | EXPANSION VENT | |
| O1-2 | 2 1/2" | Z | EXPANSION DRAIN | |
| L1-2 | 2 1/2" | Z | VENT | |
| L1-2 | 2 1/2" | Z | LEVEL CONTROL | |
| N1-4 | 4 1" | Z | DRAIN | |
| N4-N9 | 4 1" | Z | DRAIN | |
| M1-2 | 1 2" | Z | EXPANSION BOTTLE CONNECT. | |
| P | 1 20" | Z | P.S.V. | |
| PG1-6 | 6 3/4" | Z | P.I. | |
| F | 1 1" | Z | CONDENSATE FROM GLAND COND. | |
| K | 1 1/2" | Z | STEAM INLET | |
| T1-2 | 2 8" | Z | CONDENSATE OUTLET | |
| TG1-6 | 6 1 1/2" | Z | T.J. | |
| Z1-2 | 2 2" | Z | COOLING WATER INLET | |
| W1-2 | 2 2" | Z | COOLING WATER OUTLET | |
| W1-2 | 2 3" | Z | VACUUM | |
| W | 1 2" | Z | START UP DEMI WATER | |
| X1-2 | 2 2" | Z | L.G. | |
| V | 1 1/2" | Z | CONDENSATE INLET | |
| R | 1 1/2" | Z | CONDENSATE OUTLET | |
| E | 1 2" | Z | VACUUM BREAKER | |
| N15 | 1 1" | Z | DRAIN | |
| N16-17 | 2 1/2" | Z | DRAIN | |
| N10 A | 1 3/4" | Z | DRAIN | |

DESIGN DATA

| CODE | SHELL | TUBES | NOTES |
|---|-----------|-------|---|
| DESIGN CODES | | HC | |
| TEAM CLASS | | | |
| CODE "U" STAMP | | | |
| INSPECTION AUTHORITY | | | BUREAU VERITAS, DRESSER RING AND TECHNOMAT |
| OPERATING | bar (g) | | FULL VACUUM/1 |
| EXTERNAL | bar (g) | | 0.15 |
| HYDROTEST | bar (g) | | WATER FILLING 16.5 |
| PNEUMATIC TEST | bar (g) | | ONLY NOZZLE REINFORCING PAD |
| MAX. (HOT AND COLD) | bar (g) | | 1.20 |
| MAX. (HOT AND COLD) | bar (g) | | 1.07 |
| DESIGN | °C | | 120 |
| OPERATING | °C | | 54 |
| HYDROTEST | °C | | 54 |
| TEMPERATURE | °C | | 120 |
| METAL TEMPERATURE | °C | | 120 |
| CORROSION ALLOWANCE | mm | | 1 (SHELL) 1 (TUBES) |
| CORROSION ALLOWANCE | mm | | 3 (SHELL) 3 (TUBES) |
| PHYSICAL STATE | | | WATER |
| SPECIFIC GRAVITY | kg/m³ | | LIQUID |
| CAPACITY | m³ | | 34 |
| NUMBER OF TUBES | | | 1 |
| JOINTS EFFICIENCY | | | 0.85 |
| INSULATION | TYPE/THK. | | NONE |
| PREINSULATION | | | NONE |
| LOCATION | | | INDOOR |
| WIND PRESSURE | | | NONE |
| SEISMIC ZONE | | | BECHTEL SPEC. 2284-SP-000-M 001/1 ASCE 7-88 ZONE 1. |
| LENGTH AT BULKHEAD | m | | 6.00 |
| VERTICAL JAW | m | | 0.890 |
| SHEAR | mm | | 21 |
| WIND SPEED | km/h | | 42000 |
| WIND PRESSURE | kg/m² | | 8500 |
| WIND MOMENT | kg-m | | 1841 |
| WIND FORCE | kg | | 1841 |
| EXTERNAL: SANDBLASTING SA 2 WITH EPOXY MASTIC | | | |
| EXTERNAL: SANDBLASTING SA 2 WITH EPOXY MASTIC | | | |
| EXTERNAL: SANDBLASTING SA 2 WITH EPOXY MASTIC | | | |
| EXTERNAL: SANDBLASTING SA 2 WITH EPOXY MASTIC | | | |
| EXTERNAL: SANDBLASTING SA 2 WITH EPOXY MASTIC | | | |

AS BUILT

30/06/2006 Rev. No. 001-11 3433

COND. SYS. MAIN COND. SETTING PLAN

REVISIONS

| NO. | DESCRIPTION | DATE | BY | APPROVED |
|-----|---|------|----|----------|
| 1 | AS REQUIRED D.R. FAX DTD 13.06.96 AND COMMENTS DTD 19.07.96 | TCN | | 27.08.96 |
| 2 | GENERAL REVISION AS TCM. COMMENTS DATE 06.03.96 | TCN | | 08.05.96 |

MANUFACTURER'S TRADE MARK: C.A.M.P.I. SH FERRARA ITALY

CLIENT: ARABIAN IND. FIBERS CO. LTD. YANBU SAUDI ARABIA

PLANT LOCATION: YANBU SAUDI ARABIA

TYPE: MAIN CONDENSER

SETTING PLAN

DATE: 1841

SCALE: 1:100

DATE: 16.01.96

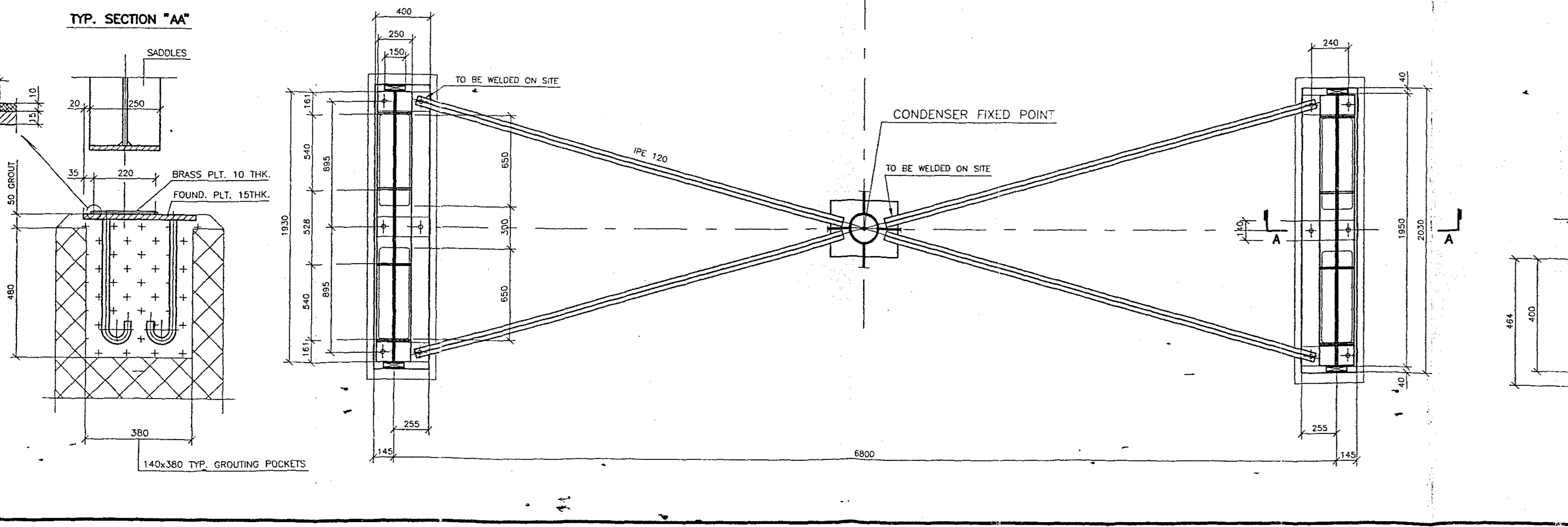
TECHNOMAT

REVISIONS

| NO. | DESCRIPTION | DATE | BY | APPROVED |
|-----|---|------|----|----------|
| 1 | WITH BLIND FLANGE, GASKET AND STUD BOLTS. | | | |
| 2 | WITH L.S. GASKET AND STUD BOLTS. | | | |
| 3 | WITH LEVEL INH. GASKET AND STUD BOLTS. | | | |
| 4 | WITH FLUG. | | | |
| 5 | WITH LEVEL INH. VALVE, GASKET AND STUD BOLTS. | | | |
| 6 | WITH GASKET AND STUD BOLTS. | | | |
| 7 | WITH VALVE AND PLUG. | | | |
| 8 | WITH VALVE. | | | |
| 9 | WITH BLIND, WELD, THREAD, COUPLING, GASKET, STUD BOLTS. | | | |

DATI TERMODINAMICI Thermodynamic data

| STEAM L/h | STEAM PRESS. BAR A | H2O PRESS. BAR G | STEAM/COND. TEMP. °C | H2O TEMP. IN °C | H2O TEMP. OUT °C | WATER FLOW m³/h | WATER INLET PRESS. BAR G | WATER PRESS. GROUP BAR | SURFACE SQM | FOULING FACTOR |
|-----------|--------------------|------------------|----------------------|-----------------|------------------|-----------------|--------------------------|------------------------|-------------|----------------|
| 65 | 0.15 | 3.5 | 54 | 40 | 50 | 3230 | 4.6 | 0.6 | 1841 | 0.0018 |



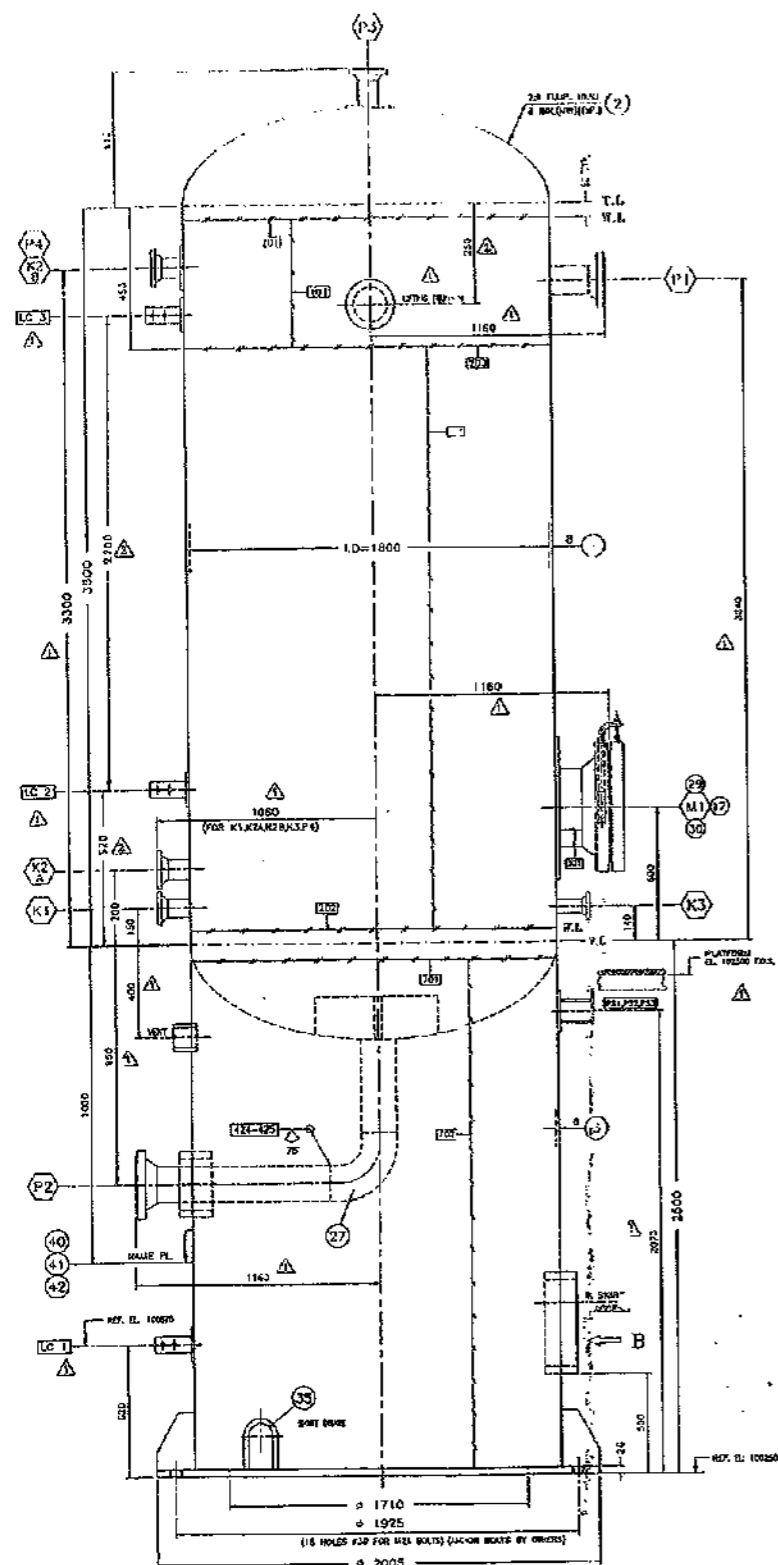
GENERAL NOTES

- Review the indicated materials at shop that will be supplied the following spare parts.
- Before shipping the unit must be drilled, internally steel and cleaned.
- Flanges contact faces must be protected with marine plywood or metal covers complete of rubber gasket or masticated steel disc.
- The eventual corrosion in the gulletted area is not to be applied to the bundle tubes for which is zero.
- Flanges according to ASME B16.5 - Couplings according to ANSI B16.11 full range type for ANSI 150 lb pressure - flange option
- Unless otherwise noted all dimensions are in millimeters.

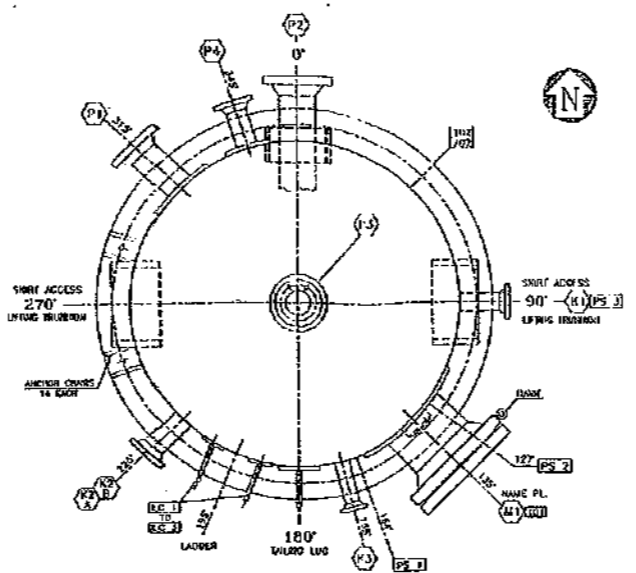
NOTE: MANUFACTURER'S TRADE MARK: C.A.M.P.I. SH FERRARA ITALY

SERRATED CONCENTRIC OR SERRATED SPIRAL FINISH ACCORDING TO ANSI B 16.5 WITH RESISTING PROOFNESS ANH 125-250 micropound (ANSI B 46.1).

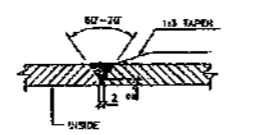
RIFERIMENTO DISEGNI E SPECIFICHE: Drawings and specifications reference



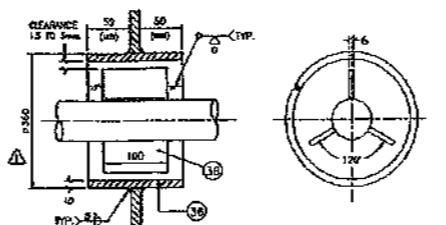
ELEVATION



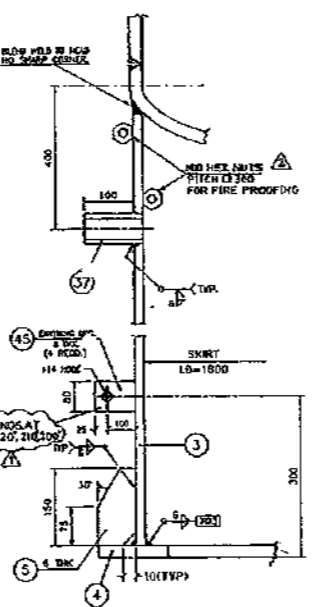
ORIENTATION



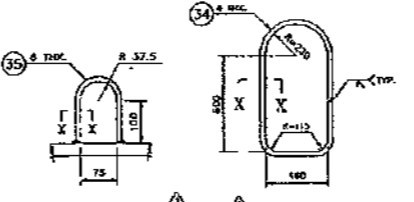
TYPICAL SHELL TO SHELL & SHELL TO HEAD SEAM WELD



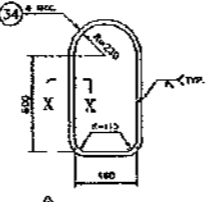
SKIRT OPENING FOR P2



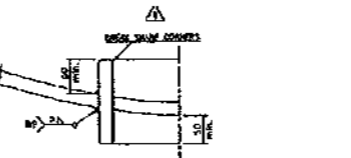
SKIRT & BASE RING DETAILS



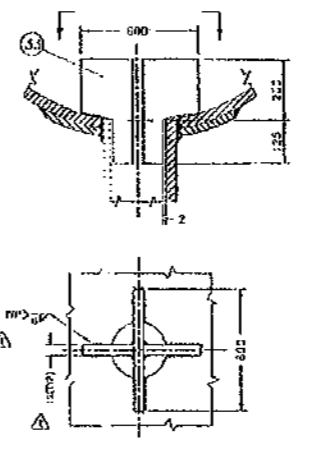
SKIRT DRAIN DETAIL



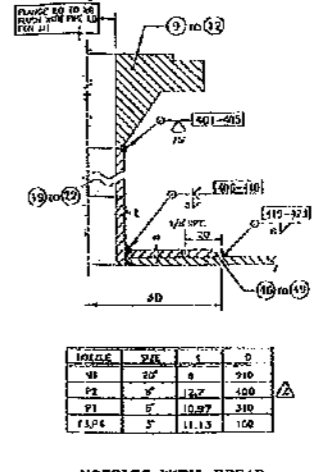
SKIRT ACCESS DETAIL



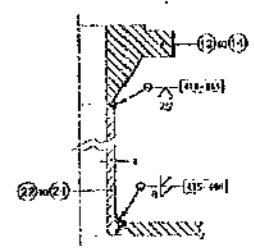
SECTION X-X



P2 VORTEX-BREAKER DETAIL



NOZZLES WITH REPAD



| NOZZLE | SIZE | 1 |
|--------|------|-------|
| NO. 1 | 3" | 11.13 |
| NO. 2 | 2" | 8.41 |
| NO. 3 | 1.5" | 5.14 |

NOZZLES WITHOUT REPAD

TECHMONT

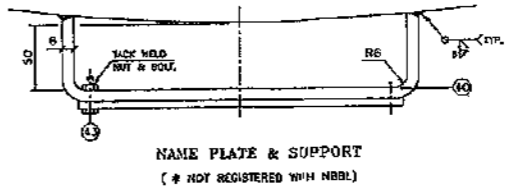
MANUFACTURER OF VESSEL
AT&V/STEPRO
EQUIPMENT

DESIGN TEMPERATURE: 100 °F
DESIGN PRESSURE: 20.0 PSIG
TEST PRESSURE (FIELD): 30.0 PSIG
CORROSION ALLOWANCE: 0.0000
3-RAY TEST: YES
STRESS RELIEF: YES

NAT'L. B.D. #

CERTIFIED BY
ARABIAN TANK AND VESSEL STEPRO
MANP. 78,58 PSI AT 212 °F

UNIT 45 T AT 29 PSI
MANUFACTURERS S/N 9614-08
YEAR BUILT 1990



NAME PLATE & SUPPORT

NOTE: REF. Dwg. 0614-08-099 FOR DETAILED BILL OF MATERIAL

| NO. | DESCRIPTION | QTY | UNIT | REMARKS |
|-----|---------------------|--|------|---------|
| 7 | GASKETS, (EXTERNAL) | NON-ASBESTOS FIBERGLASS WITH NBR GROMMET | | |
| 8 | BOLTS/NUTS | SA 193 8/16 2H | | |
| 9 | SUPPORTS/STRUCTURES | A 36 OR EQ. | | |
| 4 | SKIRT, BASE RING | A 315 CR.70 | | |
| 3 | FLANGES | SA 165 | | |
| 2 | NOZZLE NECKS (RPES) | SA 165 GR.8 | | |
| 1 | SHELL HEADS/REPADS | SA 315 CR.70 | | |

MATERIAL LIST

| NO. | DESCRIPTION | QTY | UNIT | REMARKS |
|-----|-------------|-------|---------|---------|
| 1 | PLATE | 11.13 | SQ. FT. | |
| 2 | FLANGE | 8.41 | PCS. | |
| 3 | NOZZLE NECK | 5.14 | PCS. | |

DESIGN DATA

| ITEM | VALUE | UNIT |
|-----------------------|--------|------|
| DESIGN TEMPERATURE | 100 | °F |
| DESIGN PRESSURE | 20.0 | PSIG |
| TEST PRESSURE (FIELD) | 30.0 | PSIG |
| CORROSION ALLOWANCE | 0.0000 | |
| 3-RAY TEST | YES | |
| STRESS RELIEF | YES | |

ASME

FINAL CERTIFIED
09 JUN 1997
DATE
AT&V/STEPRO DEPT.

| NO. | DATE | DESCRIPTION | DESIGNED BY | CHECKED BY | APPROVED BY |
|-----|------|-------------|-------------|------------|-------------|
| 1 | | | | | |

GENERAL NOTES

- ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED ARE IN MILLIMETERS.
- ALL DIMENSIONS SHALL BE TO CENTER UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO CENTER UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO CENTER UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO CENTER UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO CENTER UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO CENTER UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO CENTER UNLESS OTHERWISE SPECIFIED.
- ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE SPECIFIED.

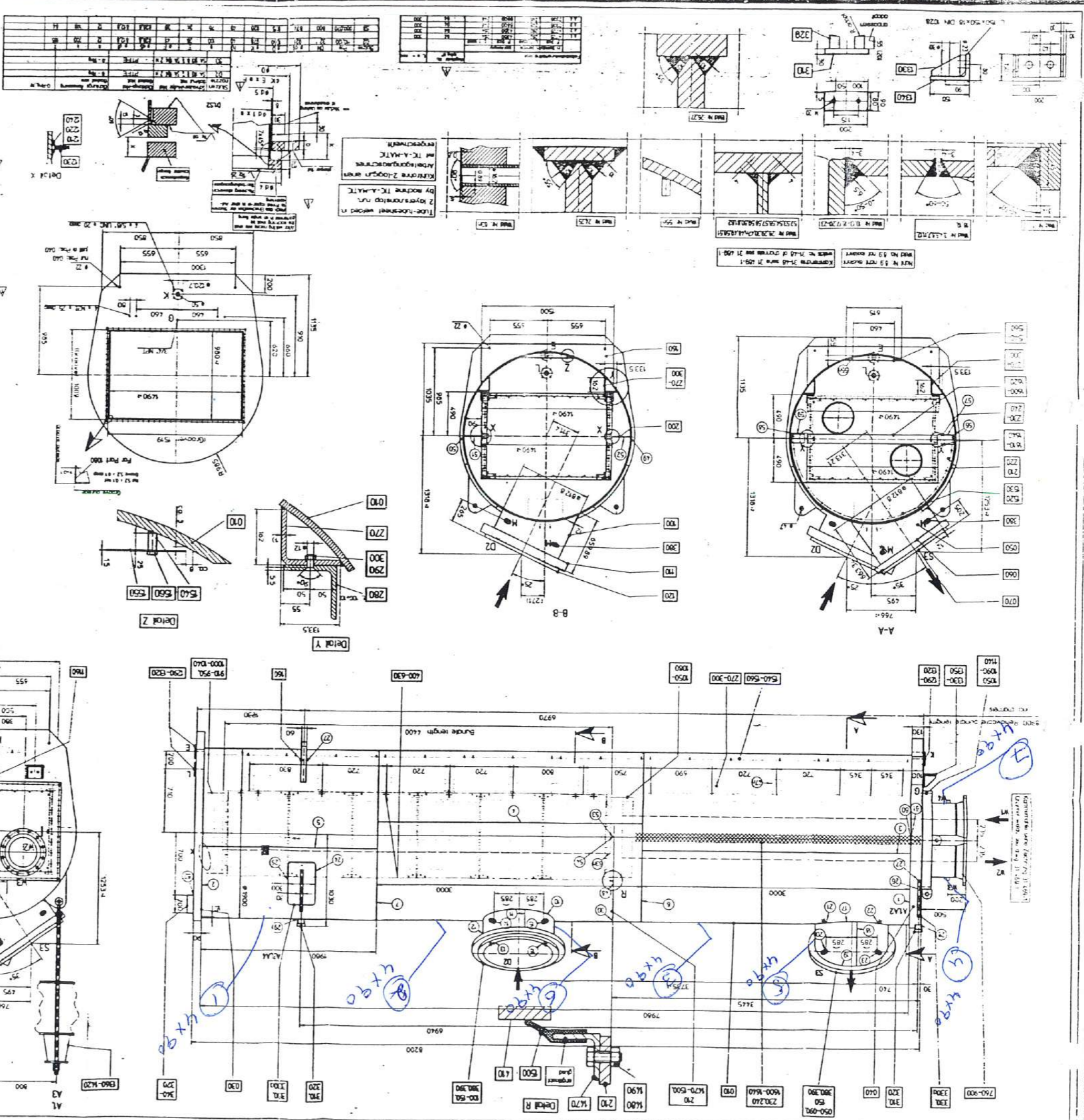
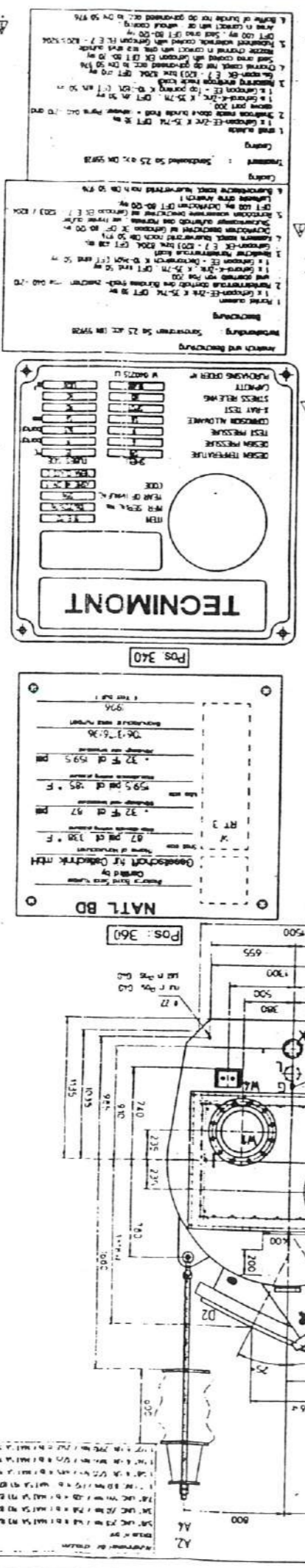
| NO. | DESCRIPTION | QTY | UNIT | REMARKS |
|-----|-------------|-------|---------|---------|
| 1 | PLATE | 11.13 | SQ. FT. | |
| 2 | FLANGE | 8.41 | PCS. | |
| 3 | NOZZLE NECK | 5.14 | PCS. | |

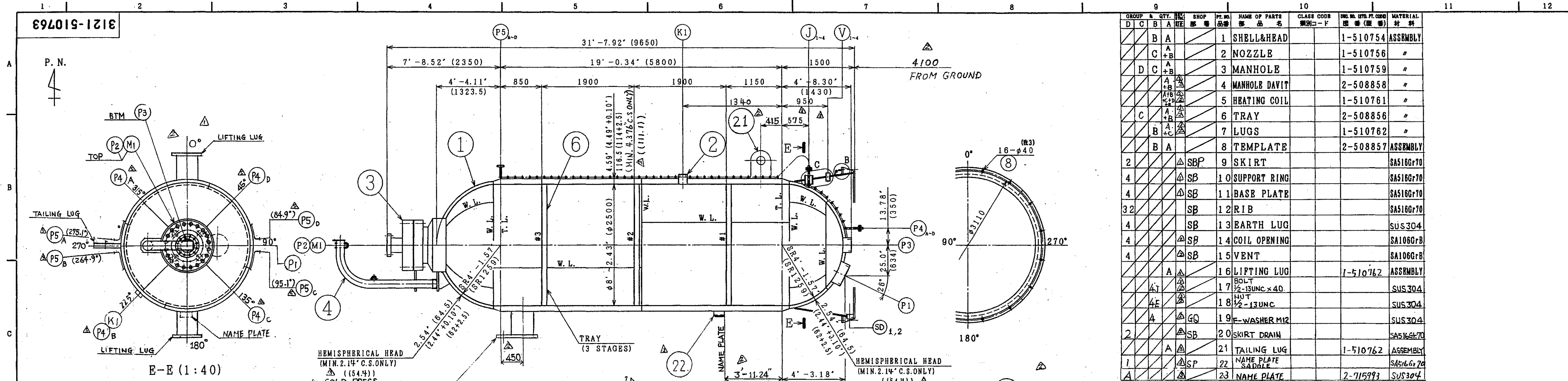
| NO. | DESCRIPTION | QTY | UNIT | REMARKS |
|-----|-------------|-------|---------|---------|
| 1 | PLATE | 11.13 | SQ. FT. | |
| 2 | FLANGE | 8.41 | PCS. | |
| 3 | NOZZLE NECK | 5.14 | PCS. | |

LIST OF CONNECTIONS

| NO. | DESCRIPTION | QTY | UNIT | REMARKS |
|-----|-------------|-------|---------|---------|
| 1 | PLATE | 11.13 | SQ. FT. | |
| 2 | FLANGE | 8.41 | PCS. | |
| 3 | NOZZLE NECK | 5.14 | PCS. | |

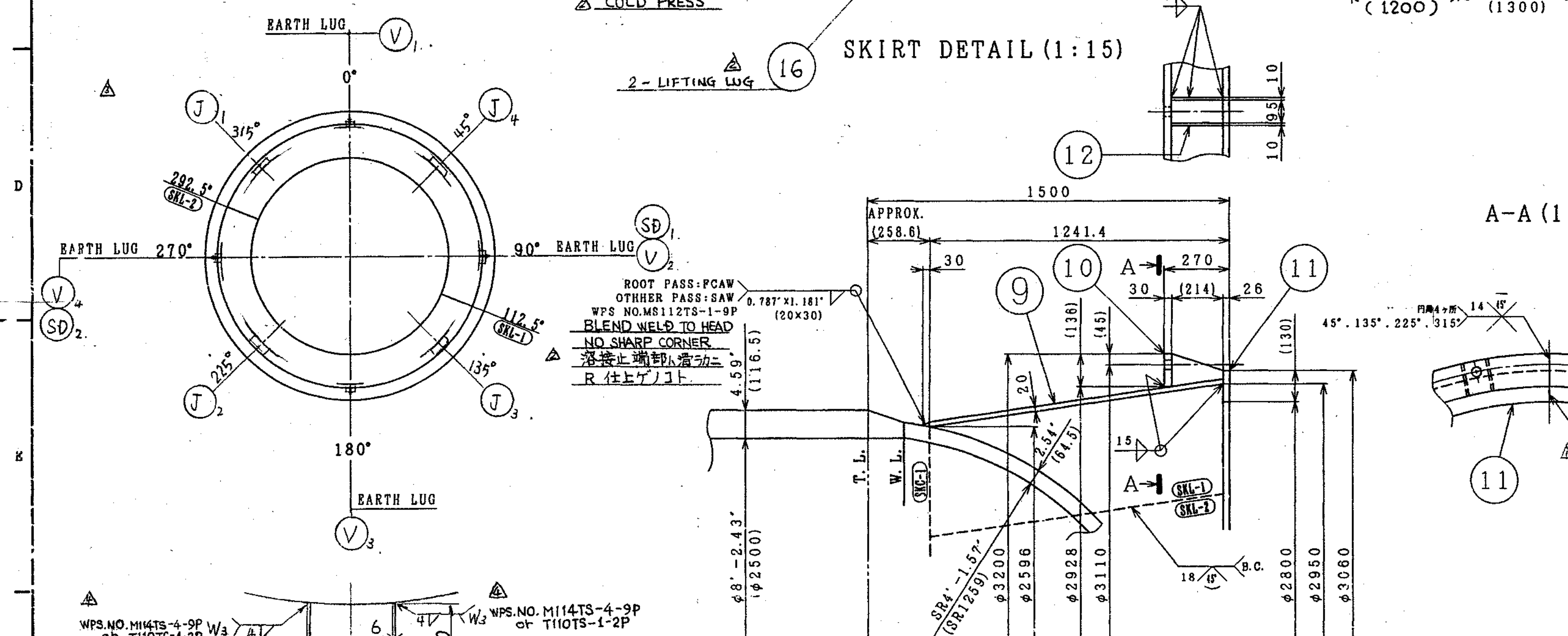
| | | | |
|---|--|--|--|
| TECHNIMONT 44350275 INTERCOOLER ZK 2 Ø1600 TAG N° 112 MO CODE EN 10204 22-05-2010 | | ASME 15 Air Cooler Type EXE 190420115R 31 472 - 0 CAVO | |
| REVISIONS NO. REV. DESCRIPTION 1 01 Initial design 2 02 Design change 3 03 Design change 4 04 Design change 5 05 Design change 6 06 Design change 7 07 Design change 8 08 Design change 9 09 Design change 10 10 Design change 11 11 Design change 12 12 Design change 13 13 Design change 14 14 Design change 15 15 Design change | | DESIGN DATA Design Pressure: 10.0 bar Design Temperature: 300 °C Material: SA-516 Gr. 60 Corrosion Allowance: 1.0 mm Wind Speed: 20 m/s Seismic: No | |
| PROPERTIES Item No. Description 1.01 SA-516 Gr. 60 1.02 SA-516 Gr. 60 1.03 SA-516 Gr. 60 1.04 SA-516 Gr. 60 1.05 SA-516 Gr. 60 1.06 SA-516 Gr. 60 1.07 SA-516 Gr. 60 1.08 SA-516 Gr. 60 1.09 SA-516 Gr. 60 1.10 SA-516 Gr. 60 | | TESTING Test No. Description 1.01 Hydrostatic Test 1.02 Non-destructive Test 1.03 Mechanical Test 1.04 Thermal Test 1.05 Vibration Test 1.06 Fatigue Test 1.07 Creep Test 1.08 Corrosion Test 1.09 Seismic Test 1.10 Wind Test | |





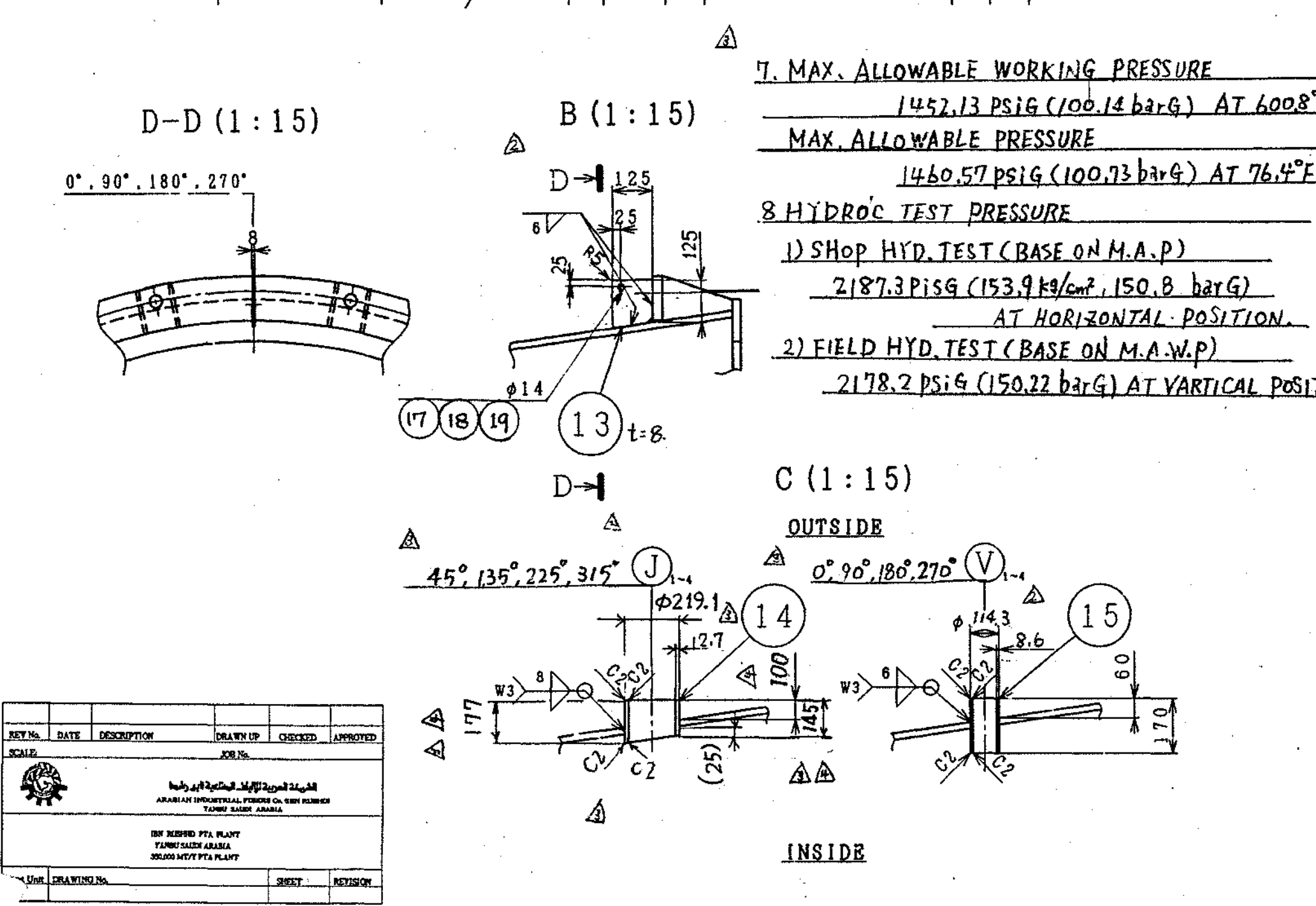
| GROUP | QTY. | ITEM | SHOP | NAME OF PARTS | CLASS CODE | DL NO. (DIN PT. CODE) | MATERIAL |
|-------|------|------|------|-------------------|------------|-----------------------|-----------|
| D | C | B | A | 品名 | 類別コード | 標準(規格) | 材料 |
| | | B | A | 1 SHELL&HEAD | | 1-510754 | ASSEMBLY |
| | | C | A | 2 NOZZLE | | 1-510756 | " |
| | | D | A | 3 MANHOLE | | 1-510759 | " |
| | | A | A | 4 MANHOLE DAVIT | | 2-508858 | " |
| | | A | A | 5 HEATING COIL | | 1-510761 | " |
| | | C | A | 6 TRAY | | 2-508856 | " |
| | | B | A | 7 LUGS | | 1-510762 | " |
| | | B | A | 8 TEMPLATE | | 2-508857 | ASSEMBLY |
| 2 | | A | A | 9 SKIRT | | | SA516Gr70 |
| 4 | | A | A | 10 SUPPORT RING | | | SA516Gr70 |
| 4 | | A | A | 11 BASE PLATE | | | SA516Gr70 |
| 32 | | A | A | 12 RIB | | | SA516Gr70 |
| 4 | | A | A | 13 EARTH LUG | | | SUS304 |
| 4 | | A | A | 14 COIL OPENING | | | SA106GrB |
| 4 | | A | A | 15 VENT | | | SA106GrB |
| | | A | A | 16 LIFTING LUG | | 1-510762 | ASSEMBLY |
| | | A | A | 17 1/2-13UNC x 40 | | | SUS304 |
| | | 4E | A | 18 1/2-13UNC | | | SUS304 |
| | | A | A | 19 F-WASHER M12 | | | SUS304 |
| 2 | | A | A | 20 SKIRT DRAIN | | | SA516Gr70 |
| | | A | A | 21 TAILING LUG | | 1-510762 | ASSEMBLY |
| 1 | | A | A | 22 NAME PLATE | | | SA516Gr70 |
| A | | A | A | 23 NAME PLATE | | 2-715993 | SUS304 |

- NOTES**
- THE DESIGN, FABRICATION, INSPECTION AND TESTING SHALL COMPLY WITH REQUIREMENTS OF THE CODE AND PURCHASER.
 - REFER TO SHEET NO. "96C01021 Rev. 2" FOR N. D. E. PROCEDURE AND DIMENSIONAL TOLERANCE.
 - HYDRO-C TEST SHOULD BE DONE AT MIN. 76.4°F (24.7°C) TEMP.
 - SHELL DESIGN PRESS.: P.V. at 212°F & 1450.746 psiG (P.V. at 100°C & 102kg/cm²G, 100barG)
 - COIL DESIGN PRESS.: 217.56 psiG (15.30kg/cm²G, 15barG)
 - IMPACT TEST TOP & BOTTOM HEADS: NONE
- SHELL : YES
- (REFER TO DOCUMENT NO. DVK-W37-V505 Ref. 3 "DESIGN CALCULATION")
6. LOCATION OF FLANGE BOLT HOLE SHALL BE AS FOLLOWING SKETCH.



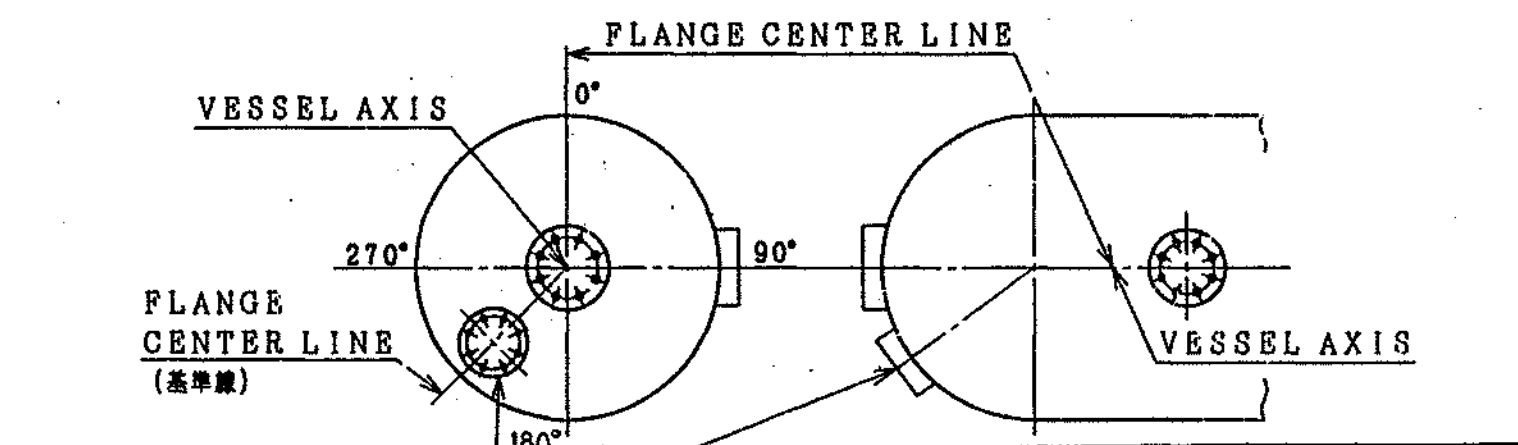
NOZZLE SCHEDULE

| MARK | SIZE | RGT | NECK | RATING | SERVICE | REMARKS | |
|------|------|------|--------|-----------|------------------------|-----------------|---------|
| SD1 | 2" | 2 | | | SKIRT DRAIN | | |
| V1 | 4" | 4 | | | SKIRT VENT | | |
| J1 | 6" | 4 | | | P4 COIL OPENING | | |
| K1 | 2" | 1 | PAD-LP | ANSI 900° | TEMPERATURE CONNECTION | 1450 | |
| M1 | 24" | 1 | LWN-LP | ANSI 900° | MANHOLE | W/R. PL & DAVIT | |
| P5 | 1" | 4 | WN-RP | ANSI 300° | HOT OIL OUTLET | 1650 | |
| P4 | 1" | 4 | WN-RP | ANSI 300° | HOT OIL INLET | | |
| P3 | 4" | 1 | PAD-LP | ANSI 900° | DRAIN | VALVE | |
| P2 | 8" | 1 | LWN-LP | ANSI 900° | LIQUID OUTLET | | |
| P1 | 8" | 1 | PAD-LP | ANSI 900° | FEED INLET | VALVE | |
| 2 | MARK | SIZE | RGT | NECK | RATING | SERVICE | REMARKS |



VESSEL DESIGN DATA

| SECTION | SHELL | COIL |
|---------------------------------|---|------------------------|
| REQ'D NO. | 1 | SET |
| CONTAINING CAPACITY | 37.4 m³ | 0.038 x 4 m³ |
| FLUID NAME (LETHAL SUBSTANCES) | TA + WATER (NONE) | HOT OIL (NONE) |
| FLUID DENSITY | 840.0 kg/m³ | 805 kg/m³ |
| DESIGN PRESS. | NOTE 4 | NOTE 4 |
| TEMP. | 600.8°F (316°C) | 644°F (340°C) |
| OPERATING PRESS. | 1085.99 psiG (74.95 barG) | 72.52 psiG (5.15 barG) |
| TEMP. | 548°F (285°C) | 600.8°F (316°C) |
| HYDRO-C TEST PRESS. | NOTE 8 | NOTE 8 |
| TEST PRESS. PNEUM-C | N/A | N/A |
| POST WELD H.T. | YES | NONE |
| RADIOGRAPH | PULL | PULL |
| JOINT EFFICIENCY | 1.00 | 1.00 |
| CORR. ALLOWANCE | OUTSIDE 0.08" (2mm) (T) | OUTSIDE 0.04" (1.0mm) |
| INSPECTION AUTHORITY | AI | |
| CODE STAMP | YES | NONE |
| INSULATION (BY OTHER) | CELLULAR GLASS/170mm THK | |
| PAINTING | AS PER (470) SPEC. NO. DYE-M37-V009 | |
| SURFACE FINISH (INT.) | ACCORDING TO DUDONT SPEC. SWIP-100% IRON FREE | |
| CORR. INHIBITOR | NONE | |
| SCREW THREAD | UNIFIED SCREW | |
| W/BIGHT OPERATING TESTING | 158733LB (72000kg) | |
| SPARE (S) | AS PER SPARE PARTS LIST | |
| ACCESSORIES | TEMPLATE FOR FOUNDATION | |
| SAFETY VALVE | PRESSURE RELIEF VALVE TO BE PROVIDED AND INSTALLED ON PIPING CONNECTING WITH NOZZLE © BY USER | |
| VACUUM LEAK TEST | NONE | |
| MIN DESIGN METAL TEMP. | 46.4°F (8°C) | 46.4°F (8°C) |
| IMPACT TESTING | NOTE 5 | |
| N. D. E. UT | NOTE 2 | |
| MAX. ALLOWABLE WORKING PRESSURE | NOTE 7 | |
| INSTALLATION | OUTDOOR | |



Hitachi, Ltd.
Tokyo Japan

3121-510763

TECHNOMONT

DATE: 1996.09.07

SCALE: 1:40

PROJECT: 22D001

REV. 01

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| REV. | NO. | DATE | BY | CHKD. | APPD. | RE. BY | RE. DATE |
|------|-----|----------|----|-------|-------|--------|----------|
| 01 | | 96-09-07 | | | | | |
| 02 | | 96-09-27 | | | | | |
| 03 | | 96-09-27 | | | | | |
| 04 | | 96-09-27 | | | | | |
| 05 | | 96-09-27 | | | | | |
| 06 | | 96-09-27 | | | | | |
| 07 | | 96-09-27 | | | | | |
| 08 | | 96-09-27 | | | | | |
| 09 | | 96-09-27 | | | | | |
| 10 | | 96-09-27 | | | | | |
| 11 | | 96-09-27 | | | | | |
| 12 | | 96-09-27 | | | | | |

Existing Drawing

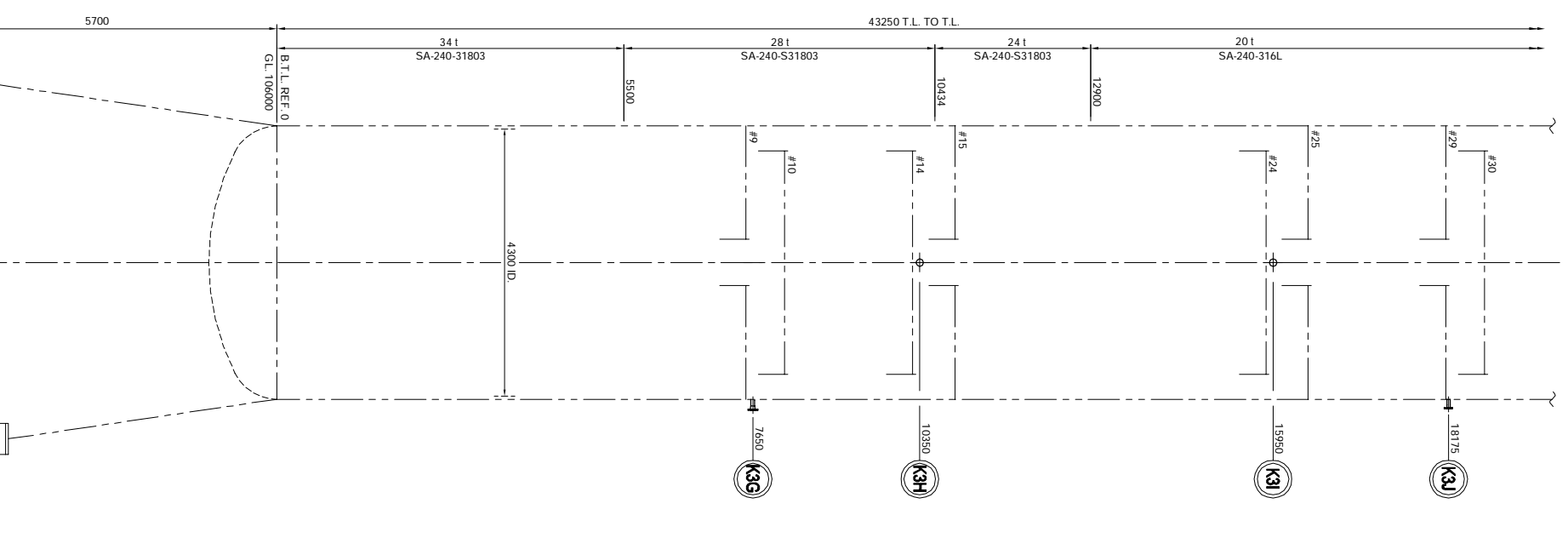
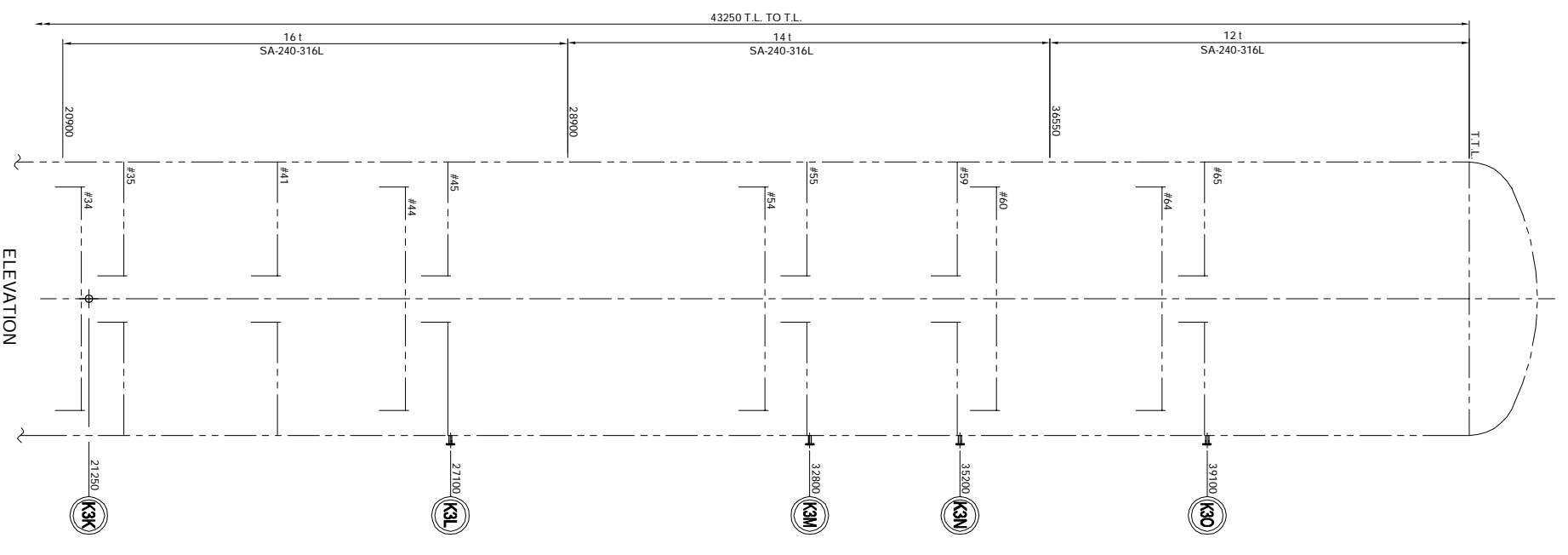
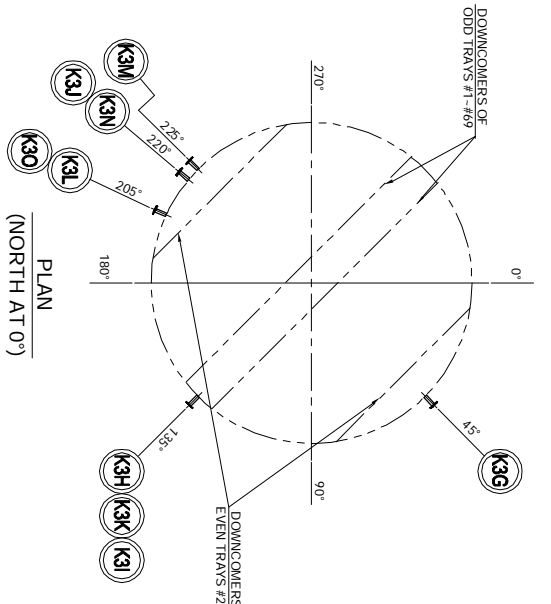
Hitachi, Ltd.
Tokyo Japan

22D001 SHELL ASSEMBLY

KASADO WORKS DWG. NO. 3121-510763

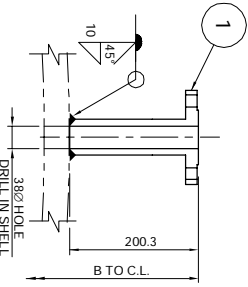
REV. 5

| NO. | DESCRIPTION | MATERIAL | QTY | REMARK |
|-----|-----------------------------|-------------|-----|---------|
| 1 | NOZ. 758.15# | SA-240-316L | 2 | NOTE 12 |
| 1 | FLANGE 1-1/2" X 150# LHM RF | SA-182-316L | 7 | |



| NOZZEL NO. | B |
|------------|------|
| K3G | 2378 |
| K3H | 2378 |
| K3I, K3J | 2370 |
| K3K, K3L | 2366 |
| K3M, K3N | 2364 |
| K3O | 2362 |

DETAIL OF NOZZLE
1-1/2" - 150#



- GENERAL NOTES:**
- ORIGINAL DESIGN DATA AND INFORMATION REFER TO 'TECHNOMONT' DWG. NO.: 2743CCVD061-001-007 & 2743CCVD061-009-017 & 2743CCVD061-030-043 & 2743CCVD061-050-058.
 - ASME 'R' STAMP IS REQUIRED.
 - NOZZLE PROJECTIONS ARE MEASURED FROM VESSEL OUTSIDE TO CENTERLINE OF NOZZLE.
 - ALL DIMENSIONS ARE IN MILLIMETERS, OTHERWISE SPECIFIED.
 - NOZZLE BOLT HOLES TO STRADDLE NATURE CENTERLINE OF VESSEL EXCEPT AS NOTED.
 - ELEVATION AND DIMENSIONS ARE FROM REFERENCE TANGENT LINE EXCEPT AS NOTED.
 - HYDROSTATIC TEST IS PRACTICALLY NOT POSSIBLE TO UTILIZED ON THE EQUIPMENT POST MODIFICATION WORK AND NDE MUST BE CONDUCTED INSTEAD OF HYDROSTATIC TEST AS PER NBCC CODE PARA 4.4.2.5C 2007 EDITION.
 - PIW PICKLINE/PASSIVATION OF 316L S. & S31603 WELDS IS REQUIRED.
 - N.D.T. PER DESIGN CODE.
 - THE DESIGN CODE OF MODIFICATION WORKS FOR THIS EQUIPMENT IS SA-240-316L 1993 EDITION.
 - DESIGN PRESSURE: 2.80g OPERATING PRESSURE: 1.011g 4.6. DESIGN TEMP.: 160 °C OPERATING TEMP.: 891722 °C (TEMPERATURE)
 - IMPACT TEST PER UHA51.
 - INSULATION THICKNESS: 80 mm.

AS BUILT

| NO. | DESCRIPTION | BY | CHK. | DATE |
|-----|--------------------|----------------|------|----------|
| 5 | AS BUILT | Yang Wong Yang | Su | 15/09/11 |
| 4 | REV AS SHOWN | Yang Wong Yang | Su | 20/13 |
| 3 | REV AS SHOWN | Lin Wong Yang | Su | 15/10/10 |
| 2 | CONSTRUCTION | Yang Wong Yang | Su | 15/09/11 |
| 1 | FOR ISSUE APPROVAL | Roy Wong Yang | Su | 20/12/10 |
| 0 | FOR APPROVAL | MND Wong WTY | Su | 20/11/10 |

IR-II PTA DBN Project

16C001
DEHYDRATION TOWER

IBN RUSHD-II PROJECT

AS BUILT

AS BUILT

AS BUILT

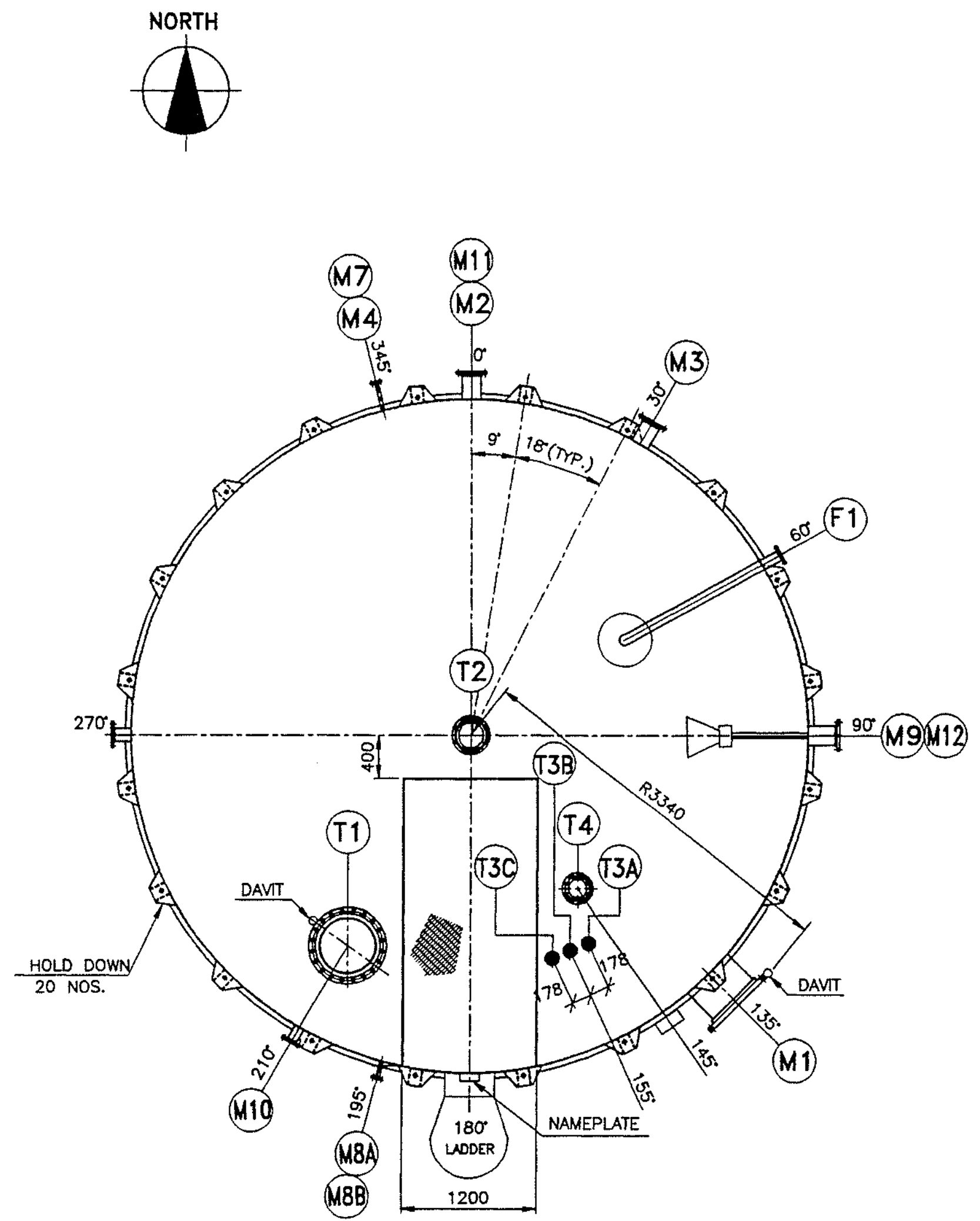
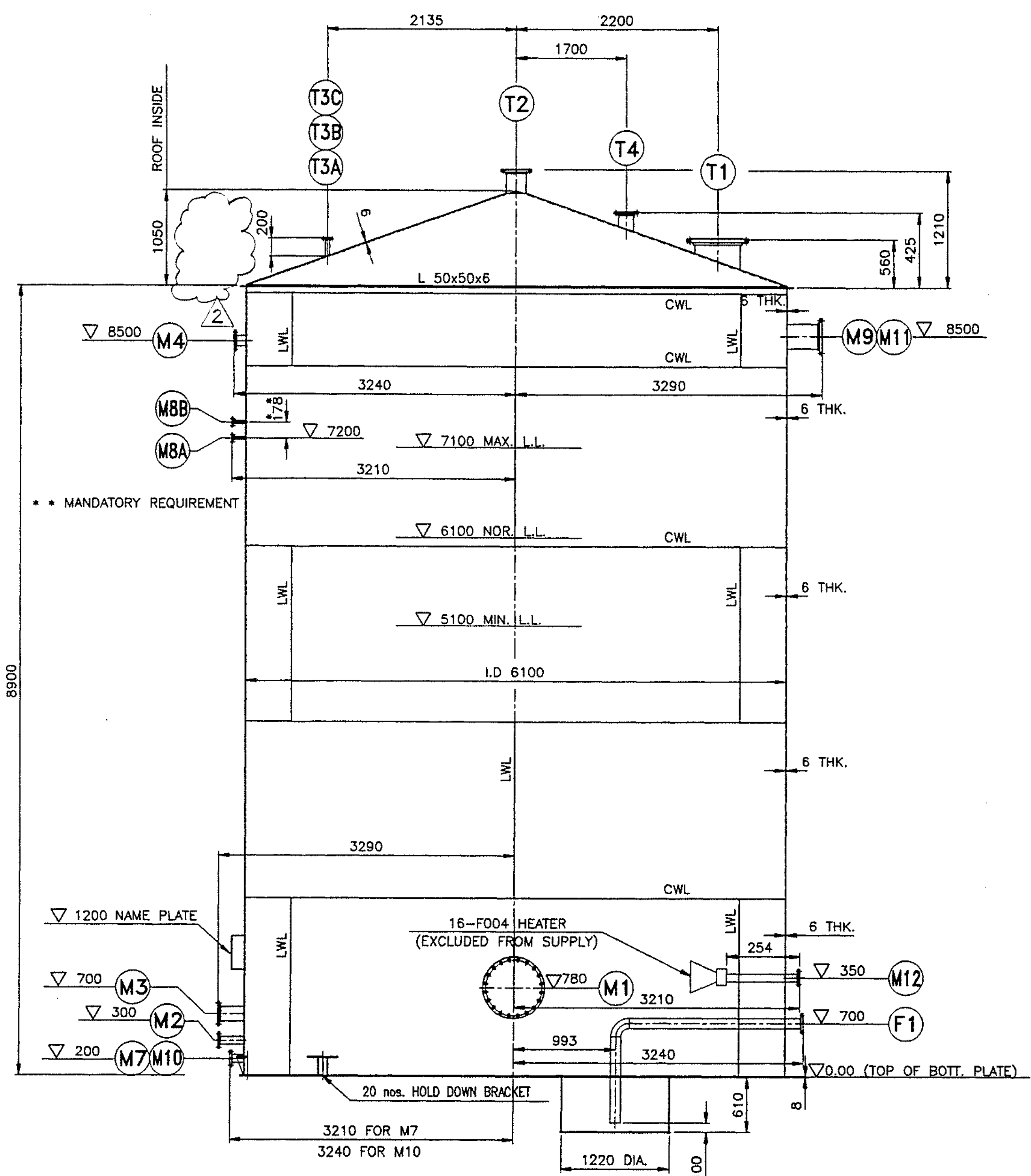
| NOZZLE NO. | QTY | SIZE | RATING & FACE | NOZZLE PROJECTION | TEMPERATURE | DESCRIPTION | NEW ADDED | REMARKS |
|------------|-----|--------|---------------|-------------------|-------------|-------------|-----------|---------|
| K3G-0 | 9 | 1-1/2" | 150# LHM RF | 20 | | | | |

| NOZZLE NO. | QTY | SIZE | RATING & FACE | NOZZLE PROJECTION | TEMPERATURE | DESCRIPTION | NEW ADDED | REMARKS |
|------------|-----|--------|---------------|-------------------|-------------|-------------|-----------|---------|
| K3G-0 | 9 | 1-1/2" | 150# LHM RF | 20 | | | | |

| NO. | DESCRIPTION | MATERIAL | QTY | REMARK |
|-----|-----------------------------|-------------|-----|---------|
| 1 | NOZ. 758.15# | SA-240-316L | 2 | NOTE 12 |
| 1 | FLANGE 1-1/2" X 150# LHM RF | SA-182-316L | 7 | |

| NO. | DESCRIPTION | MATERIAL | QTY | REMARK |
|-----|-----------------------------|-------------|-----|---------|
| 1 | NOZ. 758.15# | SA-240-316L | 2 | NOTE 12 |
| 1 | FLANGE 1-1/2" X 150# LHM RF | SA-182-316L | 7 | |

| DATE | PM | SCALE | AI |
|------|----|-------|----|
| | | | |



| DESCRIPTION | QTY | UNIT | REMARKS |
|--------------------|---------------------|------|---------|
| STEEL SHAPE | DN 1700 ST 37-2 | | |
| INTERNAL GASKETS | ASTM A 516 GR 70 | | |
| EXTERNAL GASKETS | REFER TO GEN. NOTES | | |
| NUTS | ASTM A 194 GR 2H | | |
| BOLTS | ASTM A 193 GR B7C | | |
| NOZ. NECKS (PIPES) | ASTM A 106 GR B | | |
| NOZ. NECKS (PLATE) | ASTM A 516 GR 70 | | |
| FLANGES | ASTM A 106 | | |
| BOTTOM PLATES | ASTM A 516 GR 70 | | |
| ROOF PLATES/PADS | ASTM A 516 GR 70 | | |
| SHELL PLATES/PADS | ASTM A 516 GR 70 | | |

| MATERIAL LIST | | QUANTITY | REMARKS |
|---------------|---------------|----------|----------|
| Q | STEEL SHEET | PLATE | -0.25 mm |
| Q | STEEL PIPE | PIPE | -12.5% |
| Q | STEEL FITTING | FLANGE | SIZE 10" |

| DESIGN DATA | | | |
|------------------|----------------------|------------------|------|
| DESIGN CODE | API 650 | DESIGN CODE | |
| DESIGN AUTHORITY | TECHNIMONT + BECHTEL | DESIGN AUTHORITY | |
| DESIGN | AS PER SPEC. | DESIGN | |
| OPERATING | ATM | OPERATING | |
| TEMPERATURE | FULL OF WATER | TEMPERATURE | |
| PRESSURE | | PRESSURE | |
| INSULATION | | INSULATION | |
| PAINTING | | PAINTING | |
| WELDING | | WELDING | |
| FINISH | | FINISH | |
| TESTING | | TESTING | |
| INSPECTION | | INSPECTION | |
| REVISIONS | | REVISIONS | |
| REVISION | NO. | DESCRIPTION | DATE |

- R) PAINTING IN SITE
INTERNAL SURFACES : ACC. TO 2743-VZ-SG 003
EXTERNAL SURFACES : ACC. TO 2743-YW-SG 002
- Q) TECHNIMONT TO PROVIDE THE DETAILED DESIGN OF INSULATION RING SUPPORT, LOCATION & SPACING.
- P) ALL INTERNAL & EXTERNAL FILLET WELDS SHALL BE ROUNDED (GRIND) SMOOTHLY FOR PROPER PAINTING ON THE SURFACE.
- O) GASKET - NON ASBESTOS SYNTHETIC FIBER WITH MATERIAL REINZ AFM 30, 1.6mm thk., ANSI R.F. CLASS 150.
- N) BESIDES THE INSTALLED MATERIALS AT SHOP SHALL BE SUPPLIED THE FOLLOWINGS SPARE PARTS.
- EXTERNAL PARTS:
-NO. 2 SETS OF GASKETS FOR MAIN FLANGES CONNECTING DIFFERENT SECTIONS OF THE EQUIPMENT
-NO. 2 SETS OF GASKETS FOR EACH MANHOLE OR BLIND FLANGE
-STUD BOLTS AND NUTS: 10X WITH A MINIMUM OF 2 PIECES FOR EACH CONNECTION TYPE.
- INTERNAL PARTS:
-BOLTS, NUTS, CLAMPS AND GASKETS: 10X WITH A MINIMUM OF 10 PIECES FOR EACH CONNECTION TYPE.
- M) NOZZLE FLANGE CONTACT FACES MUST BE PROTECTED WITH MARINE PLYWOOD OR METAL COVERS COMPLETE OF RUBBER GASKET OR MALLEABLE OILED CLOTH.
- L) BEFORE SHIPPING THE UNIT MUST BE CLEANED INTERNALLY DRAINED AND DRIED.
- K) ALL UNQUOTED WELDS MUST HAVE SIDES EQUAL TO THE LOWER THICKNESS OF THE PLATES TO WELD.
- J) FOR ALL REINFORCING PADS PROVIDE ONE 1/8" ANSI B1.20.1 NPT DIA. HOLE, PADS TO BE AIR TESTED AT 2 bar (g); AFTER THE PRESSURE MUST BE REDUCED TO 0.5 bar (g) AND ALL WELDS MUST BE TESTED FOR LEAKS WITH SOAP SOLUTION. VENT HOLES WILL BE LEFT OPEN AFTER TESTING. THE HOLES MUST BE FILLED WITH GREASE.
- I) ALL INTERNAL AND EXTERNAL PARTS WELDED TO THE SHELL SHALL BE OF THE SAME MATERIAL WHICH CONSTITUTES THE SECTION OF THE SHELL WHERE THE PARTS WILL BE WELDED.
- H) FLANGES ACCORDING TO STD. ANSI B16.5 - COUPLINGS ACCORDING TO ANSI B16.11 FULL LENGTH TYPE PER ANSI B1.20.1 TAPER PIPE THREADED - PIPES: CARBON STEEL ACCORDING TO ANSI B36.10 (SEAMLESS); STAINLESS STEEL PER ANSI B 36.19 - PIPE FITTINGS ACCORDING TO ANSI B16.9.
- G) ALL THICKNESSES SHOWN ON DRAWING EXCEPT FOR ELLIPTICAL HEADS ARE NOMINAL (FOR ELLIPTICAL HEADS ARE THE MINIMUM AFTER FORMING).
- F) ALL REMOVABLE INTERNALS SHALL PASS THROUGH A MANHOLE SIZE (482.6 I.D.).
- E) TRAY ELEVATIONS ARE REFERRED TO TOP OF SUPPORT RING.
- D) ALL ELEVATIONS ARE MEASURED FROM BOTTOM TANGENT LINE.
- C) UNLESS OTHERWISE INDICATED NOZZLE PROJECTIONS ARE MEASURED FROM EQUIPMENT CENTERLINE TO CONTACT FLANGE FACINGS.
- B) UNLESS OTHERWISE INDICATED, ALL GIRTH FLANGES AND FLANGE CONNECTIONS BOLT HOLES MUST BE STAGGERED TO MAIN AXIS OF THE EQUIPMENT.
- A) UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN MILLIMETERS.

| NO. | DESCRIPTION | QTY | UNIT | REMARKS |
|---------------------|--|-----|------|--------------|
| 2743-CD-5164 | TECHNIMONT DATA SHEET | 1 | | |
| DUPONT GISA | STORAGE TANK STEEL | | | |
| 2743-YW-50002 | SITE PAINTING (EXT. SURFACES) | 1 | | |
| 2743-YW-50003 | SITE PAINTING (INT. SURFACES) | 1 | | |
| 2743-CD-MR25 | MATERIAL REQUISITION | 2 | | |
| 22854-SP-000-F003 | STORAGE TANK | 2 | | SEE WELD MAP |
| DUPONT GSA | S.S. STORAGE TANK | | | |
| 24-1084-P3-0003-002 | SHELL PLATE DEVELOPMENT & WELD DETAILS | 1 | | |
| 24-1084-P3-0003-003 | ROOF & BOTTOM PLATE DEVELOPMENT PLAN | 1 | | |
| 24-1084-P3-0003-004 | NOZZLE DETAILS & NAME PLATE DETAIL | 1 | | |
| 24-1084-P3-0003-005 | NOZZLE DETAILS | 1 | | |

| NO. | DESCRIPTION | QTY | UNIT | REMARKS |
|-----|----------------|-----|------|---------|
| M1 | MANHOLE (ROOF) | 1 | | |
| M2 | MANHOLE (ROOF) | 1 | | |
| M3 | MANHOLE (ROOF) | 1 | | |
| M4 | MANHOLE (ROOF) | 1 | | |
| M7 | MANHOLE (ROOF) | 1 | | |
| M8 | MANHOLE (ROOF) | 1 | | |
| M9 | MANHOLE (ROOF) | 1 | | |
| M10 | MANHOLE (ROOF) | 1 | | |
| M11 | MANHOLE (ROOF) | 1 | | |
| M12 | MANHOLE (ROOF) | 1 | | |

| NO. | DESCRIPTION | QTY | UNIT | REMARKS |
|-----|--------------------------|-----|------|---------|
| T4 | LEVEL GAUGE | 1 | | |
| T3C | LEVEL GAUGE | 1 | | |
| T3B | LEVEL GAUGE | 1 | | |
| T3A | LEVEL GAUGE | 1 | | |
| T2 | VENT | 1 | | |
| T1 | MANHOLE (ROOF) | 1 | | |
| F1 | BOTTOM DRAIN | 1 | | |
| M12 | STEAM FOR INT. HEATER | 1 | | |
| M11 | SPARE | 1 | | |
| M10 | LEVEL INDICATOR | 1 | | |
| M9 | OVERFLOW | 1 | | |
| MBB | HIGH LEVEL SWITCH | 1 | | |
| MBA | HIGH LEVEL SWITCH | 1 | | |
| M7 | TEMPERA. CONTROLLER | 1 | | |
| M4 | RECYCLE FROM 166007/017 | 1 | | |
| M3 | LIQUID OUTLET | 1 | | |
| M2 | LIQUID INLET (NaOH SOL.) | 1 | | |
| M1 | MANHOLE (SHELL) | 1 | | |

| NO. | DESCRIPTION | QTY | UNIT | REMARKS |
|-----|---|-----|------|---------|
| 1 | WITH BLIND FLANGE AND DAVIT. | | | |
| 2 | WITH BLIND FLANGE. | | | |
| 3 | WITH 80.3 O.D. 5.54 THK. INTERNAL PIPE. | | | |
| 4 | WITH 114.3 O.D. 5.54THK. INTERNAL DRAW OFF SLUMP.(SEE DRG.) | | | |

AS FINAL

AS FINAL

| NO. | DESCRIPTION | DATE | DRAWN | CHECKED | APPROVED |
|-----|--------------------------------|------|-------|---------|----------|
| 4 | REVISED AS PER CLIENT COMMENTS | edd | ABD | ABD | |
| 3 | REVISED AS PER CLIENT COMMENTS | Rene | ABD | ABD | |
| 2 | REVISED AS PER CLIENT COMMENTS | Edd | RBU | ABD | |
| 1 | REVISED AS PER CLIENT COMMENTS | Rene | RBU | ABD | |
| 0 | FOR APPROVAL | Rene | RBU | ABD | |
| 1 | PRELIMINARY | PGS | RBU | ABD | |

| NO. | DESCRIPTION | DATE | DRAWN | CHECKED | APPROVED |
|-----|---|----------|-------|---------|----------|
| 2 | REVISED AS PER CLIENTS COMMENTS, ISSUED AS FINAL | 28SEP96 | edd | ABD | |
| 1 | HOLD NOZZLES (T3A-C & M12) ORIENTATION & PROTECTION RELEASED AS PER CLIENT APPROVAL | 2AUG96 | Rene | ABD | ABD |
| D | REVISED AS PER CLIENT COMMENTS | 13JUL96 | Edd | RBU | ABD |
| C | REVISED AS PER CLIENT COMMENTS | 5JUN96 | Rene | RBU | ABD |
| B | For Approval | 10APR96 | Rene | RBU | ABD |
| A | PRELIMINARY | 26.02.96 | PGS | RBU | ABD |

CLIENT: **TECNIMONT**

MANUFACTURER: **AL ZAMIL HEAVY INDUSTRIES LTD.**
MAIN OFFICE: JEDDAH, TEL: 899 2411 (4 LINES), FAX: 899 2420
P.O. BOX: 1549 JEDDAH 21493 S.A. TELE: 803703 244840 SA

TITLE: **"GENERAL ARRANGEMENT" CAUSTIC SODA SOL. STORAGE TANK 16F004**

DESIGNED: RBU CHECKED: PGS/Rene APPROVED: ABD

DRAWN: PGS/Rene CONTRACT No. (I.O.No.) TOTAL CONSTRUCTION WEIGHT

SCALE: 1:40 DRAWING No. ZHI-1084-P01-0003-001 REV. SIZE A1

VALID FOR FIELD ASSEMBLY

TECNIMONT

19D002
RECOVERY SOLID SLURRY TANK SKETCH

| CODICE IDENTIFICAZIONE | | | | | |
|------------------------|-----|-----|---|-------|-----|
| Identification code | | | | | |
| COMM | Job | E | C | T | N |
| 27 | 43 | V | D | F | 192 |
| Foglio | | EM. | | Issue | |
| Sheet | | 003 | | 04 | |

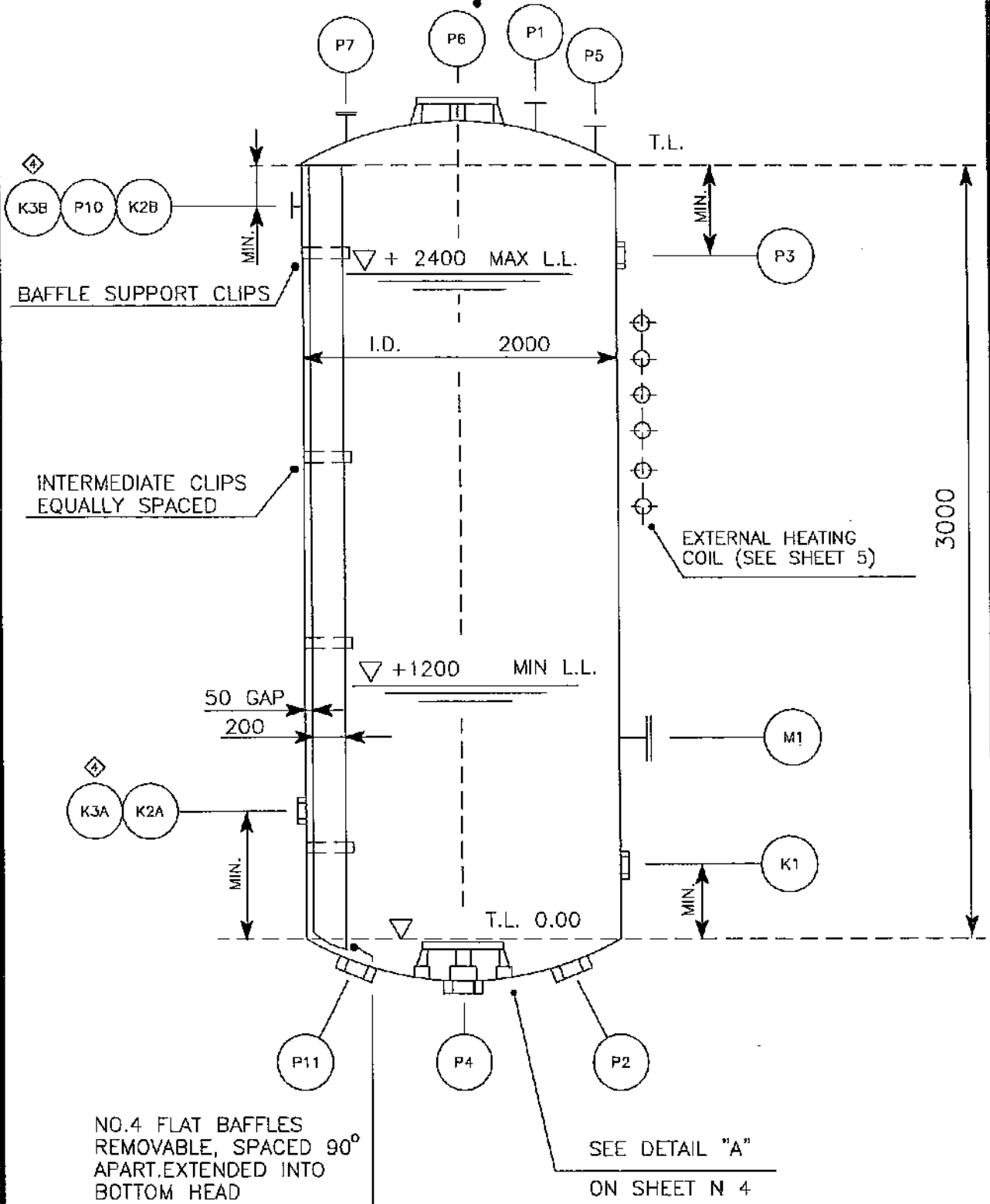
IMP. PTA YANBU
Plant SAUDI ARABIA

RIF. CLIENTE
Client ref. IBN RUSHD

COMPANY IDENTIFICATION CODE
DS-019-A-301

003
EM. Issue 04

FACE OF NOZZLE P6 TO BE SQUARE
WITH VESSEL AXIS-TOL. WITHIN 1/4 DEGREE



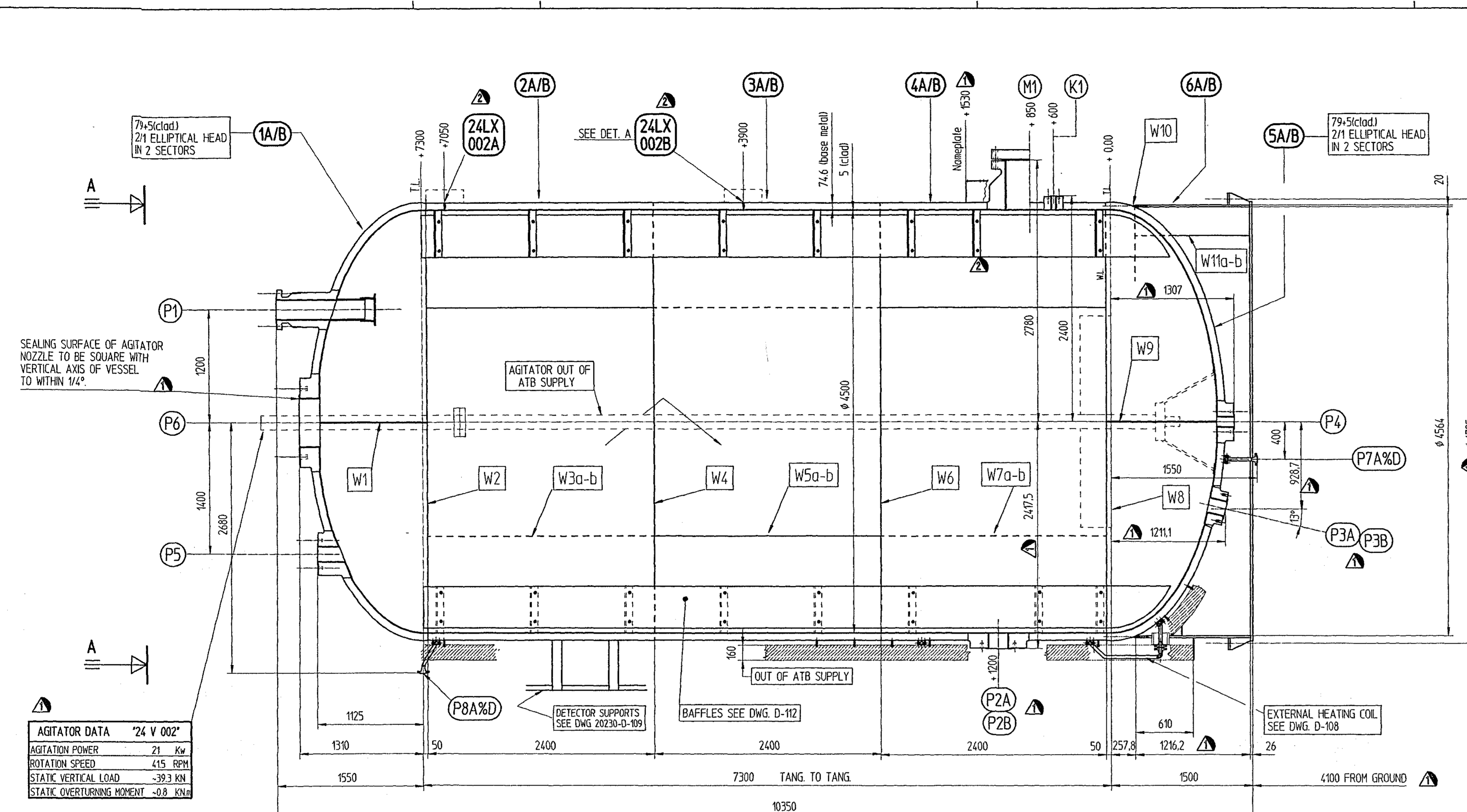
disclosed to others, nor used for any purpose other than that for which it is specifically furnished without the prior written consent of Tecnimont.

FOR CASARE, RIVENDITTO, COPIATO O MOSTRATO A TERZI, NE' USATO PER NESSUNO SCOPO DIVERSO DA QUELLO PER IL QUALE E' STATO SPECIFICAMENTE FORNITO SENZA PREVA AUTORIZZAZIONE SCRITTA DELLA TECNIMONT.

TECNIMONT

NO.4 FLAT BAFFLES
REMOVABLE, SPACED 90°
APART. EXTENDED INTO
BOTTOM HEAD

SEE DETAIL "A"
ON SHEET N 4



FONDI SEMIELLITTICI MARCA 1 & 5 IN DUE PEZZI
VIROLE MARCA 2A/B-3A/B-4A/B CON DUE SALDATURE LONGITUDINALI
GONNA MARCA 6A/B CON DUE SALDATURE LONGITUDINALI

SEMIELLIPT. HEAD ITEM 1 & 5 IN TWO PIECES
COURSES ITEM 2A/B-3A/B-4A/B WITH TWO LONGITUDINAL WELDS
SKIRT ITEM 6A/B WITH TWO LONGITUDINAL WELDS

CONSTRUCTION NOTES - NOTE COSTRUTTIVE

- 1) - COSTRUIRE N° 1 REATTTORE
- ONE REACTOR BE SUPPLIED.
- 2) - GLI SPessori INDICATI A DISEGNO SI INTENDONO MINIMI DOPO FORMATURA E LAVORAZIONE MECCANICA.
- THE THICKNESSES SHOWN ON DRAWING ARE MINIMUM AFTER FORMING AND MACHINING.
- 3) - TOLLERANZE - TOLERANCES : ASME CODE SECT. VIII Div. 1 AND -
DUPONT SPC NR 56 15
- 4) - QUALIFICA SALDATURE E SALDATORI IN ACCORDO AL CODICE ASME IX.
- WELD AND WELDERS QUALIFICATION ACCORDING TO ASME IX.
- 5) - I FONDI SARANNO STAMPATI A CALDO E LE VIROLE CALANDRATE A FREDDO.
- HEADS SHALL BE HOT FORMED AND COURSES SHALL BE COLD ROLLED.
- 6) - PER PROCEDIMENTI DI SALDATURA (W.P.S.) VED. WELDING DATA BOOK 20230-SA-01.
- FOR WELDING PROCEDURE SPECIF. (W.P.S.) SEE WELDING DATA BOOK 20230-SA-01.
- 7) - ATB SERIAL NR. 18880

GENERAL NOTES - NOTE GENERALI

- 1) - Tutte le sporgenze e le dimensioni delle flange sono ritenute alla faccia di flangia.
- All flange projections and dimensions are to flange face.
- 2) - Tutte le quote in acciaio sono misurate dalla Linea di Tangenza Inferiore (BTRTLI).
- All elevations are measured from Bottom Tangent Line (BTRTLI).
- 3) - La posizione dei bacchetti in acciaio e schematica, per l'esatta orientamento attenersi solamente a quanto indicato nella VISTA "A-A".
- Position of nozzles in elevation is schematic, for correct orientations see only VIEW "A-A".
- 4) - Tutti i fori delle flange e dei bacchetti e quelli per i bulloni di ancoraggio sono sfalsati rispetto agli assi principali del Vessel, salvo dove diversamente indicato.
- All bolt holes of flanges, nozzles and anchor bolts shall be offset natural centerlines, unless where shown otherwise.
- 5) - Flange per bacchetti secondo ANSI B16.5 tipo RF.
- Flanges for nozzles according to ANSI B16.5 type RF.
- 6) - Finitura facce di flangia in accordo a quanto indicato nei Disegni ATB n° 20230-D-103 / 104 / 105.
- Flange face finishing according to ATB Drawings n° 20230-D-103 / 104 / 105.
- 7) - Finitura Bullone e Dado in accordo ad ANSI B11.
- Bolts and Nuts thread according to ANSI B11.
- 8) - I bracci esterni saranno protetti con "MOLYCOTE".
- External Stud Bolts shall be coated with "MOLYCOTE".
- 9) - Accessori interni:
a) I "baffles" saranno costruiti e montati all'interno della colonna da ATB prima della prova idraulica.
b) La superficie di tenuta del bacchello P6 dovrà essere normale all'asse del vessel, max. errore V4°
- Internals:
a) Internal baffles shall be fabricated and installed inside the vessel by ATB before hydrotest.
b) Sealing surface of agitator nozzle P6 to be square with vertical axis of vessel to within V4°.
- 10) - Accessori esterni:
a) N° 1 Maschera di posizionamento per le mazzette di fondazione abballata e spedita in cantiere entro il 30/06/96
- External Fillings:
a) One Base Ring Template shall be packed and shipped in field within 30/06/96
- 11) - Spedizione:
a) Le superfici interne ed esterne del vessel dovranno essere pulite e libere da "grease, weld spatter, scale, slag" e da qualsiasi altra sostanza estranea. La pulizia interna non dovrà essere eseguita con sostanze contenenti cloruri.
b) Finitura superfici esterne: per sabbia, verniciatura e marcatura attenersi a quanto indicato nel Disegno di spedizione n° 20230-D-103.
c) Le superfici lavorate di macchina saranno protette con MOLYCOTE o RUST VETO 342.
d) Tutte le aperture non previste di coperto saranno chiuse per la spedizione con coperchi metallici, guarnizione in neoprene e bulloni come indicato nel Disegno di spedizione.
e) Le parti da spedire scritte sono elencate nel Disegno di spedizione.
f) Durante la spedizione il reattore sarà pressurizzato con AZOTO.
- Shipping:
a) Internal and external surfaces of Vessel shall be cleaned and free from grease, weld spatter, scale, slag and any other foreign matter. No cleaning agent containing chlorides will be used on austenitic stainless steel.
b) External surface finishing: for sandblasting, painting and marking see Shipping Dwg. 20230-D-103.
c) All machined surfaces shall be coated with MOLYCOTE and/or RUST VETO 342.
d) All openings without cover shall be closed for shipping with steel cover, neoprene gasket and bolts, as per Shipping Drawing.
e) For loose parts see list on Shipping Drawing.
f) During shipping the reactor shall be pressurized with NITROGEN.
- 12) - Guarnizioni:
a) N° 1 serie per prova idraulica e spedizione.
b) Bulloni esterni:
- N° 1 serie come scorta.
- 10% come parti di scorta.
c) Gaskets:
- One set for Hydrotest and Shipping.
- Two sets for Spare.
d) External Bolts:
- One set as shown on ATB Dwg n° 20230-D-102 for Hydrotest and Service.
- 10% as spare parts.

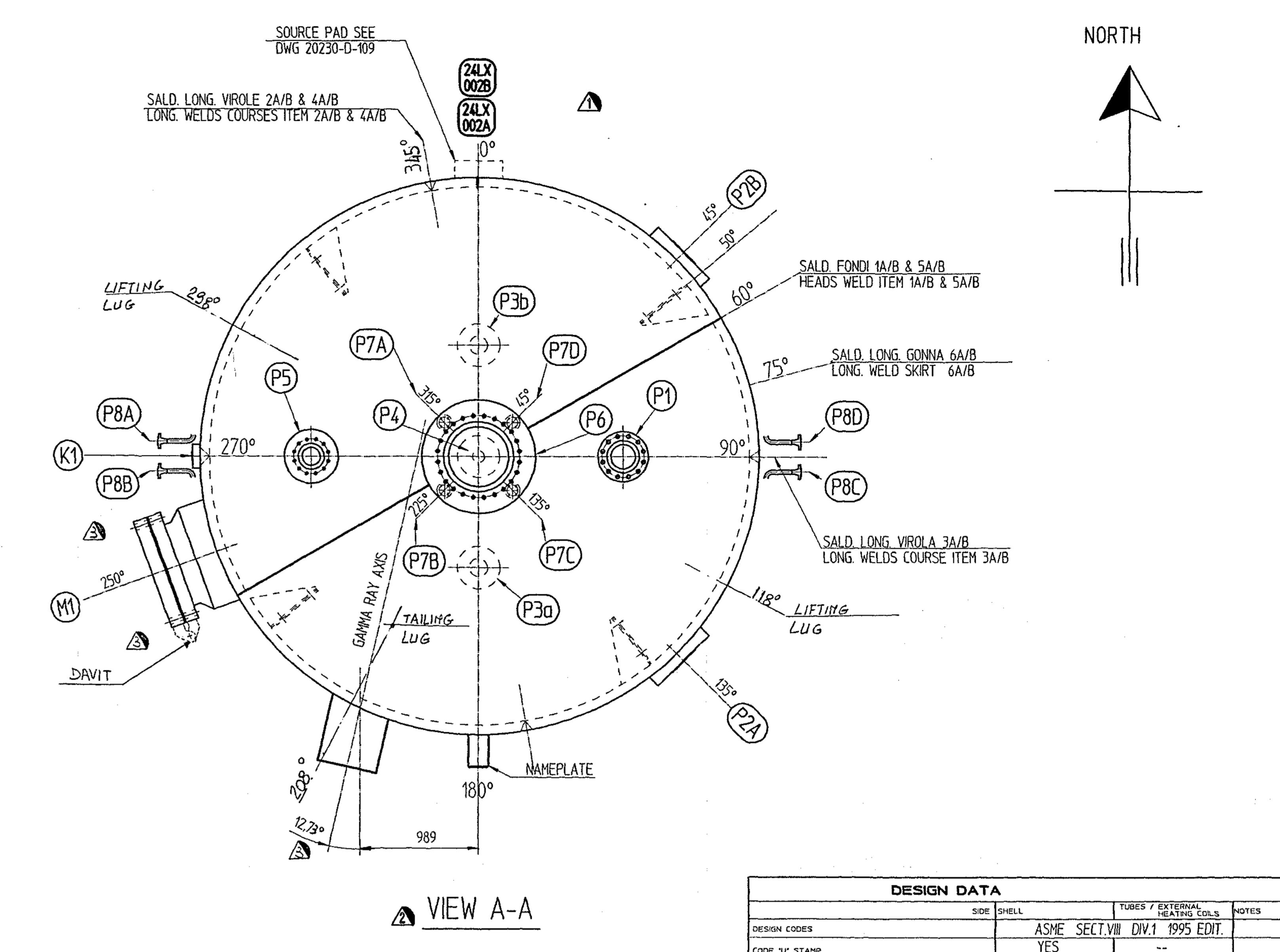
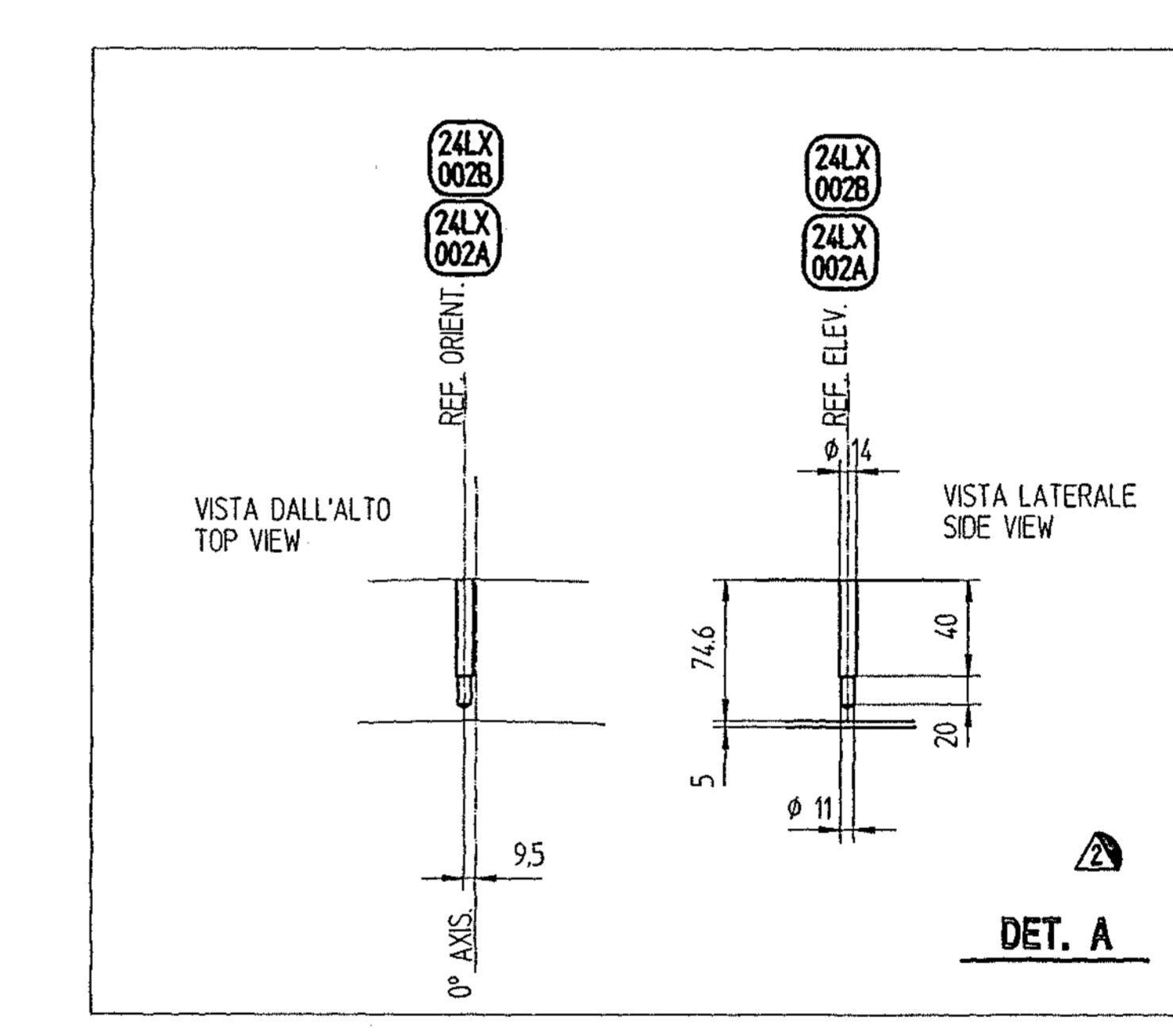
ELENCO PROCEDURE ATB APPLICABILI - LIST OF APPLICABLE PROCEDURES

- SPEC. N° 20230 PF. 05 : HOT FORMING OF HEAD.
- SPEC. N° 20230 PF. 20 : HYDROTEST PROCEDURE.
- SPEC. N° 20230 PC. 50 : R. T. EXAMINATION OF WELDS.
- SPEC. N° 20230 PC. 55 : U. T. EXAMINATION OF WELDS.
- SPEC. N° 20230 PC. 60 : BONDING PROCEDURE
- SPEC. N° 20230 PC. 70 : DYE PENETRANT EXAMINATION.
- SPEC. N° 20230 PC. 77 : WELD PRODUCTION TEST PLATES.
- SPEC. N° 20230 PF. 10 : PWHT PROCEDURE
- SPEC. N° 20230 PF. 25 : INT. CLEANING & PAINTING
- SPEC. N° 20230 PF. 30 : NITROGEN PRESS. PROCEDURE

MATERIALI - MATERIALS

| | | |
|--|--|-------------------------|
| 11- Mantello - Shell | ASME SA 264 | BASE METAL SA 516 GR 70 |
| Fondi - Heads | ASME SA 240 TP 321 | CLADDING SA 240 TP 321 |
| 21- Bacchetti fucinali - Forged Nozzles | ASME SA 105 + 321 S.S. WELD DEPOSIT | |
| 31- Gonna - Skirt | ASME SA 516 GR 60 | |
| 41- Serpentina - Heating coil | ASME SA 106 GR B / SA 105 | |
| 51- Anello di base gonna, Scatole ancoraggio e Tailing Lug - Skirt Base Ring, Chairs and Tailing Lug | ASME SA 516 GR 60 (or equivalent) | |
| 61- Interni (saldati) - Internals (welded) | ASME SA 240 TP 321 | |
| 71- Interni (non saldati) - Internals (not welded) | ASME SA 240 TP 304L | |
| 81- Accessori esterni - Laniera - External Fillings - Plate | ASME SA 516 GR 70 (welded to shell) | |
| 91- Bulloni in pressione - Pressure Bolting | ASME SA 193 B7 / SA 194-2H | |
| 101- Bulloni interni - Internal Bolting | ASME SA 193 B8 / SA 194-8 | |
| 111- Guarnizioni in pressione - Pressure Gaskets | SPIRAL WOUND 321 SS / GRAPHITE WITH 321 S.S. INTERNAL RING AND CARBON STEEL EXT. RING. | |
| 121- Guarnizioni serpentina. - Coils Gaskets | SPIRAL WOUND 316 SS / GRAPHITE WITH 316 S.S. INTERNAL RING AND CARBON STEEL EXT. RING. | |

TOT. WEIGHT = 9832 Kg



VIEW A-A

| DESIGN DATA | | DESIGN CODE | ASME SECT. VIII DIV. 1 1995 EDITION |
|---|--|---|--|
| DESIGN CODE | ASME SECT. VIII DIV. 1 1995 EDITION | DESIGN CODE | ASME SECT. VIII DIV. 1 1995 EDITION |
| INSPECTION AUTHORITY | ASME INSPECTION | INSPECTION AUTHORITY | ASME INSPECTION |
| OPERATING PRESSURE | 225 bar | OPERATING PRESSURE | 225 bar |
| EXTERNAL PRESSURE | 5 bar | EXTERNAL PRESSURE | 5 bar |
| HYDROTEST PRESSURE | 58 bar | HYDROTEST PRESSURE | 58 bar |
| WIND PRESSURE | 22.5 bar | WIND PRESSURE | 22.5 bar |
| SEISMIC GRAVITY | 0.3 | SEISMIC GRAVITY | 0.3 |
| DESIGN TEMPERATURE | 255 °C FOR F.V. | DESIGN TEMPERATURE | 255 °C FOR F.V. |
| OPERATING TEMPERATURE | 227 °C | OPERATING TEMPERATURE | 227 °C |
| CORROSION ALLOWANCE | 1 mm | CORROSION ALLOWANCE | 1 mm |
| TYPE | PTA + WATER | TYPE | PTA + WATER |
| PHYSICAL STATE | LIQUID | PHYSICAL STATE | LIQUID |
| SPECIFIC GRAVITY | 947 kg/m³ | SPECIFIC GRAVITY | 947 kg/m³ |
| CAPACITY | ~140 m³ | CAPACITY | ~140 m³ |
| LIQUID LEVEL FOR MECHANICAL RESISTANCE BOTTOM FL. | 1 m | LIQUID LEVEL FOR MECHANICAL RESISTANCE BOTTOM FL. | 1 m |
| INSULATION TYPE/THK. | CELLULAR GLASS / 60 MM | INSULATION TYPE/THK. | CELLULAR GLASS / 60 MM |
| LOADS AT BASE | OPERATING: 2782 kN, HYDROTEST: 2857 kN, EARTHQUAKE: 160 kN | LOADS AT BASE | OPERATING: 2782 kN, HYDROTEST: 2857 kN, EARTHQUAKE: 160 kN |
| HEIGHT | ~11800 mm | HEIGHT | ~11800 mm |
| WEIGHT | ~25105 kg | WEIGHT | ~25105 kg |
| LOCATION | OUTDOOR | LOCATION | OUTDOOR |

ATB Caldereria s.p.a. BRESCIA ITALIA

IBN RUSHD TECNIMONT 20230

24 D 002 SECOND PTA CRYSTALLIZER

INSIEME E NOTE - ASSEMBLY AND NOTES

DESIGN NO. 125 20230 D 101 3

ASME STAMP U Pressure vessel Div. 1

| REV. | DATE | DESCRIPTION | DRAWN UP | CHECKED | APPROVED |
|------|-----------|---------------------------|----------|---------|----------|
| 3 | 11/04/97 | FINAL ISSUE | | | |
| 2 | 26 JUN 96 | MODIFIED WHERE SHOWN WITH | | | |
| 1 | 16 APR 96 | MODIFIED WHERE SHOWN WITH | | | |
| 0 | 08 FEB 96 | FIRST ISSUE | | | |

IBN RUSHD PTA PLANT YANBU SAUDI ARABIA

ATB Caldereria s.p.a. BRESCIA ITALIA

TECNIMONT

IBN RUSHD

PTA-YANBU SAUDI ARABIA

SECOND PTA CRYSTALLIZER

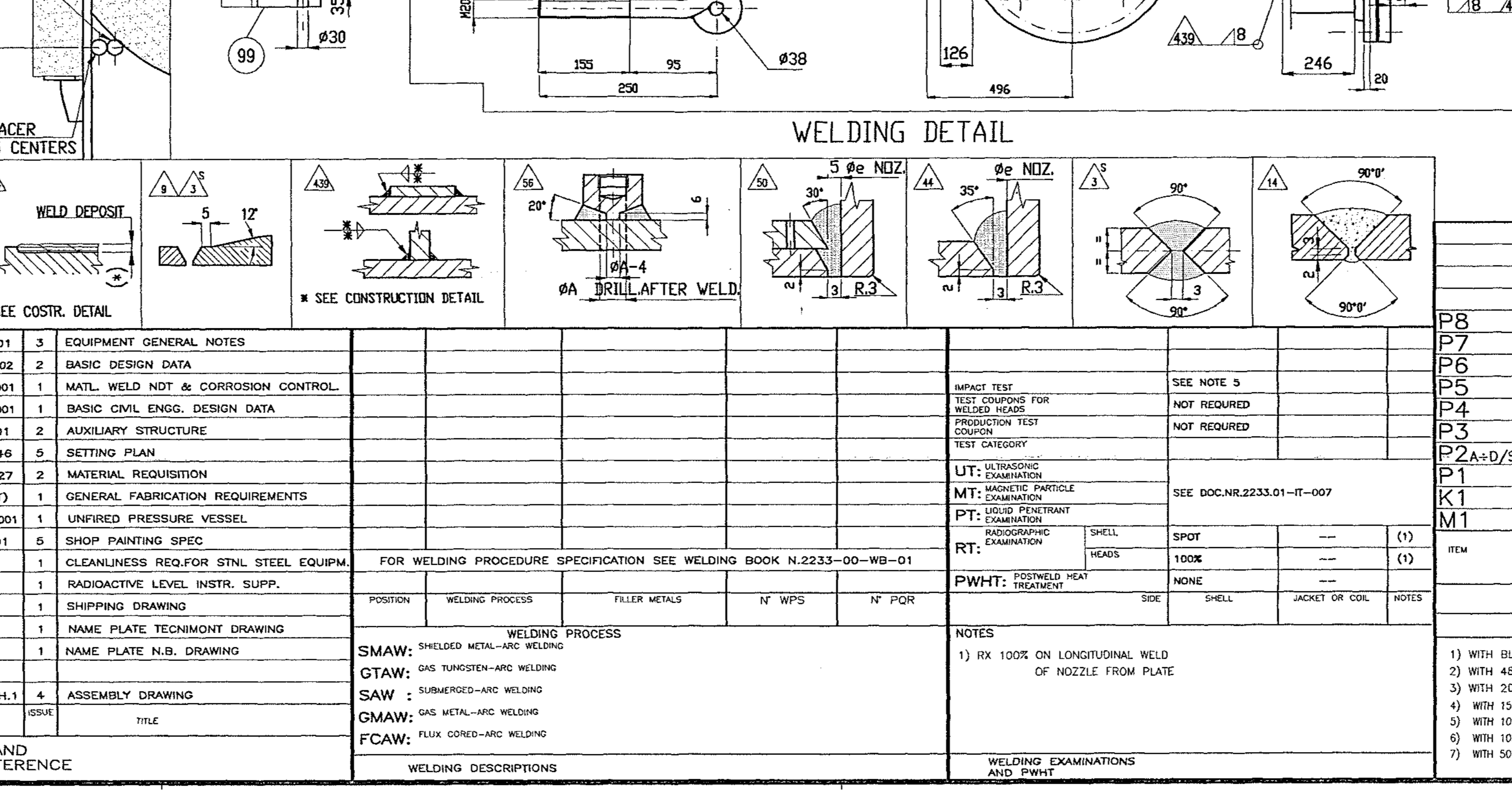
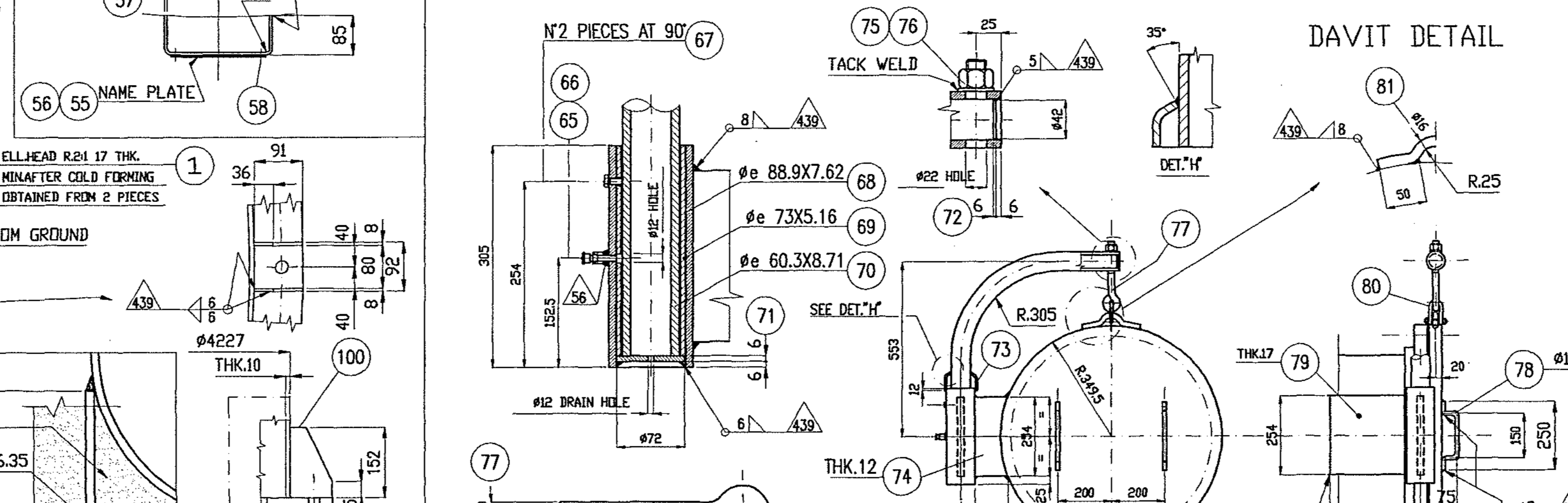
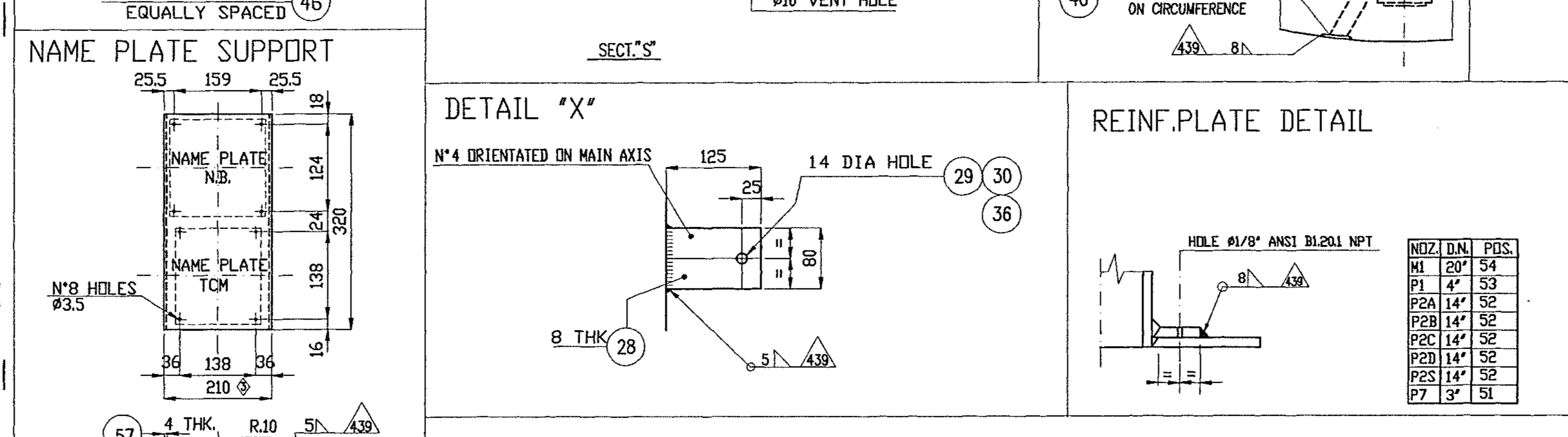
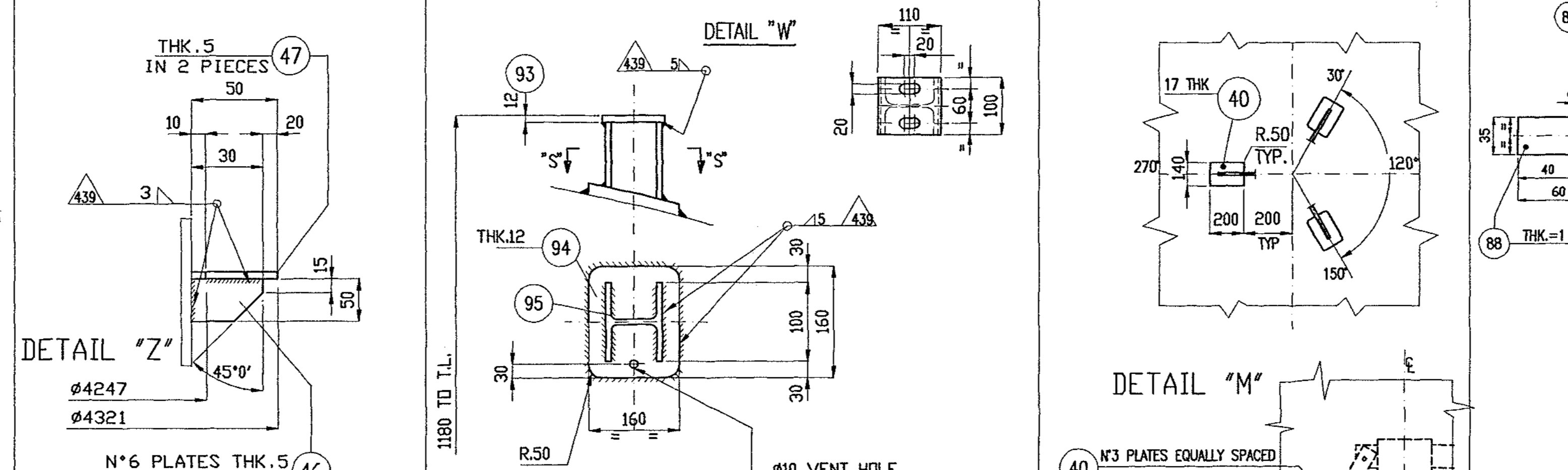
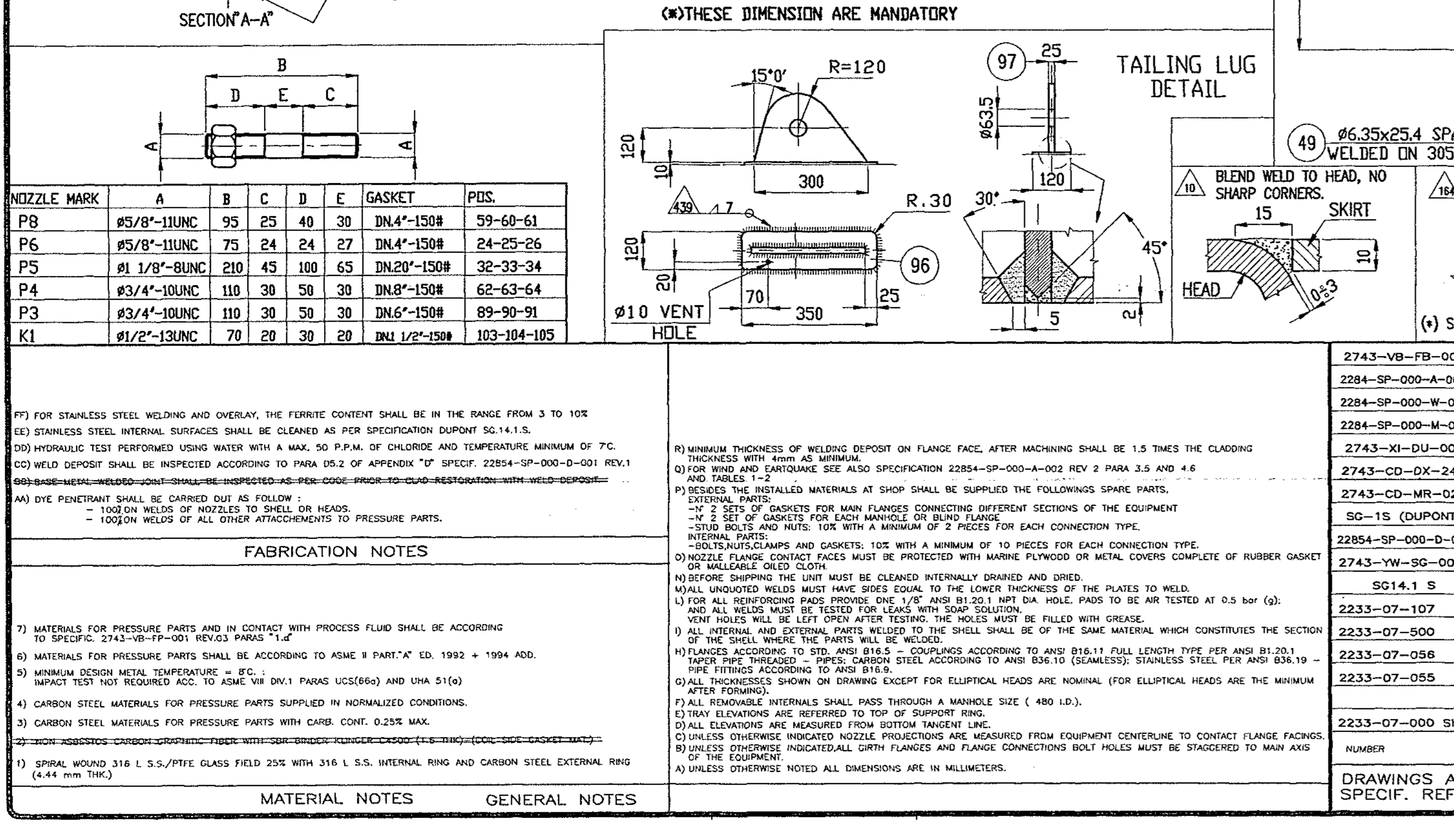
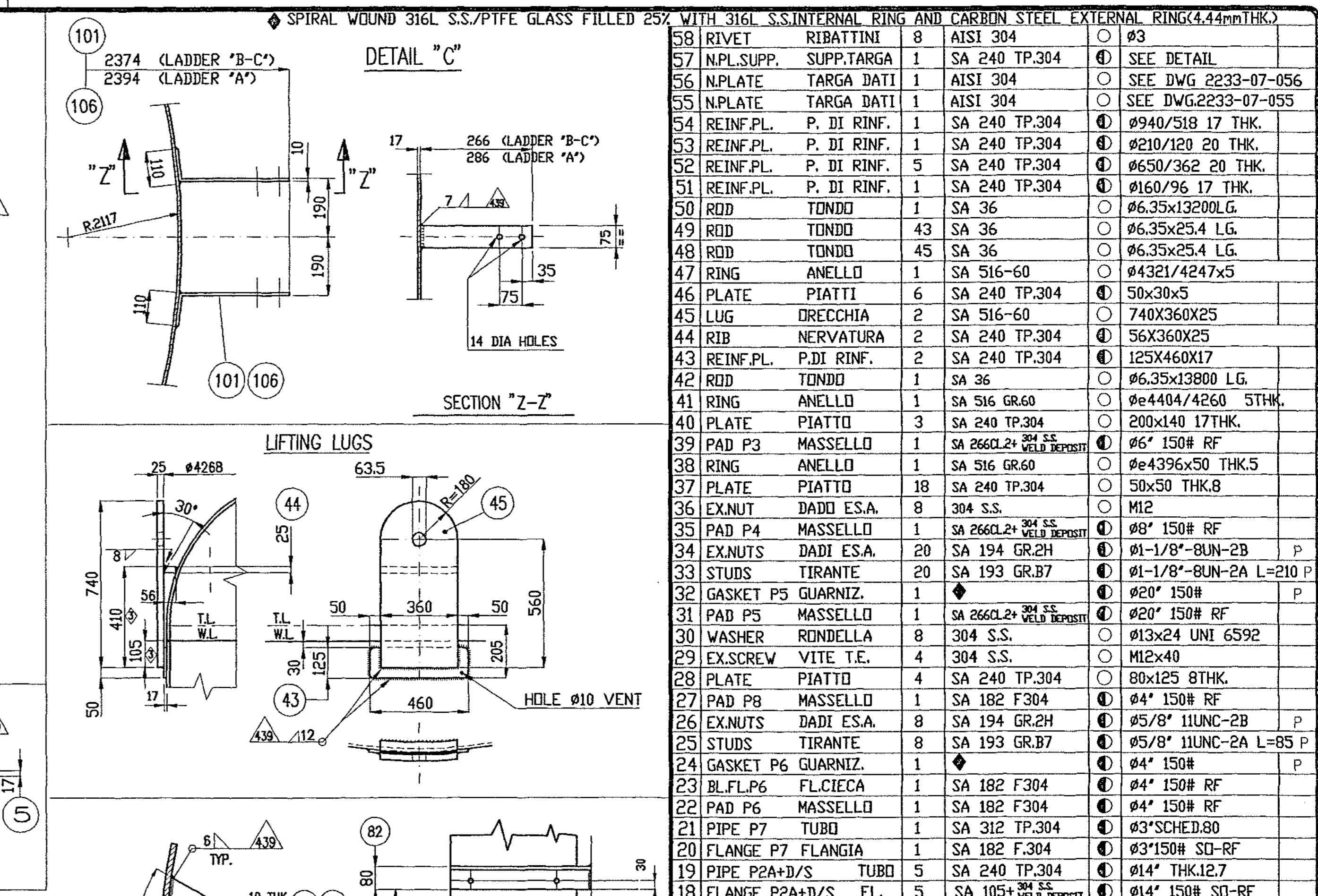
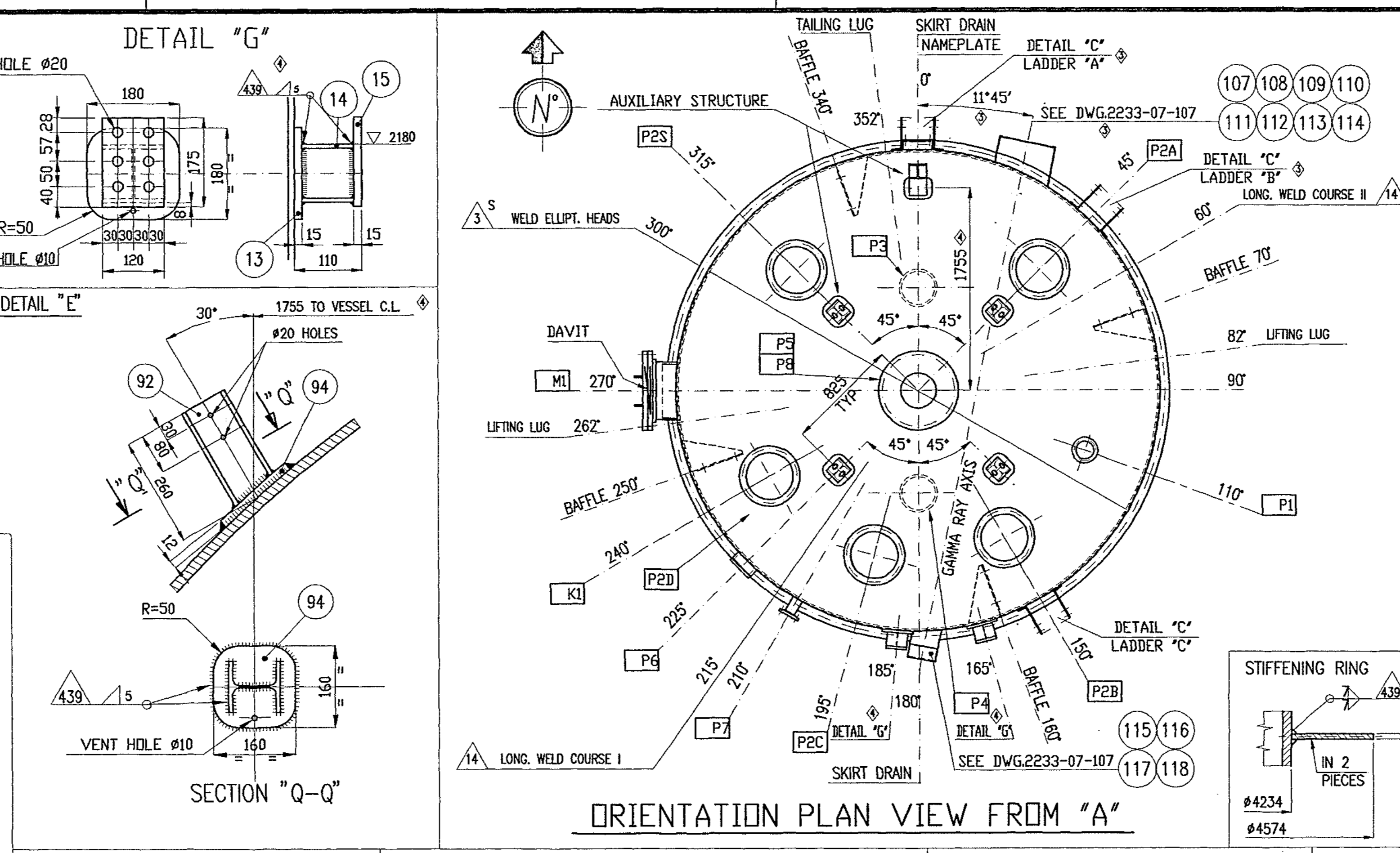
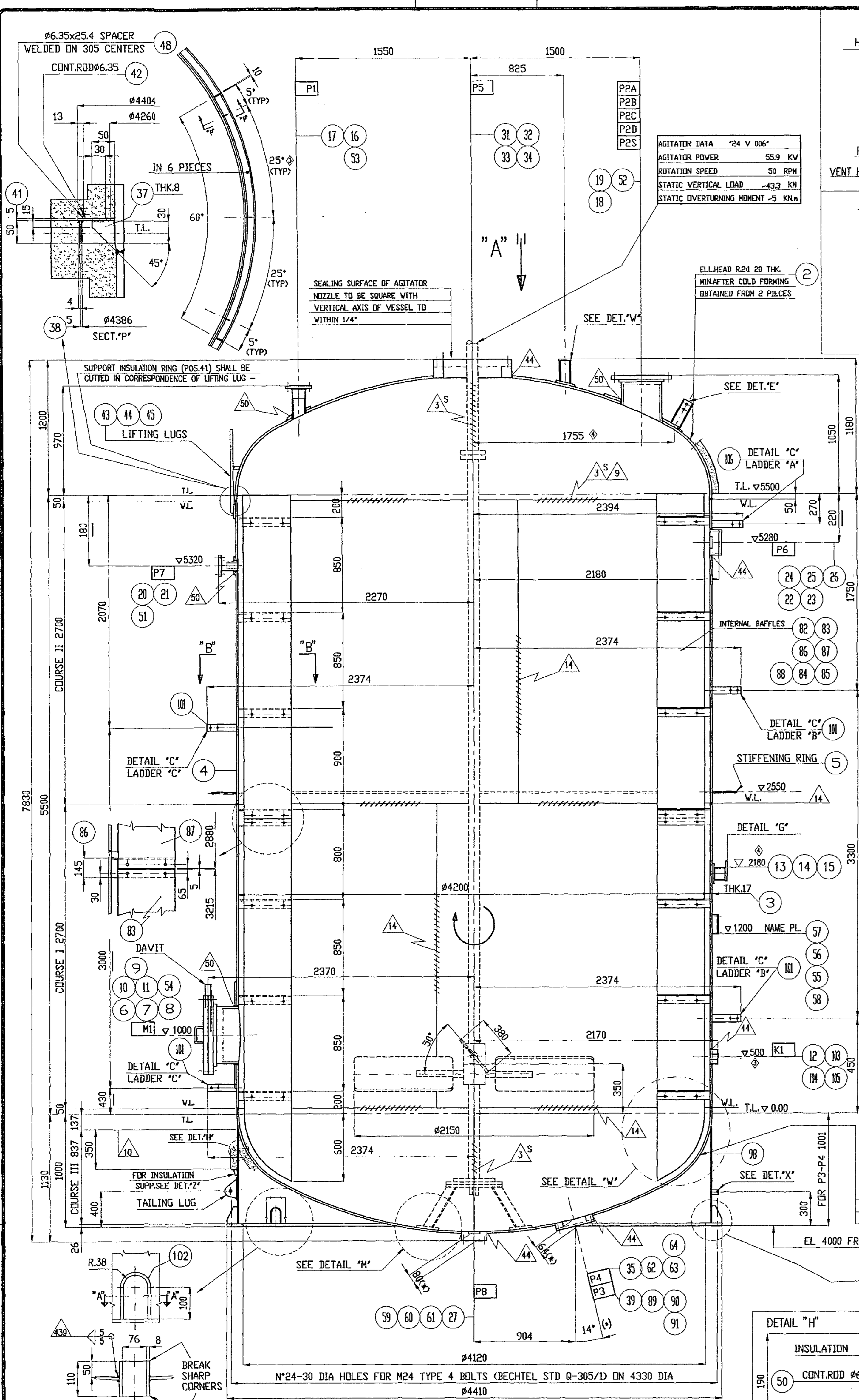
DATE: 08-02-96

| ITEM | DESCRIPTION | MATERIAL | N° | WEIGHT (kg) |
|------|-----------------------|---------------------------|----|-------------|
| 6A/B | SKIRT COURSE | ASME SA 516 GR 60 | 1 | 2758 |
| 5A/B | 81/8" ELLIPTICAL HEAD | ASME SA 264/516 GR 70/321 | 1 | 15662 |
| 4A/B | SHELL COURSE | ASME SA 264/516 GR 70/321 | 1 | 21410 |
| 3A/B | SHELL COURSE | ASME SA 264/516 GR 70/321 | 1 | 21410 |
| 2A/B | SHELL COURSE | ASME SA 264/516 GR 70/321 | 1 | 21410 |
| 1A/B | TOP ELLIPTICAL HEAD | ASME SA 264/516 GR 70/321 | 1 | 15662 |

LIST OF CONNECTIONS

- 1) WITH BLIND FLANGE
- 2) WITH BLIND FLANGE AND DAVIT
- 3) NOZZLES OF EXTERNAL HEATING COILS
- 4) WITH INTERNAL BAFFLE

FOR VESSEL



DETAIL "C"

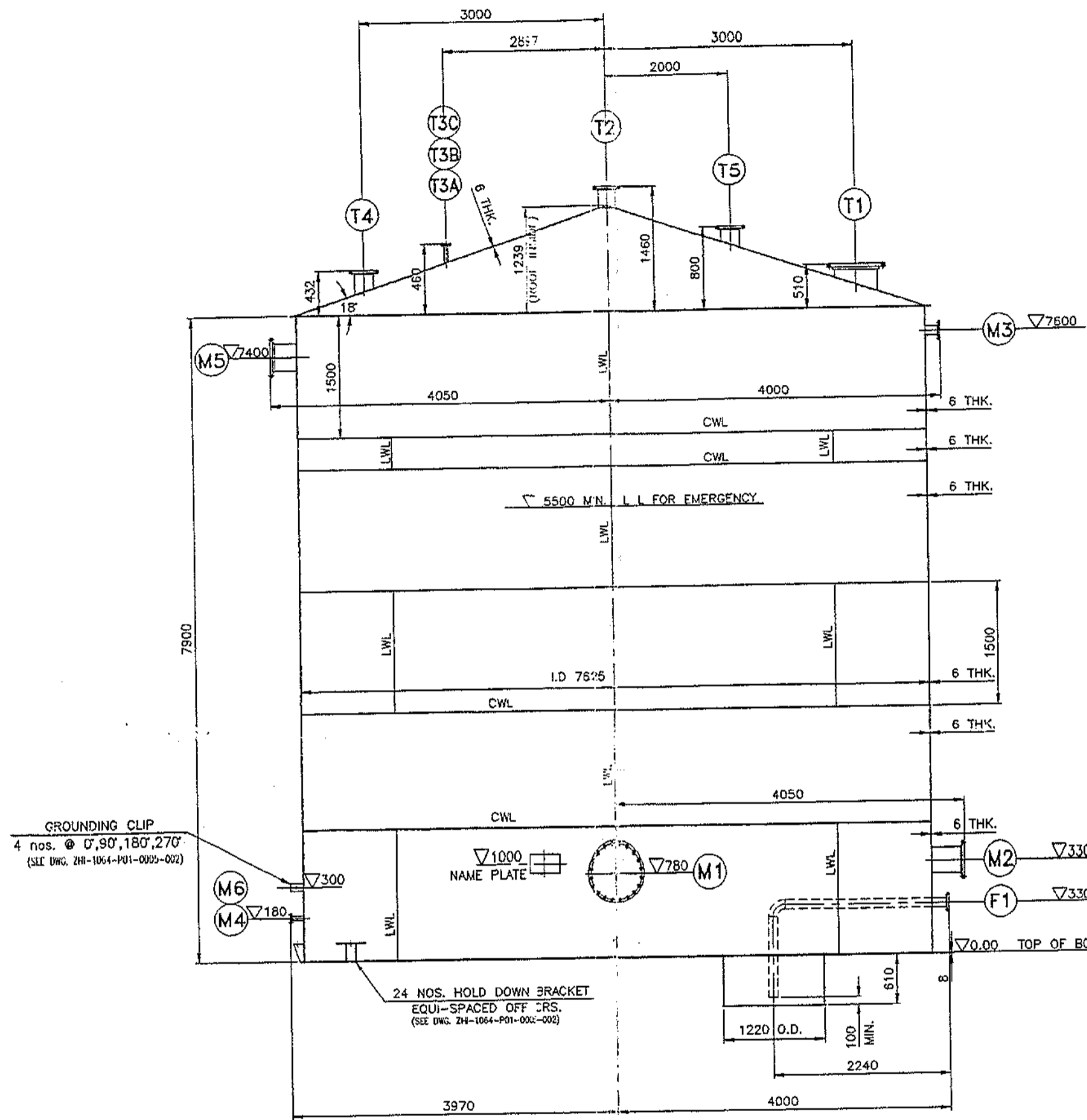
| | | | | | |
|-----|--------------------|---------------|----|------------------|--------------------------|
| 118 | EX SCREW | VITE T.E. | 16 | CARBON STEEL | Ø M16 LG70 |
| 117 | EX NUTS | DADI E.S.A. | 16 | CARBON STEEL | Ø M16 |
| 116 | BRACKET | SUPPORTO | 1 | 304 S.S. | Ø SEE DETAIL "C" |
| 115 | BRACKET | SUPPORTO | 1 | 304 S.S. | Ø SEE DETAIL "C" |
| 114 | EX SCREW | VITE T.E. | 20 | CARBON STEEL | Ø M20 LG25 |
| 113 | EX NUTS | DADI E.S.A. | 20 | CARBON STEEL | Ø M20 |
| 112 | ANGLE BAR | ANGOLARE | 2 | CARBON STEEL | Ø 40x40xL=5500 |
| 111 | PLATE | PIATTO | 5 | SA 240 TP304 | Ø 40x2 LG500 |
| 110 | PLATE | PIATTO | 3 | 304 S.S. | Ø 100x4 LG165 |
| 109 | PLATE | PIATTO | 2 | 304 S.S. | Ø 100x4 LG185 |
| 108 | PLATE | PIATTO | 2 | 304 S.S. | Ø 100x4 LG305 |
| 107 | PLATE | PIATTO | 3 | 304 S.S. | Ø 100x4 LG285 |
| 106 | LADDER "M" SUPP. | SUPPSCALE | 2 | SA 240 TP304 | Ø SEE DETAIL "C" |
| 105 | EXNUT P3 | DADI E.S.A. | 4 | SA 194 GR2H | Ø 1 1/2" 150N-2B |
| 104 | BOLTS K1 | TIRANTE | 4 | SA 193 GR.B7 | Ø 1 1/2" 150N-2B |
| 103 | GASKET K1 | GUARNIZ. | 1 | Ø 1 1/2" 150N RF | Ø SEE DETAIL "C" |
| 102 | DRAIN | DRENAGGIO | 2 | SA 516 GR.60 | Ø SEE DETAIL "C" |
| 101 | LADDER "B-C" SUPP. | SUPPSCALE | 8 | SA 240 TP304 | Ø SEE DETAIL "C" |
| 100 | RIB | NERVATURA | 48 | SA 516 GR.60 | Ø SEE DETAIL "C" |
| 99 | RIB | NERVATURA | 1 | SA 516 GR.60 | Ø 440x1420 THK.26 |
| 98 | COURSE III | VIROLA | 1 | SA 240 TP304 | Ø 1.14207-837 THK10 |
| 97 | LUG | DIRECCIA | 1 | SA 240 TP304 | Ø SEE DETAIL "C" |
| 96 | REIN.FL. | PIATTO | 1 | SA 240 TP304 | Ø 350x120x10 |
| 95 | SECTION | PROFILATO | 4 | FE 360 BUN17070 | Ø HEA100 UNIS397 |
| 94 | REIN.FL. | PIATTO | 5 | SA 240 TP304 | Ø 160x160 THK.12 |
| 93 | PLATE | PIATTO | 4 | SA 516 GR.60 | Ø 100x110 12 THK. |
| 92 | SECTION | PROFILATO | 1 | FE 360 BUN17070 | Ø HEA 100 UNI 5397 |
| 91 | GASKET P3 | GUARNIZ. | 1 | Ø 6" 150N | Ø SEE DETAIL "C" |
| 90 | EXNUT P3 | DADI E.S.A. | 8 | SA 194 GR.2H | Ø 1 1/2" 150N-2B |
| 89 | STUD P3 | TIRANTE | 8 | SA 193 GR.B7 | Ø 1 1/2" 150N-2B |
| 88 | PLATE | PIATTO | 64 | SA 240 TP304 | Ø 35X50X1 |
| 87 | INT.BAF. | PIATTO INT. | 4 | SA 240 TP304 | Ø 420X280X10 |
| 86 | PLATES | PIATTI | 4 | SA 240 TP304 | Ø 10 THK. SEE DETAIL "W" |
| 85 | EXNUTS | DADI E.S.A. | 64 | SA 194 GR.8M | Ø M16 6H |
| 84 | EX. SCREW | VITE T.E. | 64 | SA 193 GR.8M | Ø M16X60-6g |
| 83 | INT.BAF. | PIATTI INT. | 4 | SA 240 TP304 | Ø 420X325X10 |
| 82 | PLATES | PIATTI | 24 | SA 240 TP304 | Ø 10 THK. SEE DETAIL "W" |
| 81 | RIB | TONDO | 1 | SA 36 | Ø 16 |
| 80 | ANCH-SHACKLE | GRILLO | 1 | FORGED STEEL | Ø 1 1/2" STD. |
| 79 | HANDLE | MANGIOLA | 2 | SA 36 | Ø 246X254X12 |
| 78 | HANDLE | MANGIOLA | 2 | SA 36 | Ø 16 |
| 77 | EX. BOLT | TIRCON OCCIHO | 1 | SA 36 | Ø M20X250 |
| 76 | EXNUT | DADI E.S.A. | 1 | SA 36 | Ø M20 6H |
| 75 | WASHER | RONDELLA | 1 | SA 36 | Ø 37/22 X 3 THK. |
| 74 | PLATE | PIATTO | 1 | SA 516 GR.60 | Ø 126X254X12 |
| 73 | DISK | FONDELLO | 1 | SA 403 WP.304 | Ø 1 1/2" X 5 THK. |
| 72 | CAP | DISCO | 1 | SA 516 GR.60 | Ø 42 THK.6 |
| 71 | DISK | DISCO | 1 | SA 240 TP304 | Ø 72 THK.6 |
| 70 | PIPE | TUBO | 1 | SA 193 GR.8M | Ø 450x120 |
| 69 | PIPE | TUBO | 1 | SA 312 TP304 | Ø 1 1/2" SCH40 |
| 68 | PIPE | TUBO | 1 | SA 312 TP304 | Ø 3" SCHXS. |
| 67 | EX.SCREW | VITE T.E. | 2 | 304 S.S. | Ø 3/8" 16UNC-2A L=20 |
| 66 | GREASE FITTING | INGR. | 1 | 304 S.S. | Ø 1/8" STD. |
| 65 | EXNUT P4 | DADI E.S.A. | 8 | SA 194 GR.2H | Ø 1 1/2" 150N-2B |
| 64 | GASKET P4 | GUARNIZ. | 1 | Ø 1 1/2" 150N RF | Ø SEE DETAIL "C" |
| 63 | EXNUT P4 | DADI E.S.A. | 8 | SA 193 GR.8M | Ø 1 1/2" 150N-2B |
| 62 | STUD P4 | TIRANTE | 8 | SA 193 GR.8M | Ø 1 1/2" 150N-2B |
| 61 | GASKET P8 | GUARNIZ. | 1 | Ø 4" 150N | Ø SEE DETAIL "C" |
| 60 | EXNUT P8 | DADI E.S.A. | 8 | SA 194 GR.2H | Ø 1 1/2" 150N-2B |
| 59 | STUD P8 | TIRANTE | 8 | SA 193 GR.8M | Ø 1 1/2" 150N-2B |

MATERIAL LIST

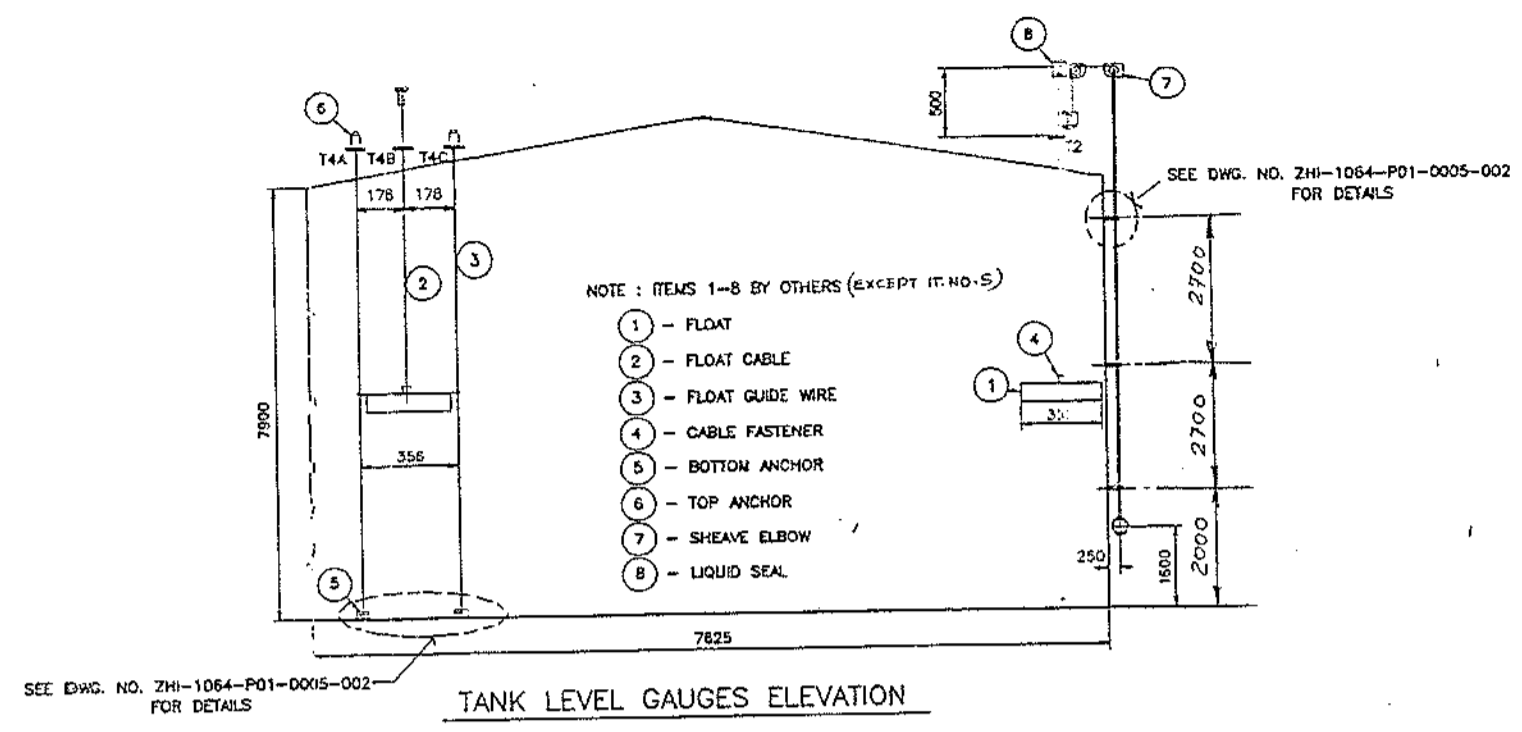
| ITEM NO. | DESCRIPTION | MATERIAL | QTY | UNIT | REMARKS |
|----------|---------------|-------------|-----|-------|-----------------------|
| 1 | ELLHEAD | FONDO EL. | 1 | PIECE | Ø 1.14207 THK.17 |
| 2 | ELLHEAD | FONDO EL. | 1 | PIECE | Ø 1.14207 THK.20 |
| 3 | COURSE I | VIROLA | 1 | PIECE | Ø 1.14207 THK.17 |
| 4 | COURSE II | VIROLA | 1 | PIECE | Ø 1.14207 THK.17 |
| 5 | RING | ANELLO | 1 | PIECE | Ø 4574/4234 THK.17 |
| 6 | EXNUTS | DADI E.S.A. | 40 | PIECE | Ø 1 1/2" 150N-2B |
| 7 | STUDS | TIRANTI | 20 | PIECE | Ø 1 1/2" 150N-2B |
| 8 | GASKET MI | GUARNIZ. | 1 | PIECE | Ø 20" 150N RF |
| 9 | BL.FL. | FLICCIA | 2 | PIECE | Ø 20" 150N RF |
| 10 | PIPE MI | TUBO | 1 | PIECE | Ø 20" 150N RF |
| 11 | FLANGE MI | FLANGIA | 1 | PIECE | Ø 20" 150N RF |
| 12 | PAD KI | MASSELLI | 1 | PIECE | Ø 20" 150N RF |
| 13 | REIN.FL. | PIATTO | 2 | PIECE | Ø 20" 150N RF |
| 14 | BEAM | PROFILATO | 2 | PIECE | Ø HEA 120 L=80 |
| 15 | PLATE | PIATTO | 2 | PIECE | Ø 175x120x15 THK. |
| 16 | FLANGE P1 | FLANGIA | 1 | PIECE | Ø 4" 150N SD-RF |
| 17 | PIPE P1 | TUBO | 1 | PIECE | Ø 4" 150N SD-RF |
| 18 | FLANGE P2+D/S | FL. | 5 | PIECE | Ø 1 1/2" 150N SD-RF |
| 19 | PIPE P2+D/S | TUBO | 5 | PIECE | Ø 1 1/2" 150N SD-RF |
| 20 | FLANGE P7 | FLANGIA | 1 | PIECE | Ø 3" 150N SD-RF |
| 21 | PIPE P7 | TUBO | 1 | PIECE | Ø 3" 150N SD-RF |
| 22 | PAD P6 | MASSELLI | 1 | PIECE | Ø 4" 150N RF |
| 23 | BL.FL.P6 | FLICCIA | 1 | PIECE | Ø 4" 150N RF |
| 24 | GASKET P6 | GUARNIZ. | 1 | PIECE | Ø 4" 150N RF |
| 25 | STUDS | TIRANTE | 8 | PIECE | Ø 5/8" 11UNC-2A L=5 P |
| 26 | EXNUTS | DADI E.S.A. | 8 | PIECE | Ø 5/8" 11UNC-2A L=5 P |
| 27 | PAD P8 | MASSELLI | 1 | PIECE | Ø 4" 150N RF |
| 28 | EXNUTS | DADI E.S.A. | 8 | PIECE | Ø 5/8" 11UNC-2A L=5 P |
| 29 | STUDS | TIRANTE | 8 | PIECE | Ø 5/8" 11UNC-2A L=5 P |
| 30 | GASKET P8 | GUARNIZ. | 1 | PIECE | Ø 4" 150N RF |
| 31 | WASHER | RONDELLA | 8 | PIECE | Ø 5/8" 11UNC-2A L=5 P |
| 32 | GASKET P5 | GUARNIZ. | 1 | PIECE | Ø 20" 150N RF |
| 33 | STUDS | TIRANTE | 20 | PIECE | Ø 1 1/2" 150N-2B |
| 34 | EXNUTS | DADI E.S.A. | 20 | PIECE | Ø 1 1/2" 150N-2B |
| 35 | PAD P4 | MASSELLI | 1 | PIECE | Ø 1 1/2" 150N RF |
| 36 | EXNUTS | DADI E.S.A. | 8 | PIECE | Ø 1 1/2" 150N-2B |
| 37 | PLATE | PIATTO | 10 | PIECE | Ø 50x50 THK.8 |
| 38 | RING | ANELLO | 1 | PIECE | Ø 432x142x5 |
| 39 | PLATE | PIATTO | 3 | PIECE | Ø 200x140 17 THK. |
| 40 | PLATE | PIATTO | 3 | PIECE | Ø 200x140 17 THK. |
| 41 | RING | ANELLO | 1 | PIECE | Ø 440x4260 5 THK. |
| 42 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 43 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 44 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 45 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 46 | PLATE | PIATTO | 6 | PIECE | Ø 200x140 17 THK. |
| 47 | RING | ANELLO | 1 | PIECE | Ø 432x142x5 |
| 48 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 49 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 50 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 51 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 52 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 53 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 54 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 55 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 56 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 57 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 58 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 59 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 60 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 61 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 62 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 63 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 64 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 65 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 66 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 67 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 68 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 69 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 70 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 71 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 72 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 73 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 74 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 75 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 76 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 77 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 78 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 79 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 80 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 81 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 82 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 83 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 84 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 85 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 86 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 87 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 88 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 89 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 90 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 91 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 92 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 93 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 94 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 95 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 96 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 97 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 98 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 99 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |
| 100 | RIB | NERVATURA | 2 | PIECE | Ø 200x140 17 THK. |

DESIGN DATA

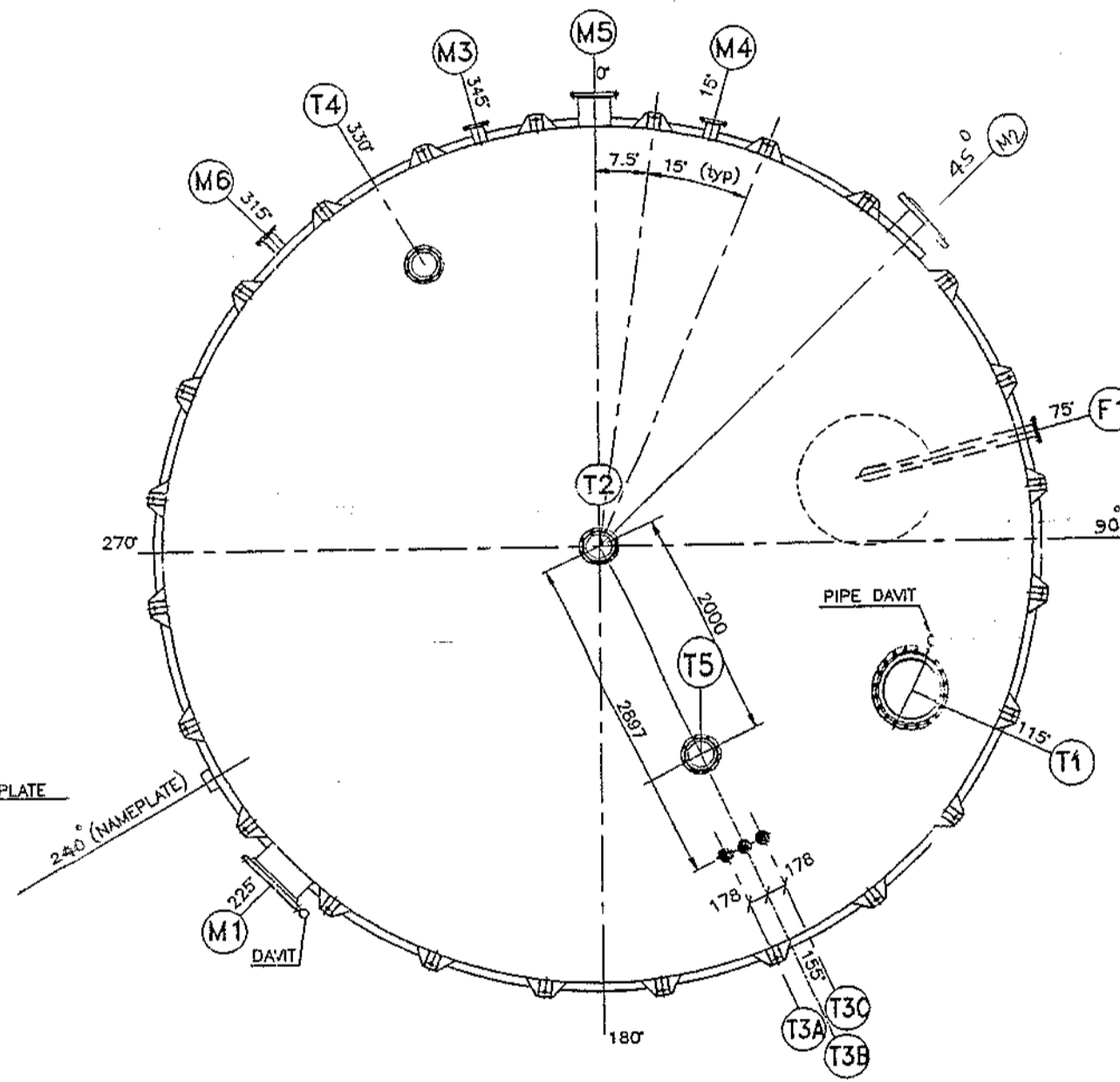
| ITEM | DESCRIPTION | VALUE | UNIT | REMARKS |
|------|-----------------|------------------|---------|----------|
| 1 | DESIGN CODE | ASME VIII DIV. 1 | | 1999 ED. |
| 2 | DESIGN PRESSURE | 1.5 | BAR | |
| 3 | WIND SPEED | 107.8 | km/h | |
| 4 | TEMPERATURE | 100 | °C | |
| 5 | WIND PRESSURE | 1.170 | kg/m² | |
| 6 | WIND PRESSURE | 1.170 | kg/m² | |
| 7 | WIND PRESSURE | 1.170 | kg/m² | |
| 8 | WIND PRESSURE | 1.170 | kg/m² | |
| 9 | WIND PRESSURE | 1.170 | kg/m² | |
| 10 | WIND PRESSURE | 1.170 | kg/m² | |
| 11 | WIND PRESSURE | 1.170 | kg/m² | |
| 12 | WIND PRESSURE | 1.170 | kg/m² | |
| 13 | WIND PRESSURE | 1.170 | kg/m² | |
| 14 | WIND PRESSURE | 1.170 | kg/m² | |
| 15 | WIND PRESSURE | 1.170 | kg/m² | |
| 16 | WIND PRESSURE | 1.170 | kg/m² | |
| 17 | WIND PRESSURE | 1.170 | kg/m² | |
| 18 | WIND PRESSURE | 1.170 | kg/m² | |
| 19 | WIND PRESSURE | 1.170 | kg/m² | |
| 20 | WIND PRESSURE | 1.170 | kg/m² | |
| 21 | WIND PRESSURE | 1.170 | kg/m² | |
| 22 | WIND PRESSURE | 1.170 | kg/m² | |
| 23 | WIND PRESSURE | 1.170 | kg/m² | |
| 24 | WIND PRESSURE | 1.170 | kg/m² | |
| 25 | WIND PRESSURE | 1.170 | kg/m² | |
| 26 | WIND PRESSURE | 1.170 | kg/m² | |
| 27 | WIND PRESSURE | 1.170 | kg/m² | |
| 28 | WIND PRESSURE | 1.170 | kg/m² | |
| 29 | WIND PRESSURE | 1.170 | kg/m² | |
| 30 | WIND PRESSURE | 1.170 | kg/m² | |
| 31 | WIND PRESSURE | 1.170 | kg/m² | |
| 32 | WIND PRESSURE | 1.170 | kg/m² | |
| 33 | WIND PRESSURE | 1.170 | kg/m² | |
| 34 | WIND PRESSURE | 1.170 | kg/m² | |
| 35 | WIND PRESSURE | 1.170 | kg/m² | |
| 36 | WIND PRESSURE | 1.170 | kg/m² | |
| 37 | WIND PRESSURE | 1.170 | kg/m² | |
| 38 | WIND PRESSURE | 1.170 | kg/m² | |
| 39 | WIND PRESSURE | 1.170 | kg/m² | |
| 40 | WIND PRESSURE | 1.170 | kg/m² | |
| 41 | WIND PRESSURE | 1.170 | kg/m² | |
| 42 | WIND PRESSURE | 1.170 | kg/m² | |
| 43 | WIND PRESSURE | 1.170 | kg/m² | |
| 44 | WIND PRESSURE | 1.170 | kg/m² | |
| 45 | WIND PRESSURE | 1.170 | kg/m² | |
| 46 | WIND PRESSURE | 1.170 | kg/m² | |
| 47 | WIND PRESSURE | 1.170 | kg/m² | |
| 48 | WIND PRESSURE | 1.170 | kg/m² | |
| 49 | WIND PRESSURE | 1.170 | kg/m²</ | |



ELEVATION



TANK LEVEL GAUGES ELEVATION



ORIENTATION

Q) SPIRAL WOUND 316L/PTFE GLASS FILLED 25% WITH 316L INTERNAL RING AND C-5 EXTERNAL RING 4.4MM THK.
 P) BESIDES THE INSTALLED MATERIALS AT SHOP SHALL BE SUPPLIED THE FOLLOWINGS SPARE PARTS.
 EXTERNAL PARTS:
 -NO. 2 SETS OF GASKETS FOR MAIN FLANGES CONNECTING DIFFERENT SECTIONS OF THE EQUIPMENT
 -NO. 2 SETS OF GASKETS FOR EACH MANHOLE OR BLIND FLANGE
 -NO. 2 SETS OF GASKETS FOR EACH MANHOLE OR BLIND FLANGE
 -STUD BOLTS AND NUTS: 10% WITH A MINIMUM OF 2 PIECES FOR EACH CONNECTION TYPE.
 INTERNAL PARTS:
 -BOLTS,NUTS,CLAMPS AND GASKETS: 10% WITH A MINIMUM OF 10 PIECES FOR EACH CONNECTION TYPE.
 O) NOZZLE FLANGE CONTACT FACES MUST BE PROTECTED WITH MARINE PLYWOOD OR METAL COVERS COMPLETE OF RUBBER GASKET OR MALLEABLE OILED CLOTH.
 N) BEFORE SHIPPING THE UNIT MUST BE CLEANED INTERNALLY DRAINED AND DRIED.
 M) ALL UNQUOTED WELDS MUST HAVE SIZES EQUAL TO THE LOWER THICKNESS OF THE PLATES TO WELD.
 L) FOR ALL REINFORCING PADS PROVIDE ONE 1/8" ANSI B1.20.1 NPT DIA. HOLE. PADS TO BE AIR TESTED AT 2 bar (g); AFTER THE PRESSURE MUST BE REDUCED TO 0.5 bar (g) AND ALL WELDS MUST BE TESTED FOR LEAKS WITH SOAP SOLUTION. VENT HOLES WILL BE LEFT OPEN AFTER TESTING. THE HOLES MUST BE FILLED WITH GREASE.
 I) ALL INTERNAL AND EXTERNAL PARTS WELDED TO THE SHELL SHALL BE OF THE SAME MATERIAL WHICH CONSTITUTES THE SECTION OF THE SHELL WHERE THE PARTS WILL BE WELDED.
 H) FLANGES ACCORDING TO STD. ANSI B16.5 - COUPLINGS ACCORDING TO ANSI B16.11 FULL LENGTH TYPE PER ANSI B1.20.1 TAPER PIPE THREADED - PIPES: CARBON STEEL ACCORDING TO ANSI B36.10 (SEAMLESS), STAINLESS STEEL PER ANSI B 36.19 - PIPE FITTINGS ACCORDING TO ANSI B16.9.
 G) ALL THICKNESSES SHOWN ON DRAWING EXCEPT FOR ELLIPTICAL HEADS ARE NOMINAL (FOR ELLIPTICAL HEADS ARE THE MINIMUM AFTER FORMING).
 F) ALL REMOVABLE INTERNALS SHALL PASS THROUGH A MANHOLE SIZE (478 I.D.).
 E) TRAY ELEVATIONS ARE REFERRED TO TOP OF SUPPORT RING.
 D) ALL ELEVATIONS ARE MEASURED FROM BOTTOM TANGENT LINE.
 C) UNLESS OTHERWISE INDICATED NOZZLE PROJECTIONS ARE MEASURED FROM EQUIPMENT CENTERLINE TO CONTACT FLANGE FACINGS.
 B) UNLESS OTHERWISE INDICATED, ALL GIRTH FLANGES AND FLANGE CONNECTIONS BOLT HOLES MUST BE STAGGERED TO MAIN AXES OF THE EQUIPMENT.
 A) UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN MILLIMETERS.

| NO. | DESCRIPTION | QTY | UNIT | REMARKS |
|-------------------|-----------------------------|-----|------|--------------|
| 2743-CD-SE 231 | TECNIMONT DATA SHEET | 1 | | |
| 2743-YW-SG 002 | SITE PAINTING | 1 | | |
| 2743-CD-WR 25 | MATERIAL REQUISITION | 2 | | SEE WELD MAP |
| 22854-SP-000-4701 | STORAGE TANK | 1 | | |
| DUPONT GBA | S.S. STORAGE TANK | 1 | | |
| 21-104-01-005-001 | SHELL & ROOF PLATE DEV. | 3 | | |
| 21-104-01-005-002 | NOZZLE DETAILS | 3 | | |
| 21-104-01-005-003 | NOZZLE & NAME PLATE DETAILS | 3 | | |

| ITEM NO. | DESCRIPTION | QTY | UNIT | REMARKS |
|----------|----------------------------|------|---------|----------------------|
| T5 1 | R1 SPARE | 1500 | S.O.R.F | 218.1 8.18 45.7 6 2 |
| T4 1 | R1 WATER INLET | 1500 | S.O.R.F | 218.1 8.18 45.7 6 6 |
| T3C 1 | 1 1/2" LEVEL GAUGE | 1500 | S.O.R.F | 48.33.68 - - - |
| T3B 1 | 1 1/2" LEVEL GAUGE | 1500 | S.O.R.F | 48.33.68 - - - |
| T3A 1 | 1 1/2" LEVEL GAUGE | 1500 | S.O.R.F | 48.33.68 - - - |
| T2 1 | 10" VENT | 1500 | S.O.R.F | 273.19 27.684 6 1 |
| T1 1 | 20" MANHOLE (230P) | 1500 | S.O.R.F | 508.015 50.1067 6 1 |
| F1 1 | 2" BOTTOM DRAIN | 1500 | S.O.R.F | 114.3 6.02 305 6 3 |
| M6 1 | 2" LEVEL CONTROLLER | 1500 | S.O.R.F | 60.3 3.91 - - - |
| M5 1 | 12" OVERFLOW | 1500 | S.O.R.F | 323.910 31.686 - - - |
| M4 1 | 1.5" TEMPERATURE CONN. | 1500 | S.O.R.F | 48.3 3.89 - - - |
| M3 1 | 4" RECYCLE | 1500 | S.O.R.F | 114.3 6.02 305 6 6 |
| M2 1 | 10" OUTLET TO 210001/01110 | 1500 | S.O.R.F | 273.1 9.27 584 6 6 |
| M1 1 | 20" MANHOLE (SHELL) | 1500 | S.O.R.F | 508.015 50.106 6 1 |

| DESCRIPTION | QTY | UNIT | REMARKS |
|--------------------|-------------------|------|---------|
| ANCHOR CHAIR | ASTM A740 TP 304 | O | |
| INTERNAL | S.S TYPE 304 | O | |
| GASKET | SEE NOTE-0 | O | |
| NUTS | ASTM A 194 GR 7H | O | |
| BOLTS (EXT.) | ASTM A 193 GR 87H | O | |
| BOLTS/NUTS (INT.) | S.S TYPE 304 | O | |
| ROZ. RECKS (PIPS) | ASTM A 312 TP 304 | O | |
| ROZ. RECKS (PLATE) | ASTM A 240 TP 304 | O | |
| FLANGES | ASTM A 182 F 304 | O | |
| BOTTOM PLATES | ASTM A 240 TP 304 | O | |
| ROOF PLATES/PADS | ASTM A 240 TP 304 | O | |
| SHELL PLATES/PADS | ASTM A 240 TP 304 | O | |

| DESIGN DATA | |
|--------------------|---------------------|
| DESIGN CODE | API 650 |
| DESIGNER | TECNIMONT + BECHTEL |
| SCALE | +500/-50 mm H2O |
| OPERATING PRESSURE | ATM |
| TEMPERATURE | FULL OF WATER |
| INSULATION | |
| PAINT | |
| WIND SPEED | |
| SEISMIC | |
| FOUNDATION | |
| CONCRETE | |
| STEEL | |
| WELDING | |
| INSULATION | |
| PAINT | |
| FOUNDATION | |
| CONCRETE | |
| STEEL | |
| WELDING | |

| REVISION | DESCRIPTION OF CHANGE | DATE | DESIGN | CHECKED | APPROVED |
|----------|---|----------|--------|---------|----------|
| 3 | AS FINAL | 26SEP96 | Rene | ABD | ABD |
| 2 | VOID NOTICES ORIENTATION & PROJECTION RELEASED AS PER CLIENT COMMENTS | 31JULY96 | Rene | ABD | ABD |
| 1 | REVISED AS PER CLIENT COMMENTS | 29JULY96 | Rene | ABD | ABD |
| 0 | ISSUED FOR FABRICATION | 29JUN96 | Rene | RBU | ABD |
| C | REVISED AS PER CLIENT COMMENTS | 14JUN96 | Rene | RBU | ABD |
| B | For Approval | 31.03.96 | PGS | RBU | ABD |
| A | PRELIMINARY | 26.02.96 | PGS | RBU | ABD |

| REVISION | DESCRIPTION OF CHANGE | DATE | DESIGN | CHECKED | APPROVED |
|----------|---|----------|--------|---------|----------|
| 3 | AS FINAL | 26SEP96 | Rene | ABD | ABD |
| 2 | VOID NOTICES ORIENTATION & PROJECTION RELEASED AS PER CLIENT COMMENTS | 31JULY96 | Rene | ABD | ABD |
| 1 | REVISED AS PER CLIENT COMMENTS | 29JULY96 | Rene | ABD | ABD |
| 0 | ISSUED FOR FABRICATION | 29JUN96 | Rene | RBU | ABD |
| C | REVISED AS PER CLIENT COMMENTS | 14JUN96 | Rene | RBU | ABD |
| B | For Approval | 31.03.96 | PGS | RBU | ABD |
| A | PRELIMINARY | 26.02.96 | PGS | RBU | ABD |

CLIENT: DELIVERED 29 SEP 1996
 TECNIMONT

MANUFACTURER: AL ZAMIL HEAVY INDUSTRIES LTD.
 MAIN OFFICE: JEDDAH, TEL: 666 2411 (4 LINES) FAX: 666 2420
 P.O. BOX 10188 JEDDAH 21463 S.A. TEL: 965232 EXT. 51

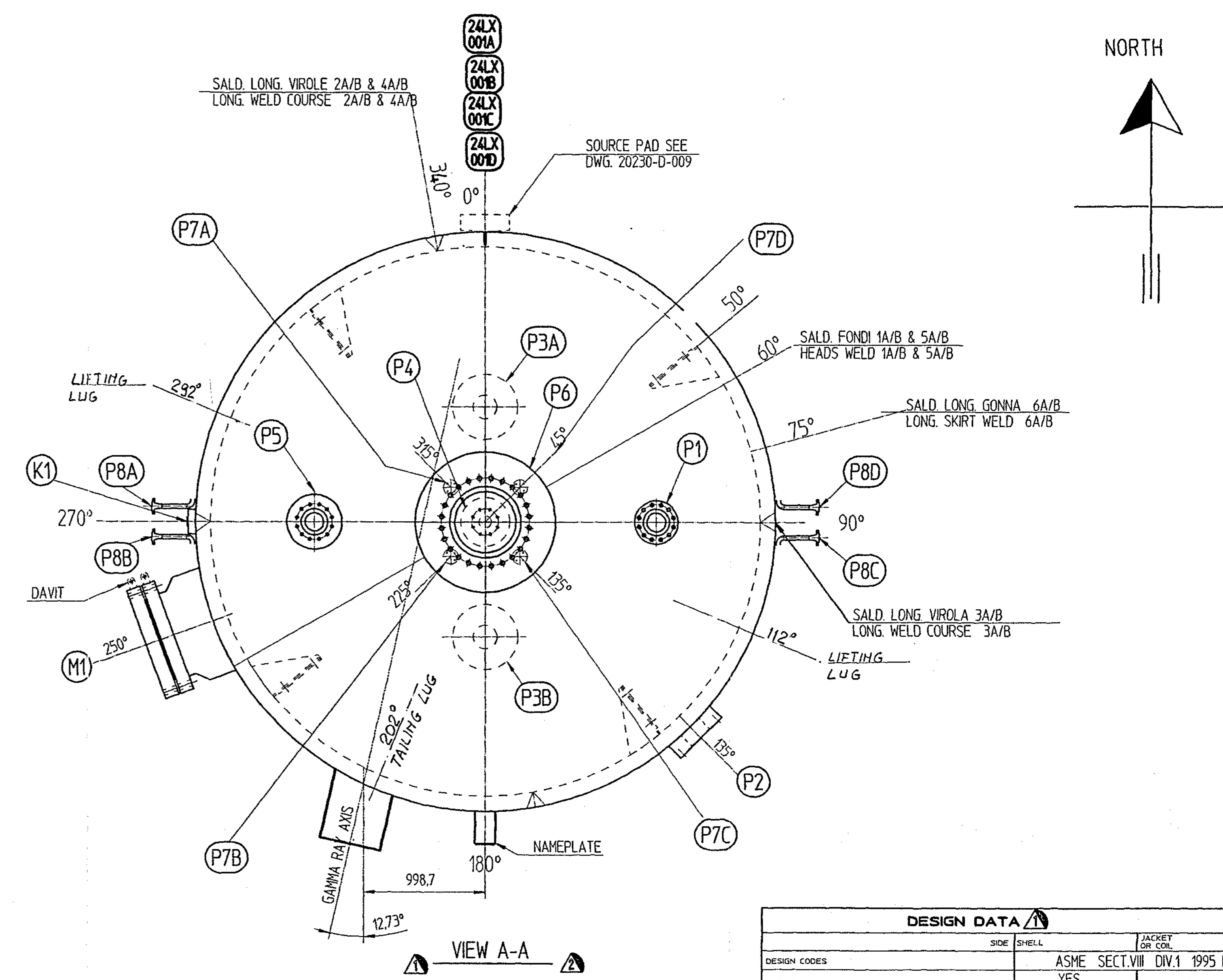
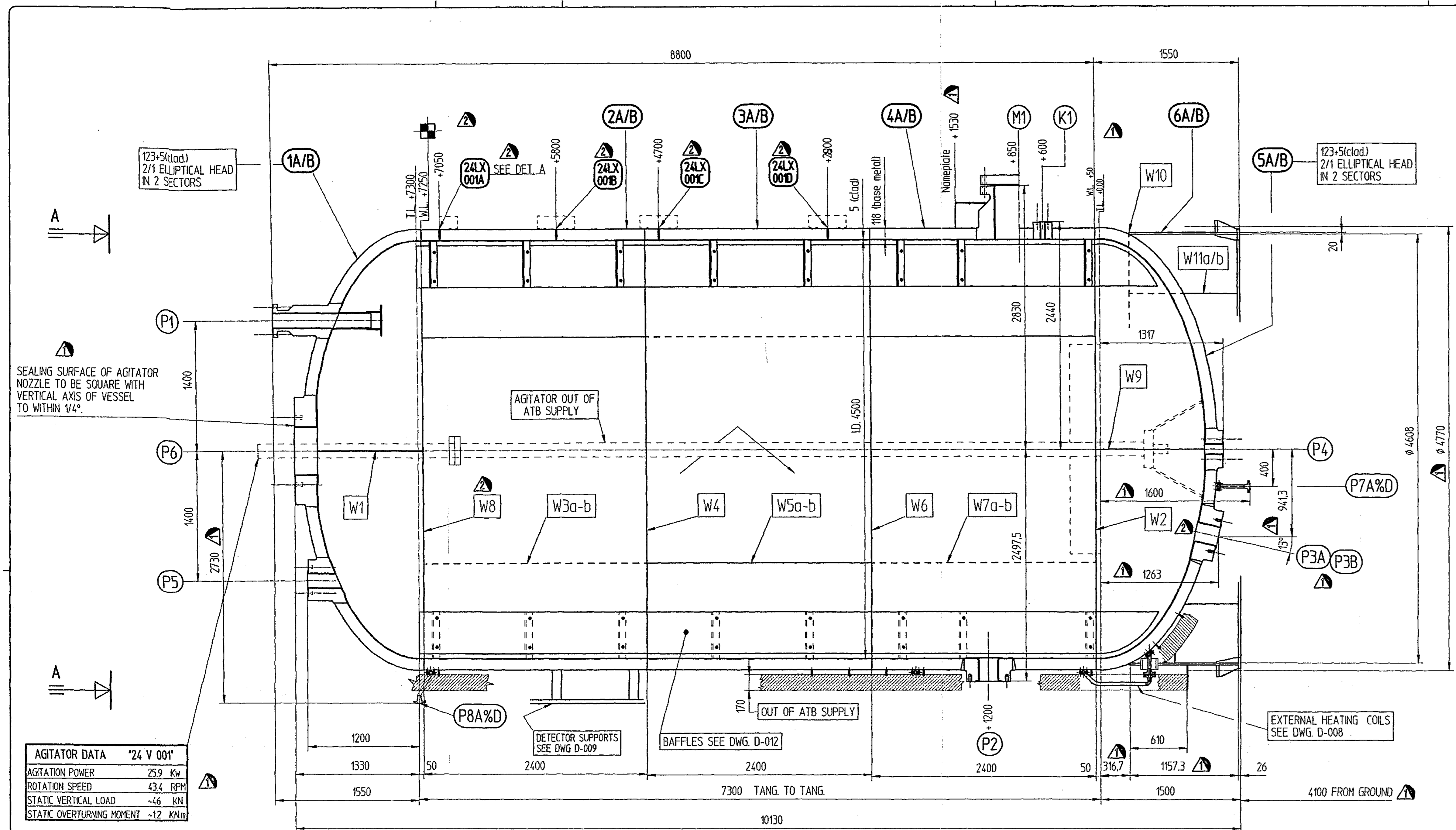
TITLE: GENERAL ARRANGEMENT
 PLANT DEMI. WATER TANK
 23F001

DESIGNED: RBU/PGS
 CHECKED: ABD
 APPROVED: ABD

CONTRACT No. (J.O.No.): P01-1064/95
 TOTAL CONSTRUCTION WEIGHT: -

SCALE: 1:40
 DRAWING No.: ZHI-1064-P01-0005-001
 SHEET: 3 OF 3
 SIZE: A1

VALID FOR FIELD ASSEMBLY



AGITATOR DATA "24 V 001"

| | |
|---------------------------|----------|
| AGITATION POWER | 259 Kw |
| ROTATION SPEED | 43.4 RPM |
| STATIC VERTICAL LOAD | -46 KN |
| STATIC OVERTURNING MOMENT | -12 KNM |

FONDI SEMIELLITTICI MARCA 1 & 5 IN DUE PEZZI
VIROLE MARCA 2A/B-3A/B-4A/B CON DUE SALDATURE LONGITUDINALI
GONNA MARCA 6A/B CON DUE SALDATURE LONGITUDINALI

SEMIHELLIP. HEAD ITEM 1 & 5 IN TWO PIECES
COURSES ITEM 2A/B-3A/B-4A/B WITH TWO LONGITUDINAL WELDS
SKIRT ITEM 6A/B WITH TWO LONGITUDINAL WELDS

SALDATURA DA ESEGUIRE PRESSO LO STABILIMENTO DI PORTO MARGHERA
WELD TO BE MADE AT PORTO MARGHERA SHOP.

- CONSTRUCTION NOTES - NOTE COSTRUTTIVE**
- 1- COSTRUIRE N° 1 REATTORIO
ONE REACTOR TO BE SUPPLIED.
 - 2- GLI SPessori INDICATI A DISEGNO SI INTENDONO MINIMI DOPO FORMATURA E LAVORAZIONE MECCANICA
THE THICKNESSES SHOWN ON DRAWING ARE MINIMUM AFTER FORMING AND MACHINING.
 - 3- TOLLERANZE - TOLERANCES - ASME CODE SECT. VIII DIV. 1 AND -
DUPONT SPEC NR 35 1 S
 - 4- QUALIFICA SALDATURE E SALDATORI IN ACCORDO AL CODICE ASME IX.
WELD AND WELDERS QUALIFICATION ACCORDING TO ASME IX.
 - 5- I FONDI SARANNO STAMPATI A CALDO E LE VIROLE CALANDRATE A FREDDO.
HEADS SHALL BE HOT FORMED AND COURSES SHALL BE COLD ROLLED.
 - 6- PER PROCEDIMENTI DI SALDATURA (W.P.S.) VED. WELDING DATA BOOK 20230-SA-01.
FOR WELDING PROCEDURE SPECIF. (W.P.S.) SEE WELDING DATA BOOK 20230-SA-01.
 - 7- ATB SERIAL NR. 18879

- GENERAL NOTES - NOTE GENERALI**
- 1- Tutte le sporgenze e le dimensioni delle flange sono riferite alla faccia di flangia.
All flange projections and dimensions are to flange face.
 - 2- Tutte le quote in chiaro sono assolute dalla Linea di Tangenza Inferiore (BTM.T.L.).
All elevations are measured from Bottom Tangent Line (BTM.T.L.).
 - 3- La posizione dei bocchelli in alzato e' schematica, per l'esatto orientamento attenersi solamente a quanto indicato nella VISTA "A-A".
Position of nozzles in elevation is schematic, for correct orientation see only VIEW "A-A".
 - 4- Tutti i fori delle flange e dei bocchelli e quelli per i bulloni di ancoraggio sono statosi rispetto agli assi principali del Vessel, salvo dove diversamente indicato.
All ball holes of flanges, nozzles and anchor bolts shall straddle natural centerlines, unless where shown otherwise.
 - 5- Flange per bocchelli secondo ANSI B16.5 tipo RF, salvo bocchello P24(F).
Flange for nozzles according to ANSI B16.5 type RF, unless nozzle P24(F).
 - 6- Finitura facce di flangia in accordo a quanto indicato nei Disegni ATB n° 20230-D-003 / 004 / 005.
Flange face finishing according to ATB Drawings n° 20230-D-003 / 004 / 005.
 - 7- Finiture Bulloni e Bulli in accordo ad ANSI B11.
Balls and Nuts thread according to ANSI B11.
 - 8- I bracci esteri saranno protetti con "MOLYCOTE".
External Stud Bolts shall be coated with "MOLYCOTE".
 - 9- Accessori interni:
a) I "baffles" saranno costruiti e montati all'interno della colonna da ATB prima della prova idraulica.
b) La superficie di tenuta del bocchello P6 dovrà essere manovale offese del vessel, max errore 1/4".
Internals:
a) Internal baffles shall be fabricated and installed inside the vessel by ATB before hydrotest.
b) Sealing surface of agitator nozzle P6 to be square with vertical axis of vessel to within 1/4".
 - 10- Accessori Esterni:
a) N° 1 Maschera di posizionamento per le mazzette di fondazione imballata e spedita in cantiere entro il 30/06/96
- External Filings:
a) One Base Ring Template shall be packed and shipped in field within 30/06/96
 - 11- Spedizioni:
a) Le superfici interne ed esterne del vessel dovranno essere pulite e libere da "grease, weld spatter, scale, slag" e da qualsiasi altra sostanza estranea. La pulizia interna non dovrà essere eseguita con sostanze contenenti cloruri.
b) Finitura superfice esterne: per sabbolatura, verniciatura e marcatura attenersi a quanto indicato nei Disegni di spedizione n° 20230-D-003.
c) Le superficie lavorate di macchina saranno protette con MOLYCOTE e RUST VELO 342.
d) Tutte le aperture non previste di capocchia saranno chiuse per la spedizione con coperchi metallici, guarnizione in neoprene e bulloni come indicato nel Disegno di spedizione.
e) Le parti da spedire sciolte sono elencate nel Disegno di spedizione.
f) Durante la spedizione il vessel sarà pressurizzato con AZOTO.
- Shipping:
a) Internal and external surfaces of Vessel shall be cleaned and free from grease, weld spatter, scale, slag and any other foreign matter. No cleaning agent containing chlorides will be used on austenitic stainless steel.
b) External surface finishing for sandblasting, painting and marking see Shipping Dwg. 20230-D-003.
c) All machined surfaces shall be coated with MOLYCOTE and/or RUST VELO 342.
d) All openings without cover shall be closed for shipping with steel cover, neoprene gasket and bolts, as per Shipping Drawing.
e) For loose parts see list on Shipping Drawing.
f) During the shipping vessel shall be pressurized with NITROGEN.
 - 12- al Guarnizione:
- n° 1 serie per prova idraulica e spedizione.
- n° 2 serie come scorta.
a) Bulloni esteri:
- n° 1 serie come indicato nel Dis. ATB n° 20230-D-002 per prova idraulica ed esercizio.
- 10% come parti di scorta.
- One set for Hydrotest and Shipping.
- Two sets for Spare.
b) External Bolts:
- One set as shown on ATB Dwg n° 20230-D-002 for Hydrotest and Service.
- 10% as spare parts.

- ELENCO PROCEDURE ATB APPLICABILI - LIST OF APPLICABLE PROCEDURES**
- | | |
|-----------------------|------------------------------|
| SPEC. N° 20230 PF. 05 | HOT FORMING OF HEAD. |
| SPEC. N° 20230 PF. 20 | HYDROTEST PROCEDURE. |
| SPEC. N° 20230 PC. 50 | R.T. EXAMINATION OF WELDS. |
| SPEC. N° 20230 PC. 55 | U.T. EXAMINATION OF WELDS. |
| SPEC. N° 20230 PC. 60 | BONDING PROCEDURE. |
| SPEC. N° 20230 PC. 70 | DYE PENETRANT EXAMINATION. |
| SPEC. N° 20230 PC. 77 | WELD PRODUCTION TEST PLATES. |
| SPEC. N° 20230 PF. 10 | PAINT PROCEDURE. |
| SPEC. N. 20230 PF. 25 | INT. CLEANING & PAINTING. |
| SPEC. N. 20230 PF. 30 | NITROGEN PRESS. PROCEDURE. |

MATERIALI - MATERIALS

| | |
|--|--|
| 11- Mantello - Shell | ASME SA 264 |
| Fondi - Heads | BASE METAL SA 516 N GR 70 CLADDING SA 240 TP 321 |
| 21- Bocchelli fucinati - Forged Nozzles | ASME SA 105 + 321 S.S. WELD DEPOSIT |
| 31- Gonna - Skirt | ASME SA 516 GR 60 |
| 41- Serpentina - Heating coil | ASME SA 106 GR B / SA 105 |
| 51- Anello di base gonna, Scatoie ancoraggio e Tailing Lug - Skirt Base Ring, Chairs and Tailing Lug | ASME SA 516 GR 60 (for equivalent) |
| 61- Interni (saldati) - Laniera - Internals (welded) - Plate | ASME SA 240 TP 321 |
| 71- Interni (non saldati) Internals (not welded) | ASME SA 240 TP 304L |
| 81- Accessori esterni - Laniera - External Fittings - Plate | ASME SA 516 GR 70 (welded to shell) |
| 91- Bulloni in pressione - Pressure Bolting | ASME SA 193 B77 SA 194-2H |
| 101- Bulloni interni - Internal Bolting | ASME SA 193-88 / SA 194-8 |
| 111- Guarnizioni in pressione - Pressure Gaskets | SPIRAL WOUND 321 SS / GRAPHITE WITH 321 S.S. INTERNAL RING AND CARBON STEEL EXT. RING. |
| 121- Guarnizioni serpentina - Coils Gaskets | SPIRAL WOUND 316 SS / GRAPHITE WITH 316 S.S. INTERNAL RING AND CARBON STEEL EXT. RING. |
| 131- Guarnizione bocchello P2 - Nozzle P2 Gasket | SPIRAL WOUND 321 SS / GRAPHITE WITH 321 S.S. INTERNAL RING. |

TOT. WEIGHT = 152872 Kg

| | | |
|----------------|---|------------------------------------|
| 2743 CD-MR-035 | 1 | MATERIAL REQUISITION |
| 2743 CD-DX-241 | 2 | TECNOMONT DRAWINGS |
| 2743 CD-001 | 3 | GENERAL FABRICATION REQUIREMENTS |
| 2743 YW-SG-001 | 3 | PAINTING SPECIFICATION |
| 2743 CD-001 | 3 | FIREPROOFING GENERAL SPECIFICATION |

| | | |
|-------------|---|--|
| 20230-D-013 | 1 | SHIPPING DRAWING |
| 20230-D-012 | 2 | INTERNAL DETAILS |
| 20230-D-011 | 2 | DAVITS FOR MANHOLES |
| 20230-D-010 | 1 | NAMEPLATE AND SUPPORT |
| 20230-D-009 | 0 | INSULATION SUPPORTS AND EXTERNAL DETAILS |
| 20230-D-008 | 0 | INSULATION SUPPORTS AND EXTERNAL DETAILS |
| 20230-D-007 | 1 | LIFTING TRUNNIONS |
| 20230-D-006 | 2 | SKIRT |
| 20230-D-005 | 1 | TEMPLATE |
| 20230-D-004 | 0 | INTERNAL RING |
| 20230-D-003 | 2 | NOZZLE DETAILS |
| 20230-D-002 | 2 | WELDING DETAILS (AND NO EXAMINATION) |
| 20230-D-001 | 2 | ASSEMBLY AND NOTES |

LIST OF CONNECTIONS

| ITEM | PIECES | ON | SERVICE | FLANGE | TYPE | FACING | OD. | TRK. | OD. | TRK. | NOZZLE | HEAT EXCH. |
|-------|--------|---------|------------------------|--------|------|--------|-------|-------|-----|------|--------|------------|
| P8A/D | 4 | 1" | HOT OIL OUTLET | 300# | WN | RF | 33.4 | 4.55 | --- | --- | --- | --- |
| P7A/D | 4 | 1" | HOT OIL INLET | 300# | WN | RF | 33.4 | 4.55 | --- | --- | --- | --- |
| P6 | 1 | 20" | AGITATOR MOUNT | 600# | PAD | RF | 150 | 312.5 | --- | --- | --- | --- |
| P5 | 1 | 6" | SPARE | 600# | PAD | RF | 450 | 142.5 | --- | --- | --- | --- |
| P4 | 1 | 100 ID | DRAIN | 600# | PAD | RF | 450 | 142.5 | --- | --- | --- | --- |
| P3A/B | 2 | 200 ID | SLURRY OUTLET | 600# | PAD | RF | 550 | 167.5 | --- | --- | --- | --- |
| P2 | 1 | 200 ID | FEED INLET | 900# | PAD | RF | 469.9 | 127.5 | --- | --- | --- | --- |
| P1 | 1 | 6" | VAPOURS OUTLET | 600# | LWN | RF | 325.6 | 156.6 | --- | --- | --- | --- |
| K1 | 1 | 14-1/2" | TEMPERATURE CONNECTION | 600# | PAD | RF | 200 | 72.5 | --- | --- | --- | --- |
| M1 | 1 | 3/8" | BY HERBY WEIR | 800 | RF | 800 | 172.5 | --- | --- | --- | --- | --- |

REV. No. DATE DESCRIPTION DRAWN UP CHECKED APPROVED

| | | | | | |
|---|-----------|---------------------------|--|--|--|
| 3 | 13 JAN 97 | FINAL ISSUE | | | |
| 2 | 20 JUN 96 | MODIFIED WHERE SHOWN WITH | | | |
| 1 | 15 APR 96 | MODIFIED WHERE SHOWN WITH | | | |
| 0 | 08 FEB 96 | FIRST ISSUE | | | |

SCALE: JOB No.

ARABIAN INDUSTRIAL FIBERS CO. IBN RUSHD
YANBU SAUDI ARABIA

IBN RUSHD PTA PLANT
YANBU SAUDI ARABIA
350000 MTY PTA PLANT

DESIGN DATA

| | |
|-----------------------|-----------------------------------|
| DESIGN CODES | ASME SECT VIII DIV 1 1995 EDITION |
| CODE "U" STAMP | YES |
| INSPECTION AUTHORITY | ASME INSP/CLIENT |
| DESIGN | 60 / FULL VACUUM |
| OPERATING | 48.7 |
| EXTERNAL | --- |
| HYDROTEST IN | 91 |
| HYDROTEST IN | 91 |
| PNEUMATIC TEST | --- |
| M.A.P. (NEW AND COLD) | 60.4 |
| M.A.P. (HOT AND COLD) | 60.4 |
| DESIGN | 280 / 100 FOR F.V. |
| OPERATING | 261 |

FLUID

| | |
|---------------------|---------------------|
| TEMPERATURE | 8 °C AT 60 mm W.P. |
| CORROSION ALLOWANCE | ALL 321 S.S. LINING |
| TYPE | PTA - WATER |
| PHYSICAL STATE | LIQUID |
| SPECIFIC GRAVITY | 891 |
| CAPACITY | -140 |

LOADS AT BASE

| | |
|------------|------|
| OPERATING | 3404 |
| HYDROTEST | 3561 |
| EARTHQUAKE | 3404 |

INSULATION

| | |
|---------|-------------------------|
| TYPICAL | CELLULAR GLASS / 170 MM |
|---------|-------------------------|

WIND PRESSURE

| | |
|---------------------------|-------------------------|
| SEE BECHTEL SPEC 22854-SP | ASCE 7-88 "EXPOSURE C" |
| SEISMIC ZONE | 1000-M-001 Rev 2 PARA 4 |
| POSTWELD HEAT TREATMENT | YES NONE 131 |
| RADIOGRAPHY | 100% 100% 141 |

ATB Caldereria s.p.a. BRESCIA ITALIA

IBN RUSHD TECNIMONT 20230

24 D 001
FIRST PTA CRYSTALLIZER

INSIEME E NOTE - ASSEMBLY AND NOTES

DEGRADO A.G. APPROVATO F. PERINI

SCALE: 1:25

REVISIONI:

| REV. | DATE | DESCRIPTION | APPROVED | DATE |
|------|----------|-----------------------|----------|-----------|
| 1 | 14/11/96 | ISSUED AS FINAL | ARRIGHI | F. PERINI |
| 2 | 19/06/96 | REISSUED FOR APPROVAL | ARRIGHI | F. PERINI |
| 3 | 15/04/96 | REISSUED FOR APPROVAL | ARRIGHI | F. PERINI |
| 4 | 08/02/96 | ISSUED FOR APPROVAL | ARRIGHI | F. PERINI |

ASME STAMP U
Pressure vessel Div. 1

ATB Caldereria s.p.a. BRESCIA ITALIA

TECNIMONT

IBN RUSHD

24 D 001

FIRST PTA CRYSTALLIZER

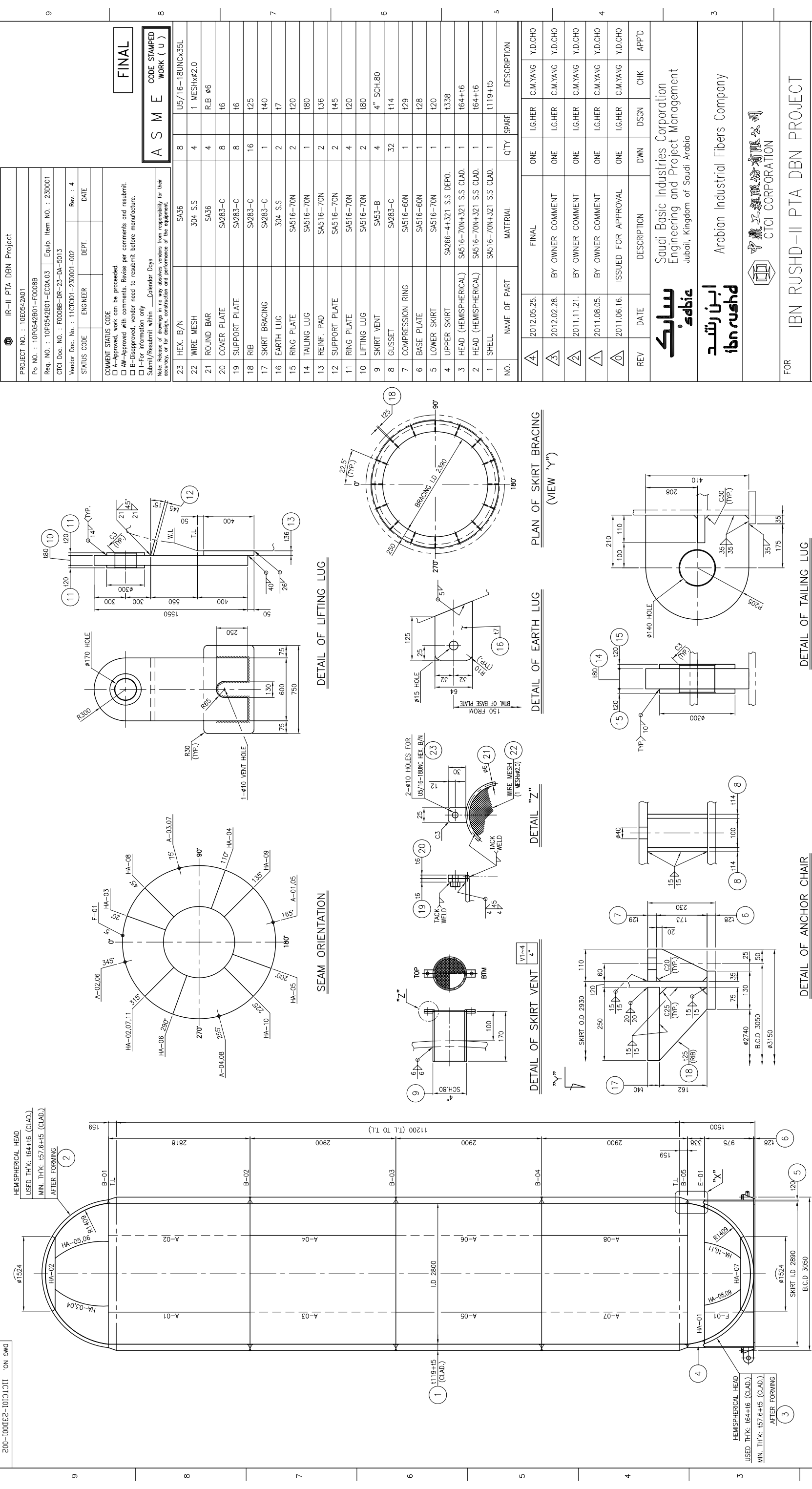
SCALE: 1:25

REV. 1

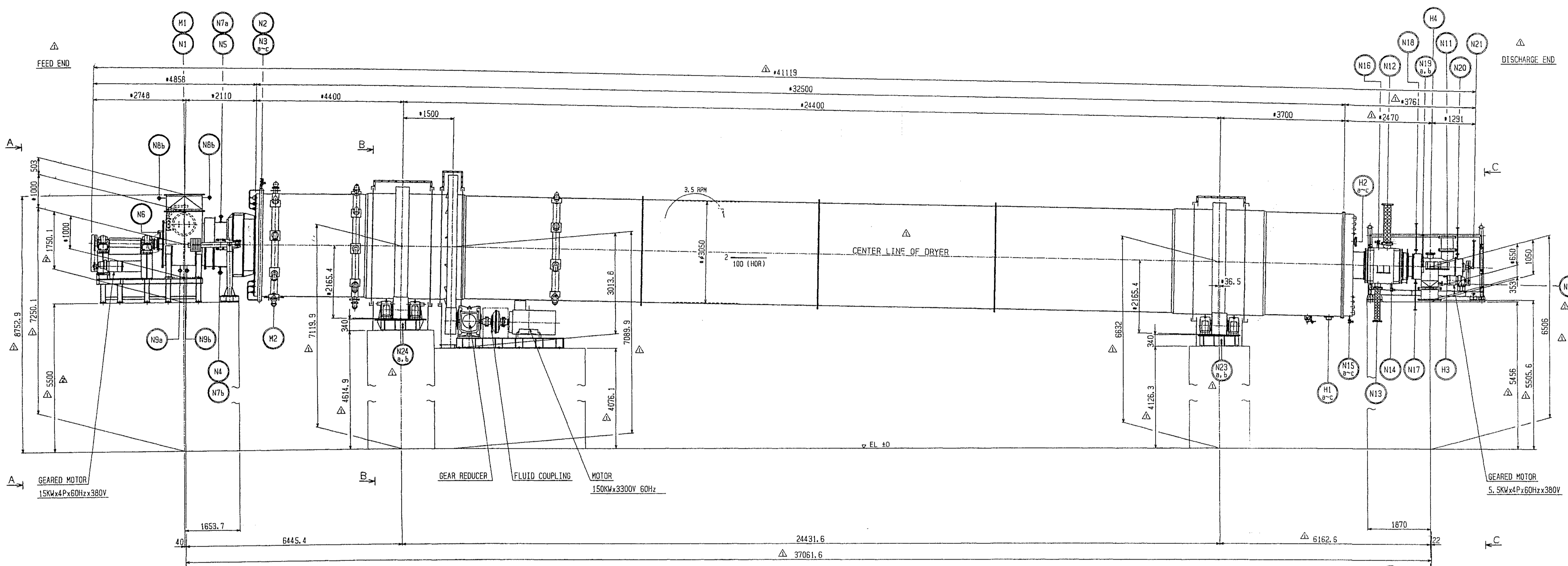
DATE: 08-02-96

DATE: 01/11/96

200-1000022-10101311 ON SWG

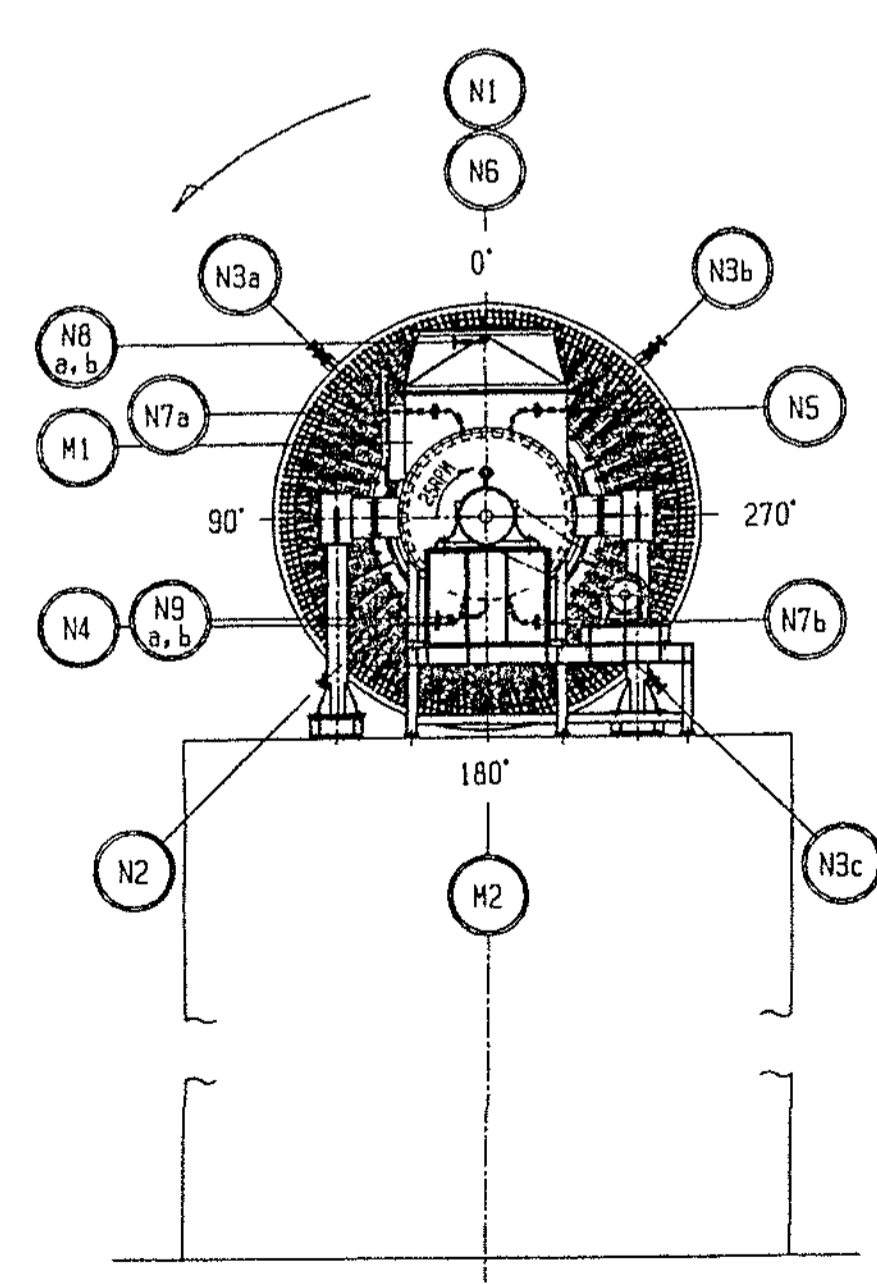


| | | | | |
|--|----------------------|--------------------------|------|--------------------------|
| PROJECT NO. : 10E0542A01 | | IR-II PTA DBN Project | | |
| Po No. : 10P0542B01-F0008B | | Equip. Item No. : 23D001 | | |
| CTCI Doc. No. : F0008B-DR-23-DA-5013 | | Rev. : 4 | | |
| Vendor Doc. No. : 11CTCI01-23D001-002 | | DEPT. | | |
| STATUS CODE | | ENGINEER | | |
| DATE | | DATE | | |
| <p>COMMENT STATUS CODE</p> <p><input type="checkbox"/> A-Approved, work can be proceeded.</p> <p><input type="checkbox"/> AW-Approved with comments. Revise per comments and resubmit.</p> <p><input type="checkbox"/> B-Disapproved, vendor need to resubmit before manufacture.</p> <p><input type="checkbox"/> I-For information only</p> <p>Submit/Resubmit within _____ Calendar Days</p> <p>Note: Release of drawings in no way absolves vendors from responsibility for their accuracy, or for design, construction and performance of the equipment.</p> | | | | |
| 23 | HEX. B/N | SA36 | 8 | U5/16-18UNCX35L |
| 22 | WIRE MESH | 304 S.S | 4 | 1 MESH#2.0 |
| 21 | ROUND BAR | SA36 | 4 | R.B #6 |
| 20 | COVER PLATE | SA283-C | 8 | 16 |
| 19 | SUPPORT PLATE | SA283-C | 8 | 16 |
| 18 | RIB | SA283-C | 16 | 125 |
| 17 | SKIRT BRACING | SA283-C | 1 | 140 |
| 16 | EARTH LUG | 304 S.S | 2 | 17 |
| 15 | RING PLATE | SA516-70N | 2 | 120 |
| 14 | TAILING LUG | SA516-70N | 1 | 180 |
| 13 | REINF. PAD | SA516-70N | 2 | 136 |
| 12 | SUPPORT PLATE | SA516-70N | 2 | 145 |
| 11 | RING PLATE | SA516-70N | 4 | 120 |
| 10 | LIFTING LUG | SA516-70N | 2 | 180 |
| 9 | SKIRT VENT | SA63-B | 4 | 4" SCH.80 |
| 8 | GUSSET | SA283-C | 32 | 114 |
| 7 | COMPRESSION RING | SA516-60N | 1 | 129 |
| 6 | BASE PLATE | SA516-60N | 1 | 128 |
| 5 | LOWER SKIRT | SA516-70N | 1 | 120 |
| 4 | UPPER SKIRT | SA266-4+321 S.S DEPO. | 1 | 1338 |
| 3 | HEAD (HEMISPHERICAL) | SA516-70N+321 S.S CLAD. | 1 | 164+16 |
| 2 | HEAD (HEMISPHERICAL) | SA516-70N+321 S.S CLAD. | 1 | 164+16 |
| 1 | SHELL | SA516-70N+321 S.S CLAD. | 1 | 1119+15 |
| NO. | NAME OF PART | MATERIAL | Q'TY | DESCRIPTION |
| 4 | 2012.05.25. | FINAL | ONE | I.G.HER C.M.YANG Y.D.CHO |
| 3 | 2012.02.28. | BY OWNER COMMENT | ONE | I.G.HER C.M.YANG Y.D.CHO |
| 2 | 2011.11.21. | BY OWNER COMMENT | ONE | I.G.HER C.M.YANG Y.D.CHO |
| 1 | 2011.08.05. | BY OWNER COMMENT | ONE | I.G.HER C.M.YANG Y.D.CHO |
| 0 | 2011.06.16. | ISSUED FOR APPROVAL | ONE | I.G.HER C.M.YANG Y.D.CHO |
| REV | DATE | DESCRIPTION | DWN | DSGN CHK APP'D |
| <p>سابك ابن رشيد ibn rushd</p> <p>Saudi Basic Industries Corporation Engineering and Project Management Jubail, Kingdom of Saudi Arabia</p> <p>Arabian Industrial Fibers Company شركة ابي رشيد للصناعات النسيجية CICI CORPORATION</p> | | | | |
| FOR IBN RUSHD-II PTA DBN PROJECT | | | | |
| TITLE 23D001 | | | | |
| HYDROGENATION REACTOR DETAIL OF BODY | | | | |
| CERTIFIED FOR CONSTRUCTION | DWG. | DSGN. | CHK. | APPR. |
| BY | DATE | DATE | DATE | DATE |
| IR PROJ NO. | IR DRAWING NO. | | | |
| CTCI PROJ NO. | CTCI DRAWING NO. | | | |
| 10E0542A01 | F0008B-DR-23-DA-5013 | | | |
| TSM TSM TECH CO., LTD. | | | | |
| CAD FILE NAME | 11CTCI01-23D001-002 | | | DWG. SIZE |
| | | | | SCALE |
| | | | | NONE |

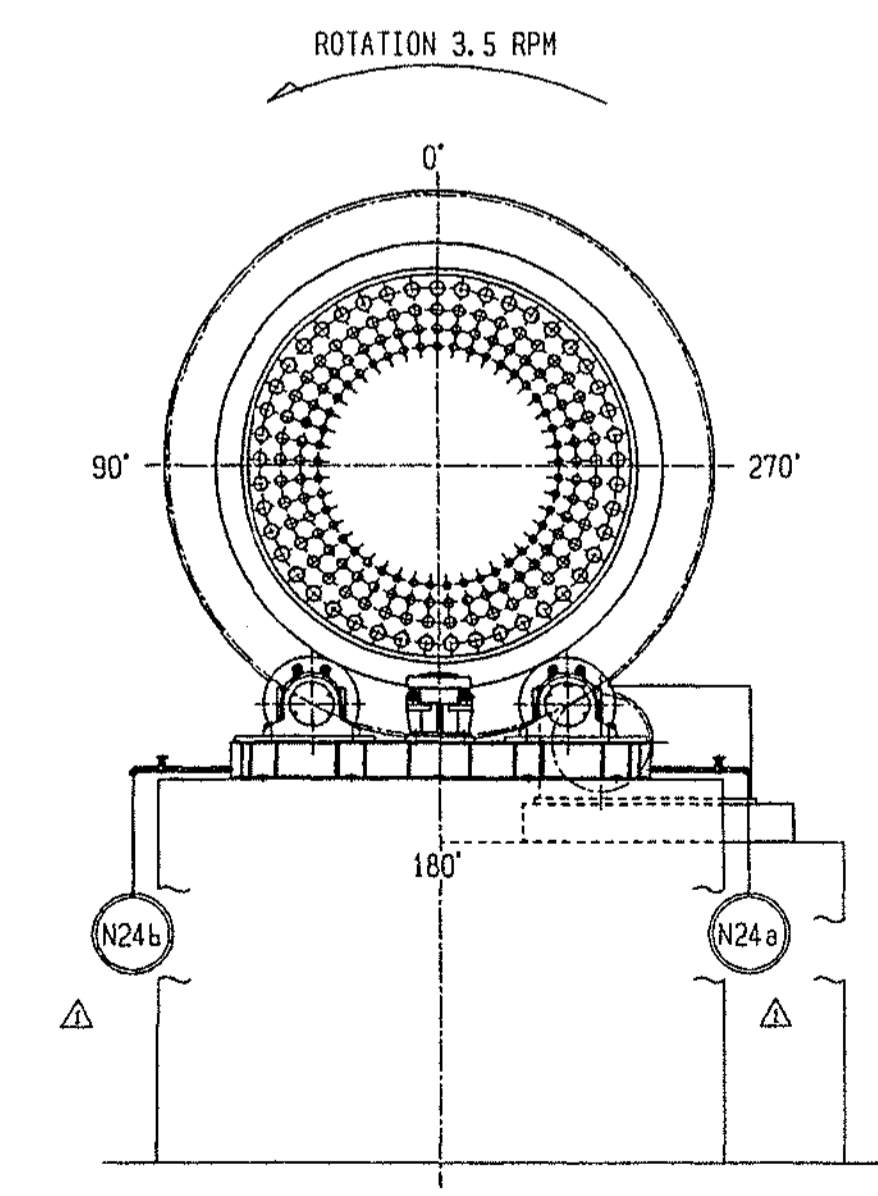


DATUM LINE (FOR N1)

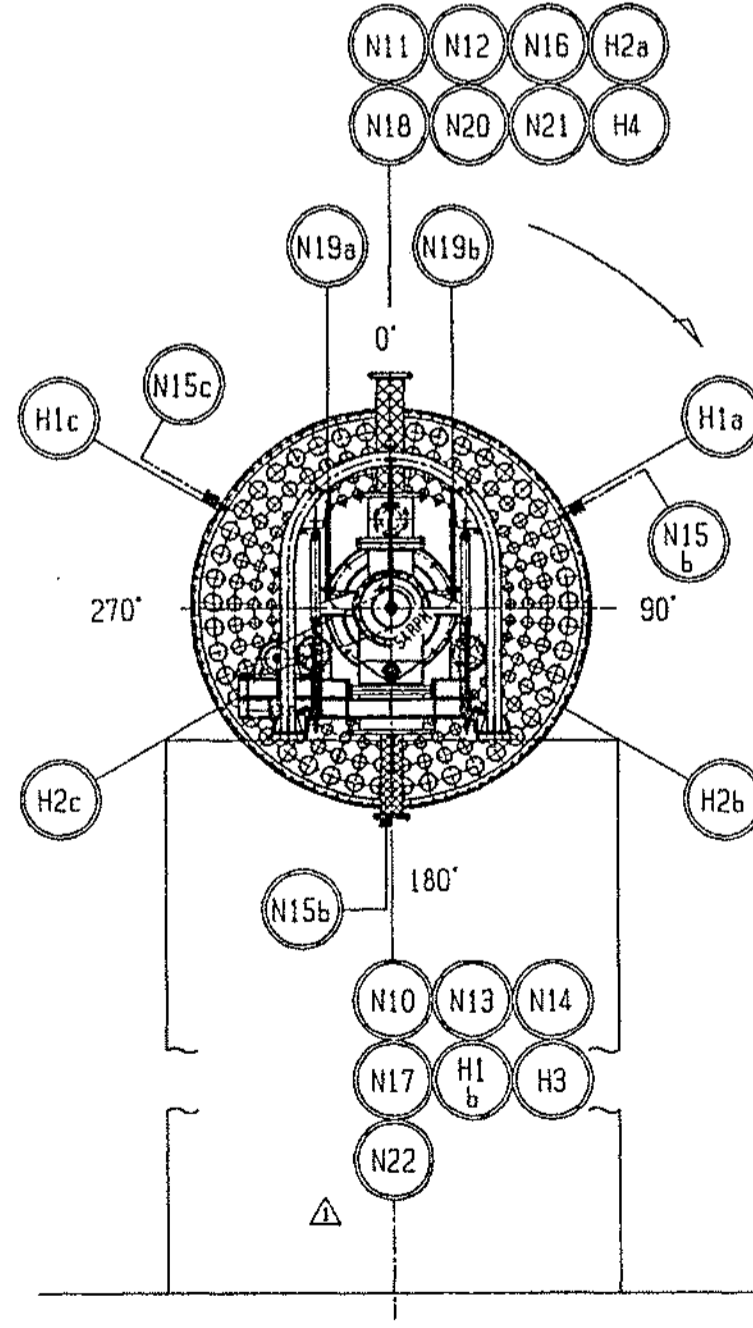
DATUM LINE (FOR CARRIER MACHINE)



VIEW AA



SECTION BB



VIEW CC

| NO. | SIZE | SERVICE | QUANT | REMARKS |
|---------|--------|-----------------------------|-------|----------------|
| H4 | 6" | HAND HOLE | 1 | ANSI 150RF |
| H3 | #100 | HAND HOLE (WITH CORE) | 1 | ANSI 150RF |
| H2a-c | 6" | HAND HOLE | 3 | ANSI 150RF |
| H1a-c | #200 | HAND HOLE (WITH CORE) | 3 | ANSI 150RF |
| M2 | #500 | MAN HOLE (WITH CORE) | 1 | |
| M1 | #500 | MAN HOLE (WITH CORE) | 1 | |
| N24a, b | 1" | DRAIN (THRUST BASE) | 2 | PT 1 |
| N23a, b | 1" | DRAIN (FREE BASE) | 2 | PT 1 |
| N22 | 1 1/2" | THERMO NOZZLE | 1 | ANSI 150RF |
| N21 | 3/4" | N ₂ GAS INLET | 1 | ANSI 150RF |
| N20 | 3/4" | N ₂ GAS INLET | 1 | ANSI 150RF |
| N19a, b | 3/4" | N ₂ GAS INLET | 2 | ANSI 150RF |
| N18 | 3/4" | COOLING WATER OUTLET | 1 | ANSI 150RF |
| N17 | 3/4" | COOLING WATER INLET | 1 | ANSI 150RF |
| N16 | 1/2" | MANUAL AIR VENT | 1 | ANSI 150RF |
| N15a-c | 1/2" | DRAIN OUTLET | 3 | ANSI 150RF |
| N14 | 1/2" | DRAIN OUTLET | 1 | ANSI 150RF |
| N13 | 6" | CONDENSATE | 1 | ANSI 150RF |
| N12 | 6" | STEAM INLET | 1 | ANSI 150RF |
| N11 | 14" | CARRIER GAS INLET | 1 | ANSI 150RF |
| N10 | 20" | MATERIAL OUTLET | 1 | ANSI 150RF |
| N9a, b | 3/4" | CONDENSATE | 2 | ANSI 150RF |
| N8a, b | 3/4" | STEAM INLET | 2 | ANSI 150RF |
| N7a, b | 1" | N ₂ GAS INLET | 2 | ANSI 150RF |
| N6 | 3/4" | N ₂ GAS INLET | 1 | ANSI 150RF |
| N5 | 3/4" | COOLING WATER OUTLET | 1 | ANSI 150RF |
| N4 | 3/4" | COOLING WATER INLET | 1 | ANSI 150RF |
| N3a-c | 1/2" | AUTOMATIC AIR VENT | 3 | ANSI 150RF |
| N2 | 1/2" | MANUAL AIR VENT | 1 | ANSI 150RF |
| N1 | #1070 | MATERIAL INLET (GAS OUTLET) | 1 | SEE DWG 560901 |

NOZZLE LIST



NOTE
1). DIMENSIONS WITH *MARK SHOW ONES MEASURED IN PARALLEL OR VERTICAL TO THE DRYER CENTER LINE.

| NO. | DATE | DESCRIPTION | APP'R | CHK'D | DRAWN |
|-----|-------------|---------------------------|-------|-------|-------|
| △ | AUG. 1 '96 | REVISED AS MARK | MS | | TK |
| △ | MAY. 22 '96 | REVISED AS MARK | N.S | K.K | T.K |
| △ | DEC. 28 '95 | NEW DRAWING FOR TECNIMONT | | | |

NO. 1

| | | | | | |
|---------|------------|-----|----------|-----|---------------------------|
| 690AA2 | P95111-012 | AA | 1 | 1 | 1 |
| 工事番号 | 560900 | 製作者 | 月島機械株式会社 | 製作者 | TSUKISHIMAKIKAI CO., LTD. |
| JOB NO. | | 製作者 | | 製作者 | |

| 部番 | 名 | 材質 | 数量 | 備考 |
|-------------|--------------------------|------------|----------|-------------|
| 承認 | 審査 | 審査 | 作製 | 日付 |
| APPR'D BY | CHECKED BY | CHECKED BY | DRAWN BY | DATE |
| M. Sekido | K. Koike | T. Koike | T. Kato | DEC. 28 '95 |
| 図面名称 | 24V020 (24V025, 24V026) | | | |
| TITLE | PTA DRYER (#3050x32500L) | | | |
| | GENERAL ASSEMBLY | | | |
| 納先 | TECNIMONT (FOR SABIC) | | | |
| FOR | | | | |
| 図番 | 560900 | | | |
| DRAWING NO. | | | | |

ZONE 8

MATERIALS

NOZZLES

DESIGN DATA

| COMPONENTS | MATERIALS SPECIFICATIONS |
|-------------------------|----------------------------------|
| PLATES | |
| 1 SHELLS | SA 240 304L (G5) |
| HEADS | SA 240 304L (G5) |
| 4 NOZZLE FROM PLATE | SA 240 304L |
| 5 REINFORCING PADS | SA 240 304L |
| 6 SUPPORT SADDLES | SA 285 GR C |
| 7 TRANSITION PLATE | SA 240 304L |
| 9 INTERNALS | AISI 304 L |
| 10 INTERNAL SUPPORTS | AISI 304 L |
| 11 PLATF.&LADDERS SUPP. | SA 240 304L + SA 285 C |
| PIPES | |
| NOZZLES FROM PIPE | SA 312 TP304L (smls) |
| INTERNAL PIPES | SA 312 TP304L (smls) |
| FORGINGS | |
| 1 FL. & BLIND | SA 182 F304L |
| BOLTING | |
| 1 INT. STUD B. & NUTS | - |
| 2 EXT. STUD B. & NUTS | A 193 B7/A 194 2H |
| SHAPES | |
| 3 INSULATION SUPPORTS | SA 240 304L + SA 285 C |
| GASKETS | |
| 1 EXT. GASKETS | GFP (GLASS FIBRE FILLED PTFE) |
| 2 INT. GASKETS | - |
| NOTES | |
| FLANGE FINISHING | 6.4-12.5 MICROMETERS Ra(ISO 468) |
| TREATMENTS | |
| RADIOGRAPHY | SPOT |
| STRESS RELIEVING | NOT REQ'D |
| DIMENSIONS | |
| PIPES | ASME B36.19M |
| FLANGES | ANSI B16.5 |
| FITTINGS | ANSI B16.9 |
| THREADS | ASME B1.1 CLASS 2A OR 2B |
| GASKETS | API 601 |

| MARK | N.D. | FLANGES | | | THK. | R.PAD | PROJ. | OR. | ECC. | SERVICE | NOTES |
|------|------|---------|------|------|------|---------|---------|-----|------|------------------------|------------------|
| | in | RATING | TYPE | FAC. | mm | D.xTHK. | FM CL | mm | mm | | |
| N1 | 1.5" | 150 | LWN | RF | - | - | 1575 | - | - | BUTYL ACETATE MAKE-UP | |
| N2 | 3" | 150 | WN | RF | 5.4 | 190x8 | 1575 | - | - | LIQUID OUTLET | |
| N3 | 1.5" | 150 | LWN | RF | - | - | 1575 | - | - | LIQUID INLET | |
| N4 | 6" | 150 | WN | RF | 7.1 | 270x8 | 1575 | - | - | VENT | |
| N5 | 1" | 150 | LWN | RF | - | - | SEE DWG | - | - | UTILITY CONNECTION | |
| L1A | 3" | 150 | WN | RF | 5.4 | 190x8 | 1575 | - | - | LEVEL BRIDLE | |
| L1B | 3" | 150 | WN | RF | 5.4 | 190x8 | 1575 | - | - | LEVEL BRIDLE | |
| T1 | 1.5" | 150 | LWN | RF | - | - | SEE DWG | - | - | TEMPERATURE CONNECTION | |
| M1 | 24" | 150 | WN | RF | 8.0 | 930x8 | SEE DWG | - | - | MANWAY | Bl.flange, Davit |

| | |
|-----------------------|-------------------------------------|
| CALCULAT. CODES | ASME VIII DIV.1 LAST EDIT. (NOTE 7) |
| ALLOW.STRESSES | ASME VIII DIV.1 LAST EDIT. |
| INSPECTION | SEE MR |
| SPECIFICATIONS | SEE MR |
| WIND/EARTHQUAKE | SEE JSD 0400.01 /SEE JSD 0400.01 |
| TYPE OF TEST | HYDRAULIC |
| POSITION IN TEST | HORIZONTAL |
| FLUID | (10) |
| HAZARD CONSIDERATIONS | FLAMMABLE/TOXIC |
| FLUID DENSITY | 815/890 Kg/m3 |

| No. | ELEMENT | PRESSURE Bars g (1) (2) | | | TEMPERATURE °C | | | EFF. | CORR |
|-----|---------|-------------------------|------|------|----------------|------|------|------|------|
| | | DESIGN | TEST | Ext. | DESIGN | TEST | Ext. | | |
| 1 | HEAD | 5.0 | - | F.V. | 105 | - | 105 | .85 | - |
| 2 | SHELL | 5.0 | - | F.V. | 105 | - | 105 | .85 | - |
| 3 | HEAD | 5.0 | - | F.V. | 105 | - | 105 | .85 | - |

GENERAL NOTES

- The static pressure of the contents shall be added to this pressure.
- This vessel is subject to steamout of 120°C. and 0.5 bar g. (0.5 F.V.)
- All dimensions are in mm (unless otherwise specified)
- The indicated thicknesses are the minimum acceptable after construction.
- Nozzles projections referred from vessel centerline to flange contact face.
- Nozzles flange stud bolts holes straddle C.L.
- ASME "U" stamp is not req'd.
- Reinforcing plates shall be provided with 1/4 inch NPT diameter tell tale holes, to be filled with grease.
- All instrument nozzles sizes and location are hold.
- 90-100% butyl acetate, 0-10% water and acetic acid.

WEIGHTS & LOADING DATA

| | ERECT. | TEST | OPERAT. |
|--------------------|---------------|----------|----------------|
| WEIGHTS Kgf | 6380 | 57340 | 49320 |
| EART.VERT.LOADS N | - | - | - |
| SHEAR | - | - | - |
| LG.WIND/EARTH. N | 8160 / 9180 | 1632 / - | 8872 / 77806 |
| TV.WIND/EARTH. N | 18152 / 9180 | 3671 / - | 28145 / 86780 |
| MOMENT | - | - | - |
| LG.WIND/EARTH. N.m | 12645 / 14380 | 2550 / - | 13971 / 122062 |
| TV.WIND/EARTH. N.m | 28451 / 14380 | 5711 / - | 44053 / 136135 |

REFERENCE STANDARDS

| | |
|--------------------|--|
| Q01-E15 | VESSEL LIFTING LUGS: TWO PLATE TYPE |
| Q01-F01 | PRESSURE VESSELS: WELDING AND FABRICATION |
| Q01-F07 | PRESSURE VESSELS - FABRICATION |
| Q01-F13 | STEEL SADDLES SUPPORTS FOR HORIZONTAL VESSELS |
| Q01-F15 | VESSELS: NAME PLATE AND STAMPING |
| Q01-F17 | GRAB RUNGS AND STEPS FOR MANWAYS |
| Q01-F18 | VORTEX BREAKER |
| Q01-F20 | DAVIT FOR OUTDOOR MANHOLE COVERS |
| Q01-F21 | VESSELS: PIPE GUIDE |
| Q01-F22 | PRESSURE VESSELS: PIPE SUPPORT |
| Q01-F23/VEVF 1123 | VESSELS: INSULATION AND FIRE PROOFING SUPPORT |
| Q01-F25 | VESSELS: GROUNDING AND LUG DETAILS |
| Q01-F28 | ALLOWABLE FABRICATION TOLERANCES HORIZONTAL AND VERTICAL PRESSURE VESSEL |
| Q01-F37 | AUSTENITIC AND H.A. STEEL PRESS. VESSEL: FABRICATION |
| Q01-T02 | INSPECTION REQUIREMENTS FOR PRESSURE VESSELS |
| W01-F01 | WELDING AND INSPECTION |
| 22854-SP-000-X-002 | SHOP AND FIELD PAINTING |
| SZ5D | RECOMMENDED COATING SYSTEMS FOR EXTERNAL PROTECTION |
| 1000.00.ST.0800.01 | NAME PLATE |
| Q01-E01 | PRESSURE VESSELS - GENERAL |
| Q01-E14 | HORIZONTAL VESSEL ON TWO SADDLE: DESIGN |
| Q01-T01 | TESTING AND INSPECTION - PRESSURE VESSELS |
| Q01-T06 | PRESSURE VESSELS MATERIAL CONTROL PROGRAM |
| Q01-T07 | MATERIALS IDENTIFICATION PROGRAM |

| | | | |
|------------------------|--|---------------------------|--|
| OPERATION | | NORM 47/MAX 85/MIN 9 | |
| MAX OPER. STATIC HEAD | | FULL m | |
| TOTAL VOLUME | | 48.45 m3 | |
| EMPTY WEIGHT | | 6380 Kgf | |
| REMOV. INTERNAL WEIGHT | | - Kgf | |
| TRAYS WEIGHT | | - Kgf | |
| PACKING WEIGHT | | - Kgf | |
| EXTERNAL SURFACE | | 82 m2 (SUPPORTS EXCLUDED) | |

LINING & PAINTING DATA

| | TYPE | THK. mm | SURF. m2 |
|-------------------------|---------------------|---------|----------|
| INSULATION 1 | P.P. | 40 | 83 |
| INSULATION 2 | - | - | - |
| EXT. PAINTING | SEE REFER. STANDARD | - | - |
| INT. COATING | - | - | - |
| FIRE PROOFING | - | - | - |
| SURF. PREPAR. INT./EXT. | SEE REFER. STANDARD | - | - |

TECHNIP-COFLEXIP



SABIC ACETIC ACID PLANT
IBN RUSHD SITE - YANBU - KINGDOM OF SAUDI ARABIA

| | |
|-------------|---|
| XXXX Status | ITEM : 100-D252 |
| | SERVICE : ENTRAINER HOLDING DRUM |
| CAD model | |
| Scale | 2121 05 DW 0811 - 02 1 of 2 1 |
| Project | Unit Type of doc. Code & progressive Sheet Rev. |

REVISIONS

| REV | DATE | DESCRIPTION | PREP.D | CHKD | APPD. | AUT.D |
|-----|------------|---------------------------------------|---------|-------|-------|-------|
| 0 | 30-09-2002 | ISSUED FOR PURCHASE TO M.I.S. | DE LUCA | MERET | IORIO | TILU |
| B | 04-07-2002 | REVISED AS SHOWN-REISSUED FOR INQUIRY | DE LUCA | MERET | IORIO | TILU |
| 1 | 25-11-2002 | REVISED AS SHOWN | DE LUCA | MERET | IORIO | TILU |

I will safeguard its rights according to the civil and penal provisions of the law.

GENERAL NOTES

- All dimensions are in mm (unless otherwise specified)
- Indicated values refer to one apparatus only.
- The indicated thicknesses are the minimum acceptable after construction.
- Nozzles projections referred from reactor centerline to flange contact face.
- Nozzles flange stud bolts faces straddle C.L.
- Nozzles flange contact faces finishing shall be: 3.2 TO 6.3 micrometers Ra (ISO468)
- ASME "U" stamp req'd.
the side is subject to steamout at 120°C. and 0.5 barg
shell side to be raised to 120°C. before steamout)
- Tubes shall be verified at ext. pressure of 67.0 barg at 315°C.
- Vendor shall verify and modify projections in order to dismount bolts from back side of flanges.
- Clad plate according to SA 264
- Pipe fittings shall be the same size and thickness as the attached pipe, elbows and bends shall be long radius type unless otherwise noted.
- All stainless steel welds (including heat effect zones) shall be dye penetrant inspected.
- tube to lower tubesheet joint to be straight welded to tubesheet and tested in accordance with fig.2a of EEMUA 143 or equivalent.
Tube to upper tubesheet joint to have an equivalent integrity welded joint as the lower but the joint is to form a smooth contour to allow complete drainage of top channel.
Tube to tubesheet joints to be lightly expanded after welding.
- Tube holes in tubesheets to be TEMA special close fit.
- A detailed tube-hole layout shall be produced by the equipment supplier, who shall confirm the vessel diameter on the basis of the tube-hole layout.
- Tubesheet details shown on the attached sheets are typical only, alternative arrangements may be acceptable. The equipment supplier shall carry out a detailed analysis to confirm the integrity of the chosen arrangement.
Design shall consider: A) Design-life pressure and temperature cycles agreed between Detailed engineering contractor and Supplier.
B) Pressure drop through the catalyst tubes.
C) The worst combination of pressure/no pressure on either side of tubesheet.
- Water inlets (A to H) and steam outlets (A to H) are to be equi spaced around the shell circumference.
- The following data shall be used in the equipment and catalyst support device design:
-Catalyst density: 1460 - 1550 Kg/m³
-catalyst size: 3.175mm x 3.175mm (cylindrical)
-Design pressure drop through catalyst: 8.0 Bar (downwards).
Top of tubes are to be filled with 6mm diameter inert balls.
Vendor shall include details of proposed catalyst support. Vendor to supply catalyst support plus 5% spare and include any necessary insertion / removal tools.
Vendor shall perform a pullout test on 3 sample catalyst support using a section of production tube prior to manufacture of the remaining catalyst support. test load on spring to be 100 Kg minimum.
- Tubeside process gas at inlet is as follows (mol%):
Normal operation- 48.5% C₂H₆; 20.3% CH₄; 18.3% N₂; 5.1% CO₂; 5% O₂; 1.5% C₂H₄; 0.8% H₂O
0.2% C₃H₈; 0.2% Ar.; 0.1% impurities.
Start-up/Shutdown- Nitrogen
- The equipment operating conditions are the following:
Case 1 SOR 43.2 barg at 255 °C 33.0/28.1 barg at 225/258 °C
Case 2 EOR 55.1 barg at 270 °C 33.0/27.2 barg at 225/271 °C
Future case 29 barg at 232 °C
- In addition to design conditions specified on design data, the tubes, tubesheets and shell side barrel shall be designed for the following combinations of temperature and pressure.
SHELL SIDE TUBE SIDE
-Case 1 43.2 barg at 255 °C 33.0 barg at 259 °C Tube Average Metal Temperature
-Case 2 55.1 barg at 270 °C 33.0 barg at 271 °C Tube Average Metal Temperature
-Case 3 55.1 barg at 270 °C 33.0 barg at 267 °C Tube Average Metal Temperature
Case 3 is emergency shutdown and purge.
- At shutdown shellside will be cooled at a rate of 15 °C/hour.
The maximum allowable differential metal temperature between tubes and shell is to be advised by vendor.
The equipment Supplier is required to confirm that shell bellows will not be required.
Vendor is to ensure all manifolds are subjected to flexibility analysis.
- Tube support grids shall preferably be of rod or bar type and designed by equipment supplier. Other design may be acceptable and are to be detailed in quotation.
Equipment supplier to advise number of tube support grids required. Tube support must not cause vapour pockets or disturb vapour flow. Equipment supplier to ensure that tube vibration is avoided during all cases listed above.
- All tube side surfaces in contact with the process gas shall be thoroughly cleaned and degreased prior to despatch.
- If solid stainless steel nozzles are used the vendor must ensure that mechanical properties are not impaired by Post Weld Heat Treatment.
- Details shown for perforated impingement cylinder and flow baffle are typical only.
To be designed impingement cylinder and flow baffle to ensure even distribution of water across tube bundle. Vapour release holes are to be provided in the flow baffle between tubes
- Temperature T1 to T4 are accommodate 20 tubeside thermocouples (18 "In tube" and 2 reactor head thermocouples). The two reactor head thermocouples shall be secured to the inside of the top dished head (see detail on follow sheets).

NOZZLES

| MARK | N.D. in | FLANGES | | | THK. mm | R.PAD D.xTHK. mm | PROJ. FM CL (4) mm | OR. | ECC. mm | SERVICE | NOTES |
|------|------------|---------|-----------|------|------------|------------------------|-----------------------------|-----|------------|----------------------------------|------------|
| | | RATING | TYPE | FAC. | | | | | | | |
| N1 | 16 | 600 | WN | RF | 12.7+3 | SELF REINF | SEE DWG | - | - | GAS INLET | |
| N2 | 16 | 600 | WN | RF | 12.7+3 | SELF REINF | SEE DWG | - | - | GAS OUTLET | |
| N3A | 12 | | BUTT WELD | | 12.7 | SELF REINF | SEE DWG | - | - | STEAM OUTLET FROM MANIFOLD | |
| N3B | 12 | | BUTT WELD | | 12.7 | SELF REINF | SEE DWG | - | - | STEAM OUTLET FROM MANIFOLD | |
| N4A | 6 | | BUTT WELD | | 11 | SELF REINF | 2050 | - | - | PUMP DISCHARGE | |
| N4B | 6 | | BUTT WELD | | 11 | SELF REINF | 2050 | - | - | PUMP DISCHARGE | |
| N5 | 1.5 | 600 | LWN | RF | - | - | 2040 | - | - | STEAM VENT | |
| N6 | 2 | | BUTT WELD | | 8.7 | SELF REINF | 2000 | - | - | INTERMITTENT BLOWDOWN | |
| N7 | 1.5 | 600 | LWN | RF | - | - | 2000 | - | - | UTILITY CONNECTION | |
| N8 | 2" | 600 | LWN | RF | - | - | SEE DWG | - | - | GAS VENT | |
| N9A | 10" | | BUTT WELD | | 12.7 | SELF REINF | SEE DWG | - | - | DOWNCOMER CONNECTION TO MANIFOLD | |
| N9B | 10" | | BUTT WELD | | 12.7 | SELF REINF | SEE DWG | - | - | DOWNCOMER CONNECTION TO MANIFOLD | |
| N10 | 1" | 600 | LWN | RF | - | - | 2020 | - | - | DRAIN | (BL. FLG.) |
| P1 | 1.5 | 600 | LWN | RF | - | - | 2000 | - | - | PRESSURE TAPPING | |
| P2 | 1.5 | 600 | LWN | RF | - | - | 2000 | - | - | PRESSURE TAPPING | |
| P3 | 1.5 | 600 | LWN | RF | - | - | SEE DWG | - | - | PRESSURE TAPPING | |
| P4 | 1.5 | 600 | LWN | RF | - | - | SEE DWG | - | - | PRESSURE TAPPING | |
| T1 | 4 | 600 | WN | RF | 11.1+3 | SELF REINF | SEE DWG | - | - | TEMPERATURE TAPPING | |
| T2 | 4 | 600 | WN | RF | 11.1+3 | SELF REINF | SEE DWG | - | - | TEMPERATURE TAPPING | |
| T3 | 4 | 600 | WN | RF | 11.1+3 | SELF REINF | SEE DWG | - | - | TEMPERATURE TAPPING | |
| T4 | 4 | 600 | WN | RF | 11.1+3 | SELF REINF | SEE DWG | - | - | TEMPERATURE TAPPING | |
| T5 | 1.5 | 900 | LWN | RF | - | - | SEE DWG | - | - | TEMPERATURE TAPPING | |
| T6 | 1.5 | 900 | LWN | RF | - | - | SEE DWG | - | - | TEMPERATURE TAPPING | |
| T7 | 1.5 | 900 | LWN | RF | - | - | SEE DWG | - | - | TEMPERATURE TAPPING | |
| T8 | 1.5 | 900 | LWN | RF | - | - | SEE DWG | - | - | TEMPERATURE TAPPING | |
| M1 | 24 | 600 | WN | RF | 10+3 | SELF REINF | SEE DWG | - | - | MANWAY | (37) |
| M2 | 24 | 600 | WN | RF | 10+3 | SELF REINF | SEE DWG | - | - | MANWAY | (37) |
| M3 | 24 | 600 | WN | RF | 10+3 | SELF REINF | SEE DWG | - | - | MANWAY | (37) |

29 Temperature tapping T5 to T8 accommodate 4 shellside thermocouples. Typical thermocouple entry details are shown in detail on sheet 6. The machined coupling shall be welded to the perforated tube prior to insertion of the tube into the tubesheet. The upper portion of the coupling shall be left blind until after shellside hydrotest. After shell side hydrotest the upper portion of the coupling shall be drilled out and the assembly completed. It is imperative that the nozzles T5 to T8 are accurately aligned with the respective perforated tube.

30 DELETE

31 Vendor shall undertake the flexibility analysis of the riser and downcomers piping system. All risers and downcomer support and guides shall be provided. Horizontal legs shall be avoided in the riser pipe.

32 Upset conditions: Equipment supplier to take in to consideration that an upset condition exists whereby the generation in the reactor process side is 128% of Design Rate. Equipment supplier to ensure that the thermal and mechanical integrity of the reactor can be maintained at this up set condition.

33 Reactor designer shall ensure that the vessel is designed for a site hydrotest and that the requirements of the design code are met.

34 Holes in coolant thermocouple tubes shall be smooth (de-burred) to allow insertion of thermocouples.

35 DELETE

36 Tubesheets shall be designed acc. to ASME VIII Div.1 + Finite Elements Analysis

37 With blind flange and davit.

38 Minimum design temperature at pressure:

Shell side: 9°C at 67.0 barg F.V.

Tube side: 5°C at 72.0 barg

39 All carbon steel material shall be supplied as normalized condition.

DESIGN DATA

| CALCULAT. CODES | ASME VIII DIV.1 - LAST EDIT. (36) | |
|----------------------|-----------------------------------|-------------------------------|
| ALLOW.STRESSES | ASME VIII DIV.1 - LAST EDIT. | |
| INSPECTION | SEE MR | |
| SPECIFICATIONS | SEE MR | |
| WIND/EARTHQUAKE | SEE MR | / SEE MR |
| FLUID | SHELL SIDE | TUBE SIDE |
| DESIGN PRESSURE | 67.0 Bars g | 42.0 Bars g |
| DESIGN TEMPERAT. | 295 °C | 315 °C |
| TEST PRESSURE | BY MFR Bars g | BY MFR Bars g |
| EXTERNAL PRESS. | F. V. AT 295°C | (9) Bars g |
| TUBESHEET PRESS. | - Bars g | |
| TUBESHEET TEMPER. | 315 °C | |
| TUBESHEET TOT.CORR. | 3 + CLAD mm | |
| FLOAT.HEAD TOT.CORR. | - mm | |
| WORK. TEMP. (IN) | NOTE 21 | NOTE 21 |
| WORK. TEMP. (OUT) | NOTE 21 | NOTE 21 |
| FLUID DENSITY | 950 Kg/m ³ | 22.63 (SOR) Kg/m ³ |
| CORROSION | 3 mm | 3 CLAD mm |
| JOINT EFFICIENCY | 1.0 | 1.0 |
| NO. OF PASSES | 1 | 1 |
| RADIOGRAPHY | FULL | FULL |
| STRESS RELIEVING | YES | YES |
| FLOAT.HEAD STRESS RE | - | |
| TOTAL VOLUME | 126.67 m ³ | |
| HAZARD CONSIDERATION | - | YES-OXYGEN+H/C |
| FATIGUE DESIGN REQ.D | - | TUBESHEET-NOTE 17 |

TUBE BUNDLE DATA

| | | | |
|---------------|-----------------------|--------------|---------------|
| NO.TUBES | 3600 | O.D. | 38.1 mm |
| THK. (MIN.) | 12 BWG mm | LENGTH | 10400 mm |
| PITCH | 48.1 mm | LAYOUT | ◇ |
| SURFACE (net) | BY MFR m ² | JOINT | (SEE NOTE 14) |
| SECT.IN PAR. | - | SECT.IN SER. | - |

LINING & PAINTING DATA

| | TYPE | | THK. mm | | SURF. m ² | |
|------------------------|------------------------|------|---------|------|----------------------|------|
| | S.S. | T.S. | S.S. | T.S. | S.S. | T.S. |
| INT.COATING | - | - | - | - | - | - |
| INSULATION | H.C. | H.C. | 75 | 75 | - | - |
| EXT.PAINTING | SEE REFERENCE STANDARD | | | | | |
| SURF.PREPAR. INT./EXT. | SEE REFERENCE STANDARD | | | | | |

TECHNIP-COFLEXIP

سابك
sabic

SABIC ACETIC ACID PLANT
IBN RUSHD SITE - YANBU - KINGDOM OF SAUDI ARABIA

XXXX Status
ITEM : 100-R-121
SERVICE : REACTOR

CAD model
Scale
2121 Project
02 Unit
DW Type of doc.
0411 - 01 Code & progressive
1 of 6 Sheet
0 Rev.

WEIGHTS & LOADING DATA

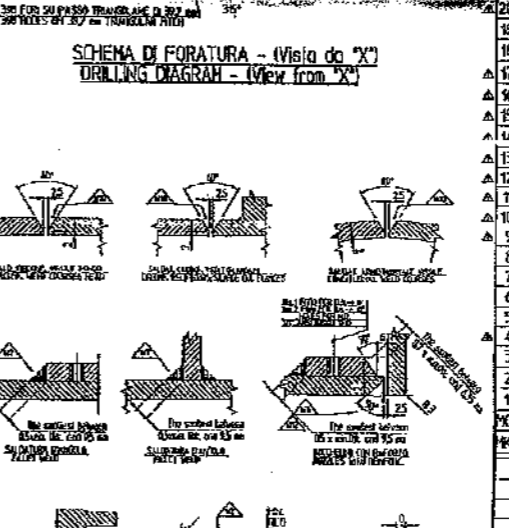
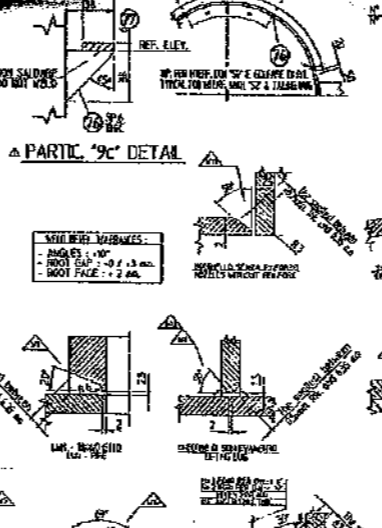
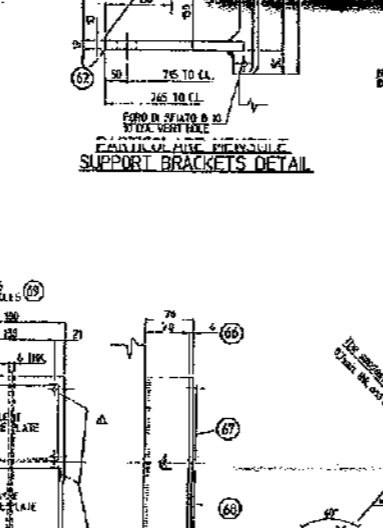
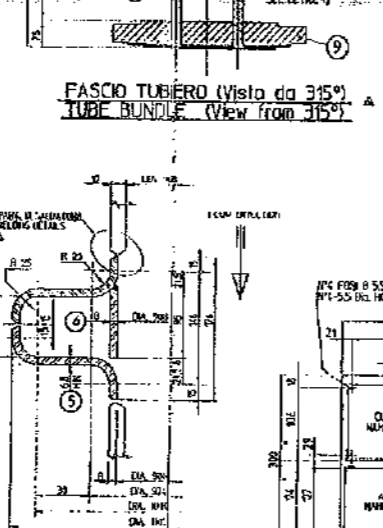
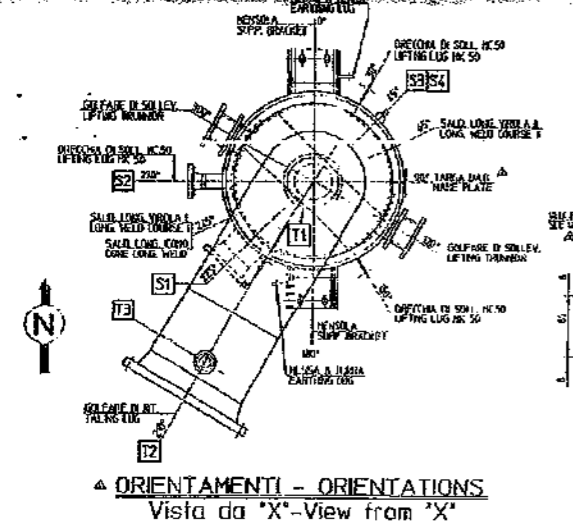
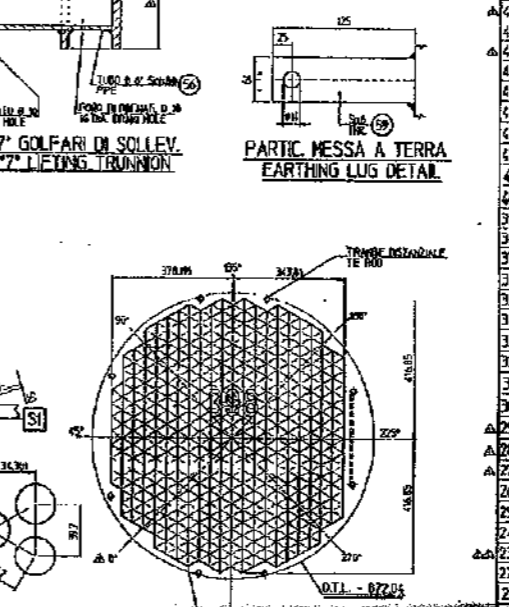
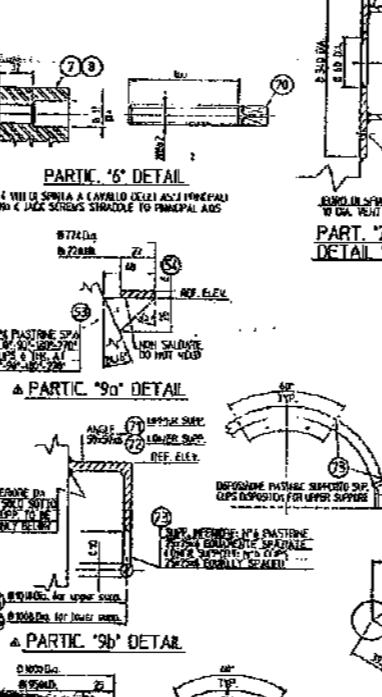
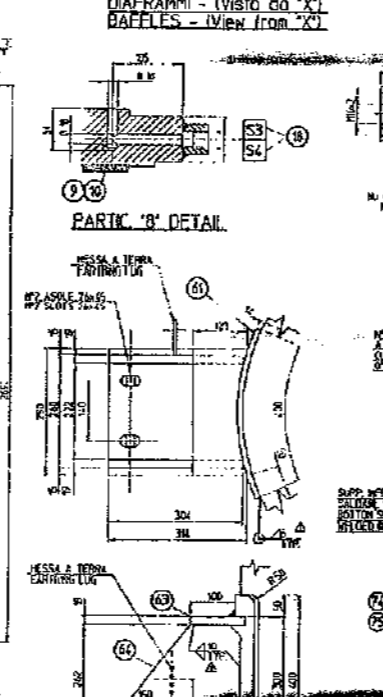
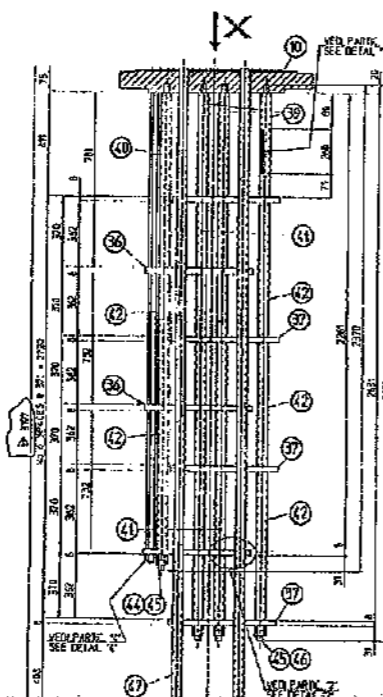
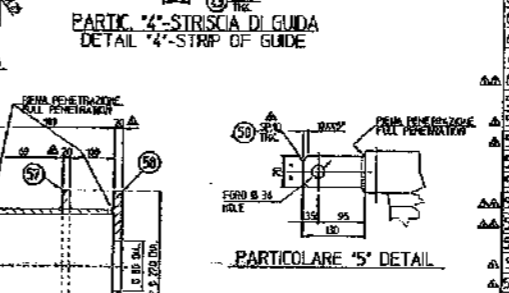
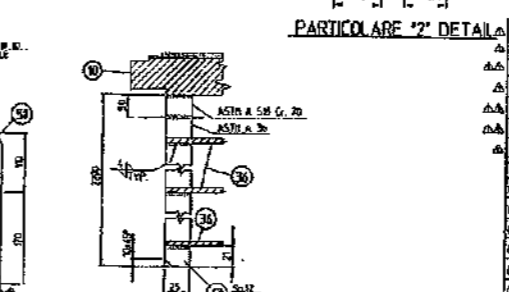
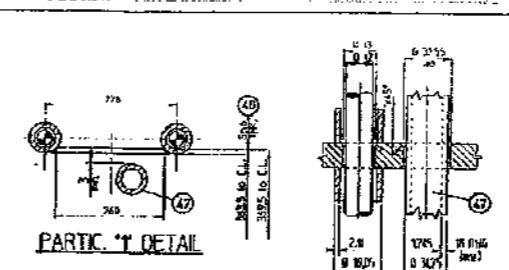
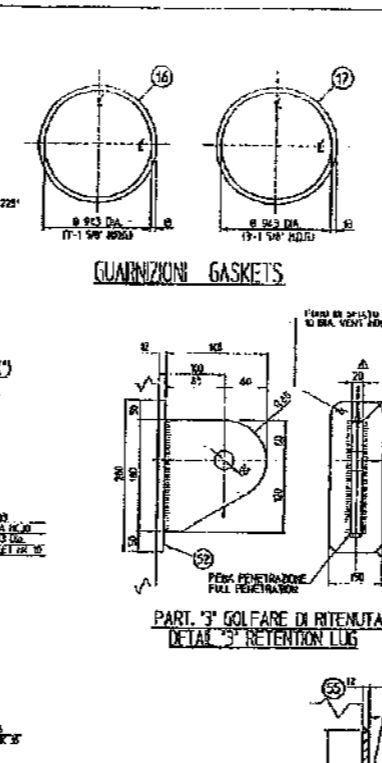
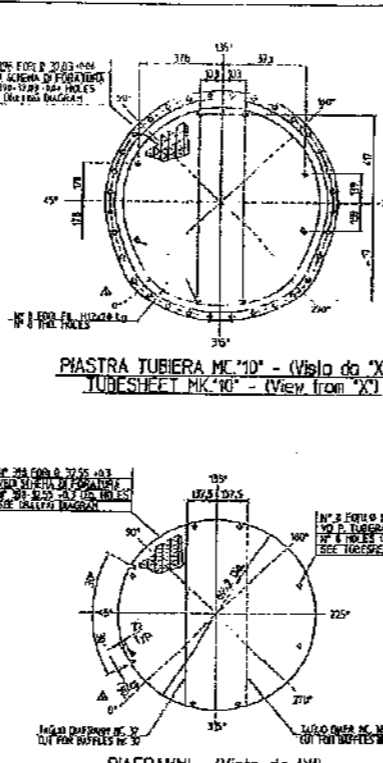
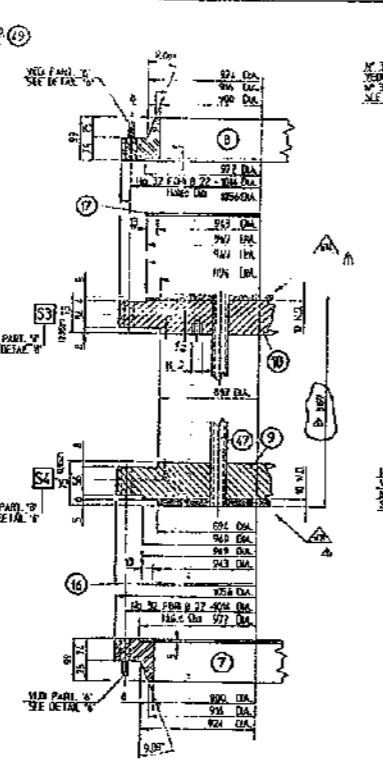
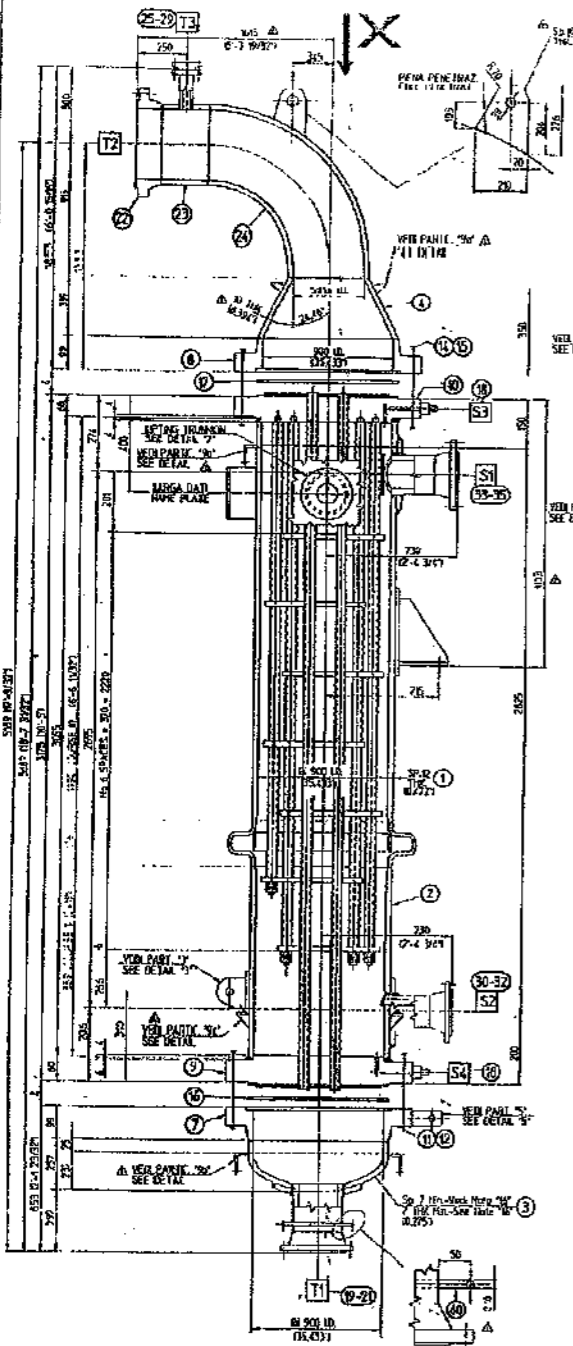
| WEIGHT OF EACH SECTION | TOTAL DRY | | Kg |
|------------------------|---------------|-----------------|--------------------------|
| | ERECT. | TEST | |
| | 255000 | 395300 | |
| | FULL OF WATER | | Kg |
| | 255000 | 395300 | |
| | ERECT. | TEST | OPERAT. |
| WTS | Kg | 255000 | 367700 |
| VERT.LOADS | N | - | - |
| SHEAR | | | |
| LG.WIND/EARTH. | N | / | / |
| TV.WIND/EARTH. | N | 37300 / 328800 | 7700 / 42000 / 521400 |
| MOMENT | | | |
| LG.WIND/EARTH. | N.m | / | / |
| TV.WIND/EARTH. | N.m | 94800 / 1575300 | 19500 / 106900 / 2440000 |

REVISIONS

| REV | DATE | DESCRIPTION | PREP.D | CHKD. | APPD. | AUT.D |
|-----|----------|--------------------------------------|---------|-------|-------|-------|
| 0 | 29-07-02 | ISSUED FOR PURCHASE TO HITACHI ZOSEN | De Luca | Merel | lorio | Tilli |
| B | 10-06-02 | REISSUED FOR INQUIRY | De Luca | Merel | lorio | Tilli |
| A | 19-04-02 | ISSUED FOR INQUIRY | De Luca | Merel | lorio | Tilli |

| MATERIALS | | REFERENCE STANDARDS | |
|-------------------------------|--|---------------------|--|
| SHELL | | Q01-E10 | THICK WALLED VESSELS AND HEAT EXCHANGERS - DESIGN CRITERIA |
| TUBE SUPPORT GRIDS | SA 516 Gr 70 | Q01-E13 | VESSEL LIFTING LUGS: TRUNNION AND DOUBLE RING TYPE |
| TUBE AND CATALYST SUPPORTS | AISI 316L STAINLESS SPRING STEEL | Q01-E24 | PRESSURE VESSELS: ALLOY CLAD CARBON STEEL - DESIGN CRITERIA |
| BARREL | SA 516 Gr 70 | Q01-F01 | PRESSURE VESSELS: WELDING AND FABRICATION |
| MANIFOLDS AND PIPING | SA 106 B | Q01-F05 | VESSELS - SUPPORT LUG FABRICATION |
| NOZZLE FROM PIPE | SA 106 B | Q01-F07 | PRESSURE VESSELS - FABRICATION |
| NOZZLE FROM PLATE | SA 516 Gr 70 | Q01-F08 | WELDING OVERLAY AND WELDING OF CLAD MATERIAL |
| NOZZLES FLANGES | SA 105 | Q01-F10 | FABRICATION (ALLOY CLAD CARBON STEEL) |
| PIPE FITTINGS | SA 234 WPB | Q01-F15 | VESSELS: NAME PLATE AND STAMPING |
| NOZZLE REINF.PAD | SA 516 Gr 70 | Q01-F20 | DAVIT FOR OUTDOOR MANHOLE COVERS |
| REACTOR SUPPORTS (BRACKETS) | SA 516 Gr 70 | Q01-F21 | VESSELS: PIPE GUIDE |
| FORGINGS | SA 266 GR 4 | Q01-F22 | PRESSURE VESSELS: PIPE SUPPORT |
| STIFFENING RINGS | - | Q01-F23/VEVF 1123 | VESSELS: INSULATION AND FIRE PROOFING SUPPORT |
| EXPANSION JOINT | - | Q01-F25 | VESSELS: GROUNDING AND LUG DETAILS |
| MANIFOLD STUBS | SA 105 / SA 106 Gr B | Q01-F28 | ALLOWABLE FABRICATION TOLERANCES HORIZONTAL AND VERTICAL PRESSURE VESSEL |
| INT. ATTACHMENTS | SA 516 Gr 70 | Q01-F34 | CARBON AND LOW ALLOY STEELS FABRICATION - PRESSURE VESSELS |
| EXT. ATTACHMENTS | SA 516 Gr 70 | Q01-F35 | THICK WALLED - FABRICATION |
| SHELL COVER | | Q01-F37 | AUSTENITIC AND HIGH ALLOY STEEL PRESSURE VESSEL : FABRICATION |
| BARREL | - | Q01-T02 | INSPECTION REQUIREMENTS FOR PRESSURE VESSELS |
| COVER | - | Q01-T07 | MATERIALS IDENTIFICATION PROGRAM |
| FLANGES | - | 22854-SP-000-X-002 | SHOP AND FIELD PAINTING |
| CHANNEL (11) | | SZ5D | RECOMMENDED COATING SYSTEMS FOR EXTERNAL PROTECTION |
| BARREL | SA 516 Gr 70+3mm AISI 316L | 1000.00.ST.0800.01 | NAME PLATE |
| ANNULAR FORGING | SA 266 GR 4 + 3mm AISI 316L W.O.(TUBE SIDE) | Q01-T02 | INSPECTION REQUIREMENTS FOR PRESSURE VESSELS |
| HEADS | SA 516 Gr 70 + 3mm AISI 316L W.O. | Q01-T02 | INSPECTION REQUIREMENTS FOR PRESSURE VESSELS |
| FLAT COVER | - | Q01-T02 | INSPECTION REQUIREMENTS FOR PRESSURE VESSELS |
| NOZZLES FLANGES | SA 105 + AISI 316L W.O. (26) | Q01-T02 | INSPECTION REQUIREMENTS FOR PRESSURE VESSELS |
| NOZZLE FROM PLATE | SA 516 Gr 70 + 3mm AISI 316L | SG1-12S | DELETED |
| MANIFOLDS AND PIPING | SA 312 TP 316L | | |
| COUPLINGS & PLUGS | SA 403 WP 316L | | |
| FORGING | SA 266 GR 4 + 3mm AISI 316L W.O. | | |
| SEPARATION PLATES | - | | |
| INT. ATTACHMENTS | SA 240 316L | | |
| EXT. ATTACHMENTS | SA 516 Gr 70 | | |
| FLOATING HEAD | | | |
| COVER | - | | |
| FLANGES | - | | |
| SPLIT RING | - | | |
| TUBE BUNDLE | | | |
| TUBES | SA 789 UNS S31803 (SMLS) (SAF 2205) | | |
| TUBESHEETS | SA 516 Gr 70 + AISI 316L W.O. (TUBE SIDE) | | |
| BOLTS/FLES/SUPPORTS/IMP.PLATE | SA 516 Gr 70 | | |
| TIE RODS & SPACERS | C.S. | | |
| BOLTS & NUTS | | | |
| EXT. BOLTS | SA 193 B7 / SA 194 2H | | |
| INT. BOLTING | AISI 316L | | |
| GASKETS | | | |
| BLIND COVER MANHOLE | AISI 316L SP. WOUND FIBRE FILLED+AISI 316 INNER RING AND C.S. CENTERING RING | | |
| NOTES | | | |
| FLANGE FINISHING | SEE NOTE 6 | | |
| TREATMENTS | | | |
| RADIOGRAPHY | FULL | | |
| STRESS RELIEVING | YES | | |
| DIMENSIONS | | | |
| PIPES | ASME B36.10M/B36.19M | | |
| FLANGES | ANSI B16.5 | | |
| FITTINGS | ANSI B16.9 | | |
| THREADS | ANSI B1.1 CLASS 2A OR 2B | | |
| GASKETS | API 6D1 | | |

| | | | |
|---|-------------------|----------------------|---------------------------------|
| TECHNIP-COFLEXIP | | سابك sabic | |
| SABIC ACETIC ACID PLANT IBN RUSHD SITE - YANBU - KINGDOM OF SAUDI ARABIA | | | |
| XXXX Status | ITEM : 100-R121 | | |
| | SERVICE : REACTOR | | |
| CAD model | | | |
| / | 2121 | 02 | DW 0411 - 01 |
| Scale | Project | Unit | Type of doc. Code & progressive |
| | | | 2 of 6 0 |
| | | | Sheet Rev. |



| Q.TA | DESCRIZIONE | MISURE | MATERIALE |
|------|-----------------|------------------------|--------------|
| 27 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 28 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 29 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 30 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 31 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 32 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 33 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 34 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 35 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 36 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 37 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 38 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 39 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 40 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 41 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 42 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 43 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 44 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 45 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 46 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 47 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 48 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 49 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 50 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 51 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 52 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 53 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 54 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 55 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 56 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 57 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 58 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 59 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 60 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 61 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 62 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 63 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 64 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 65 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 66 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 67 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 68 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 69 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 70 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 71 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 72 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 73 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 74 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 75 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 76 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 77 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 78 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 79 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |
| 80 | PIASTRA TUBIERA | 1000 Ø - 750 H - 6 THK | SA 203 Gr. C |

NOTE - NOTES

1. VERIFICARE IL PIANO DI MONTAGGIO...
2. VERIFICARE IL PIANO DI MONTAGGIO...
3. VERIFICARE IL PIANO DI MONTAGGIO...
4. VERIFICARE IL PIANO DI MONTAGGIO...
5. VERIFICARE IL PIANO DI MONTAGGIO...
6. VERIFICARE IL PIANO DI MONTAGGIO...
7. VERIFICARE IL PIANO DI MONTAGGIO...
8. VERIFICARE IL PIANO DI MONTAGGIO...
9. VERIFICARE IL PIANO DI MONTAGGIO...
10. VERIFICARE IL PIANO DI MONTAGGIO...

TABELLA CONNESSIONI - HOZZLES TABLE

| NO. | DESCRIZIONE | TIPO | NO. PARTI | NOTA |
|-----|-------------|--------|-----------|------|
| 1 | CONNESSIONE | TIPO A | 1 | |
| 2 | CONNESSIONE | TIPO B | 2 | |
| 3 | CONNESSIONE | TIPO C | 3 | |
| 4 | CONNESSIONE | TIPO D | 4 | |
| 5 | CONNESSIONE | TIPO E | 5 | |
| 6 | CONNESSIONE | TIPO F | 6 | |
| 7 | CONNESSIONE | TIPO G | 7 | |
| 8 | CONNESSIONE | TIPO H | 8 | |
| 9 | CONNESSIONE | TIPO I | 9 | |
| 10 | CONNESSIONE | TIPO J | 10 | |
| 11 | CONNESSIONE | TIPO K | 11 | |
| 12 | CONNESSIONE | TIPO L | 12 | |
| 13 | CONNESSIONE | TIPO M | 13 | |
| 14 | CONNESSIONE | TIPO N | 14 | |
| 15 | CONNESSIONE | TIPO O | 15 | |
| 16 | CONNESSIONE | TIPO P | 16 | |
| 17 | CONNESSIONE | TIPO Q | 17 | |
| 18 | CONNESSIONE | TIPO R | 18 | |
| 19 | CONNESSIONE | TIPO S | 19 | |
| 20 | CONNESSIONE | TIPO T | 20 | |

DESCRIZIONE LATO MANIFOLLO LATO TUBI
DESCRIPTION SHELL SIDE TUBE SIDE

DATI DI PROGETTO - DESIGN DATA

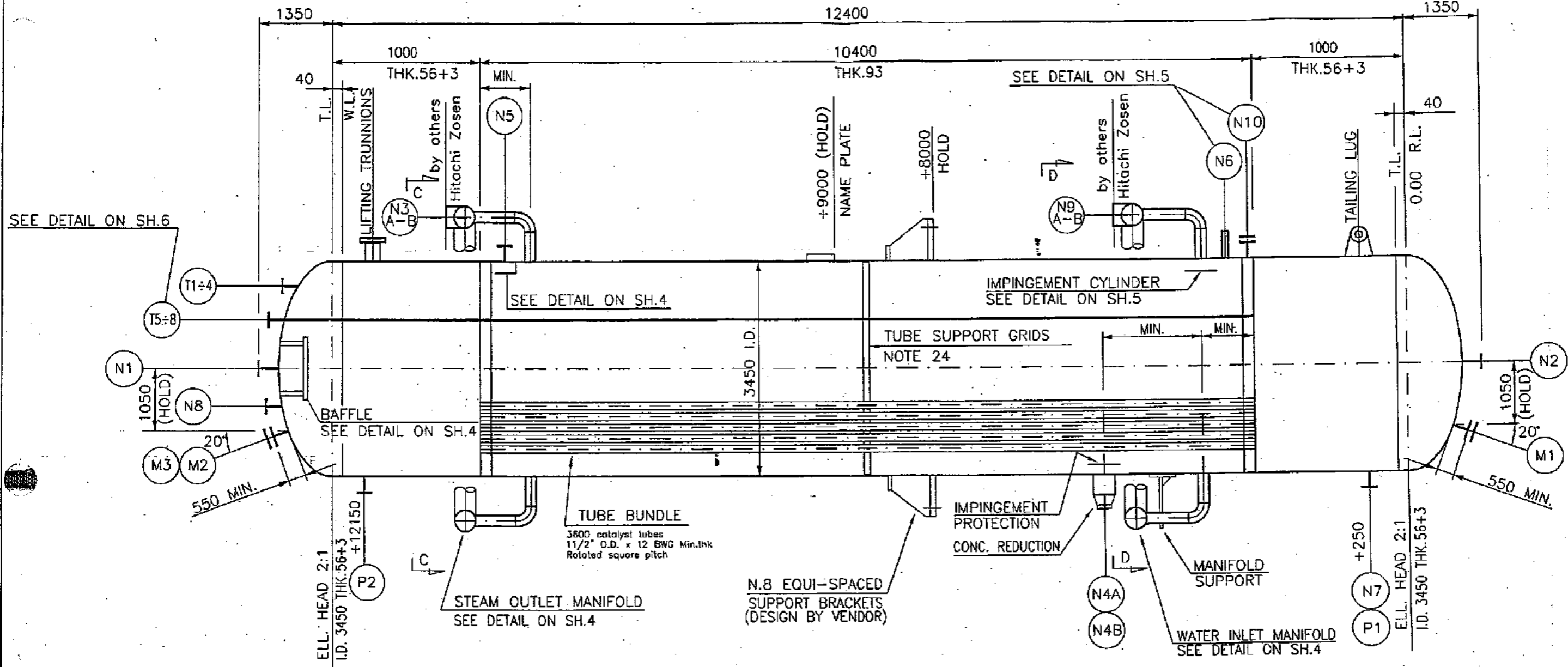
TECHNIP-COITEMP

BREMBANA
Dehydratore - Bergamo - Italy

DEHYDRATION COLUMN BOILER
ITEM: 100-E02

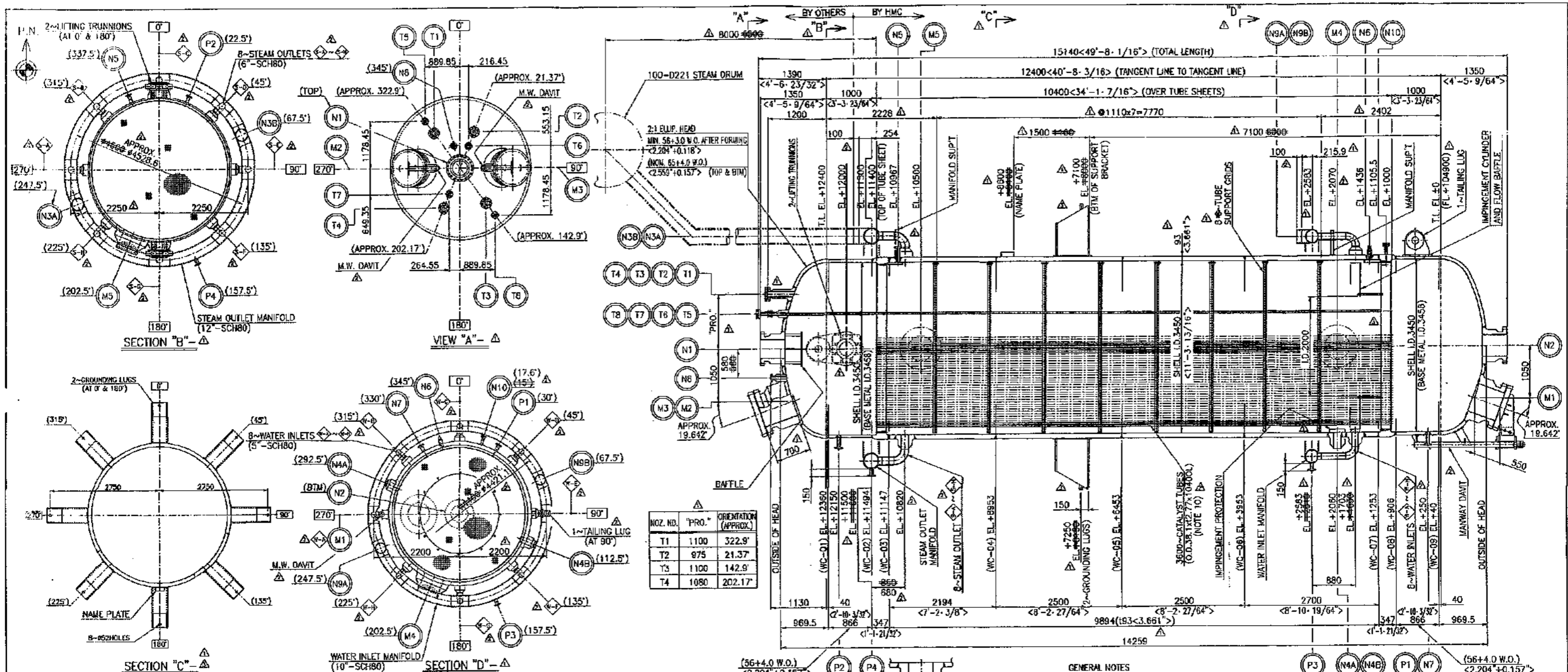
REVISIONI - REVISIONS

| NO. | DESCRIZIONE | DATA |
|-----|--------------|------------|
| 1 | ESABORAZIONE | 01/01/2001 |
| 2 | REVISIONE | 01/01/2001 |
| 3 | REVISIONE | 01/01/2001 |
| 4 | REVISIONE | 01/01/2001 |
| 5 | REVISIONE | 01/01/2001 |



ORIENTATION TO BE DEFINED LATER

| | | | |
|---|--------------------|-----------------------------|--------------|
| TECHNIP-COFLEXIP | | سابك <i>sabik</i> | |
| SABIC ACETIC ACID PLANT IBN RUSHD SITE - YANBU - KINGDOM OF SAUDI ARABIA | | | |
| XXXX Status | ITEM : 100-R121 | | |
| - | SERVICE : REACTOR | | |
| CAD model | | | |
| / | 2121 | 02 | DW |
| Scale | Projct | Unit | Type of doc. |
| | 0411 - 01 | 3 of 6 | 0 |
| | Code & progressive | Sheet | Rev. |



| NOZ. NO. | "PRO." | ORIENTATION (APPROX.) |
|----------|--------|-----------------------|
| T1 | 1100 | 322.9' |
| T2 | 975 | 21.37' |
| T3 | 1100 | 142.9' |
| T4 | 1080 | 202.17' |

| LOADING DATA | |
|--------------------|-------------|
| 1. ERECTION WT | 2,380,000 N |
| 2. OPERATING WT | 3,040,000 N |
| 3. OVERHUNG MOMENT | 212,000 N-m |
| 4. HORIZ'L FORCE | 392,000 N |

| NO. | NO. | SIZE | ORIF. | ORIF. DIA. | ORIF. TYPE | SERVICE & DESCRIPTION | PROJECTION |
|-------|-----|--------|---------|------------|------------|-----------------------|---------------------------------|
| M4.5 | 2 | 20" | 10.500 | | MANWAY | 2193 | |
| P | 2 | 24" | 10.536 | | RF | LWN | MANWAY W/DAVIT |
| A | 1 | 24" | 10.536 | | RF | LWN | MANWAY W/DAVIT |
| T5-B | 4 | 1-1/2" | 10.3014 | | RF | LWN | TEMPERATURE TAPPING W/BLF |
| T1-A | 4 | 4" | 10.856 | | RF | LWN | TEMPERATURE TAPPING |
| P3.4 | 2 | 1-1/2" | 10.361 | | RF | LWN | PRESSURE TAPPING |
| P1.2 | 2 | 1-1/2" | 10.361 | | RF | LWN | PRESSURE TAPPING |
| N10 | 1 | 1" | 10.243 | | RF | LWN | DRAIN W/B.F. |
| N9A,B | 2 | 10" | KS | | BUTT WELD | | TOXIC/HAZARDOUS CORROSION W/BLF |
| N8 | 1 | 2" | 10.508 | | RF | LWN | GAS VENT |
| N7 | 1 | 1-1/2" | 10.361 | | RF | LWN | UTILITY CONNECTION |
| N6 | 1 | 2" | SCH80 | | BUTT WELD | | INTERMEDIATE FLOW/DRAIN |
| N5 | 1 | 1-1/2" | 10.361 | | RF | LWN | STEAM VENT |
| N4A,B | 2 | 6" | SCH80 | | BUTT WELD | | PUMP DISCHARGE |
| N3A,B | 2 | 12" | XS | | BUTT WELD | | SEE DWG. |
| N2 | 1 | 18" | 10.4258 | | RF | LWN | GAS OUTLET |
| N1 | 1 | 16" | 10.3750 | | RF | LWN | GAS INLET |

| DESIGN DATA | |
|-----------------------------------|---|
| 1. REGULATION | ASME SEC. VIII DIV. 1, 2001 EDITION |
| 2. DESIGN CODE | ASME SEC. VIII DIV. 1, 2001 EDITION |
| 3. DESIGN PRESSURE | (INT.) 67.0 bar G (98.4 kg/cm ² G) <971.8 psi G> (EXT.) 1.03 bar G (1.48 kg/cm ² G) <150 psi G> |
| 4. DESIGN TEMPERATURE | 295.0 °C (563.0 °F) / 315.0 °C (599.0 °F) |
| 5. OPERATING PRESSURE | SEE NOTE 9 |
| 6. OPERATING TEMPERATURE | SEE NOTE 9 |
| 7. MAX. ALLOW. WORKING PRESS. | 103.2 bar G (148.6 kg/cm ² G) <1498.1 psi G> NEW & COOL: 71.9 bar G (101.4 kg/cm ² G) <1042.8 psi G> NEW & COOL: 43.7 bar G (61.4 kg/cm ² G) <633.8 psi G> |
| 8. HYDROSTATIC TEST PRESS. | 93.24 bar G (130.8 kg/cm ² G) <1352.4 psi G> / 58.52 bar G (82.9 kg/cm ² G) <851.9 psi G> |
| 9. PNEUMATIC TEST PRESS. | |
| 10. POSTWELD HEAT TREATMENT | YES |
| 11. RADIOGRAPHED | FULL |
| 12. JOINT EFFICIENCY | 1.0 |
| 13. CORROSION ALLOWANCE | 3.0 mm |
| 14. INSULATION (HOT/COLD) | TYPE 1: HEM CORROSION PROTECTION TYPE 2: HEM CORROSION PROTECTION + 25 mm (1 IN) MIN. INSULATION |
| 15. FIREPROOFING | NONE |
| 16. WIND DESIGN CODE | ASCE 7-1995 EDITION (EXPOSURE CATEGORY C) |
| 17. WIND DESIGN VELOCITY/FACTOR 1 | 39.9 m/s at 10m AERIAL GROUND |
| 18. EARTHQUAKE CODE | UNIFORM BUILDING CODE-1994 EDITION |
| 19. EARTHQUAKE ZONE/FACTOR 1 | 2A / 1.25 |
| 20. MIN. DESIGN METAL TEMP. | 80 °C (182 °F) AT DESIGN PRESS. 80 °C (182 °F) AT DESIGN PRESS. |
| 21. CAPACITY | 28.1 m ³ / 88.4 m ³ |
| 22. CODE STAMP | YES |
| 23. OPERATION FLUID | OXID. REDUCING/SATUR. PROCESS GAS |

| MATERIAL SPECIFICATION | |
|-------------------------------|--|
| 1. SHELL | SAS16Gr.70 |
| 2. HEAD | SAS16Gr.70 + TYPE316L W.O. |
| 3. ANNULAR FORGING | SA266Gr.4 + TYPE316L W.O. |
| 4. SUPPORT BRACKET | SAS16Gr.70 |
| 5. BASE PLATE | SAS16Gr.70 |
| 6. STIFFENING RING | |
| 7. NOZZLE NECKS (FORGING) | SA105 |
| 8. NOZZLE NECKS (PIPE) | SA106Gr.B |
| 9. NOZZLE NECKS (PLATE) | |
| 10. FLANGES | SA105 |
| 11. 15-18 SLUG & NOZZLE | SA182Gr.F316L |
| 12. N7,P1,P2 FORGED NOZZLE | SA182Gr.F316L |
| 13. LINING | |
| 14. EXTERNAL BOLTINGS | B : SA193Gr.B7 / N : SA194Gr.2H |
| 15. EXTERNAL GASKETS | ST. STEEL AISI 316L SPIRAL WOUND, FIBRE FILLED + AISI 316 INNER RING AND C.S. CENTERING RING |
| 16. INTERNAL BOLTINGS | TYPE316L S.S. |
| 17. INTERNAL GASKETS | |
| 18. INTERNALS (WELDED) | SAS16Gr.70 |
| 19. EXTERNAL CLIPS | SAS16Gr.70 |
| 20. TUBE SUPPORT GRID | JIS SS400 |
| 21. TUBE SHEET | SAS16Gr.70 + TYPE316L W.O. |
| 22. TUBE | SA789 UNS S31803 (SEAMLESS) |
| 23. TUBE END CATALYST SUPPORT | TYPE304 STAINLESS STEEL SPRING |
| 24. STEAM OUTLET MANIFOLD | SA106Gr.B / SA234Gr.WPB |
| 25. WATER INLET MANIFOLD | SA106Gr.B / SA234Gr.WPB |

- GENERAL NOTES**
- VERTICAL MAIN ELEVATION IS DIAGRAMMATIC ONLY. FOR ORIENTATION OF NOZZLE AND/OR DECKS, SEE PLAN.
 - ALL VESSEL SEAMS SHALL BE LOCATED TO CLEAR OPENINGS AND IMPORTANT INTERNALS.
 - ALL LONGITUDINAL AND CIRCUMFERENTIAL SEAMS AND SIMILAR JOINTS SHALL BE FULL PENETRATION DOUBLE BUTT JOINTS EXCEPT AS SPECIFIED IN DWG.
 - NOZZLE POSITIONS ARE FROM REFERENCE LINES EXCEPT AS SPECIFIED IN DWG.
 - NOZZLE PROJECTIONS ARE FROM TANGENTIAL LINE OR CENTER LINE OF VESSEL TO FLANGE FACE.
 - ALL BOLT HOLES OF FLANGES SHALL STRADDLE VESSEL CENTER LINES.
 - VESSEL SHALL BE THOROUGHLY CLEANED INSIDE AND OUTSIDE AND FREE FROM FIELD SPATTER AND FOREIGN MATTER.
 - SURFACE PREPARATION, PAINTING AND PICKLING.

| PARTS | SURFACE PREPARATION | PAINTING |
|---|--|--|
| INSIDE AND OUTSIDE OF VESSEL (SHELL SIDE) | PER HMC'S PAINTING PROCEDURE, 5550-34-04 | PER HMC'S PAINTING PROCEDURE, 5550-34-04 |
| INSIDE AND OUTSIDE OF VESSEL (TUBE SIDE) | PER HMC'S PAINTING PROCEDURE, 5550-34-04 | PER HMC'S PAINTING PROCEDURE, 5550-34-04 |

| | SHELL SIDE | TUBE SIDE (INLET/OUTLET) |
|------------|----------------------|-------------------------------|
| CASE 1 SOR | 43.2 bar.a at 255 °C | 33.0/28.1 bar.a at 225/258 °C |
| CASE 2 EOR | 55.1 bar.a at 270 °C | 33.0/27.2 bar.a at 225/271 °C |
| FUTURE RUN | 29.0 bar.a at 232 °C | 33.0/28.0 bar.a at 225/234 °C |

10. CATALYST BULK DENSITY : 1500-1600 kg/m³

| NO. | DESCRIPTION | QTY | REMARKS |
|-----|-----------------|-------------|---------|
| 1 | ERECTION WT | 2,380,000 N | |
| 2 | OPERATING WT | 3,040,000 N | |
| 3 | OVERHUNG MOMENT | 212,000 N-m | |
| 4 | HORIZ'L FORCE | 392,000 N | |

| REV. | PREPARED BY | REVIEWED BY | APPROVED BY | DATE | DESCRIPTION |
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AS BUILT

1~VESSEL REQUIRED

2163030 TECHNIP ITALY S.p.A. / SABIC

P.O. NO. : 21240001
PROJECT : 2124-SABIC ACETIC ACID PROJECT
ITEM NO. : 100-R-121 REACTOR

GENERAL ASSEMBLY SCALE 1/50,1/40

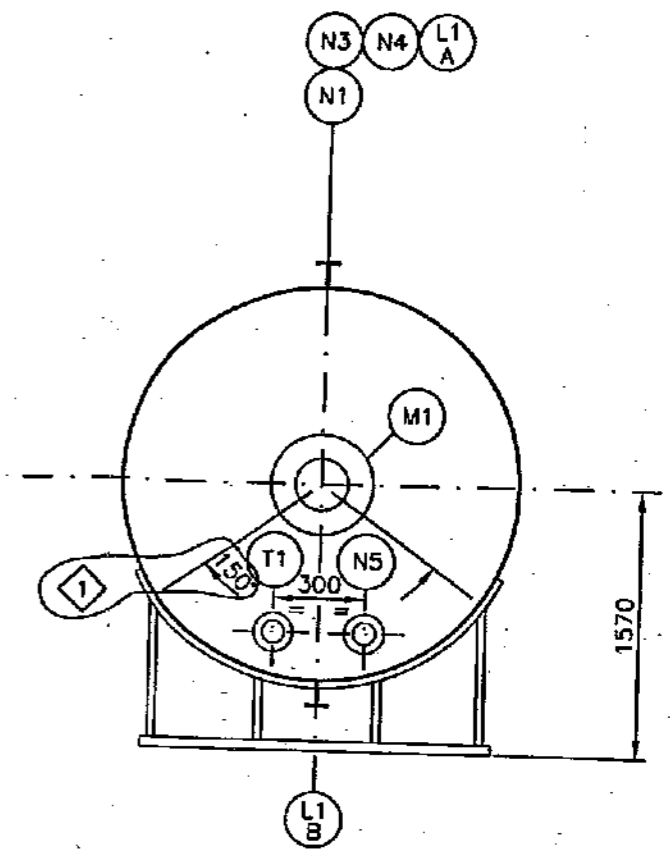
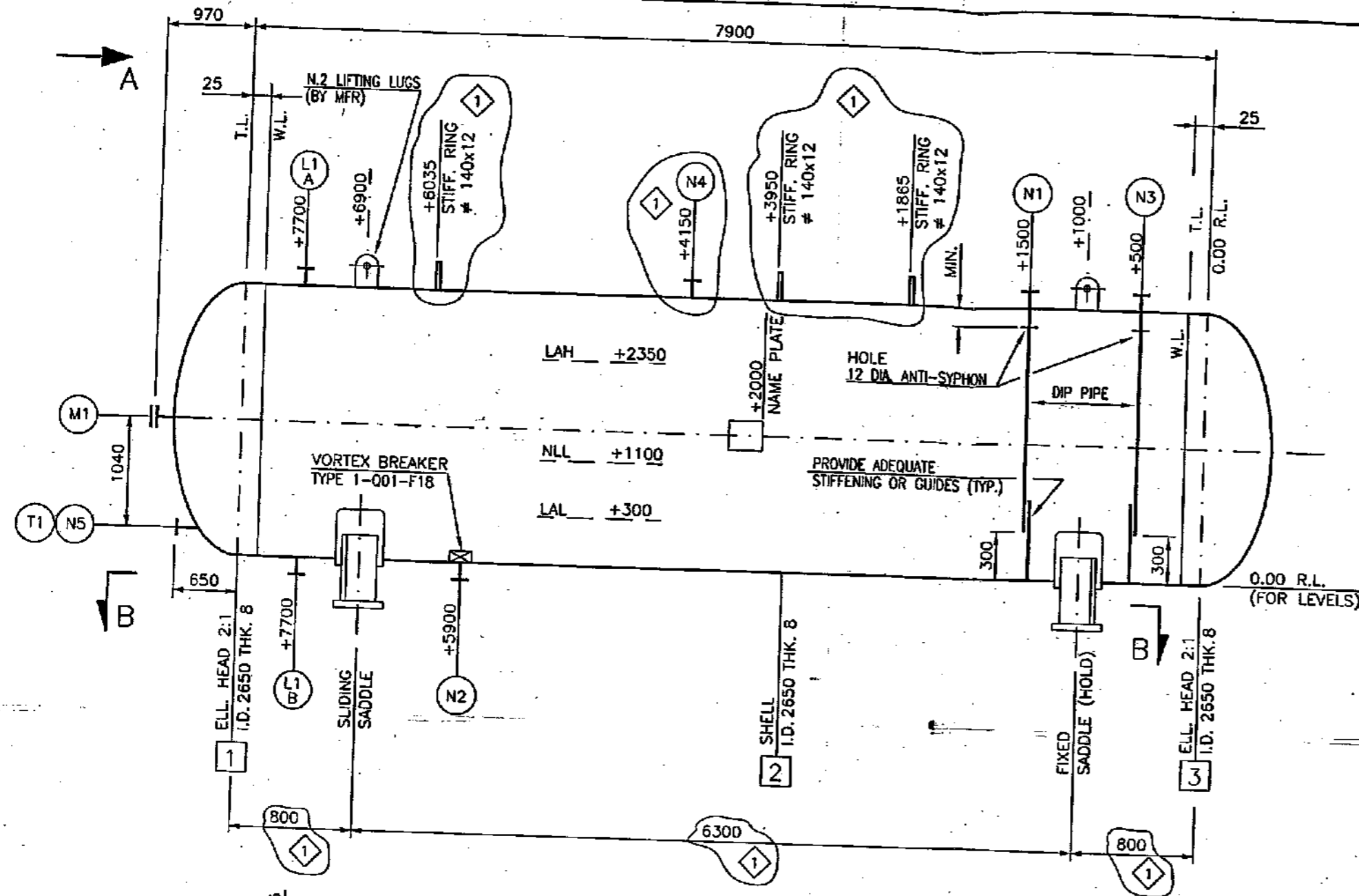
HITACHI ZOSEN MECHANICAL CORPORATION

Drawn By: KEJ-U 8/30/02
Prepared By: KUNIGIO 8/30/02
Reviewed By: TCHIKUSHI 8/30/02
Approved By: R.NAKASHIMA 8/30/02

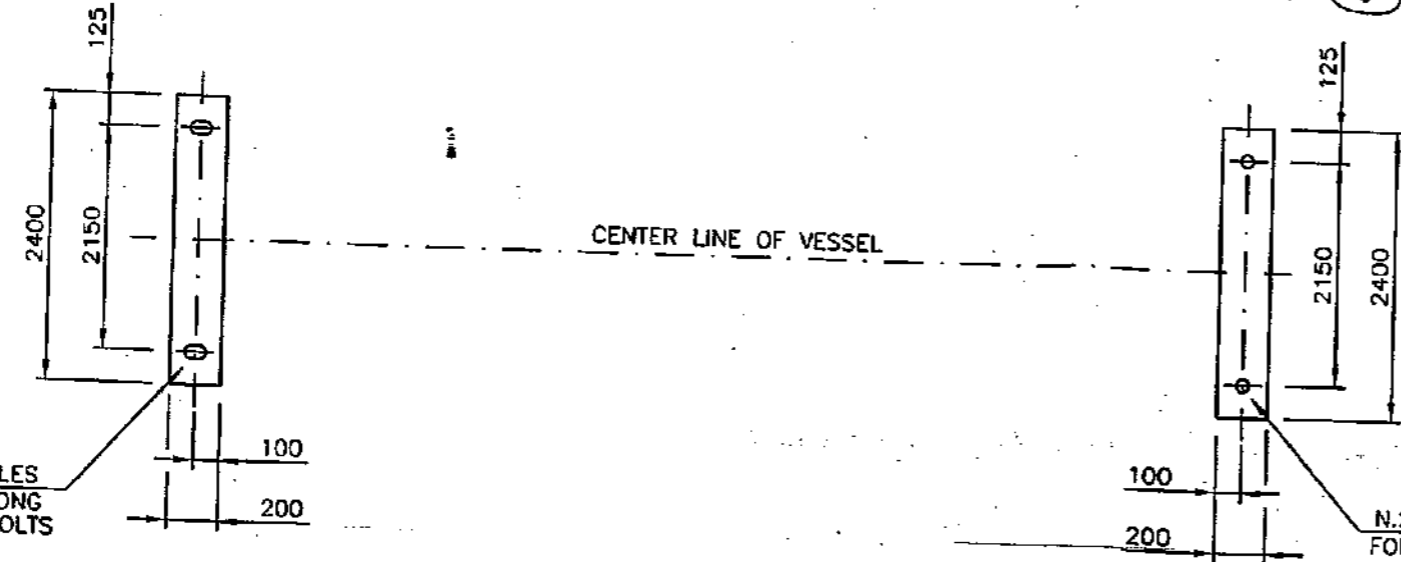
DATE: 8/30/02
MANUF. NO.: 2163030
SHEET NO.:
CODE NO.:
DRAWING NO.: 5550-22-01

| REV. | DATE | DESCRIPTION |
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I hereby warrant that the design and construction of this vessel will conform to the civil and penal provisions of the law.



VIEW A
ORIENTATION HOLD

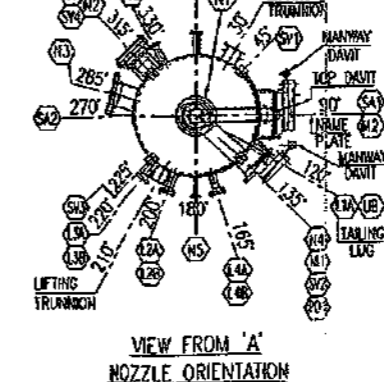
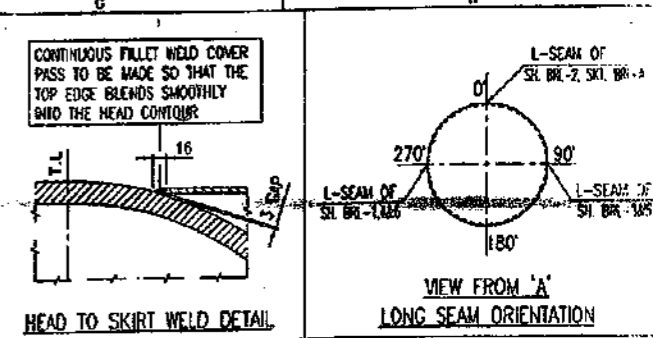
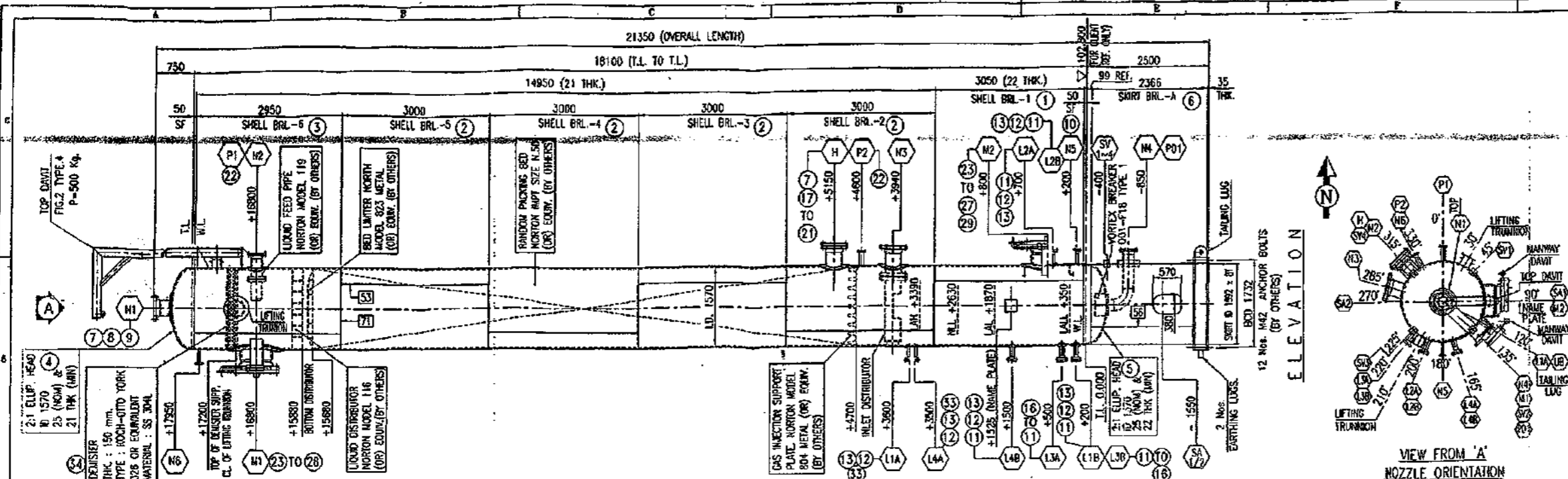


VIEW "B-B"
SUPPORT BASES

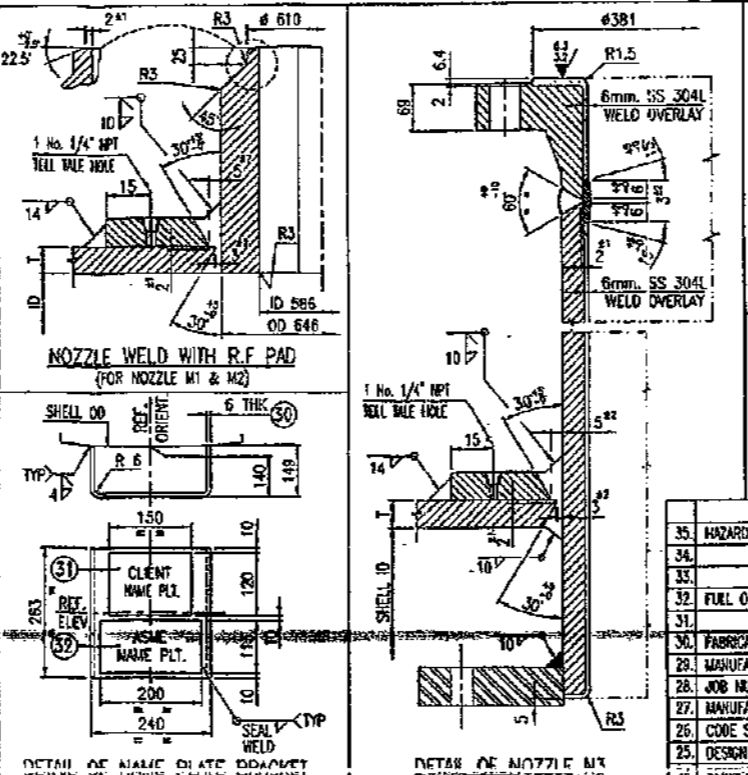
N.2 SLOTTED HOLES
30 WIDE x 60 LONG
FOR M24 H.D. BOLTS

N.2 HOLES DIA. 30
FOR M24 H.D. BOLTS

| | | | |
|---|-----------------|----------------------------------|---|
| TECHNIP-COFLEXIP | | سابك sabik | |
| SABIC ACETIC ACID PLANT IBN RUSHD SITE - YANBU - KINGDOM OF SAUDI ARABIA | | | |
| XXXX Status | ITEM : 100-D252 | SERVICE : ENTRAINER HOLDING DRUM | |
| CAD model | | | |
| / Scale | 2121 Project | 05 Unit | DW 0811 - 02 Type of doc. Code & progressive |
| | | 2 of 2 Sheet | 1 Rev. |



| BELLELI REFERENCE DRAWINGS | |
|----------------------------|---|
| DA-7391-04-002 | DETAIL DRAWING |
| DA-7391-04-003 | FORMED HEAD (TOP) |
| DA-7391-04-004 | FORMED HEAD (BOT.) |
| DA-7391-04-005 | CLIENT NAME PLATE |
| DA-7391-04-006 | ASME NAME PLATE |
| DA-7391-04-007 | CLIPS FOR PLTF. & LADDERS |
| DA-7391-04-008 | CLIPS FOR PIPE SUPP./GUIDES & INSULATION |
| DA-7391-04-009 | DEWATER SUPPORT DETAILS |
| DA-7391-04-010 | INTERNAL ATTACHMENTS |
| DA-7391-04-001 | GEN. ASSY. FOR PLATFORM & LADDERS |
| DA-7391-04-001 | PLATFORM & MANWAY DETAILS |
| DA-7391-04-002 | LADDERS & SAFETY GUARD DETAIL |
| DA-7391-00-002 | MANWAY DMIT DETAIL |
| DA-7391-00-007 | SKIRT ACCESS COVERING |
| DA-7391-00-005 | TOP DMIT |
| DA-7391-00-009 | HAND HOLE RIDGE 12"-300" |
| DA-7391-04-001 | SHIPPING ARRANGEMENT |
| DA-7391-04-001 | FINISH REQUIREMENTS |
| DA-7391-04-001 | TEMPERATURE |
| GO1-001 | SHIP PREPARATION OF EQUIPMENT FOR SHIPMENT |
| GO1-106 | PROTECTIVE VESSEL MATERIAL CONTROL PROGRAM |
| GO1-106 | NAME PLATE |
| GO1-106 | RECOMMENDED COATING SYS. FOR EXT. PROTECTION |
| GO1-106 | SHOP AND FIELD PAINTING |
| GO1-106 | NON DEGRADING AND STRESS RELIEF OF WELD |
| GO1-106 | WELDING AND INSPECTION |
| GO1-106 | QUALITY ASSURANCE AND INSPECTION - TESTING AND RECORDS |
| GO1-106 | MATERIALS IDENTIFICATION PROGRAM |
| GO1-106 | INSPECTION REQUIREMENTS FOR PRESSURE VESSELS |
| GO1-106 | COLUMBIA TRANS & INTERNAL FABRICATION |
| GO1-106 | CARBON & LOW ALLOY STEEL FABRICATION - PRESSURE VESSELS |
| GO1-106 | DEWATER DMIT ASSEMBLY AND DETAILS |
| GO1-106 | DMIT FOR OUTDOOR MANHOLE COVERS |
| GO1-106 | COLUMBIA DMIT FABRICATION DETAIL |
| GO1-106 | GRAB RINGS AND STEPS FOR MANWAYS |
| GO1-106 | COLUMBIA FABRICATION |
| GO1-106 | PRESSURE VESSELS - WELDING AND FABRICATION |
| GO1-106 | PRESSURE VESSELS - CARBON AND LOW ALLOY - STEEL DESIGN CRITERIA |
| GO1-106 | ALLOWABLE FABRICATION TOLERANCES |
| GO1-106 | VESSEL IUG MANUFACTURE & GROUNDING DETAIL |
| GO1-106 | VESSEL INSULATION AND FIRE PROTECTIVE SUPPORT |
| GO1-106 | PRESSURE VESSEL PIPE SUPPORT |
| GO1-106 | VESSEL PIPE GUIDE |
| GO1-106 | VORTEX BREAKER |
| GO1-106 | VESSEL NAME PLATE AND STAMPING |
| GO1-106 | VESSEL LIFTING LUGS, MANWAY & DOUBLE END TYPE |
| GO1-106 | SKIRT-TYPE SUPPORTS, VERTICAL VESSELS |
| GO1-106 | TESTING & INSPECTION PRESSURE VESSELS |
| GO1-106 | PRESSURE VESSELS - GENERAL |
| GO1-106 | PRESSURE VESSELS - FABRICATION |
| GO1-106 | COLUMBIA-DESIGN CRITERIA |
| GO1-106 | DATA SHEET |



| MARK | QTY | SIZE | PROJ. FROM O.D. | SERVICE |
|-------|-----|------|---------------------------|-----------------------------|
| P01 | 1 | 18" | - | PIPE OPENING FOR N1 |
| SAT-2 | 2 | 4" | - | SKIRT ACCESS |
| SM1-4 | 4 | 4" | - | SKIRT VENT |
| M2 | 1 | 24" | 1210 | MANWAY W/BUND FLG. & DMIT |
| M1 | 24" | 1210 | MANWAY W/BUND FLG. & DMIT | |
| H | 1 | 12" | 1200 | MANHOLE W/BUND FLG. & HINGE |
| P1/P2 | 2 | 2" | 1100 | PRESSURE TAPPING |
| L1/L2 | 1 | 3" | 1100 | LEVEL INSTRUMENT |
| L3A | 1 | 3" | 1100 | LEVEL INSTRUMENT |
| L3B | 2 | 3" | 1100 | SPIRE & BUND |
| L2A/B | 2 | 3" | 1100 | LEVEL TRIP |
| L1B | 1 | 3" | 1100 | LEVEL GAUGE |
| L1A | 1 | 3" | 1100 | LEVEL GAUGE |
| N6 | 1 | 1.5" | 1100 | BOILER WASHING |
| N5 | 1 | 1" | 1100 | UTILITY CONNECTION |
| N4 | 1 | 8" | 1100 | LIQUID OUTLET |
| N3 | 1 | 12" | 1200 | VAPOUR INLET |
| N2 | 1 | 8" | 1100 | LIQUID INLET |
| N1 | 1 | 12" | 1200 | VAPOUR OUTLET |

| CONDITION | LOAD | VERTICAL LOAD (kg) |
|------------------|------|--------------------|
| EMPTY (ERECTION) | | 21800 |
| OPERATING | | 43850 |
| HYDROTEST | | 65300 |

| HAZARD CONSIDERATIONS | FLAMMABLE/TOXIC |
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| TOTAL WT. = 19438.3 Kg. | |
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| NO. | DESCRIPTION | LENGTH | WIDTH | THICKNESS | WT. IN KG. | MATL. | MATL. CODE | MR. NO. | REMARKS |
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BELLELI SAUDI HEAVY INDUSTRIES LTD.
AS BUILT
CERTIFIED BY: [Signature]

| REV. | DATE | DESCRIPTION | DRAWN | CHK'D | APT. |
|------|-----------|--|-------|-------|------|
| 4 | 30 Apr 20 | REVISED AS PER CLIENT COMMENTS MARKED Δ & 'AS BUILT' | | | |
| 3 | 12 Mar 20 | REVISED AS MARKED Δ 'AS BUILT' | | | |
| 2 | 28 Feb 20 | REVISED AS PER CLIENT COMMENTS MARKED Δ | | | |
| 1 | 15 Dec 19 | REVISED AS PER CLIENT COMMENTS & ISSUED FOR CONSTRUCTION | | | |
| 0 | 27 Sep 19 | ISSUED FOR APPROVAL & INTERNAL COMMENTS. | | | |

SCALE: 1 : 50

CLIENT: **TECHNIP-COFLXIP**

ORDER: 2121NAD006

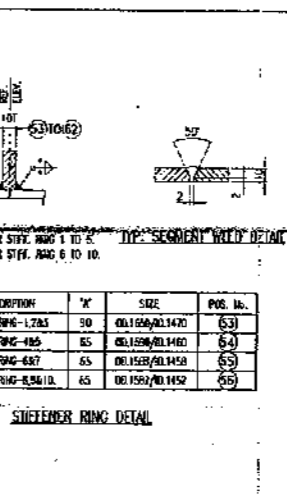
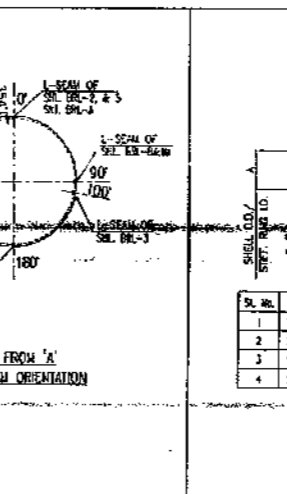
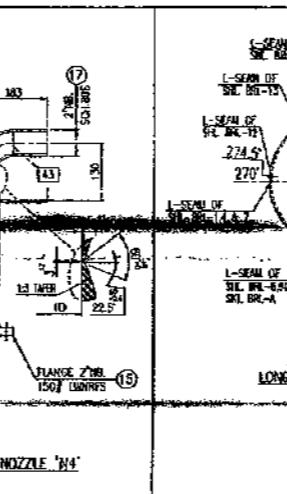
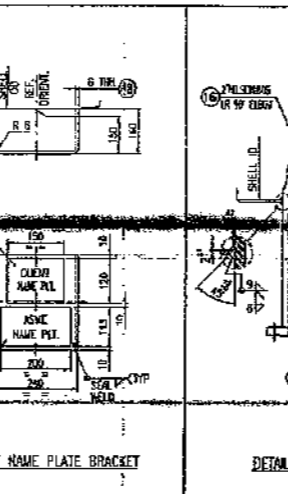
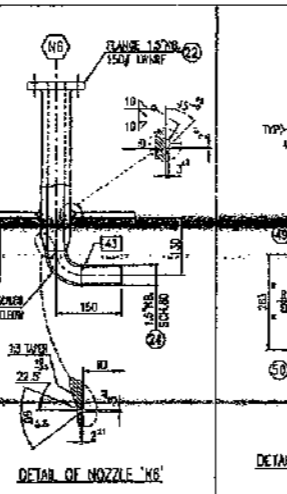
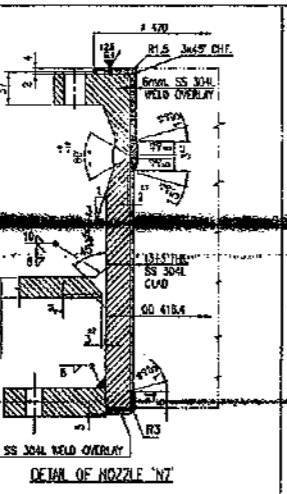
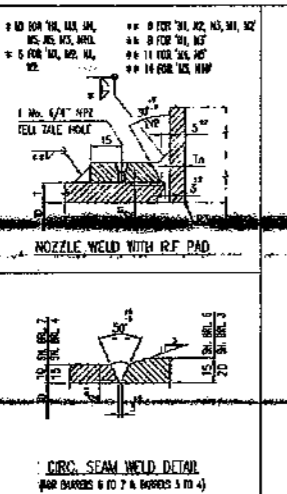
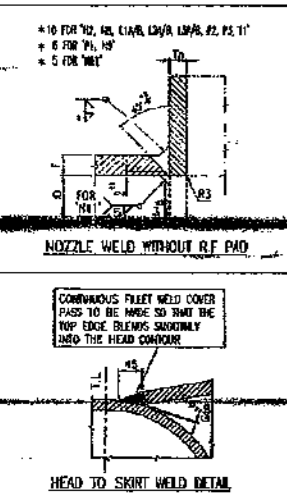
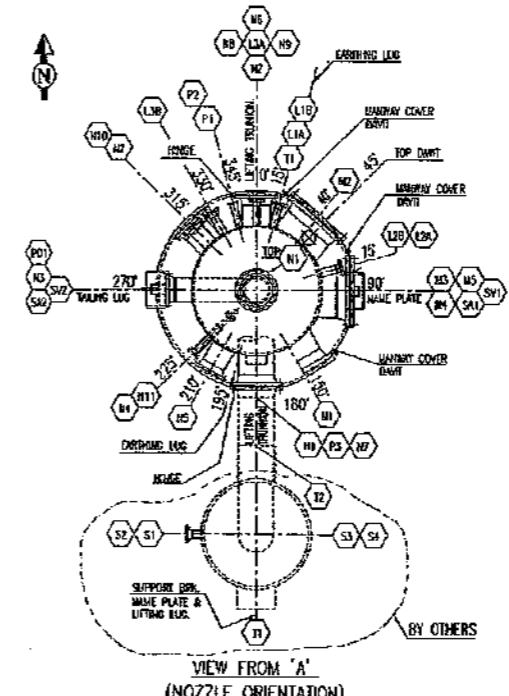
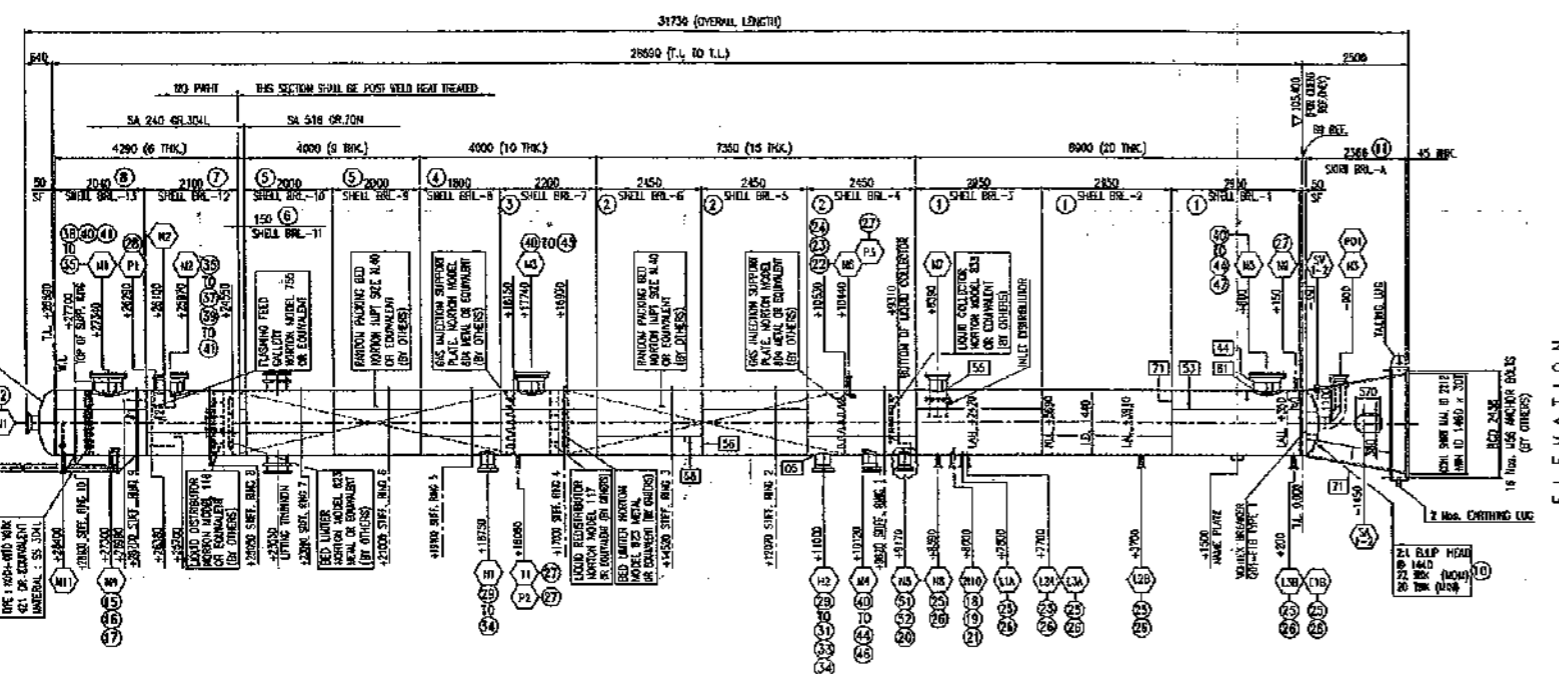
APPROVED FOR CONSTRUCTION BY: [Signature]

DATE: 18/12/19

GENERAL ASSEMBLY

DRAWING NO. DA-7391-04-001

THIS DRAWING IS NOT TO BE REPRODUCED IN WHOLE OR PART WITHOUT THE WRITTEN PERMISSION OF BELLELI SAUDI HEAVY INDUSTRIES LTD.



| CLIENT'S REF. DWGS. & SPECS. | DESCRIPTION | DRAWING No. | DESCRIPTION |
|------------------------------|----------------------------|-------------|-------------|
| DA-2101-01-01 | NOZZLE WELD WITHOUT RF PAD | | |
| DA-2101-01-02 | NOZZLE WELD WITH RF PAD | | |
| DA-2101-01-03 | HEAD TO SKIRT WELD DETAIL | | |
| DA-2101-01-04 | CIRC. SEAM WELD DETAIL | | |
| DA-2101-01-05 | DETAIL OF NOZZLE 'N7' | | |
| DA-2101-01-06 | DETAIL OF NOZZLE 'N6' | | |
| DA-2101-01-07 | DETAIL OF NOZZLE 'N1' | | |
| DA-2101-01-08 | DETAIL OF NOZZLE 'N4' | | |
| DA-2101-01-09 | DETAIL OF NOZZLE 'N5' | | |
| DA-2101-01-10 | DETAIL OF NOZZLE 'N3' | | |

| DESCRIPTION | DRAWING No. | DESCRIPTION |
|----------------------------|-------------|-------------|
| NOZZLE WELD WITHOUT RF PAD | | |
| NOZZLE WELD WITH RF PAD | | |
| HEAD TO SKIRT WELD DETAIL | | |
| CIRC. SEAM WELD DETAIL | | |
| DETAIL OF NOZZLE 'N7' | | |
| DETAIL OF NOZZLE 'N6' | | |
| DETAIL OF NOZZLE 'N1' | | |
| DETAIL OF NOZZLE 'N4' | | |
| DETAIL OF NOZZLE 'N5' | | |
| DETAIL OF NOZZLE 'N3' | | |

| DESCRIPTION | DRAWING No. | DESCRIPTION |
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| NOZZLE WELD WITHOUT RF PAD | | |
| NOZZLE WELD WITH RF PAD | | |
| HEAD TO SKIRT WELD DETAIL | | |
| CIRC. SEAM WELD DETAIL | | |
| DETAIL OF NOZZLE 'N7' | | |
| DETAIL OF NOZZLE 'N6' | | |
| DETAIL OF NOZZLE 'N1' | | |
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| DETAIL OF NOZZLE 'N5' | | |
| DETAIL OF NOZZLE 'N3' | | |

| DESCRIPTION | DRAWING No. | DESCRIPTION |
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| NOZZLE WELD WITHOUT RF PAD | | |
| NOZZLE WELD WITH RF PAD | | |
| HEAD TO SKIRT WELD DETAIL | | |
| CIRC. SEAM WELD DETAIL | | |
| DETAIL OF NOZZLE 'N7' | | |
| DETAIL OF NOZZLE 'N6' | | |
| DETAIL OF NOZZLE 'N1' | | |
| DETAIL OF NOZZLE 'N4' | | |
| DETAIL OF NOZZLE 'N5' | | |
| DETAIL OF NOZZLE 'N3' | | |

| DESCRIPTION | DRAWING No. | DESCRIPTION |
|----------------------------|-------------|-------------|
| NOZZLE WELD WITHOUT RF PAD | | |
| NOZZLE WELD WITH RF PAD | | |
| HEAD TO SKIRT WELD DETAIL | | |
| CIRC. SEAM WELD DETAIL | | |
| DETAIL OF NOZZLE 'N7' | | |
| DETAIL OF NOZZLE 'N6' | | |
| DETAIL OF NOZZLE 'N1' | | |
| DETAIL OF NOZZLE 'N4' | | |
| DETAIL OF NOZZLE 'N5' | | |
| DETAIL OF NOZZLE 'N3' | | |

| DESCRIPTION | DRAWING No. | DESCRIPTION |
|----------------------------|-------------|-------------|
| NOZZLE WELD WITHOUT RF PAD | | |
| NOZZLE WELD WITH RF PAD | | |
| HEAD TO SKIRT WELD DETAIL | | |
| CIRC. SEAM WELD DETAIL | | |
| DETAIL OF NOZZLE 'N7' | | |
| DETAIL OF NOZZLE 'N6' | | |
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| DESCRIPTION | DRAWING No. | DESCRIPTION |
|----------------------------|-------------|-------------|
| NOZZLE WELD WITHOUT RF PAD | | |
| NOZZLE WELD WITH RF PAD | | |
| HEAD TO SKIRT WELD DETAIL | | |
| CIRC. SEAM WELD DETAIL | | |
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| DESCRIPTION | DRAWING No. | DESCRIPTION |
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| NOZZLE WELD WITHOUT RF PAD | | |
| NOZZLE WELD WITH RF PAD | | |
| HEAD TO SKIRT WELD DETAIL | | |
| CIRC. SEAM WELD DETAIL | | |
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| DETAIL OF NOZZLE 'N1' | | |
| DETAIL OF NOZZLE 'N4' | | |
| DETAIL OF NOZZLE 'N5' | | |
| DETAIL OF NOZZLE 'N3' | | |

| FEED COMPOSITION : | | | |
|-----------------------|--------|---------------|-------|
| COMPONENT | MOLE % | LIQUID MOLE % | WGT % |
| VAPOR CARBON DIOXIDE | 33 | | 83.3 |
| WATER | 67 | | 16.7 |
| POTASSIUM ACETATE | | 3.9 | |
| POTASSIUM CARBONATE | | 3.7 | |
| POTASSIUM BICARBONATE | | 6.1 | |
| ADDITIVE 022A | | 1 | |
| ADDITIVE 022B | | 1 | |

24. COLUMN IS SUBJECT TO STRESS AT 120°C AND 0.5 barg.
25. INSULATION SHALL BE EXTENDED UP TO & INCLUDE COVERS OF MANWAY AND HANDWAY.
26. FINAL RADIOGRAPHY IS APPLICABLE FOR THE CARBON STEEL PORTION OF THE COLUMN INCLUDING 6 TO SS CIRC. SEAM AND SPOT RADIOGRAPHY IS APPLICABLE FOR THE STAINLESS STEEL PORTION OF THE COLUMN.
27. FOLLOWING SHALL BE MARKED ON THE VESSEL AFTER PAINTING USING 100mm HIGH BLOCK LETTERS & CONTRASTING PAINT COLOUR.
 - 27.1. CARBON - POST WELD HEAT TREATED - DO NOT WELD
 - 27.2. THE THICK CARBON STEEL SECTION OF THE COLUMN INCLUDING BARNEL (1) SHALL BE POST WELD HEAT TREATED AS PER THE ENGLISH SPEC. THE STAINLESS STEEL SECTION (2) IS TO BE HEAT TREATED AS PER THE ENGLISH SPEC.
 - 27.3. A 250mm LONG SS BARREL (SHELL BARREL - 1) SHALL BE WELDED TO THE CARBON STEEL SECTION FROM TO POST WELD HEAT TREATMENT. THE REMINDER OF THE SS SECTION (SHELL BARREL 12, 13 & TOP HEAD) SHALL BE WELDED TO THE SHELL BARREL (1) AFTER POST WELD HEAT TREATMENT.
 - LOADING TEMP. : 222°C (400°F) MAX. HOLDING TIME : 35 MINUTES (MIN)
 - RATE OF HEATING : 222°C (400°F) PER HOUR MAX. HOLDING TEMP. : 610°C (1130°F) MAX.
 - RATE OF COOLING : 277°C (500°F) PER HOUR MAX. HOLDING TEMP. : 427°C (800°F) MAX.
 - 27.4. ORIENTATION SHALL BE MARKED ON THE TOP, BOTTOM AND BOTTOM PORTIONS OF THE SURFACE OF THE SHELLS AT 0°, 90°, 180° & 270° RESPECTIVELY, WITH PUNCH AND WHITE PAINT.
 - 27.5. MANWAY/NOZZLES INCLUDING THEIR REINFORCEMENT & OTHER ATTACHMENT SHALL NOT BE LOCATED WITHIN 50mm OF WELD SEAM (TOE TO TOE).
28. THE VESSEL SHALL BE THOROUGHLY CLEANED INSIDE & OUTSIDE AND SHALL BE FREE OF ALL DIRT, WELD ROD STUBS & LOOSE FOREIGN MATERIALS ETC.
29. ALL REPAIRS SHALL BE PROVIDED WITH 1/2" SPT. RILL TAIL HOLE. THIS SHALL BE PNEUMATICALLY TESTED AT 5 psig.
30. THE VESSEL SHALL BE CLOSED WITH BUILT UP PREVENTIVE GEARING AFTER PRESSURE TESTING OF VESSEL.
31. MINIMUM TEMPERATURE OF WROUGHT IRON SHALL BE 18°C AND THE TEST PRESSURE SHALL BE HELD FOR A MINIMUM OF ONE HOUR.
32. WELDING CONTENT OF TEST WATER SHALL BE LESS THAN 50 PPM.
33. THE LONGITUDINAL BUTT WELD OF NOZZLES FABRICATED FROM PLATE SHALL BE LOOSE RADIOGRAPHED.
34. ALL RILL & EXT. ATTACHMENT WELDED TO THE VESSEL SHALL BE CONTINUOUSLY SEAL WELDED.
35. ALL NOZZLES AND MANWAY THAT DO NOT EXTEND INTO THE VESSEL SHALL BE FINISHED FLUSH WITH THE INSIDE & THE INNER EDGE SHALL BE ROUNDED OFF TO A MIN. 3mm RADIUS.
36. C MARK INDICATES THE BSH WELD STANDARD NUMBER.
37. C MARK INDICATES THE POSITION NUMBER WITH REFERENCE TO LIST OF MATERIALS.
38. C MARK INDICATES THE NOZZLE MARK NUMBER.
39. SERVICE CASSETS & BOLTS FOR BOUNDED NOZZLES SHALL BE USED FOR PRESSURE TESTING. CASSETS FOR OTHER NOZZLES SHALL BE NON ASBESTOS FIBRE.
40. TWO SPARE CASSETS AND 10% (2 Nos. MIN. PER SIZE) OF FASTENERS ARE TO BE SHIPPED LOOSE FOR ALL SERVICE BOUNDED NOZZLES & MANWAYS AS CORROSION / COMMISSIONING SPARES.
41. ALL MEASURABLE MATERIALS SHALL PASS THROUGH THE NEAREST MANHOLE.
42. NOZZLE PROTECTION IS FROM ALL OF THE WESSEL TO GASKET FACE OF P.L.D. UNLESS OTHERWISE SPECIFIED.
43. FLANGES UP TO & INCL. 24" DIA SHALL BE AS PER ANSI B16.5.
44. ALL BOLTS & NUTS SHALL BE OF LOW CARBON STEEL AND INCL. 1" SIZE AND BOLT ABOVE 1" SIZE.
45. NOZZLES POSITIONS ON VESSEL DRAWINGS ARE CONSIDERED FOR RILL LOCATION SEE END VIEW.
46. FLANGE FACE FINISH SHALL HAVE SMOOTH FINISH WITH A ROUNDNESS FROM R1.2 TO 0.3 FOR RPS. R1.6-12.5 FOR BE.
47. ALL FLANGE BOLT HOLES SHALL STRADDLE VERTICAL AND/OR HORIZONTAL CENTER LINES UNLESS SHOWN OTHERWISE.
48. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.

| GENERAL NOTES CONTD... | | NOZZLE SCHEDULE | |
|------------------------|------------------|-----------------|---------------|
| NOZZLE NO. | DESCRIPTION | SIZE | POS. NO. |
| 1 | STY. RING-1745 | 50 | 001500/001470 |
| 2 | STY. RING-185 | 65 | 001500/001460 |
| 3 | STY. RING-687 | 65 | 001500/001450 |
| 4 | STY. RING-684/10 | 65 | 001500/001452 |

| CONDITION | WIND VELOCITY (km/h) | WIND PRESSURE (kPa) |
|------------|----------------------|---------------------|
| DESIGN | 60 | 0.5 |
| OPERATING | 60 | 0.5 |
| WINDSHIELD | 6000 | 6000 |

| NOZZLE NO. | DESCRIPTION | SIZE | POS. NO. |
|------------|------------------|------|---------------|
| 1 | STY. RING-1745 | 50 | 001500/001470 |
| 2 | STY. RING-185 | 65 | 001500/001460 |
| 3 | STY. RING-687 | 65 | 001500/001450 |
| 4 | STY. RING-684/10 | 65 | 001500/001452 |

| CONDITION | WIND VELOCITY (km/h) | WIND PRESSURE (kPa) |
|------------|----------------------|---------------------|
| DESIGN | 60 | 0.5 |
| OPERATING | 60 | 0.5 |
| WINDSHIELD | 6000 | 6000 |

| LIST OF MATERIAL | | | | | | | | | | | |
|------------------|------------------|-----|------|----------|----------|-----------|----------|----------|-----------|----------|----------|
| ITEM NO. | DESCRIPTION | QTY | UNIT | REQ. NO. | REQ. QTY | REQ. UNIT | REQ. NO. | REQ. QTY | REQ. UNIT | REQ. NO. | REQ. QTY |
| 1 | STY. RING-1745 | 1 | PC | 53 | 1 | PC | 53 | 1 | PC | 53 | 1 |
| 2 | STY. RING-185 | 1 | PC | 54 | 1 | PC | 54 | 1 | PC | 54 | 1 |
| 3 | STY. RING-687 | 1 | PC | 55 | 1 | PC | 55 | 1 | PC | 55 | 1 |
| 4 | STY. RING-684/10 | 1 | PC | 56 | 1 | PC | 56 | 1 | PC | 56 | 1 |

AS BUILT

RETURNED BY: _____

DATE: _____

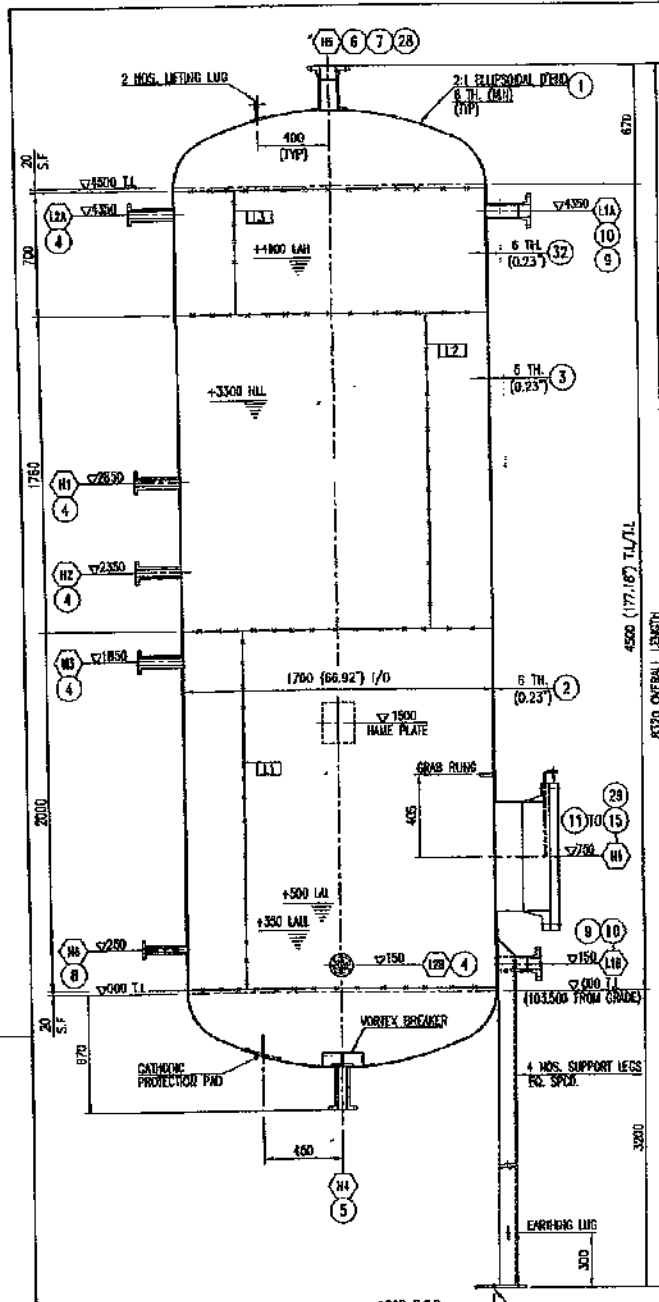
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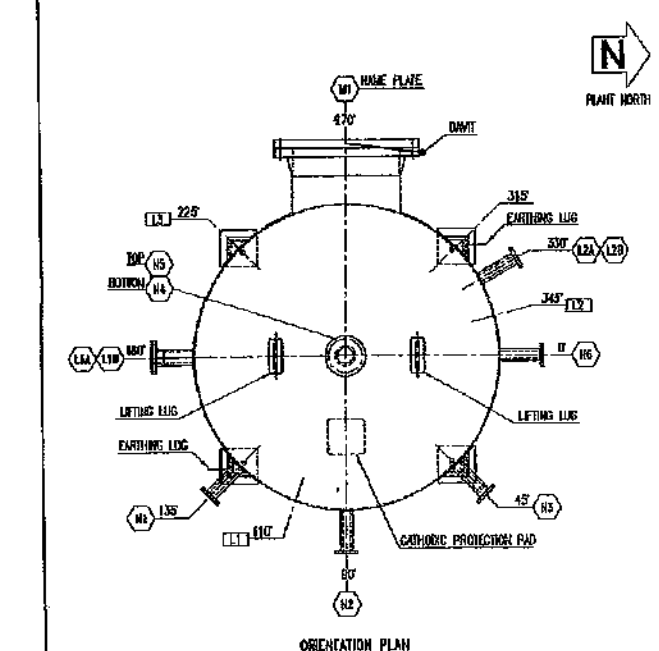
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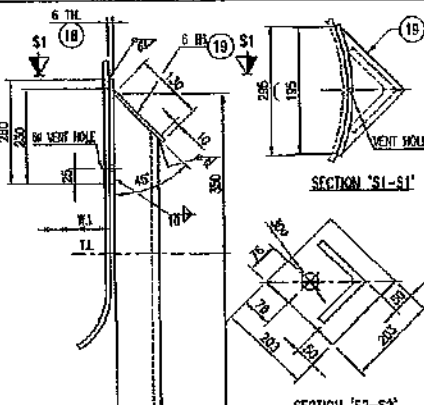
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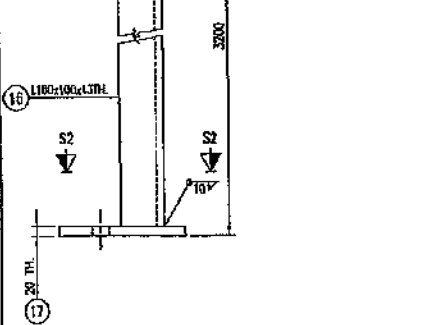
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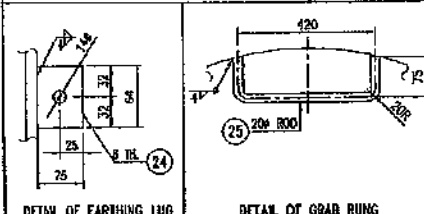
ORIENTATION PLAN



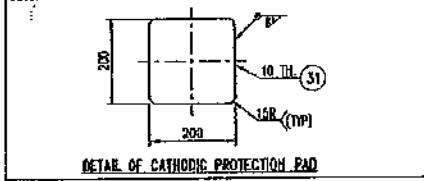
DETAIL OF NAME PLATE BRACKET



DETAIL OF VESSEL SUPPORT LEG



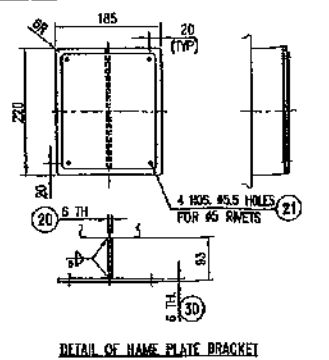
DETAIL OF EARTHING LUG



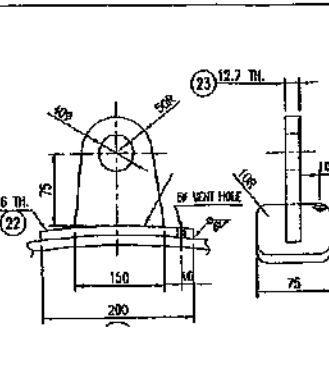
DETAIL OF GRAB RUNG



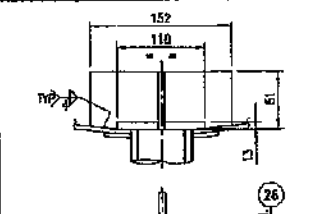
DETAIL OF CATHODIC PROTECTION PAD



DETAIL OF LIFTING LUG



DETAIL OF VORTEX BREAKER FOR NOZ-M4



DETAIL OF NOZZLE-M4

GENERAL NOTES

- THE VESSEL SHALL BE FABRICATED AS PER ASME SEC. VIII, DIV. 1, ED. 2001.
- ALL DIMENSIONS ARE IN MM & NOZZLE ELEVATIONS ARE FROM TAN LINE UNLESS OTHERWISE NOTED.
- NOZZLE PROJECTIONS HEBBED FROM VESSEL CENTERLINE TO FLANGE CONTACT FACE.
- FLANGE GASKET CONTACT SURFACE FINISH SHALL BE AS PER ASME B 16.5 TO SURF GASKET, 0.4 TO 125 RA. (ISO 480).
- NOZZLE BOLT HOLES SHALL STRADDLE PRINCIPAL CENTER LINES.
- ALL NOZZLES RF PADS SHALL HAVE 1 NO. 1/4" NPT TEL-TALE HOLE FOR AIR TEST AT 30 MPa WITH SOAP SUDS. THE HOLE SHALL BE FILLED WITH HARD GREASE AFTER HYDROTEST.
- ALL NOZZLES INSIDE EDGES EXCEPT NOZZLES WITH INSIDE PROJECTIONS SHALL BE FLUSHED WITH INTERNAL SURFACE OF VESSEL & ROUNDED OFF WITH 3 MM RADIUS.
- ALL PRESSURE RETAINING WELDS TO BE FULL PENETRATION.
- ALL INTERNAL WELDS SHALL BE CONTINUOUS FILLET WELDS.
- WELDING & NOT PER YIELD MAP NO. M15-6674-1000-V & QC INSPECTION PLAN.
- INDICATES WELD SEAM NUMBER.
- HYDROTEST SHALL BE CARRIED OUT IN HORIZONTAL POSITION USING POTABLE WATER WITH CHLORIDE CONTENT NOT EXCEEDING 50 PPM MAX. FOR 1 HR. TEMPERATURE FOR HYDROTEST SHALL BE 17 C MINIMUM AFTER TEST VESSEL SHALL BE FLUSHED WITH CLEAN WATER & SHALL BE THOROUGHLY DRAINED & DRIED.
- THE VESSEL SHALL BE THOROUGHLY WASHED AND CLEANED INSIDE AND OUTSIDE. IT SHALL BE FREE FROM WELD SPATTER, SCALE, SLAG, RUST AND ANY FOREIGN MATTERS.
- THE FABRICATION TOLERANCES SHALL BE AS PER CODE AS WELL AS SANC STD. DRG. NO. : Q01-F28 REV. 0
- FLANGED CONNECTIONS & ALL OTHER MACHINED SURFACES SHALL BE PROTECTED BY A COATING & FITTED WITH STEEL OR WOODEN COVER, 3 MM THK & NEOPRENE GASKET USING AT LEAST 4 BOLTS.
- EXTERNAL S.S. SURFACE PREPARATION & PAINTING : AS PER SYSTEM 'S2' OF TECHNIP SPEC. 2121-00-ISO-2300-01. - VESSEL COMPONENTS (SHELL, DISHED ENDS, NOZZLES ETC.) ALL EXTERNAL S.S. SURFACES PREPARATION SHALL BE AS PER - SSPC SP 7. PAINTING : 2 COATS OF EPOXY FRENKOL 150 MICRONS DFT. TOTAL DFT - 300 MICRONS
- EXTERNAL C.S. SURFACE PREPARATION & PAINTING : AS PER SYSTEM 'S1' OF TECHNIP SPEC. 2121-00-ISO-2300-01. - SUPPORT LEG, EXTERNAL ATTACHMENT ETC. ALL EXTERNAL C.S. SURFACES SHALL BE GRIT BLASTED AS PER - SA 2 PAINTING : PRIMER - EPOXY BASTIC - 125 MICRONS DFT. TOP COAT - POLYURETHANE ENAMEL (ALPHANIC) - 80 MICRONS DFT. TOTAL DFT - 175 MICRONS
- EXTERNAL ATTACHMENT PADS SHALL HAVE 1 No. 16 VENT HOLES & SHALL BE FILLED WITH HARD GREASE ONLY AFTER HYDROTEST.
- MARKINGS ON VESSEL BEFORE SHIPMENT SHALL BE IN ACCORDANCE WITH SPECS. 001-001.
- THE INDICATED THICKNESS ARE THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION
- INSIDE SURFACE OF S.S. SHALL BE PICKLED AND PASSIVATED AS PER SPEC. 2121-00-ISO-3200-01

DESIGN DATA

| | | | |
|----------------------------|------------------------------------|----------------------------|---------------------------------|
| DESIGN CODE | : ASME SEC. VIII, DIV. 1, ED. 2001 | CODE STATUS | : YES |
| INT. DESIGN PRESSURE | : 3.5 BARG (50.78 PSIG) | SERIAL NO. | : 152-1E |
| DESIGN PRESSURE | : 3.5 BARG (50.78 PSIG) | YEAR BUILT | : 2003 |
| DESIGN PRESSURE (EXT.) | : N/A | OPERATING PRESSURE | : 3.0 BARG (43.5 PSIG) |
| MAX. OPER. STAING HEAD (M) | : 4.20 m | OPERATING TEMP. MIN./MAX. | : 500 C (212 F) / 117 C (243 F) |
| DESIGN TEMPERATURE | : 155 C (311 F) | MAWP (BAR) | : 6.38 BARG (92.53 PSIG) |
| MAX. DESIGN METAL TEMP. | : 17 C (48.2 F) | MAWP (MPSI) | : 0.98 BARG (14.23 PSIG) |
| CORROSION ALLOWANCE | : NIL | HYDROTEST PRESSURE | : 8.29 BARG (120.23 PSIG) |
| WELDING TEST | : NO | HYDROTEST SITE | : YES (BY OTHERS) |
| HYDROGRAPHY | : SPOT | FIRE PROOFING | : YES (BY OTHERS) |
| WELD EFFICIENCY | : 0.85 | INSULATION | : 25 MM (BY OTHERS) (P.P.) |
| P.W.R.T. | : NO | CICLIG/SOLUBLE SERVICE | : NO / NO / NO |
| EXTERNAL COATING | : LUB-ZONE ZA | EXTERNAL PAINT | : YES (SEE NOTES) |
| WIND SPEED | : 38.0 m/s (ASCE-7) | INTERNAL COATING | : NO |
| RESISTION | : A1 | OPERATING MEDIUM | : (?) |
| | | SPECIFIC GRAVITY OF LIQUID | : 1000 |
| | | NORMAL CAPACITY | : 11.50 CUM. |

MATERIAL OF CONSTRUCTION

| | | | |
|------------------|--------------------------------|------------------|----------------------------------|
| SHELL | : SA 240 GR 304L (GS) | INTERNAL ATTACH. | : SS 304L |
| HEAD | : SA 240 GR 304L (GS) | EXTERNAL ATTACH. | : SA 240 GR 304L / SA 516 GR. 70 |
| FLANGES | : SA 182 F 304L | BOLTING EXTERNAL | : SA 193 GR 07/SA 194 GR 2H |
| LEG SUPPORT | : SA 240 GR 304L / A 38 OR EQ. | BOLTING INTERNAL | : N/A |
| FAB. NOZZLE NECK | : SA 240 GR 304L | GASKETS (EXT.) | : GLASS FIBRE FILLED PTFE (GFP) |
| NOZ. PIPES | : SA 312 TP 304L | FITTINGS | : N/A |
| RF. PAD | : SA 240 GR 304L | | |

BILL OF MATERIAL (BOM IS FOR 1 NO. EQPT.)

| NO. | QTY. | PART | DESCRIPTION | MATERIAL | REF. DRG. | WT. (KGS.) |
|-----|-------|-------------------|---|-----------------------------|-----------|------------|
| 32 | 1 | SHELL | PLATE 6 TH. x 700W x 5350 LG. | SA 240 GR 304L(GS) | SHOP DWG | 177 |
| 31 | 1 | PAD PLATE | PLATE 10 TH. x 200 x 200 | SA 240 GR 304L(GS) | SEE DWG | 3 |
| 30 | 1 | NAME PL. BRACKET | PLATE 6 TH. x 185 x 220 | SA 240 GR 304L | SEE DWG | 4 |
| 29 | 1 | NOZ-M1 | PAD PLATE 6 TH. x 950 Q/D x 637 I/D | SA 240 GR 304L | SHOP DWG | 19 |
| 28 | 1 | NOZ-M2 | PAD PLATE 6 TH. x 200 Q/D x 132 I/D | SA 240 GR 304L | SHOP DWG | 1 |
| 27 | 2 | VORTEX BREAKER | PLATE 6 TH. x 73 x 51 | SA 240 GR 304L | SEE DWG | - |
| 26 | 1 | VORTEX BREAKER | PLATE 6 TH. x 152 x 51 | SA 240 GR 304L | SEE DWG | - |
| 25 | 1 | GRAB RUNG | ROD 206 x 850 (OUT TO SURT) | SS 304L | SEE DWG | 1 |
| 24 | 2 | EARTHING LUG | PLATE 6 TH. x 75 x 64 | SS 316L | SEE DWG | - |
| 23 | 2 | LIFTING LUG | PLATE 12.7 TH. x 150 x 200 (OUT TO SUIT) | SA 516 GR. 70 | SEE DWG | 2 |
| 22 | 2 | LIFTING LUG | PAD PLATE 6 TH. x 130 x 75 | SA 240 GR 304L | SEE DWG | 2 |
| 21 | 4 | WELD ATT. BRACKET | PLATE 6 TH. x 87 x 220 | SS | SEE DWG | - |
| 20 | 1 | WELD ATT. BRACKET | PLATE 6 TH. x 87 x 220 | SA 240 GR 304L | SEE DWG | 2 |
| 19 | 4 | SUPPORT | PLATE 6 TH 185 x 145 (OUT TO SUIT) | SA 516 GR. 70 | SEE DWG | 6 |
| 18 | 4 | SUPPORT | PAD PLATE 6 TH. x 295 x 280 | SA 240 GR 304L | SEE DWG | 15 |
| 17 | 4 | SUPPORT | BASE PLATE 20 TH. x 203 x 203 | SA 516 GR. 70 | SEE DWG | 23 |
| 16 | 4 | SUPPORT | ANGLE 100 x 100 x 13 TH. x 3530 LG. | A 38 GR. ED. | SEE DWG | 229 |
| 15 | 20+12 | NOZ-M1 | STUD BOLT 1 1/4" x 7" LG. W/2 HWY. HEX. NUTS | SA 193 GR. 07/SA 194 GR. 2H | SEE DWG | 41 |
| 14 | 1+2 | NOZ-M1 | GASKET 24" 150# API 601 | GLASS FIBRE FILLED PTFE | SEE DWG | - |
| 13 | 1 | NOZ-M1 | BLIND FLANGE 24" 150# RF ASME B16.5 | SA 182 F 304L | SEE DWG | 186 |
| 12 | 1 | NOZ-M1 | FAB PIPE 6 TH. x 215W x 180 G LG. | SA 240 GR 304L | SHOP DWG | 20 |
| 11 | 1 | NOZ-M1 | FLANGE W/ 24" 150# RF ASME B16.5 (287.8 BORE) | SA 182 F 304L | SEE DWG | 118 |
| 10 | 2 | NOZ-L1A/L1B | PIPE 3" NB SCH 40S x 182 LG. | SA 312 TP 304L | SHOP DWG | 2 |
| 9 | 2 | NOZ-L1A/L1B | FLANGE W/ 2" 150# RF ASME B 18.5 SCH 40S | SA 182 F 304L | SEE DWG | 8 |
| 8 | 1 | NOZ-M6 | FLANGE W/ 1" 150# RF ASME B 18.5 x 251 LG. | SA 182 F 304L | SEE DWG | 3 |
| 7 | 1 | NOZ-M6 | PIPE 4" NB SCH 40S x 149 LG. | SA 312 TP 304L | SHOP DWG | 3 |
| 6 | 1 | NOZ-M6 | FLANGE W/ 4" 150# RF ASME B 18.5 SCH 40S | SA 182 F 304L | SEE DWG | 7 |
| 5 | 1 | NOZ-M4 | FLANGE W/ 2" 150# RF ASME B18.5 x 245 LG. | SA 182 F 304L | SEE DWG | 7 |
| 4 | 5 | NOZ-M4 | FLANGE W/ 1 1/2" 150# RF ASME B18.5 x 233 LG. | SA 182 F 304L | SEE DWG | 30 |
| 3 | 1 | SHELL | PLATE 6 TH. x 1760W x 5350 LG. | SA 240 GR 304L(GS) | SHOP DWG | 414 |
| 2 | 1 | SHELL | PLATE 6 TH. x 2000W x 5350 LG. | SA 240 GR 304L(GS) | SHOP DWG | 505 |
| 1 | 2 | HEAD | 2:1 ELLIPTICAL HEAD 1700 I/D x 6 TH. MH. | SA 240 GR 304L(GS) | SHOP DWG | 339 |

NOZZLE SCHEDULE

| NOZZLE MARK | QTY. | SIZE | NOZ./HEX. RATINGS | TYPE | FWAC | IN FROM TAIL END (PHASE 3) | SERVICE | TYPE | A | B | C | REMARKS | | | | |
|-------------|------|------|-------------------|------|------|----------------------------|---------|-------------------------|---|---|---|---------|---|---|---|--------------------|
| V1 | 1 | 24" | 8 TH. | WN | RF | - | 1160 | LIFTING LUG | | | | 142.36 | 6 | - | 6 | RF PAD 6 TH. x 200 |
| L2B | 1 | 1/2" | 14.2 TH. | WN | RF | - | 1160 | LEVEL TRIP | | | | 6 | 6 | - | - | |
| L2A | 1 | 1/2" | 14.2 TH. | WN | RF | - | 1160 | LEVEL TRIP | | | | 6 | 6 | - | - | |
| L1B | 1 | 3" | SCH 40S | WN | RF | - | 1160 | LEVEL BRIDGE | | | | 2.6 | 6 | - | - | |
| L1A | 1 | 3" | SCH 40S | WN | RF | - | 1160 | LEVEL BRIDGE | | | | 2.6 | 6 | - | - | |
| M6 | 1 | 1" | 12.7 TH. | WN | RF | - | 1160 | PUMP SPOLEPACK | | | | 6 | 6 | - | - | |
| M5 | 1 | 1" | 12.7 TH. | WN | RF | - | 1160 | VENT | | | | 2.35 | 6 | - | 6 | RF PAD 6 TH. x 200 |
| M4 | 1 | 2" | 13.2 TH. | WN | RF | - | 1160 | LIQUID OUTLET | | | | 6 | 6 | - | - | VORTEX BREAKER |
| M3 | 1 | 1/2" | 14.2 TH. | WN | RF | - | 1160 | RECYCLE WATER FEED | | | | 6 | 6 | - | - | |
| M2 | 1 | 1/2" | 14.2 TH. | WN | RF | - | 1160 | RECYCLE CONDENSATE FEED | | | | 6 | 6 | - | - | |
| M1 | 1 | 1/2" | 14.2 TH. | WN | RF | - | 1160 | RECYCLE WATER FEED | | | | 6 | 6 | - | - | |

TECHNIP-COFLIXIP

REVISIONS:

| REV. | DATE | DESCRIPTION | BY | CHKD/APPD |
|------|----------|--|----|-----------|
| 5 | 09.08.05 | AS BUILT. | | |
| 4 | 12.07.03 | AS BUILT. | | |
| 3 | 15.04.03 | REVISED AS MARKED. | | |
| 2 | 03.04.03 | REVISED AS MARKED. | | |
| 1 | 02.03.03 | REVISED AS MARKED. | | |
| 0 | 24.01.03 | ISSUED FOR CONSTRUCTION & REVISED AS MARKED. | | |
| A | 08.12.02 | ISSUED FOR CLIENT'S APPROVAL. | | |

REVISIONS:

| REV. | DATE | DESCRIPTION | BY | CHKD/APPD |
|------|----------|--|----|-----------|
| 5 | 09.08.05 | AS BUILT. | | |
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| 2 | 03.04.03 | REVISED AS MARKED. | | |
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MARITIME INDUSTRIAL SERVICES CO. LTD. INC.

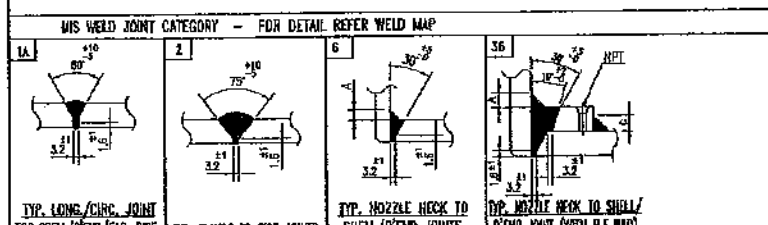
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EQUIPMENT: SCRUBBER FEED WATER DRUM (100-D231)

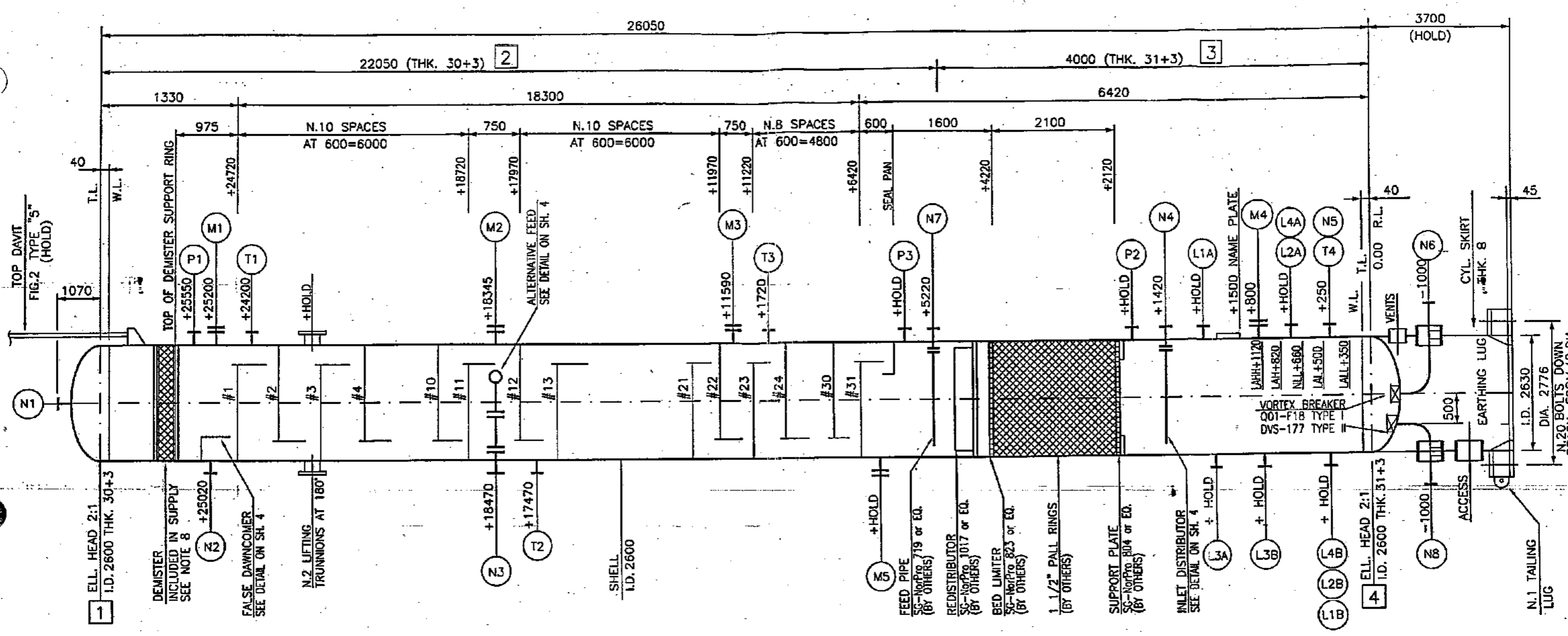
GENERAL ARRANGEMENT & DETAILS

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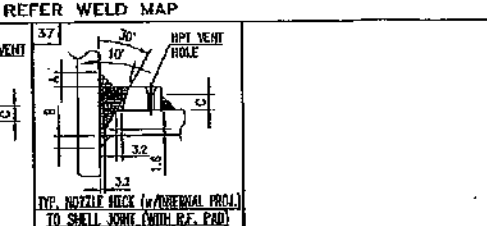
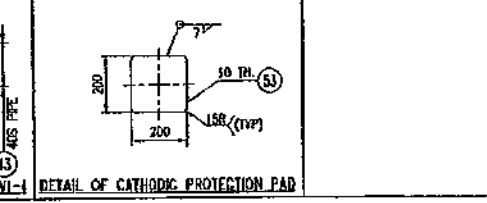
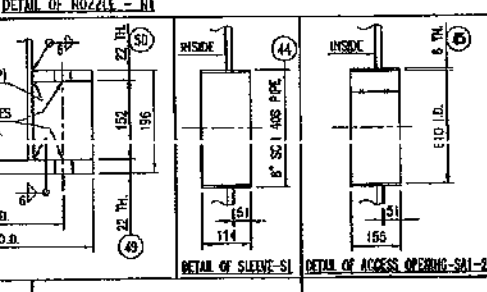
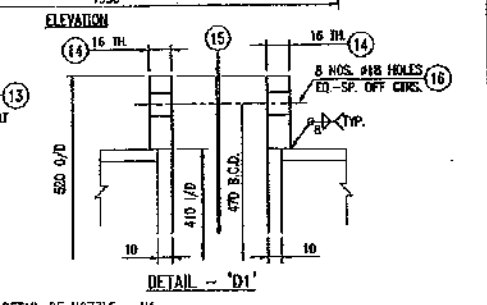
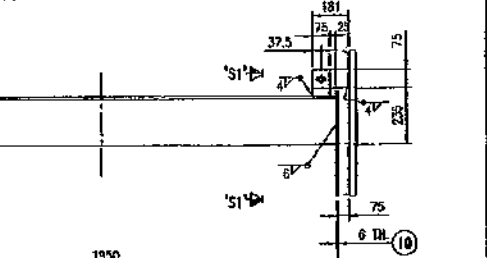
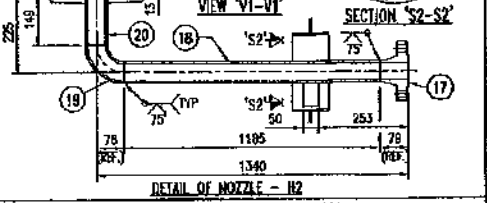
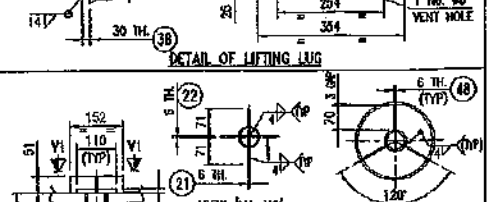
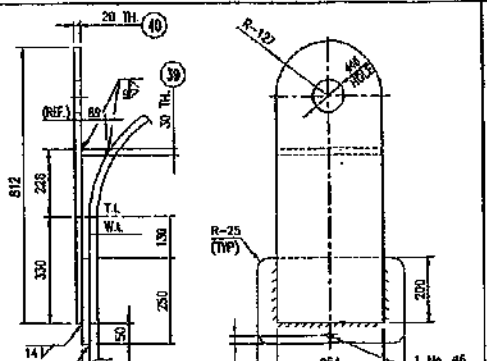
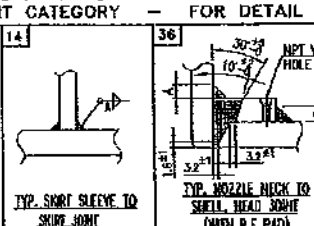
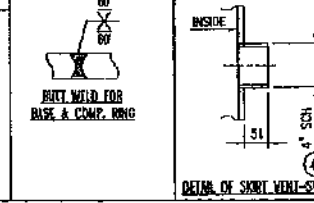
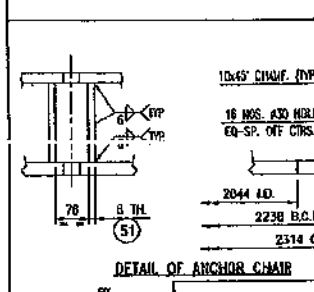
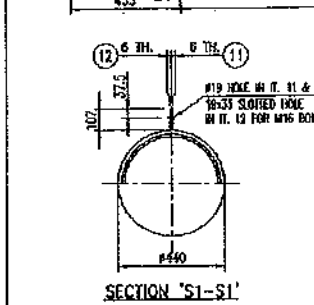
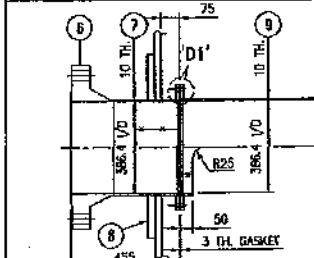
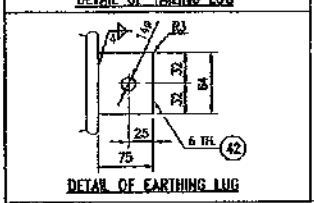
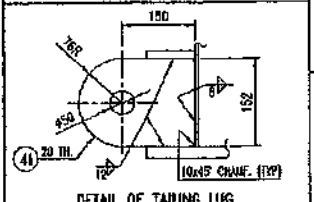
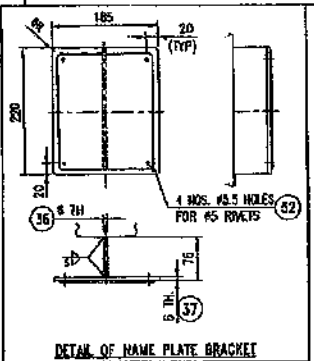
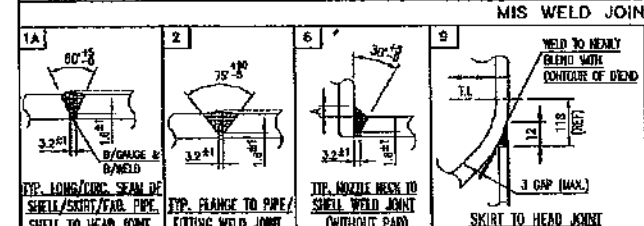
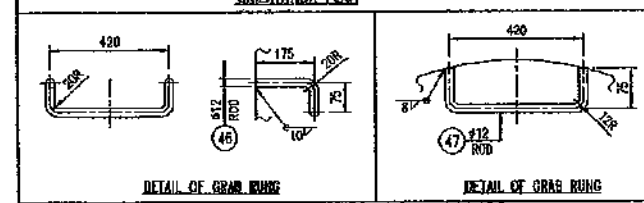
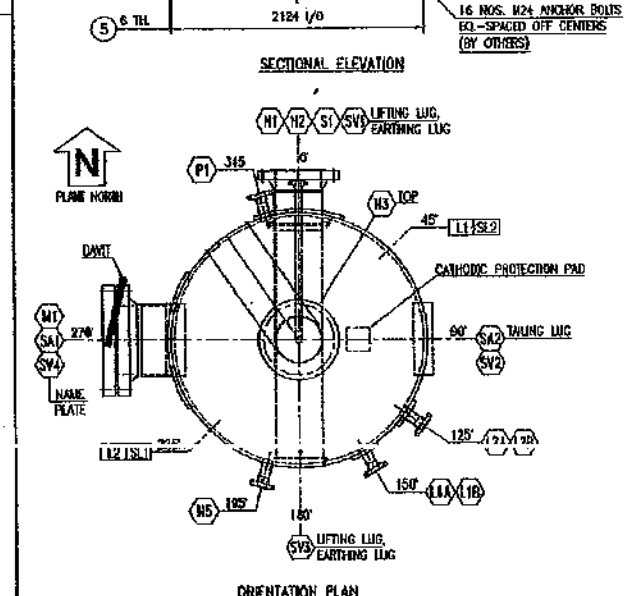
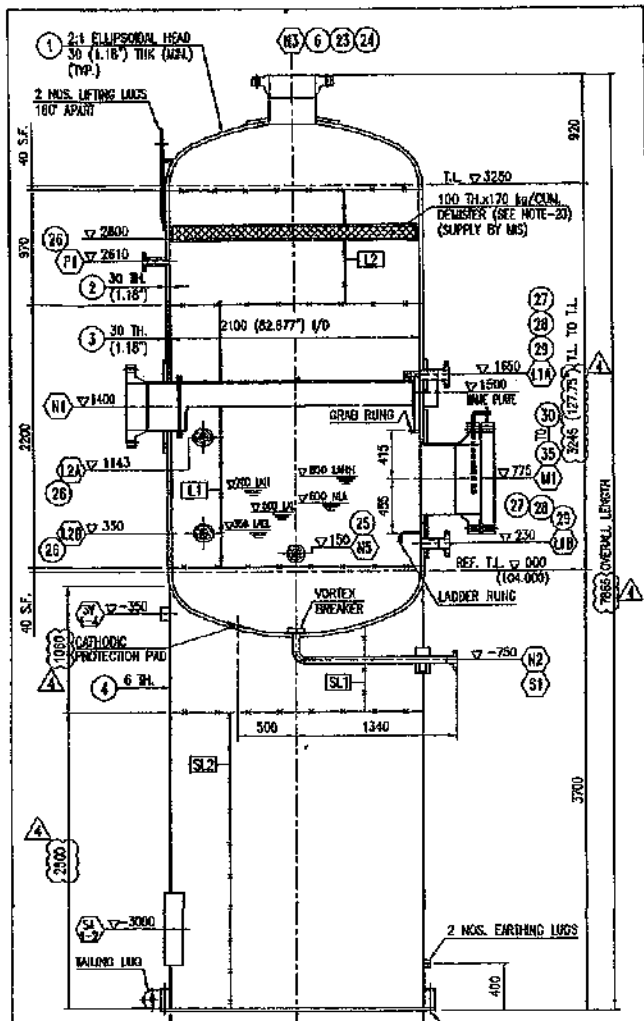
DRAWING NO. MIS-4674-044-V.01 OF 01/01



ROME who will safeguard its rights according to the law and penal provisions of the law.



| | | | |
|---|---------------------------------------|-----------------------------|---|
| TECHNIP-COFLEXIP | | سابك sabik | |
| SABIC ACETIC ACID PLANT IBN RUSHD SITE - YANBU - KINGDOM OF SAUDI ARABIA | | | |
| XXXX Status | ITEM : 100-C131 SERVICE : SCRUBBER | | |
| CAD model | | | |
| / Scale | 2121 Project | 03 Unit | DW 0511 - 01 Type of doc. Code & progressive |
| | 3 of 4 Sheet | 0 Rev. | |



GENERAL NOTES

1. THE VESSEL SHALL BE FABRICATED AS PER ASME SEC. VIII DIV. 1, ED. 2001.
2. ALL DIMENSIONS ARE IN MM & NOZZLE ELEVATIONS ARE FROM MAIN LIE UNLESS OTHERWISE NOTED.
3. NOZZLE PROJECTIONS REFERRED FROM VESSEL CENTERLINE TO FLANGE CONTACT FACE.
4. FLANGE GASKET CONTACT SURFACE FINISH SHALL BE AS PER ASME B.1.6.5 TO SUIT GASKET, 3.2 TO 6.3 HO (ISO 468).
5. NOZZLE BOLT HOLES SHALL STRADDLE PRINCIPAL CENTER LINES.
6. ALL NOZZLES R/F PADS SHALL HAVE 1 NO. 1/4" NPT TEL-TALE HOLE FOR AIR TEST AT 30 BARS WITH SOAP SUDS. THE HOLE SHALL BE FILLED WITH HARD GREASE AFTER HYDROTEST.
7. ALL NOZZLES INSIDE EDGES EXCEPT NOZZLES WITH INSIDE PROJECTIONS SHALL BE FLISHED WITH INTERNAL SURFACE OF VESSEL & ROUNDED OFF WITH 3 MM RADIUS.
8. ALL PRESSURE RETAINING WELDS TO BE FULL PENETRATION.
9. ALL INTERNAL WELDS SHALL BE CONTINUOUS TRILET WELDS.
10. WELDING & NOT PER WELD MAP NO. MIS-4674-038-V & QC INSPECTION PLAN.
11. [] INDICATES WELD SEAM NUMBER.
12. HYDROTEST SHALL BE CARRIED OUT IN HORIZONTAL POSITION USING PORTABLE WATER WITH CHLORIDE CONTENT 50 PPM FOR 1 HR. 15 MINUTES. TEMPERATURE FOR HYDROTEST SHALL BE 17 C MINIMUM. AFTER TEST VESSEL SHALL BE FLISHED WITH CLEAN WATER & SHALL BE THOROUGHLY DRAINED & DRIED.
13. THE VESSEL SHALL BE THOROUGHLY DRIED AND CLEANED INSIDE AND OUTSIDE. IT SHALL BE FREE FROM WELD SPATTER, SCALE, SLAG AND ANY FOREIGN MATTERS.
14. SERVICE GASKETS & BOLLINGS SHALL BE USED BURSH HYDROTEST.
15. THE FABRICATION TOLERANCES SHALL BE AS PER CODE AS WELL AS SAGIG STD. DPG. NO. : 001-F28 REV. 0
16. FLANGED CONNECTIONS & ALL OTHER MACHINED SURFACES SHALL BE PROTECTED BY A COATING & FITTED WITH STEEL OR WOODEN COVER 3 MM RIB & NEOPRENE GASKET USING AT LEAST 4 BOLTS.
17. EXTERNAL S.S. SURFACE PREPARATION & PAINTING: AS PER SYSTEM S2 308 OF TECHNIP SPEC. 2121-00-350-2300-01, REV. 0.
 - VESSEL COMPONENTS (SHELL, DISHED ENDS, NOZZLES, TOP S.S. SKIRT INTERNAL/EXTERNAL ETC.)
 - ALL EXTERNAL S.S. SURFACES PREPARATION SHALL BE AS PER - SSPC SP 7.
 - PAINTING: 2 COATS OF EPOXY PHENOLIC 150 MICRONS DFT.
 - TOTAL DFT - 300 MICRONS
 - EXTERNAL S.S. SURFACE PREPARATION & PAINTING: AS PER SYSTEM 'S1' OF TECHNIP SPEC. 2121-00-350-2300-01, REV. 0.
 - VESSEL COMPONENTS (BOAT, C.S. SKIRT, EXTERNAL ETC.)
 - ALL EXTERNAL C.S. SURFACES SHALL BE PREPARED AS PER - SA 2
 - PAINTING: PRIMER - EPOXY MASTIC - 125 MICRONS DFT.
 - TOP COAT - POLYURETHANE ENAMEL (ALUMINUM) - 50 MICRONS DFT.
 - TOTAL DFT - 175 MICRONS
18. EXTERNAL ATTACHMENT PADS SHALL HAVE 1 NO. 1/4" NPT HOLES & SHALL BE FILLED WITH HARD GREASE ONLY AFTER HYDROTEST.
19. MANHOLES ON VESSEL BEFORE SHIPMENT SHALL BE OF ACCORDANCE WITH SPECS. 001-004.
20. ALL REMOVED INTERIORS SHALL PASS THROUGH 500 MM LO MANNING.
21. THE STAMP PRESSURE OF THE CONTENTS SHALL BE ADDED TO THIS PRESSURE.
22. THE INDICATED THICKNESS ARE THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
23. DESIGNER TO BE KINDNESS TYPE 9032 OR EQUIVALENT.
 - THICKNESS: 300MM, FREE VOLUME: 97.50%, BULK DENSITY: 170 KG/CUM, SURFACE AREA: 350 SQM/CUM MIN.
 - DESIGNER TO BE SUITABLE FOR THE FOLLOWING PROCESS CONDITION:
 - DESIGN VAPOR FLOWRATE: 145992 Kg/h LIQUID DENSITY: 980 KG/CUM
 - MIN. OPERATING VAPOR FLOWRATE: 70402 Kg/h MAX. ALLOWABLE PRESSURE DROP: 0.05 bar
 - VAPOR DENSITY: 2.55 KG/CUM
 - DESIGNER IS TO BE REMOVED FROM BELOW AS PER STD. 001-F34 FOR SUPPORT DETAILS.
24. FLUID COMPOSITION (WGT%): VAPOR: ETHANE 49.7, METHANE 21.8, NITROGEN 18.6, DIOSIDE S.S., ETHYLENE 1.8, WATER 0.5, OXYGEN 0.4, ARGON 0.2, PROPANE 0.2, OTHERS 0.1
25. THE DRUM IS SUBJECT TO STEAM OUT AT 120C AND 0.5 barg.
26. MINIMUM DESIGN TEMPERATURE AT 9C AT 31.8 barg.
27. INSIDE SURFACE OF S.S. SHALL BE PICKLED AND PASSIVATED AS PER SPEC. 2121-00-350-2300-01

| NO. | QTY. | PART | DESCRIPTION | MATERIAL | REF. DRG. (MIS USE) | WL. (KG) |
|-----|------|--------------|--|-----------------|---------------------|----------|
| 53 | 1 | PAD PLATE | PLATE 10 TH. x 200 x 200 | SA 240 GR. 304L | SEE DRG. 3 | |
| 54 | 4 | NAME PLATE | RIVETS 95 | SS | SEE DRG. - | |
| 55 | 32 | GUSSET | PLATE 8 TH. x 152 x 91 | SA 516 GR. 70 | SHOP DRG. 28 | |
| 56 | 1 | COMP. RING | PLATE 22 TH. x 2514 O/D x 2136 I/D | SA 516 GR. 70 | SHOP DRG. 80 | |
| 57 | 1 | BASE RING | PLATE 22 TH. x 2514 O/D x 2044 I/D | SA 516 GR. 70 | SHOP DRG. 147 | |
| 58 | 3 | NOZ. H2 | FM PLATE 6 TH. x 50 x 75 (CUT TO SUIT) | SA 240 GR. 304L | SEE DRG. 1 | |
| 59 | 1 | GRAB RING | ROD #12 x 553 LG. | SS 304L | SEE DRG. 2 | |
| 60 | 1 | LADDER RING | ROD #12 x 888 LG. | SS 304L | SEE DRG. 3 | |
| 61 | 2 | SKIRT ACCESS | FAB. PIPE PLT. 6 BH. x 155W x 1935 | SA 516 GR. 70 | SHOP DRG. 26 | |
| 62 | 1 | SLEWEE | PIPE 8" SCH 40S x 114 LG. | SA 312 TP 304L | SEE DRG. 5 | |
| 63 | 4 | SHORT VENT | PIPE 4" SCH 40S x 59 LG. | SS | SEE DRG. 1 | |
| 64 | 2 | EARTHING LUG | PLATE 6 TH. x 64 x 75 | SA 312 TP 304L | SEE DRG. 3 | |
| 65 | 1 | TAILING LUG | PLATE 20 TH. x 228 x 152 | SA 516 GR. 70 | SEE DRG. 5 | |
| 66 | 2 | LIFTING LUG | PLATE 20 TH. x 254 x 192 | SA 516 GR. 70 | SEE DRG. 05 | |
| 67 | 2 | LIFTING LUG | PLATE 20 TH. x 100 x 254 (CUT TO SUIT) | SA 240 GR. 304L | SEE DRG. 11 | |

| BILL OF MATERIAL | | DESCRIPTION | | MATERIAL | | REF. DRG. (MIS USE) | | WL. (KG) | |
|------------------|---|-------------|-----------|----------|----|---------------------|---|----------|--------------------|
| S1 | 1 | 8" | SCH 40S | - | - | - | - | - | - |
| S1-1 | 4 | 4" | SCH 40S | - | - | - | - | - | - |
| S1-2 | 2 | 2" | SCH 80S | - | - | - | - | - | - |
| U1 | 1 | 24" | 10 TH. | 600 | WN | RFS | - | 1540 | MANWAY |
| U1A/B | 2 | 1 1/2" | 15.88 TH. | 600 | WN | RFS | - | 1285 | LEVEL TRIP |
| U1A/B | 2 | 3" | SCH 80S | 600 | WN | RFS | - | 1285 | LEVEL DRIBLE |
| P1 | 1 | 1 1/2" | 15.88 TH. | 600 | WN | RFS | - | 1285 | PRESSURE TAPPING |
| N5 | 1 | 1" | 14.22 TH. | 600 | WN | RFS | - | 1285 | UTILITY CONNECTION |
| N5 | 1 | 16" | 10 TH. | 600 | WN | RFS | - | 1285 | VAPOR OUTLET |
| N2 | 1 | 2" | SCH 80S | 600 | WN | RFS | - | 1285 | LIQUID OUTLET |
| N7 | 1 | 16" | 10 TH. | 600 | WN | RFS | - | 1285 | FEED |

| NOZZLE SCHEDULE | | DESCRIPTION | | MATERIAL | | REF. DRG. (MIS USE) | | WL. (KG) | |
|-----------------|------|-------------|---------|----------|------|---------------------|----|------------|--------------------------------------|
| NOZZLE | QTY. | SIZE | SCH/TH. | EXTING. | TYPE | FACE | IN | PROTECTION | SERVICE |
| MIS-4674-043-V | | | | | | | | | SHORT TEMPLATE |
| MIS-4674-042-V | | | | | | | | | NAME PLATE |
| MIS-4674-041-V | | | | | | | | | MANWAY BOLT |
| MIS-4674-040-V | | | | | | | | | NOZZLE & INTERNAL DEBABS |
| MIS-4674-039-V | | | | | | | | | ANCHOR CHAIRS & PREPARATION SURFACES |

| DESIGN DATA | | CODE STAMP | |
|-------------------------|--|----------------------------|-------------------------------------|
| DESIGN CODE | : ASME SEC. VIII, DIV. 1, ED. 2001 | CODE STAMP | : YES |
| INT. DESIGN SHELL | : 31.6 BARG (458.3 PSIG) | SERIAL NO. | : 152-10 |
| PRESSURE HEAD | : 31.6 BARG (458.3 PSIG) | YEAR BUILT | : 2003 |
| DESIGN PRESSURE (EXG.) | : 0.8 BARG (7.25 PSIG) @ 120C | OPERATING PRESSURE (MAX.) | : 24.1/26.4 BARG (349.7/384.4 PSIG) |
| DESIGN TEMPERATURE | : 125 C (267 F) | OPERATING TEMP. MAX. | : 80 C (180 F) |
| MIN. DESIGN METAL TEMP. | : 0 C (32 F) | BUMP (HAGG) | : 32.21 BARG (467.2 PSIG) |
| CORROSION ALLOWANCE | : NIL | BUMP (HAGG) | : 32.34 BARG (469.1 PSIG) |
| IMPACT TEST | : NO | HYDROTEST PRESSURE | : 41.87 BARG (607.3 PSIG) |
| RADIOGRAPHY | : RT-1 | FIRE PROOFING | : YES (50 mm BY OTHERS) |
| LIQHT EFFICIENCY | : 1.0 | INSULATION | : NO |
| P.WALL | : NO | CYCLO/SUB/AERIAL SERVICE | : NO / NO / NO |
| MAX. OPER. STATIC HEAD | : 0.85m | EXTERNAL PAINT | : YES (SEE NOTE-17) |
| EARTH QUAKE | : URC-ZONE 2A | INTERNAL COATING | : NO |
| WIND SPEED | : 38.9 m/s (ASCE-7) | OPERATING MEDIUM | : SEE NOTE-24 |
| DISPECTION | : A1 | SPECIFIC GRAVITY OF LIQUID | : 0.98 |
| WEIGHTS | HYDROTEST : 18000 KGS. OPERATING : 18000 KGS. | HAZARD CONSIDERATION | : FLAMMABLE |
| | | NORMAL CAPACITY | : 13.68 CUM |

| MATERIAL OF CONSTRUCTION | | INTERIORS | |
|-------------------------------|-------------------------|--|--|
| SHELL | : SA 240 GR. 304L | INTERIORS | : SS 304L |
| HEAD | : SA 240 GR. 304L | INTERNAL PIPE | : SA 240 GR. 304L |
| FLANGES | : SA 182 F 304L | EXTERNAL ATTACH: SA 240 GR. 304L/SA 516 GR. 70 | |
| PIPE | : SA 512 TP 304L (SMLS) | BOLLING EXTERNAL: A 193 GR. B7/A 194 GR. 2H | |
| FAB. PIPE | : SA 240 GR. 304L | BOLLING INTERNAL: SS 304L | |
| TOP SKIRT | : SA 240 GR. 304L | GASKETS (EXT.) | : SE 316 PTFE RING 3.3MM RING & CL. OUTER RING |
| BOTTOM SKIRT | : SA 516 GR. 70 | GASKETS (INT.) | : NAF |
| ANCHOR CHAIR, BASE/COMP. PLT. | : SA 516 GR. 70 | FITTINGS | : SA 403 WP 304L |
| INTERNAL ATTACHMENTS | : SS 304L | | |

| BILL OF MATERIAL Contd... | | DESCRIPTION | | MATERIAL | | REF. DRG. (MIS USE) | | WL. (KG) | |
|---------------------------|-----|----------------|---|------------------|---------------|---------------------|--|----------|--|
| 38 | 2 | LIFTING LUG | PAD PLATE 30 TH. x 290 x 354 | SA 240 GR. 304L | SEE DRG. 42 | | | | |
| 37 | 1 | NAME PLATE | PLATE 8 TH. x 185 x 220 | SA 240 GR. 304L | SEE DRG. 4 | | | | |
| 38 | 1 | NAME PLATE | PLATE 8 TH. x 220 x 50 | SA 240 GR. 304L | SEE DRG. 2 | | | | |
| 39 | 24 | MANWAY-M1 | SOLID #1 7/8" x 13" LG. w/2 HEX NUTS | SA 193-07/104-2H | SEE DRG. 183 | | | | |
| 34 | 1-2 | MANWAY-M1 | GASKET SPIRAL WOUND 24" 600/ R | | SEE DRG. - | | | | |
| 35 | 1 | MANWAY-M1 | BLIND FLANGE 24" 600/ RFS ASME B16.5 | SA 182 F 304L | SEE DRG. 543 | | | | |
| 32 | 1 | MANWAY-M1 | R/F PAD PLATE 30 TH. x 1170 O/D x 622 I/D | SA 240 GR. 304L | SHOP DRG. 185 | | | | |
| 31 | 1 | MANWAY-M1 | FAB. PIPE 10 TH. x 326W x 1885 | SA 240 GR. 304L | SHOP DRG. 47 | | | | |
| 30 | 1 | MANWAY-M1 | FLANGE 24" WN 600/ RFS ASME B16.5 (ASBQ BORE) | SA 182 F 304L | SEE DRG. 365 | | | | |
| 29 | 2 | NOZ. L1A/B | R/F PAD PLATE 30 TH. x 270 O/D x 102 I/D | SA 240 GR. 304L | SHOP DRG. 36 | | | | |
| 28 | 2 | NOZ. L1A/B | PIPE 3" SCH 40S x 147 LG. | SA 312 TP 304L | SEE DRG. 3 | | | | |
| 27 | 2 | NOZ. L1A/B | FLANGE 3" WN 600/ RFS ASME B16.5 (SCH 40S BORE) | SA 182 F 304L | SEE DRG. 22 | | | | |
| 26 | 3 | NOZ. P1A/B | FLANGE 1 1/2" WN 600/ RFS x 237 LG. ASME B16.5 | SA 182 F 304L | SEE DRG. 16 | | | | |
| 25 | 1 | NOZ. H5 | FLANGE 1" WN 600/ RFS x 236 LG. ASME B16.5 | SA 182 F 304L | SEE DRG. 7 | | | | |
| 24 | 1 | NOZ. N3 | R/F PAD PLATE 30 TH. x 255 O/D x 414 I/D | SA 240 GR. 304L | SHOP DRG. 38 | | | | |
| 23 | 1 | NOZ. N3 | FAB. PIPE 10 TH. x 222W x 1245 LG. | SA 240 GR. 304L | SHOP DRG. 22 | | | | |
| 22 | 2 | NOZ. N3 | PLATE 8 TH. x 51 x 75 | SA 240 GR. 304L | SEE DRG. 1 | | | | |
| 21 | 1 | VORTEX BREAKER | PLATE 8 TH. x 51 x 152 | SA 240 GR. 304L | SEE DRG. 1 | | | | |
| 20 | 1 | NOZ. N2 | PIPE 2" SCH 80S x 140 LG. | SA 312 TP 304L | SEE DRG. 1 | | | | |
| 19 | 1 | NOZ. N2 | ELBOW 2" SCH 80S 90°-LR. ASME B16.5 | SA 403 WP 304L | SEE DRG. 3 | | | | |
| 18 | 1 | NOZ. N2 | PIPE 2" SCH 80S x 1165 LG. | SA 312 TP 304L | SEE DRG. 9 | | | | |
| 17 | 1 | NOZ. N2 | FLANGE 2" WN 600/ RFS ASME B16.5 (SCH 80S BORE) | SA 182 F 304L | SEE DRG. 6 | | | | |
| 16 | 8 | NOZ. N1 | HEX. BOLT M16 x 55 LG. w/1 HEX. NUT | SS 304L | SEE DRG. - | | | | |
| 15 | 1 | NOZ. N1 | GASKET 3 TH. x 520 O/D x 410 I/D | NAF | SEE DRG. - | | | | |
| 14 | 2 | NOZ. N1 | PLATE FLANGE 16 TH. x 520 O/D x 410 I/D | SA 240 GR. 304L | SEE DRG. 23 | | | | |
| 13 | 1 | NOZ. N1 | HEX. BOLT M16 x 35 LG. w/1 HEX. NUT | SS 304L | SEE DRG. - | | | | |
| 12 | 1 | NOZ. N1 | PLATE 8 TH. x 75 x 107 | SA 240 GR. 304L | SHOP DRG. 1 | | | | |
| 11 | 1 | NOZ. N1 | PLATE 6 TH. x 75 x 107 | SA 240 GR. 304L | SHOP DRG. 2 | | | | |
| 10 | 1 | NOZ. N1 | PLATE 8 TH. x 75 x 107 | SA 240 GR. 304L | SHOP DRG. 2 | | | | |
| 9 | 1 | NOZ. N1 | PLATE 8 TH. x 75 x 107 | SA 240 GR. 304L | SHOP DRG. 2 | | | | |
| 8 | 1 | NOZ. N1 | FAB. PIPE 10 TH. x 1245W x 1834 LG. | SA 240 GR. 304L | SHOP DRG. 192 | | | | |
| 7 | 1 | NOZ. N1 | R/F PAD PLATE 30 TH. x 770 O/D x 414 I/D | SA 240 GR. 304L | SHOP DRG. 38 | | | | |
| 6 | 2 | NOZ. N1A/B | FLANGE 16" WN 600/ RFS ASME B16.5 (ASBQ BORE) | SA 182 F 304L | SEE DRG. 280 | | | | |
| 5 | 1 | NOZ. N1 | FAB. PIPE 10 TH. x 280W x 1245 LG. | SA 240 GR. 304L | SHOP DRG. 28 | | | | |
| 4 | 1 | NOZ. N1 | FLANGE 16" WN 600/ RFS ASME B16.5 (ASBQ BORE) | SA 182 F 304L | SEE DRG. 380 | | | | |
| 3 | 1 | NOZ. N1 | FLANGE 16" WN 600/ RFS ASME B16.5 (ASBQ BORE) | SA 182 F 304L | SEE DRG. 380 | | | | |
| 2 | 1 | NOZ. N1 | FLANGE 16" WN 600/ RFS ASME B16.5 (ASBQ BORE) | SA 182 F 304L | SEE DRG. 380 | | | | |
| 1 | 1 | NOZ. N1 | FLANGE 16" WN 600/ RFS ASME B16.5 (ASBQ BORE) | SA 182 F 304L | SEE DRG. 380 | | | | |

TECHNIP-COFLEXIP

YORON DOUGLASS REVIEW

DATE: 16.11.02

CLIENT: TECHNIP-COFLEXIP - SABIC

PROJECT: SABIC ACETIC ACID PLANT, IBN RUSHD SITE - YANBU, K.S.A.

EQUIPMENT: RECYCLE GAS KO DRUM (ITEM NO. 100-D211)

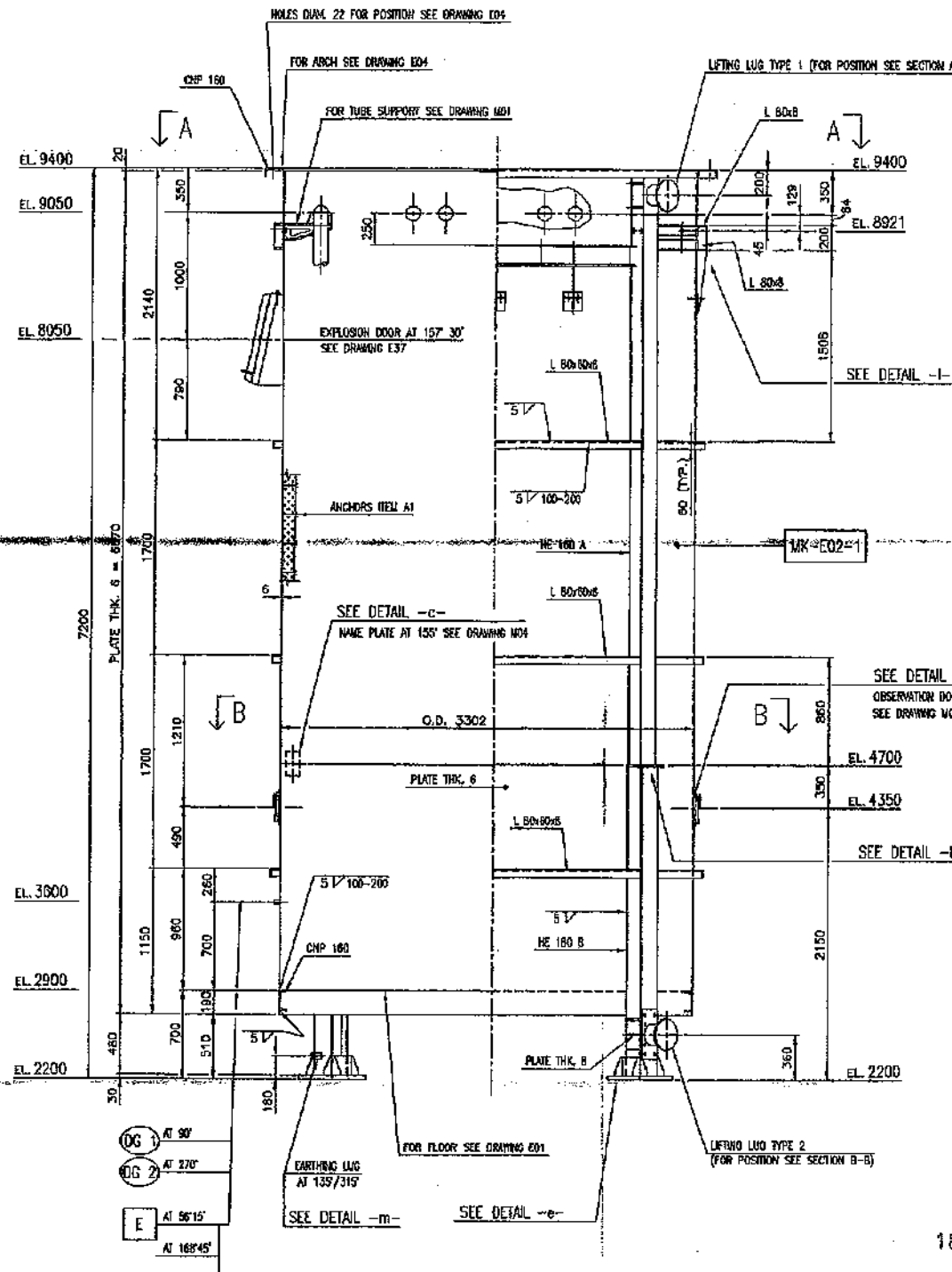
GENERAL ARRANGEMENT & DETAILS

SCALE: 1:30

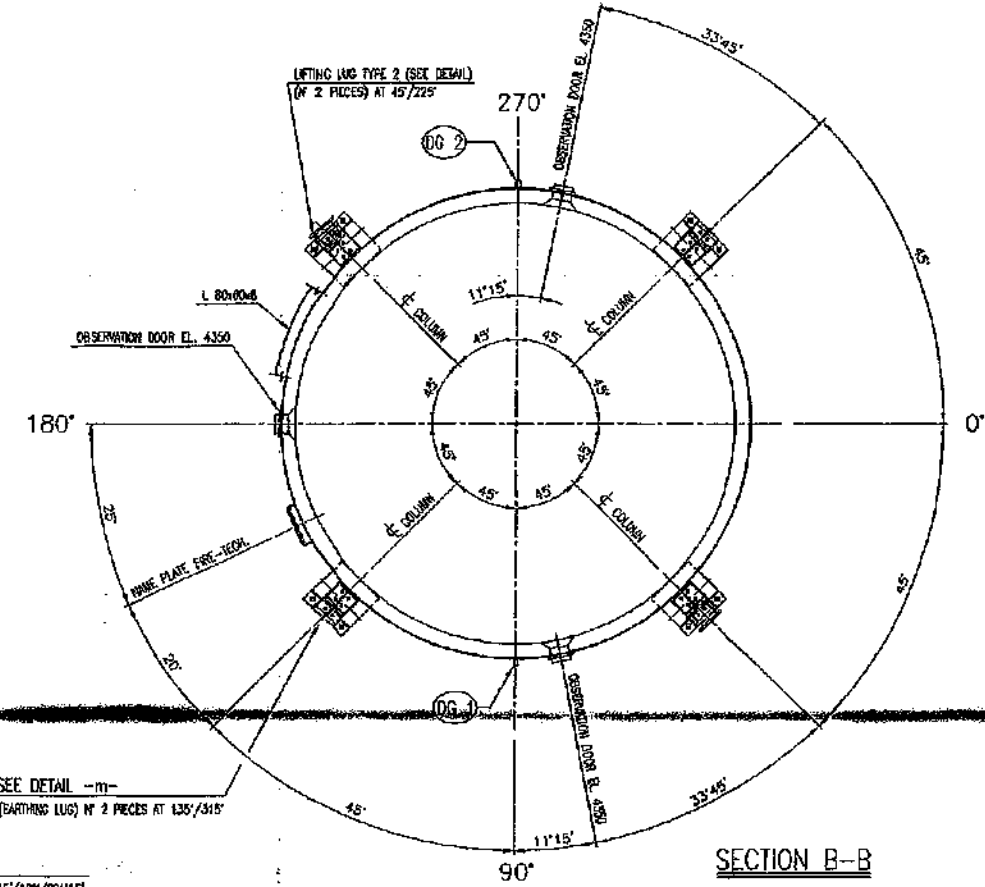
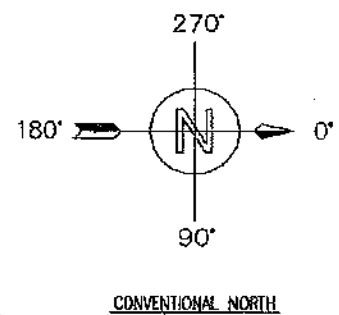
DRAWING NO. M.I.S.-4674-038-V, 0.1 of 0.1

ASME

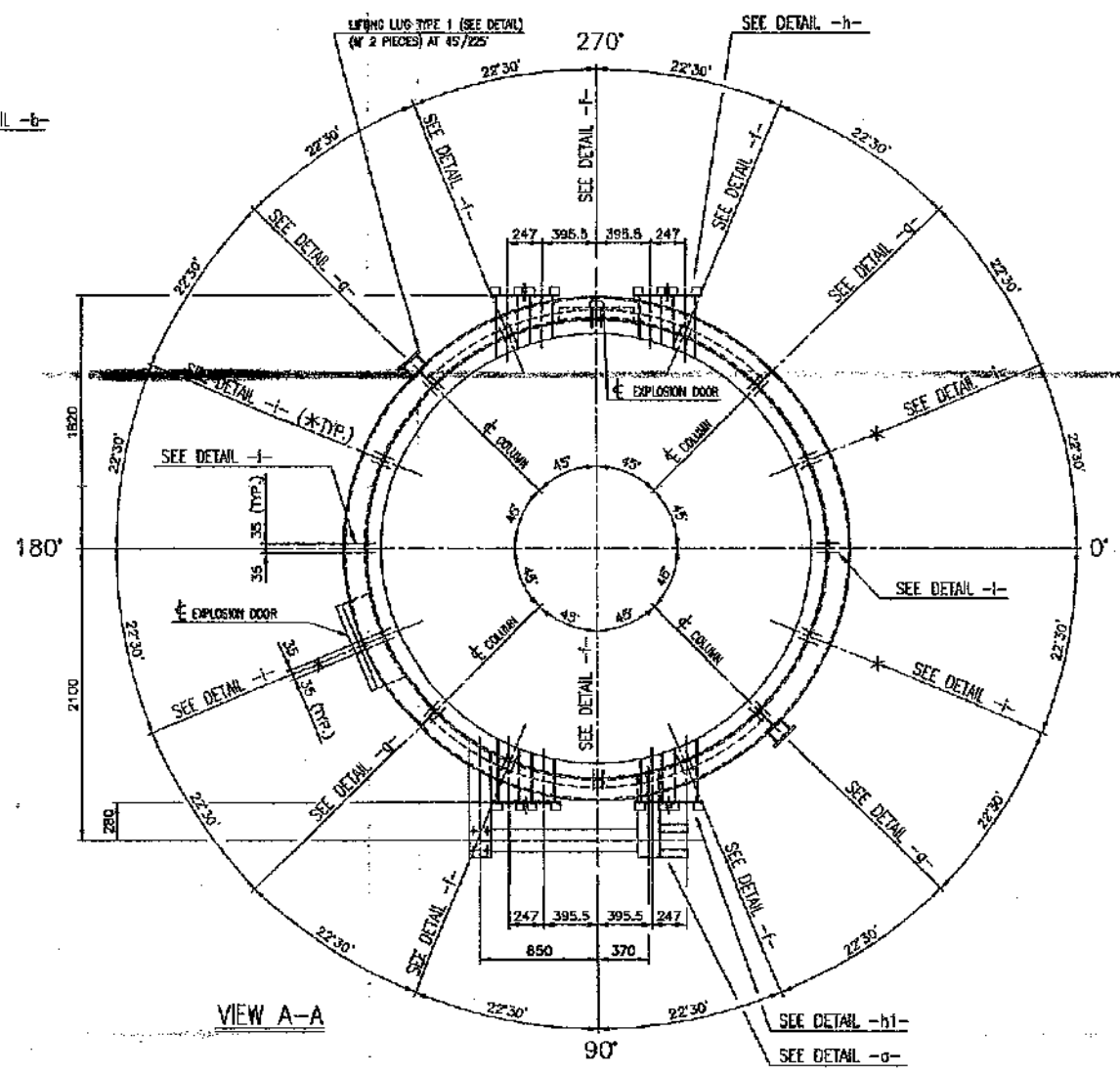
NATL. BOARD No. 1



1/2 VIEW 1/2 SECTION FROM 90°



SECTION B-B



VIEW A-A

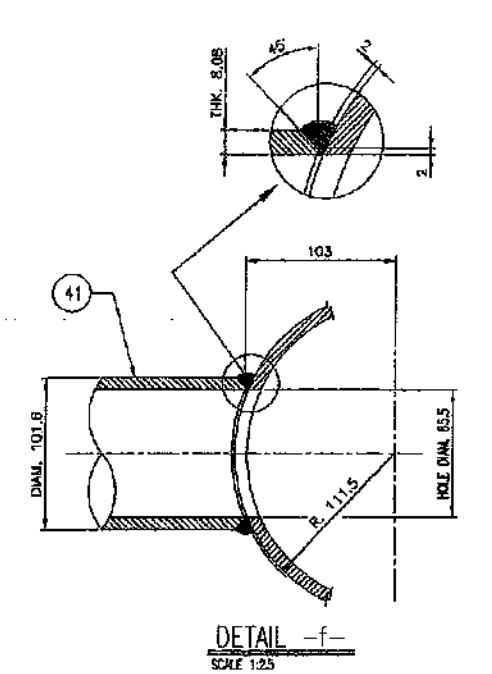
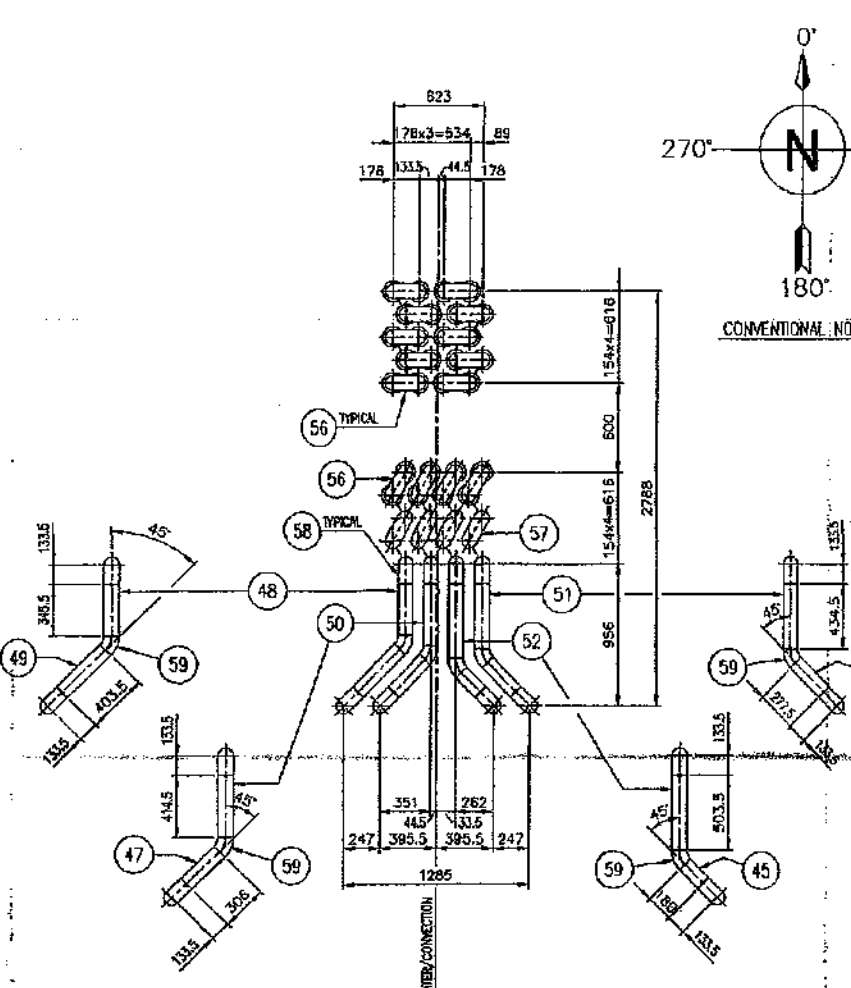
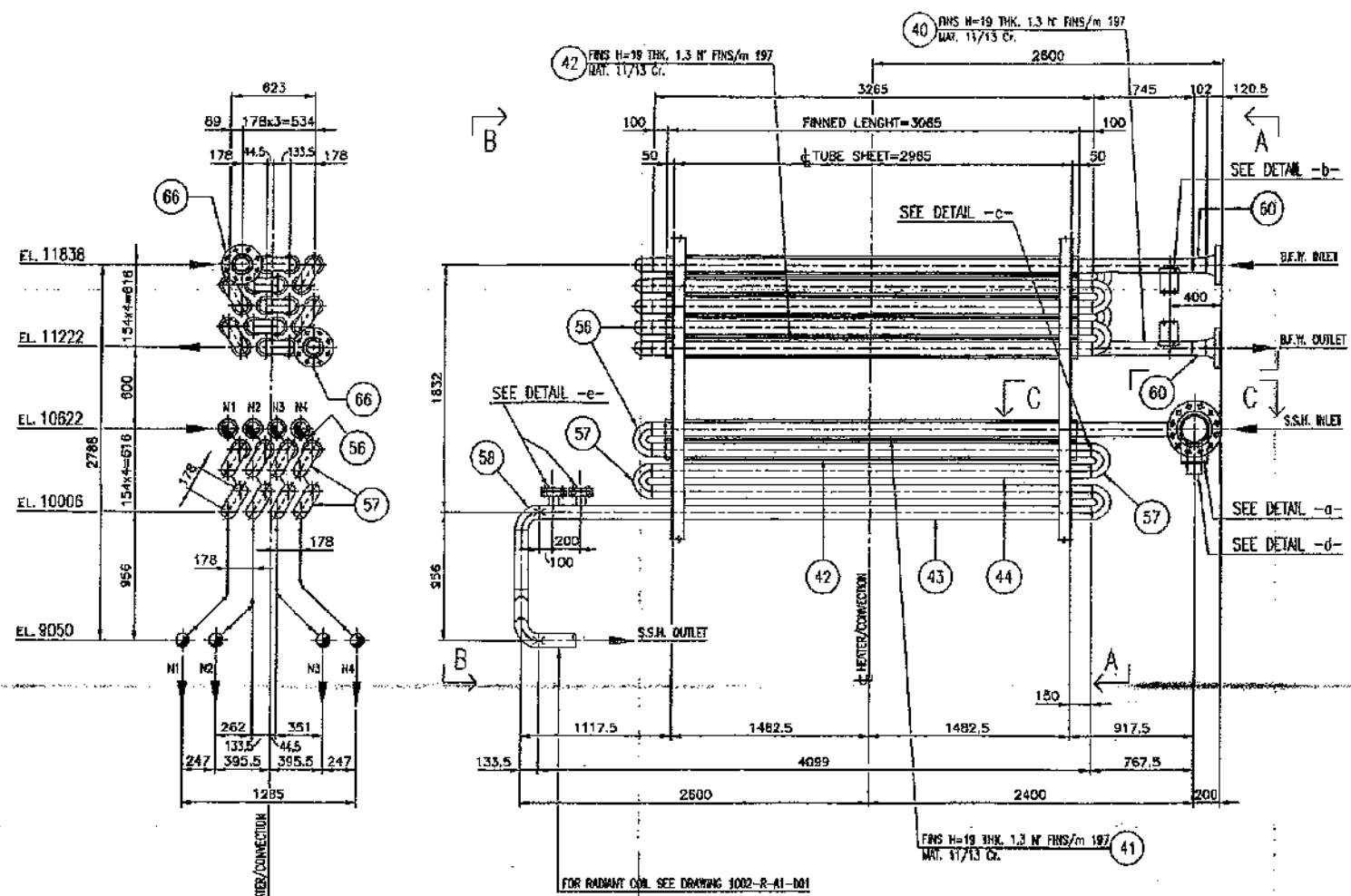
- INSULATION ANCHORS WILL BE WELDED IN SHOP
 - LINING APPLICATION WILL BE IN SHOP

- GENERAL NOTES:**
- 1) FOR GENERAL ARRANGEMENT SEE DRAWINGS B01 / B02
 - 2) FOR RADIANT SECTION (DETAILS) SEE DRAWING E03
 - 3) FOR RADIANT SUPPORT FOR TUBE NO 3 1/2" SEE DRAWING M01
 - 4) FOR INSULATION ANCHORS SEE DRAWING M02
 - 5) FOR OBSERVATION DOOR SEE DRAWING M03
 - 6) FOR NAME PLATE SEE DRAWING M04
 - 7) FOR FLOOR SEE DRAWING E01
 - 8) FOR ARCH SEE DRAWING E04
 - 9) FOR EXPLOSION DOOR SEE DRAWING E37
 - 10) FOR INSTRUMENT CONNECTION SEE DRAWING E50
 - 11) FOR GENERAL NOTES FOR STEELWORK SEE SPECIFICATION E65
 - 12) FOR LIST OF MARKS SEE SPECIFICATION E60
 - 13) FOR LIST OF BOLTS FOR ERECTION SEE SPECIFICATION E61

| | | | | | |
|---|--|-------------------|--|---|--|
| TECHNIP-COFLUXE | | س.ت.ف.ع. | | VENDOR DOCUMENT REVIEW | |
| PROJ. SABIC ACETIC ACID PROJECT | | SABIC | | <input type="checkbox"/> REVISION REQUIRED | <input type="checkbox"/> NO COMMENT - FINAL ISSUE |
| CLIENT NAME - SABIC - KINGDOM OF SAUDI ARABIA | | | | <input type="checkbox"/> TO BE ISSUED AS FINAL PROVIDED COMMENTS ARE INCORPORATED | <input type="checkbox"/> FOR INFORMATION ONLY (INTERNAL USE) |
| MATERIAL REQUISITION No. | | 2121 MR 011101011 | | BY: <i>W. Al-Jawhri</i> DATE: 3/26/03 | |
| ITEM: 100-R-181 | | | | | |
| OR Doc. CODE: A 2001 | | | | | |

| REV. | DATE | DESCRIPTION | DRAWN | CHECKED | APPROV. |
|------|----------|-------------------------|-------|---------|------------------------------|
| 2 | 14/07/03 | AS BUILT | | | C. PELUS CI C. BENEDELLI |
| 1 | 19/02/03 | ISSUED FOR CONSTRUCTION | | | A.E. F. ANDRESI C. BENEDELLI |
| 0 | 16/01/03 | ISSUED FOR APPROVAL | | | A.E. F. ANDRESI C. BENEDELLI |

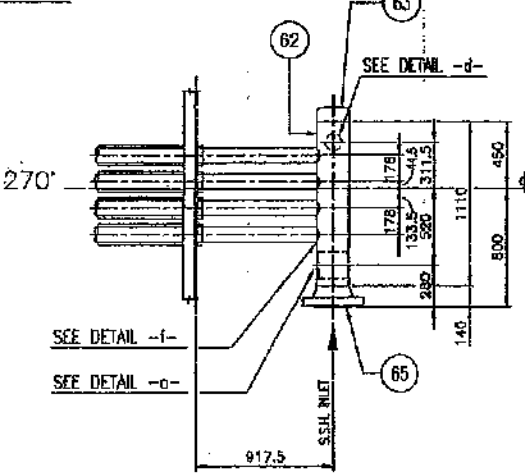
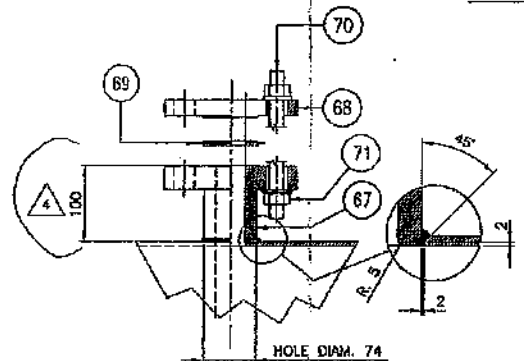
| | | | |
|--------------------------------------|--|--|--|
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| TECHNIP FOR SABIC-SAUDI ARABIA | | SCALE: 1:25 | |
| SABIC ACETIC ACID PROJECT | | NAME FILE: C336-02-401-A1-R2 | |
| STEAM FRIED HEATER (ITEM 100-H181) | | DRAWING No. 1002-R-A1-E02 | |
| RADIANT SECTION (ASSEMBLY) | | REV. 2 | |



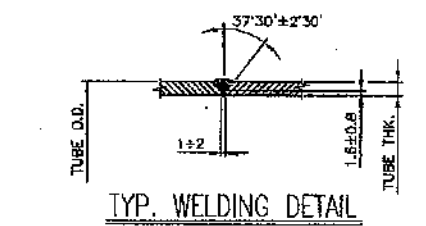
SECTION A-A
(FROM 90°)

VIEW FROM 180°

VIEW B-B
(FROM 270°)

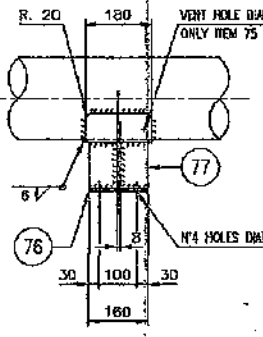


SECTION C-C

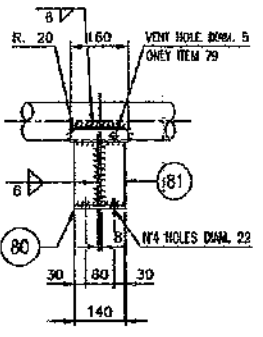


TYP. WELDING DETAIL

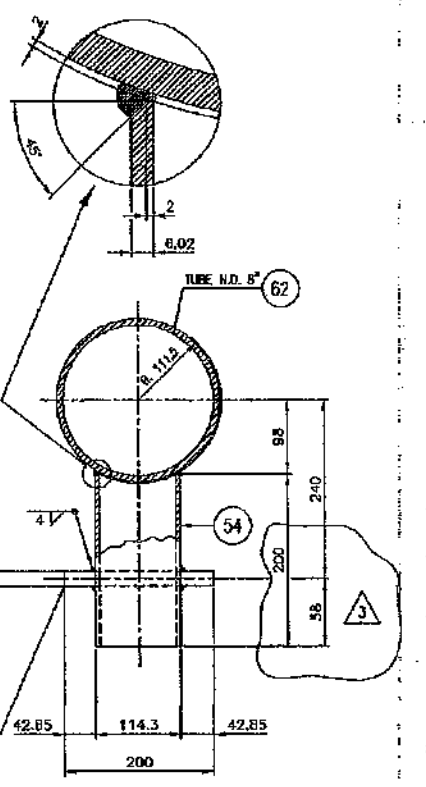
DETAIL -e-
SCALE 1:5 (IF CONNECTION)
(IF PIECES 8)



DETAIL -d- STOP FOR MANIFOLD
SCALE 1:10 (IF PIECE 1)



DETAIL -b- STOP FOR COIL
SCALE 1:10 (IF PIECE 2)



DETAIL -c- SLIDING MANIFOLD POINT
SCALE 1:10 (IF PIECE 1)

FOR RADIANT COIL SEE DRAWING 1002-R-A1-D01
FOR MATERIAL LIST, DESIGN DATA AND WELDING SPECIFICATION SEE DRAWING 1002-R-A2-D03

GENERAL NOTES

- A) ALL WELDS PREPARATION WILL BE IN ACCORDANCE TO AWS B 16-25
- B) ALL DIMENSIONS ARE IN mm EXCEPT OTHERWISE NOTED
- C) DURING CONSTRUCTION VERIFY THE TUBES EXACT LENGTH SO THAT ALL THE COIL IS PERFECTLY ALIGNED
- D) SHOWS FIELD WELDING
SHOWS PREPARATION WELDING

| | | | | | |
|---|--|-----------------|--|---|--|
| TECHNIP-COFLERIP | | ساليا | | VENDOR DOCUMENT REVIEW | |
| PROJ: SABIC ACETIC ACID PROJECT | | SABIC | | <input type="checkbox"/> REVIEW AND REQUEST | |
| CLIENT: SABIC - YAMBU - MIDDLE OF BAYN AREA | | | | <input type="checkbox"/> TO BE ISSUED AS FINAL PROVIDED | |
| MATERIAL REQUISITION No. 2121 | | MR 1011101011 | | <input checked="" type="checkbox"/> FOR COMMENT - FINAL ISSUE | |
| ITEM: 100-H-161 | | | | <input type="checkbox"/> FOR INFORMATION ONLY (INTERNAL USE) | |
| SR Doc. CODE: A 1123 | | BY: <i>Ruiz</i> | | DATE: 3/2/08 | |

| | | | | | | |
|------|----------|----------------------------|---|----------|-----------|------------|
| 4 | 14/07/03 | AS-BUILT | 4 | O. Pella | CI | C.BENEDINI |
| 3 | 12/06/03 | ISSUED FOR CONSTRUCTION | 3 | O. Pella | CI | C.BENEDINI |
| 2 | 09/03/03 | ISSUED FOR CONSTRUCTION | 2 | A.E. | F.ANDRESE | C.BENEDINI |
| 1 | 30/01/03 | REVISED WHERE SHOWN WITH 1 | 1 | A.E. | F.ANDRESE | C.BENEDINI |
| 0 | 14/11/02 | ISSUED FOR APPROVAL | 0 | A.E. | F.ANDRESE | C.BENEDINI |
| REV. | DATE | DESCRIPTION | | DRAWN | CHECKED | APPROV. |

FIRE-TECH. ENGINEERING S.r.l.
TECHNIP FOR SABIC-SAUDI ARABIA
SABIC ACETIC ACID PROJECT
STEAM FIRED HEATER ITEM 100-H161
COIL ARRANGEMENT (CONNECTION AND CROSS-OVER)

SCALE: 1:25
NAME FILE: C336-02-041-A1-R4
DRAWING No. 1002-R-A1-D02
REV. 4