

 TechnipFMC		 IndianOil		PROJECT		Standby SRU & Additional Tanks	
				IOCL - Paradip Refinery			
		CLIENT		INDIAN OIL CORPORATION LIMITED			
DATA SHEET		Project NO. 080557C001		Document No. 080557C-088-SP-0410-001		Rev. No. A	
						Page 1 of 11	
DATA SHEET SRU (088) 1ST CONVERTER 088-R-001							
			 Written By Senthilkumar Kasi 2019.12.06 19:38:24 +05'30'	 Checked By Kishoragiri Hemant 2019.12.09 14:14:55 +05'30'	 Approved By Suresh MS 2019.12.09 15:35:43 +05'30'	 Authorized By Jesumaran 2019.12.09 20:20:09 +05'30'	
A	06-Dec-2019	ISSUED FOR DESIGN	KSK	KH	MSS	JMC	
REV.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED	AUTHORIZED	

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 	PROJECT		Standby SRU & Additional Tanks	
	CLIENT		IOCL- Paradip Refinery	
DATA SHEET	Project No. 080557C001	Document No. 080557C-088-SP-0410-001	Rev. No. A	Page 2 of 11

The following notes to be considered for :

PDRP4220-8430-DS-087-2013 (**088-R-001** : Equipment Datasheet for 1st Converter)

General Notes

- 1. Information shown below supersedes the information indicated in the following pages.**
- This document shall be read along with IOCL Specifications, Technip Specifications & FWEL Specifications.
- Wherever "IOCL" is mentioned inside FWEL document, the same shall be read as PMC.
- Wherever "Vendor" is mentioned, same shall be read as CONTRACTOR & VENDOR.
- All dimensions in mm unless specified otherwise.
- All thicknesses specified on the drawing / sketch are minimum after forming and machining. The LSTK contractor / Detail Engineering Contractor (DEC) shall be responsible for detail design.
- All Nozzle sizes, Projections, Elevations, Locations are preliminary and to be finalized during detail design.
- Flange ratings shall also be checked for impact due to loads from connected piping & shall be increased, if required. See code requirements .
- All removable Internals shall be designed to pass through Manhole.
- All carbon steel material shall be in killed quality.
- SS316 spiral wound gasket with graphite filler, SS316 inner ring & CS outer ring shall be used as gasket material.
- Local load analysis for process nozzles shall be carried out as per WRC 107 / 297 or FEA.
- For Additional Technical Requirements, refer other specifications in ITB.

Specific Notes for **088-R-001**

- Quantity : ONE.
- All Butt weld seams in shell shall be Spot radiographed. All Butt weld seams in dished ends shall be fully radiographed.
- Refer Painting specification for details of surface preparation and Painting.
- Nozzle reinforcement : All Nozzle openings shall be integrally reinforced. Reinforcement Pads are not allowed. Special attention shall be given to Manhole (M6) whose opening lies in Knuckle region. Hence the nozzle to dished end junction plus surrounding annular region of upto 300mm shall be checked using FEA.
- All openings > 20" NB shall also be verified as per Appendix 1-7 of the Code.
- Corrosion Allowance : 1.5 mm C.A on each surface of internal support beams. 0 mm C.A for SS internals. For welded internals (including support clips of beam) : 3 mm C.A on each surface.
- All Pressure part and non-pressure part material shall be as per ASME. ASTM material is not to be used. Wherever ASTM is specified in this document, the same to be read as ASME.

 		PROJECT	Standby SRU & Additional Tanks IOCL- Paradip Refinery	
		CLIENT	INDIAN OIL CORPORATION LIMITED	
DATA SHEET	Project No. 080557C001	Document No. 080557C-088-SP-0410-001	Rev. No. A	Page 3 of 11

21. For Details of Catalyst, Catalyst support bed, Bed retainer with inert ceramic balls, refer to specification D6-086-R-001-1 elsewhere attached in ITB documents.
22. Catalyst, Catalyst support bed layer & Catalyst Hold down layer : Free issue material to Contractor by IOCL.
23. Contractor to select the refractory material as per FWEL specifications PDRP-8440-SP-0017, 0020, 0021 & 0023 anywhere attached in the ITB documents.
24. Refractory Properties shall meet the below requirements.
 - Acid Resistant
 - Design temperature of atleast 1000 Deg.C,
 - Insulating Castable,
 - Can contain Silica
 - Erosion resistance, Strength & other criteria shall be as per project specifications and standards.
25. All nozzle flanges shall be weld neck type.
26. Induced stresses in vessel owing to saddle reactions shall be checked as per PD 5500 as well as ASME Sec.VIII Div.2.
27. Lifting lug detail design by Contractor.
28. Vessel to be normalized Carbon steel as follows :
 - Plate : SA-516 70N C < = 0.23 %
 - Nozzles : SA-106 Gr.B C < = 0.23 %
 - Flanges : SA-105 fine grain and Normalized, C < = 0.25 %
 - Weld in internals : SA-516 70N C < = 0.23%
29. Contractor to refer the castable refractory – Inspection & Repair procedure (Black & Veatch doc. No. 160796-6.03X) elsewhere attached in ITB documents.



EQUIPMENT DATA SHEET
 PRESSURE VESSEL

088-R-001

PRESSURE VESSEL
1st CONVERTER
(088-R-001)

(*) - TO BE CONFIRMED LATER
 (**) - TO BE CONFIRMED BY CONTRACTOR

NOTE: This MDS is based on Process Data Sheet No. PDRP-8110-PS-086-013 Rev F1.

Indian Oil Corporation Limited (IOCL)
Paradip Refinery Project (PDRP)
Paradip, Orissa State, India

~~Contract No: 1 14 4200/4300~~

F2	11-Jan-10	Issued for Enhanced Design	N. Barnett		
F1	27-Aug-09	Issued for Enhanced Design	J. Icton	M. Dixon	M. Dixon
A1	29-Apr-09	Issued For Comment	S. Gray	M. Dixon	M. Dixon
Rev	Date	Description	Orig By	Checked By	Approved By

FOSTER WHEELER ENERGY LIMITED
PRESSURE VESSEL
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0410-001
REV. NO : A
PAGE NO. : 5 / 11

Item Number **088-R-001**

DESIGN DATA

Rev

Number of Units

1

Contents

Shell

Jacket / Coil

Acid Gas

N/A

Toxic / Lethal (Yes / No)

No

F2

Sour Service (Yes / No)

No

F2

Cyclic Service (Yes / No)

No

Design Pressure (Internal / External)

Kg/cm2(g)

3.8 / F.V Note 4.4

Design Temperature (Max / Min)

°C

343 175

Operating Pressure (Internal / External)

Kg/cm2(g)

0.5 -

Operating Temperature (Max / Min)

°C

287/237 -

Hydrotest Pressure (Site Corroded / Shop New)

Kg/cm2(g)

Per Code & Spec

Minimum Design Metal temperature

°C

11.3

Contents S.G.

-

0.0016

Corrosion Allowance (Internal / External)

mm

3.0 -

MECHANICAL DATA

Layout

Loads

Vertical / Horizontal

-

Horizontal

Basic Wind Speed

m/s

65

Vessel Diameter

mm

3600

Basic Wind Pressure

Kg/m²

Per IS 875

Tan / Tan

mm

15500

Earthquake Factor

-

Note 4.8

Height of Btm. T.L.

mm

N/A

Base Shear

kgf

~~61040 (Note 4.6)~~

Type of Heads

mm

2:1 Ellipsoidal

Base Moment

kgf-m

~~123911 (Note 4.6)~~

Shell Thickness

mm

20,24 (See Dwg)

AGITATOR

Head Thk (Left/Right)

mm

24 (M.A.F.)

Download

kg

-

Type of Supports

-

Saddle

Torque

kg-m

-

Insulation Thickness

mm

100

Bending Moment

kg-m

-

Insulation Type

-

IH

WEIGHT

Fireproofing

-

(**)

Shipping

kg

~~47000 (Note 4.6)~~

Vessel Volume

m³

164.0

Empty (Shop Fabricated)

kg

54,400

Liquid Volume

m³

-

Operating

kg

188,000

Jacket / Coil volume

m³

N/A

Hydrotest (at site)

kg

241,000

Heat Transfer Area

m²

N/A

Internals

kg

(**)

MATERIAL DATA (NOTE.20)

Shell

ASTM A 516 Gr.70N

Bolts (external)

ASTM A-193 B7 M

Heads

ASTM A 516 Gr.70N

Nuts (external)

ASTM A-194 2H M

Coil Shell

N/A

Bolts (internal)

SS 304L

Jacket / Coil Head

N/A

Nuts (internal)

SS 304L

Nozzle Flanges

ASTM A 105N

Gaskets (external)

Note 4.7

Nozzle Necks

ASTM A 106N Gr.B

WIRE MESH

SS 316L

Nozzle Reinforcement

SA 105N

GRATINGS, REFRACTORY ANCHORS, T-BEAMS, SPACERS, INLET BAFFLE (DEFLECTOR) PLATE, MANWAY PLUG (EXCEPT CS RING AS NOTED), 42"NB OUTLET NOZZLE SLEEVE, REFRACTORY STOP BAR

~~SS 316L~~ SS 304L

Girth Flanges

N/A

Internal Flanges

SS 304L

Saddle Wear Plate

ASTM A 516 Gr.70N

Shell Clad or Overlay

N/A

Saddle Supports

A516 Gr.70N/A36

Head Clad or Overlay

N/A

Insulation Supports

ASTM A 516 Gr.70N

Internal Supports

~~SS 316L~~

Stiffening Rings

ASTM A 516 Gr.70N

Catalyst

(See note.22)

Platform Clips

ASTM A 516 Gr.70N

Expanded Metal

CS

Tailing Lugs

N/A

Int. Refractory Lining

(See note.23)

Lifting Lugs

ASTM A 516 Gr.70N

Ext. / Int. Attachments

: SA 516 70N

Int. Support Beams

: SA 516 70N

1st CONVERTER

DATA SHEET (PRESSURE VESSEL)

Rev F2

DOC No. : PDRP4220-8430-DS-087-2013

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FOSTER WHEELER ENERGY LIMITED
PRESSURE VESSEL
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0410-001
 REV. NO : A
 PAGE NO. : 6 / 11

Item Number **088-R-001**

FABRICATION / INSPECTION

Rev

Design Code	ASME SEC VIII DIV 1- 2019 ED.	NDE	Spot / Full
Additional Specification	080557C-088-JSD-0400-001	Radiography (Shell / Head)	Per Code & Specs
Code Stamp	Yes NO	Magnetic Particle	Per Code & Specs
Stress Relieving	NORMALIZING (FOR BOTH DISHED ENDS)	Dye Penetrant	Per Code & Specs
Other Heat Treatment	Per code / Specs	Ultrasonic	Per Code & Specs
Surface finish (internal)	Clean and Dry	Gas Leak Testing	N/A
Surface finish (external)	REFER PAINTING SPECIFICATION	PMI	N/A
Painting	REFER PAINTING SPECIFICATION	Other NDE	Per Code & Specs
Lining	Refractory (Note 4.5)	Hardness Tests	Per Code & Specs
		Impact Tests at	Per Code & Specs °C

Specified Flange Rating is indicative. However Contractor/
 Vendor to verify the adequacy for connected piping Loads.

NOZZLE SCHEDULE

Nozzle	No. off.	Service	NB mm	Rating (#)	Flange	Finish	Stand -out	Elevat -ion	Note	
Process Nozzles										
N1	1	Gas Inlet Nozzle	900(**)	150	RF	125 to 250 AARH	By Contractor		c/w Deflector	F2
N2	1	Gas Inlet Nozzle	900(**)	150	RF				c/w Deflector	F2
N3	1	Gas Outlet Nozzle	1050x900(**)	150	RF				Refract. Lined 75mm	F2
N4	1	Gas Outlet Nozzle	1050x900(**)	150	RF				Refract. Lined 75mm	F2
N9	1	Vent & Purge	50	300	RF					F2
N10	1	Vent & Purge	50	300	RF					F2
Manways										
M1	1	Manway	600	150	RF	125 to 250 AARH	By Contractor		Note 3.2	
M2	1	Manway	600	150	RF				Note 3.2	
M3	1	Manway	600	150	RF				Note 3.2	
M4	1	Manway	600	150	RF				Note 3.3	
M5	1	Manway	600	150	RF				Note 3.3	
M6	1	Manway	500(**)	150	RF				Note 3.3	
Instrument Nozzles										
N5	1	Thermowell	50	300	RF	125 to 250 AARH	By Contractor			
N6	1	Thermowell	50	300	RF					
N7	1	Thermowell	50	300	RF					
N8	1	Thermowell	50	300	RF					

Notes

- 3.1) Standout from vessel centre line to flange face, for nozzles in top head from head tan line to flange face (mm).
 3.2) Manways C/W blind, gaskets, bolting and davit.
 3.3) Manways C/W blind, gaskets, bolting, davit and plug.

1st CONVERTER

DATA SHEET (PRESSURE VESSEL)

Rev F2

DOC No. : PDRP4220-8430-DS-087-2013

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FOSTER WHEELER ENERGY LIMITED

PRESSURE VESSEL

DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0410-001
REV. NO : A
PAGE NO. : 7 / 11

Item Number **088**-R-001

VESSEL DESIGN NOTES

Rev

- 4.1. Flange bolts to straddle the vessel centre lines.
- 4.2. All dimensions are in millimetres unless otherwise stated.
- 4.3. All dimensions are from reference tangent line, unless otherwise indicated.
- 4.4. Vessel shall be designed for steam out condition : 3.0 Kg / cm² (g) / FV @175° C.
- 4.5. See pages 7 and 8 for refractory details
- 4.6. The thicknesses, weights and loads shown are for estimation purposes only. Vendor shall calculate and confirm.
Thicknesses shown are the minimum acceptable to IOCL. Vendor is responsible for complete mechanical design.
- 4.7. Gaskets: Spiral wound graphite filled gasket with type ~~304 SS~~ or 316 SS windings with ~~304~~ 316SS inner rings and carbon steel outer ring conforming to ASME B16.20.
- 4.8. See **Specifications** for Wind/Earthquake requirements.
- 4.9 The Catalyst bed not including support holddown layers is centered vertically in the vessel
- 4.10 Activated Alumina Claus catalyst shall be Porocel Maxcwl 727 or equivalent, maybe cylindrical or spherical & nominal size is 3/16" (5mm). Bed depth to be 3.93ft (1200mm) and density of material is 641 kg/m³.
- 4.11 6" (150mm) catalyst support bed depth of Porocel Durocel 242 or equivalent nominal size 7/16" (11mm) active catalyst balls. Density of material is 770 kg/m³.
- 4.12 The screens which are installed on top of the horizontal support grating will be 316L SS. The screens are 6 x 6 mesh with wire diameter of 0.04" (1.04mm).
- 4.13 Pressure Drop across the catalyst bed is 0.042 kg/cm².
- 4.14 Inlet Deflector Plate to be positioned 460mm from top of vessel and consist of a square plate 1150mm. See sheet 7
- 4.15 All nozzles to be of the self reinforcing type. Reinforcing pads not allowed.
- 4.16 The following internal items are include in contractor's scope of supply and works :
- Catalyst bed, Catalyst supporting bed, Catalyst Retainer Bed : Free issue material by IOCL to Contractor.
 - Loading and installation of catalyst bed.
 - Loading and installation of catalyst support bed.
 - Loading and installation of catalyst retainer bed.
 - Supply of all accessories required for installation of catalyst, support bed and retainer bed.
 - Supply of wire mesh screen & installation of wire mesh screen.
 - Supply of gratings & installation of gratings.
 - Supply of refractory, application of refractory, supervision during refractory application, initial curing, final curing as necessary.
 - Supply and installation of ceramic / cerawool blankets as noted on datasheets.
 - Supply of support beams, installation of support beams below gratings, application of refractory on support beams, initial curing, final curing as necessary.
- 4.17 Manhole (M6) : This nozzle punctures into the knuckle region of the dished end. The dish to nozzle junction, surrounding region upto 400mm from the junction shall be checked (for adequacy of strength). Stress induced in design condition (as well as hydrotest conditions) shall be checked & limited within ASME Sec VIII Div.1 / Div.2 allowable stress limits. If necessary, dish thickness and adjoining shell thickness shall be increased to maintain stress within code limits.
- 4.18 For Nozzles N1, N2, N3, N4 : Insert plates may be provided on shell to accommodate the loads due to connected piping, if required

F2

USED ABBREVIATIONS

FV = Full vacuum, N/A = Not Applicable, NB = Nominal Bore, RF = Raised Face,
FF = Flat Face, RTJ = Ring Type Joint, SO = Slip On, WN = Weld Neck, LWN = Long Weld Neck, SR = Self Reinforced,
LJ = Lap Joint, PWHT = Post Weld Heat Treatment, PT = Penetrant Testing, MT = Magnetic Testing,
UT = Ultrasonic Testing, RT = Radiography Testing,
HC = Heat Conservation, PP = Personnel Protection, VTA = Vendor to Advise. **M.A.F = Minimum After Forming, Min.=Minimum**

	1st CONVERTER	
	DATA SHEET (PRESSURE VESSEL)	
	DOC No. : PDRP4220-8430-DS-087-2013	Rev F2
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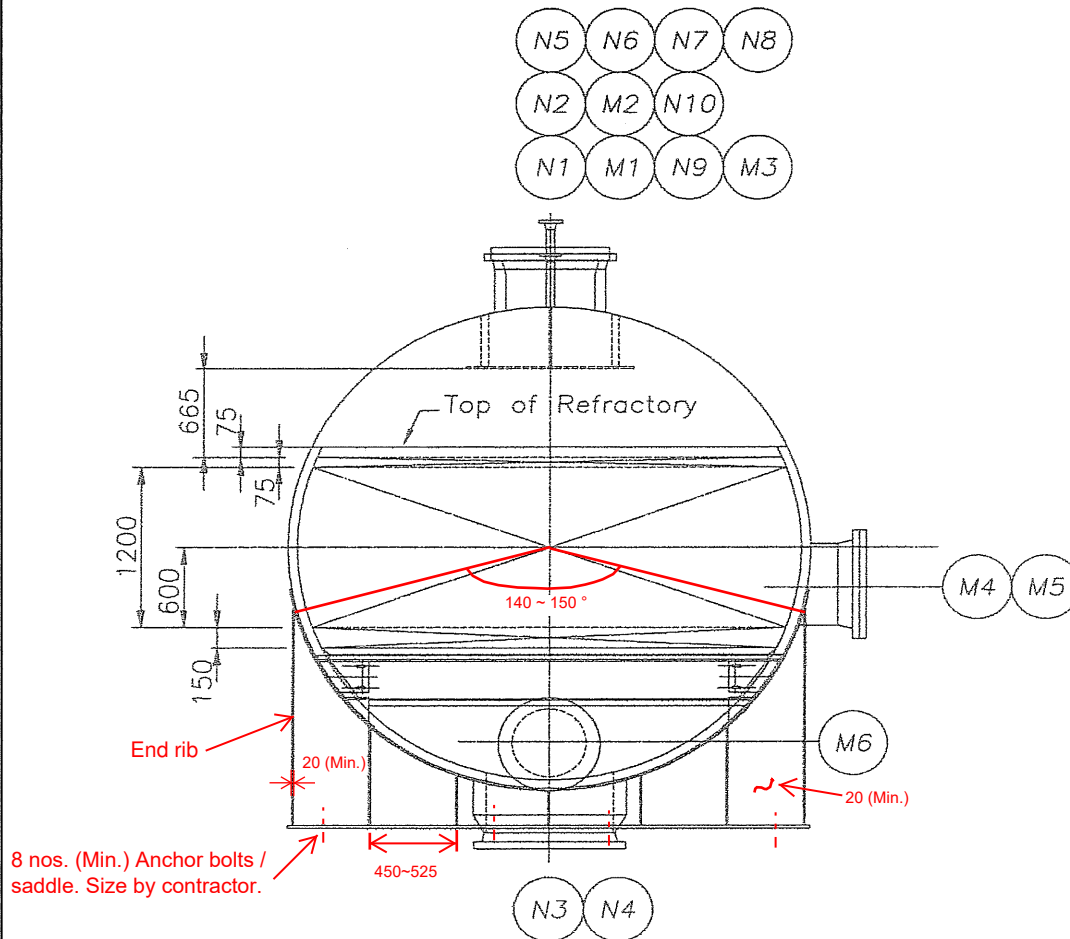
FOSTER WHEELER ENERGY LIMITED
PRESSURE VESSEL
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0410-001
 REV. NO : A
 PAGE NO. : 9 / 11

Item Number **088-R-001**

VESSEL SKETCH

Rev



- Base plate shall be wide enough to allow slotted holes on sliding saddle.
- Teflon embedded SS 304 sliding plates are to be provided below sliding saddle to reduce the friction at the sliding saddle.

1st CONVERTER

DATA SHEET (PRESSURE VESSEL)

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Rev F2

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FOSTER WHEELER ENERGY LIMITED

PRESSURE VESSEL

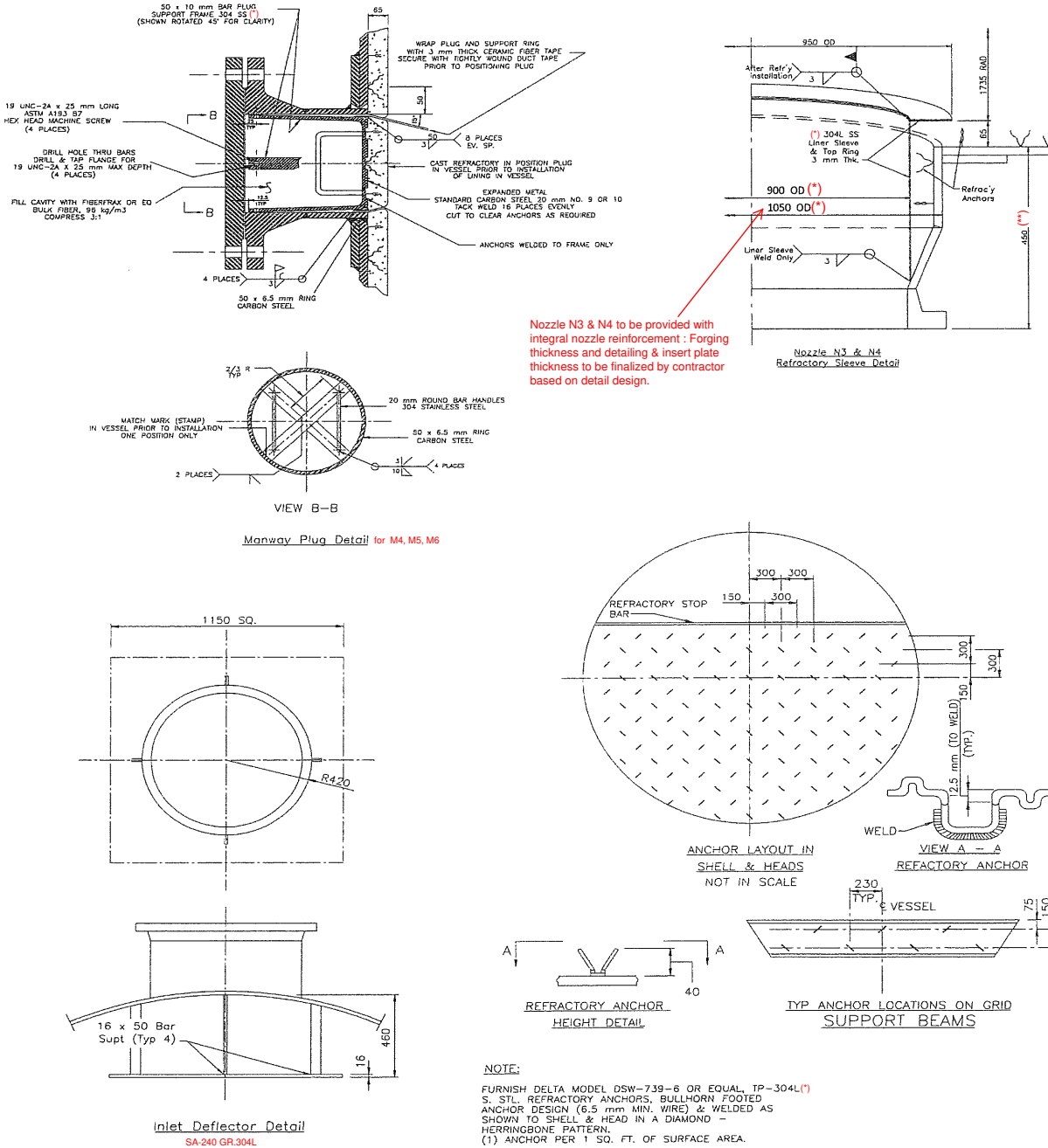
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0410-001
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Item Number **088**-R-001

VESSEL SKETCH

Rev



F2

F2

1st CONVERTER

DATA SHEET (PRESSURE VESSEL)

DOC No. : PDRP4220-8430-DS-087-2013

Rev F2

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 TechnipFMC		 IndianOil		PROJECT		Standby SRU & Additional Tanks	
				CLIENT		INDIAN OIL CORPORATION LIMITED	
DATA SHEET		Project NO. 080557C001		Document No. 080557C-088-SP-0410-002		Rev. No. A	
						Page 1 of 11	

DATA SHEET

SRU (088)

2ND CONVERTER

088-R-002

			 Written By Senthilkumar Kasi 2019-12-06 19:41:25 +05'30'	 Checked By Kishoragel Hemant 2019-12-09 14:15:55 +05'30'	 Approved By Suresh MO 2019-12-09 15:36:39 +05'30'	 Authorized By Jagannathan 2019-12-09 20:20:55 +05'30'
A	06-Dec-2019	ISSUED FOR DESIGN	KSK	KH	MSS	JMC
REV.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED	AUTHORIZED

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 	PROJECT		Standby SRU & Additional Tanks	
	CLIENT		IOCL- Paradip Refinery	
DATA SHEET	Project No. 080557C001	Document No. 080557C-088-SP-0410-002	Rev. No. A	Page 2 of 11

The following notes to be considered for :

PDRP4220-8430-DS-087-2014 (**088-R-002** : Equipment Datasheet for 2nd Converter)

General Notes

- 1. Information shown below supersedes the information indicated in the following pages.**
- This document shall be read along with IOCL Specifications, Technip Specifications & FWEL Specifications.
- Wherever "IOCL" is mentioned inside FWEL document, the same shall be read as PMC.
- Wherever "Vendor" is mentioned, same shall be read as CONTRACTOR & VENDOR.
- All dimensions in mm unless specified otherwise.
- All thicknesses specified on the drawing / sketch are minimum after forming and machining. The LSTK contractor / Detail Engineering Contractor (DEC) shall be responsible for detail design.
- All Nozzle sizes, Projections, Elevations, Locations are preliminary and to be finalized during detail design.
- Flange ratings shall also be checked for impact due to loads from connected piping & shall be increased, if required. See code requirements .
- All removable Internals shall be designed to pass through Manhole.
- All carbon steel material shall be in killed quality.
- SS316 spiral wound gasket with graphite filler, SS316 inner ring & CS outer ring shall be used as gasket material.
- Local load analysis for process nozzles shall be carried out as per WRC 107 / 297 or FEA.
- For Additional Technical Requirements, refer other specifications in ITB.

Specific Notes for **088-R-002**

- Quantity : ONE.
- All Butt weld seams in shell shall be Spot radiographed. All Butt weld seams in dished ends shall be fully radiographed.
- Refer Painting specification for details of surface preparation and Painting.
- Nozzle reinforcement : All Nozzle openings shall be integrally reinforced. Reinforcement Pads are not allowed. Special attention shall be given to Manhole (M6) whose opening lies in Knuckle region. Hence the nozzle to dished end junction plus surrounding annular region of upto 300mm shall be checked using FEA.
- All openings > 20" NB shall also be verified as per Appendix 1-7 of the Code.
- Corrosion Allowance : 1.5 mm C.A on each surface of internal support beams. 0 mm C.A for SS internals. For welded internals (including support clips of beam) : 3 mm C.A on each surface.
- All Pressure part and non-pressure part material shall be as per ASME. ASTM material is not to be used. Wherever ASTM is specified in this document, the same to be read as ASME.

 		PROJECT	Standby SRU & Additional Tanks IOCL- Paradip Refinery	
		CLIENT	INDIAN OIL CORPORATION LIMITED	
DATA SHEET	Project No. 080557C001	Document No. 080557C-088-SP-0410-002		Rev. No. A
				Page 3 of 11

21. For Details of Catalyst, Catalyst support bed, Bed retainer with inert ceramic balls, refer to specification D6-086-R-001-1 elsewhere attached in ITB documents.
22. Catalyst, Catalyst support bed layer & Catalyst Hold down layer : Free issue material to Contractor by IOCL.
23. Contractor to select the refractory material as per FWEL specifications PDRP-8440-SP-0017, 0020, 0021 & 0023 anywhere attached in the ITB documents.
24. Refractory Properties shall meet the below requirements.
 - Acid Resistant
 - Design temperature of atleast 1000 Deg.C,
 - Insulating Castable,
 - Can contain Silica
 - Erosion resistance, Strength & other criteria shall be as per project specifications and standards.
25. All nozzle flanges shall be weld neck type.
26. Induced stresses in vessel owing to saddle reactions shall be checked as per PD 5500 as well as ASME Sec.VIII Div.2.
27. Lifting lug detail design by Contractor.
28. Vessel to be normalized Carbon steel as follows :
 - Plate : SA-516 70N C < = 0.23 %
 - Nozzles : SA-106 Gr.B C < = 0.23 %
 - Flanges : SA-105 fine grain and Normalized, C < = 0.25 %
 - Weld in internals : SA-516 70N C < = 0.23%
29. Contractor to refer the castable refractory – Inspection & Repair procedure (Black & Veatch doc. No. 160796-6.03X) elsewhere attached in ITB documents.



EQUIPMENT DATA SHEET
 PRESSURE VESSEL

PDRP4220-8430-DS-087-2014

088-R-002

PRESSURE VESSEL
2nd CONVERTER
(088-R-002)

(*) - TO BE CONFIRMED LATER
 (**) - TO BE CONFIRMED BY CONTRACTOR

NOTE: This MDS is based on Process Data Sheet No. PDRP-8110-PS-086-0013 Rev F1.

Indian Oil Corporation Limited (IOCL)
Paradip Refinery Project (PDRP)
Paradip, Orissa State, India
~~Contract No: 1 14 4200/4399~~

F2	11-Jan-10	Issued for Enhanced Design	N. Barnett	<i>M. Dixon</i>	<i>M. Dixon</i>
F1	27-Aug-09	Issued for Enhanced Design	J. Icton	M. Dixon	M. Dixon
A1	29-Apr-09	Issued For Comment	S. Gray	M. Dixon	M. Dixon
Rev	Date	Description	Orig By	Checked By	Approved By

FOSTER WHEELER ENERGY LIMITED
PRESSURE VESSEL
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0410-002
REV. NO : A
PAGE NO. : 5 / 11

Item Number **088-R-002**

DESIGN DATA

Rev

Number of Units

1

Contents

Toxic / Lethal (Yes / No)

Sour Service (Yes / No)

Cyclic Service (Yes / No)

Design Pressure (Internal / External)

Kg/cm2(g)

3.8 / F.V Note 4.4

Design Temperature (Max / Min)

°C

343 175

Operating Pressure (Internal / External)

Kg/cm2(g)

0.5 -

Operating Temperature (Max / Min)

°C

287/237 -

Hydrotest Pressure (Site Corroded / Shop New)

Kg/cm2(g)

Per Code & Spec

Minimum Design Metal temperature

°C

11.3

Contents S.G.

-

0.0016

Corrosion Allowance (Internal / External)

mm

3.0 -

Jacket / Coil

N/A

F2

F2

MECHANICAL DATA

Layout

Vertical / Horizontal

-

Horizontal

Vessel Diameter

mm

3600

Tan / Tan

mm

15500

Height of Btm. T.L.

mm

N/A

Type of Heads

mm

2:1 Ellipsoidal

Shell Thickness

mm

20,24 (See Dwg)

Head Thk (Left/Right)

mm

24 (M.A.F.)

Type of Supports

-

Saddle

Insulation Thickness

mm

100

Insulation Type

-

IH

Fireproofing

-

(**)

Vessel Volume

m³

164.0

Liquid Volume

m³

-

Jacket / Coil volume

m³

N/A

Heat Transfer Area

m²

N/A

Loads

Basic Wind Speed

m/s

65

Basic Wind Pressure

Kg/m²

Per IS 875

Earthquake Factor

-

Note 4.8

Base Shear

kgf

~~61040 (Note 4.6)~~

Base Moment

kgf-m

~~123044 (Note 4.6)~~

AGITATOR

Download

kg

Torque

kg-m

Bending Moment

kg-m

WEIGHT

Shipping

kg

~~47000 (Note 4.6)~~

Empty (Shop Fabricated)

kg

54,400

Operating

kg

188,000

Hydrotest (at site)

kg

241,000

Internals

kg

(**)

MATERIAL DATA

Shell

ASTM A 516 Gr.70N

Heads

ASTM A 516 Gr.70N

Coil Shell

N/A

Jacket / Coil Head

N/A

Nozzle Flanges

ASTM A 105N

Nozzle Necks

ASTM A 106N Gr.B

Nozzle Reinforcement

SA 105N

Girth Flanges

N/A

Saddle Wear Plate

ASTM A 516 Gr.70N

Saddle Supports

A516 Gr.70N/A36

Insulation Supports

ASTM A 516 Gr.70

Stiffening Rings

ASTM A 516 Gr.70N

Platform Clips

ASTM A 516 Gr.70N

Tailing Lugs

N/A

Lifting Lugs

ASTM A 516 Gr.70N

Ext. / Int. Attachments

: SA 516 70N

Int. Support Beams

: SA 516 70N

Bolts (external)

ASTM A-193 B7 M

Nuts (external)

ASTM A-194 2H M

Bolts (internal)

SS 304L

Nuts (internal)

SS 304L

Gaskets (external)

Note 4.7

WIRE MESH

SS 316L

GRATINGS, REFRACTORY ANCHORS, T-BEAMS, SPACERS, INLET BAFFLE (DEFLECTOR) PLATE, MANWAY PLUG (EXCEPT CS RING AS NOTED), 42"NB OUTLET NOZZLE SLEEVE, REFRACTORY STOP BAR

SS 316L SS 304L

SS 304L

Internal Flanges

N/A

Shell Clad or Overlay

N/A

Head Clad or Overlay

N/A

Internal Supports

SS 316L

Catalyst

(See note.22)

Expanded Metal

CS

Int. Refractory Lining

(See note.23)

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FOSTER WHEELER ENERGY LIMITED

PRESSURE VESSEL

DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0410-002
REV. NO : A
PAGE NO. : 6 / 11

Item Number **088**-R-002

FABRICATION / INSPECTION

Rev

Design Code	ASME SEC VIII DIV 1 - 2019 ED.	NDE	Spot / Full
Additional Specification	080557C-088-JSD-0400-001	Radiography (Shell / Head)	Per Code & Specs
Code Stamp	Yes NO	Magnetic Particle	Per Code & Specs
Stress Relieving	NORMALIZING (FOR BOTH DISHED ENDS)	Dye Penetrant	Per Code & Specs
Other Heat Treatment	Per code / Specs	Ultrasonic	N/A
Surface finish (internal)	Clean and Dry	Gas Leak Testing	N/A
Surface finish (external)	REFER PAINTING SPECIFICATION	PMI	Per Code & Specs
Painting	REFER PAINTING SPECIFICATION	Other NDE	Per Code & Specs
Lining	Refractory (Note 4.5)	Hardness Tests	Per Code & Specs
		Impact Tests at	°C

F2

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NOZZLE SCHEDULE

Nozzle	No. off.	Service	NB mm	Rating (#)	Flange	Finish	Stand -out	Elevat -ion	Note	
Process Nozzles										
N1	1	Gas Inlet Nozzle	900(**)	150	RF	125 to 250 AARH	By Contractor		c/w Deflector	F2
N2	1	Gas Inlet Nozzle	900(**)	150	RF				c/w Deflector	F2
N3	1	Gas Outlet Nozzle	1050x900(**)	150	RF				Refract. Lined 75mm	F2
N4	1	Gas Outlet Nozzle	1050x900(**)	150	RF				Refract. Lined 75mm	F2
N9	1	Vent & Purge	50	300	RF					F2
N10	1	Vent & Purge	50	300	RF					F2
Manways										
M1	1	Manway	600	150	RF	125 to 250 AARH	By Contractor		Note 3.2	
M2	1	Manway	600	150	RF				Note 3.2	
M3	1	Manway	600	150	RF				Note 3.2	
M4	1	Manway	600	150	RF				Note 3.3	
M5	1	Manway	600	150	RF				Note 3.3	
M6	1	Manway	500(**)	150	RF				Note 3.3	
Instrument Nozzles										
N5	1	Thermowell	50	300	RF	125 to 250 AARH	By Contractor			
N6	1	Thermowell	50	300	RF					
N7	1	Thermowell	50	300	RF					
N8	1	Thermowell	50	300	RF					

Notes

- 3.1) Standout from vessel centre line to flange face, for nozzles in top head from head tan line to flange face (mm).
3.2) Manways C/W blind, gaskets, bolting and davit.
3.3) Manways C/W blind, gaskets, bolting, davit and plug.

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PRESSURE VESSEL
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0410-002
REV. NO : A
PAGE NO. : 7 / 11

Item Number **088**-R-002

VESSEL DESIGN NOTES

Rev

- 4.1. Flange bolts to straddle the vessel centre lines.
- 4.2. All dimensions are in millimetres unless otherwise stated.
- 4.3. All dimensions are from reference tangent line, unless otherwise indicated.
- 4.4. Vessel shall be designed for steam out condition : 3.0 Kg / cm² (g) / FV @175° C.
- 4.5. See pages 7 and 8 for refractory details
- 4.6. The thicknesses, weights and loads shown are for estimation purposes only. Vendor shall calculate and confirm.
 Thicknesses shown are the minimum acceptable to IOCL. Vendor is responsible for complete mechanical design.
- 4.7. Gaskets: Spiral wound graphite filled gasket with type ~~304 SS~~ or 316 SS windings with ~~304~~ 316SS inner rings and carbon steel outer ring. conforming to ASME B16.20.
- 4.8. See **Specifications** for Wind/Earthquake requirements. **F2**
- 4.9 The Catalyst bed not including support holddown layers is centered vertically in the vessel
- 4.10 Activated Alumina Claus catalyst shall be Porocel Maxcwl 727 or equivalent, maybe cylindrical or spherical & nominal size is 3/16" (5mm). Bed depth to be 3.93ft (1200mm) and density of material is 641 kg/m³.
- 4.11 6" (150mm) catalyst support bed depth of Porocel Durocel 242 or equivalent nominal size 7/16" (11mm) active catalyst balls. Density of material is 770 kg/m³.
- 4.12 The screens which are installed on top of the horizontal support grating will be 316L SS. The screens are 6 x 6 mesh with wire diameter of 0.04" (1.04mm).
- 4.13 Pressure Drop across the catalyst bed is 0.042 kg/cm².
- 4.14 Inlet Deflector Plate to be positioned 460mm from top of vessel and consist of a square plate 1150mm. See sheet 7
- 4.15 All nozzles to be of the self reinforcing type. Reinforcing pads not allowed.
- 4.16 The following internal items are include in contractor's scope of supply and works :
 - Catalyst bed, Catalyst supporting bed, Catalyst Retainer Bed : Free issue material by IOCL to Contractor.
 - Loading and installation of catalyst bed.
 - Loading and installation of catalyst support bed.
 - Loading and installation of catalyst retainer bed.
 - Supply of all accessories required for installation of catalyst, support bed and retainer bed.
 - Supply of wire mesh screen & installation of wire mesh screen.
 - Supply of gratings & installation of gratings.
 - Supply of refractory, application of refractory, supervision during refractory application, initial curing, final curing as necessary.
 - Supply and installation of ceramic / cerawool blankets as noted on datasheets.
 - Supply of support beams, installation of support beams below gratings, application of refractory on support beams, initial curing, final curing as necessary.
- 4.17 Manhole (M6) : This nozzle punctures into the knuckle region of the dished end. The dish to nozzle junction, surrounding region upto 400mm from the junction shall be checked (for adequacy of strength). Stress induced in design condition (as well as hydrotest conditions) shall be checked & limited within ASME Sec VIII Div.1 / Div.2 allowable stress limits. If necessary, dish thickness and adjoining shell thickness shall be increased to maintain stress within code limits.
- 4.18 For Nozzles N1, N2, N3, N4 : Insert plates may be provided on shell to accommodate the loads due to connected piping, if required

USED ABBREVIATIONS

FV = Full vacuum, N/A = Not Applicable, NB = Nominal Bore, RF = Raised Face,
 FF = Flat Face, RTJ = Ring Type Joint, SO = Slip On, WN = Weld Neck, LWN = Long Weld Neck, SR = Self Reinforced,
 LJ = Lap Joint, PWHT = Post Weld Heat Treatment, PT = Penetrant Testing, MT = Magnetic Testing,
 UT = Ultrasonic Testing, RT = Radiography Testing,
 HC = Heat Conservation, PP = Personnel Protection, VTA = Vendor to Advise. **M.A.F = Minimum After Forming, Min.=Minimum**

2nd CONVERTER

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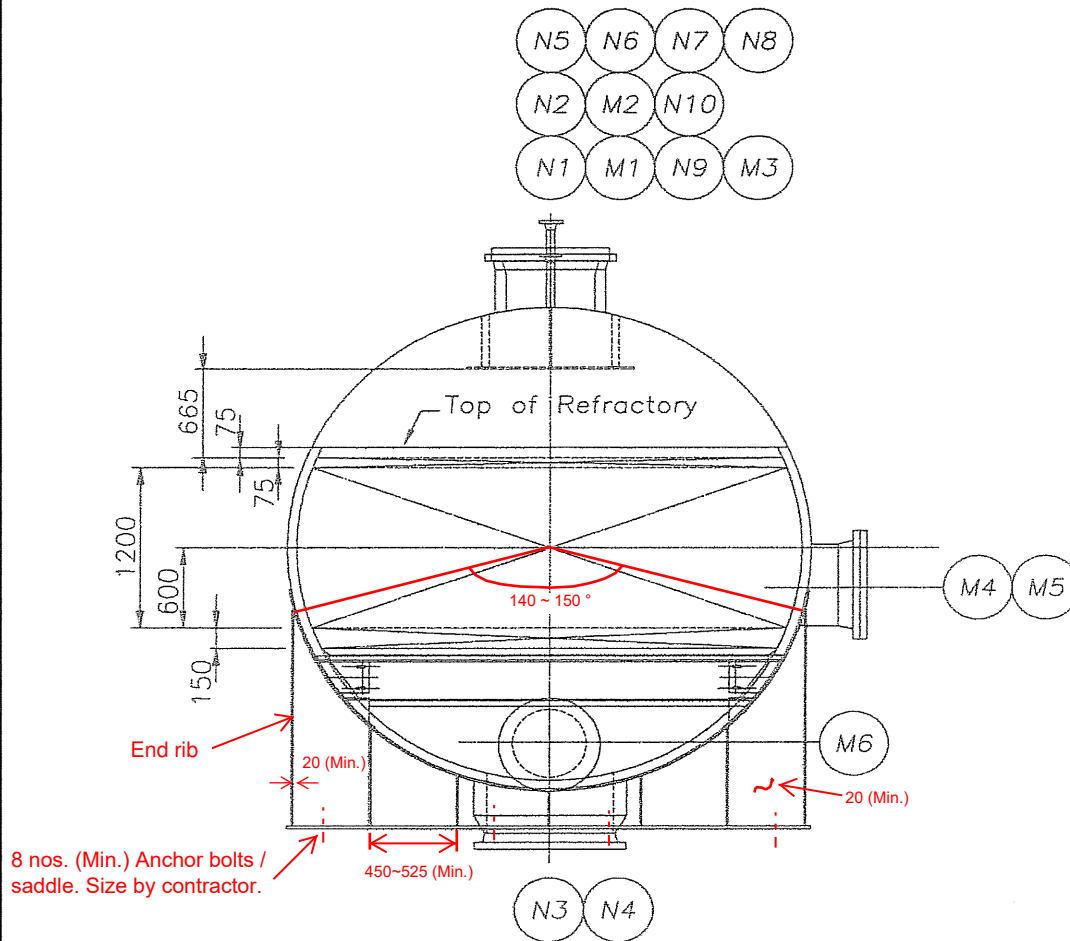
FOSTER WHEELER ENERGY LIMITED
PRESSURE VESSEL
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0410-002
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Item Number **088**-R-002

VESSEL SKETCH

Rev



- Base plate shall be wide enough to allow slotted holes on sliding saddle.
- Teflon embedded SS 304 sliding plates are to be provided below sliding saddle to reduce the friction at the sliding saddle.

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PRESSURE VESSEL

DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0410-002
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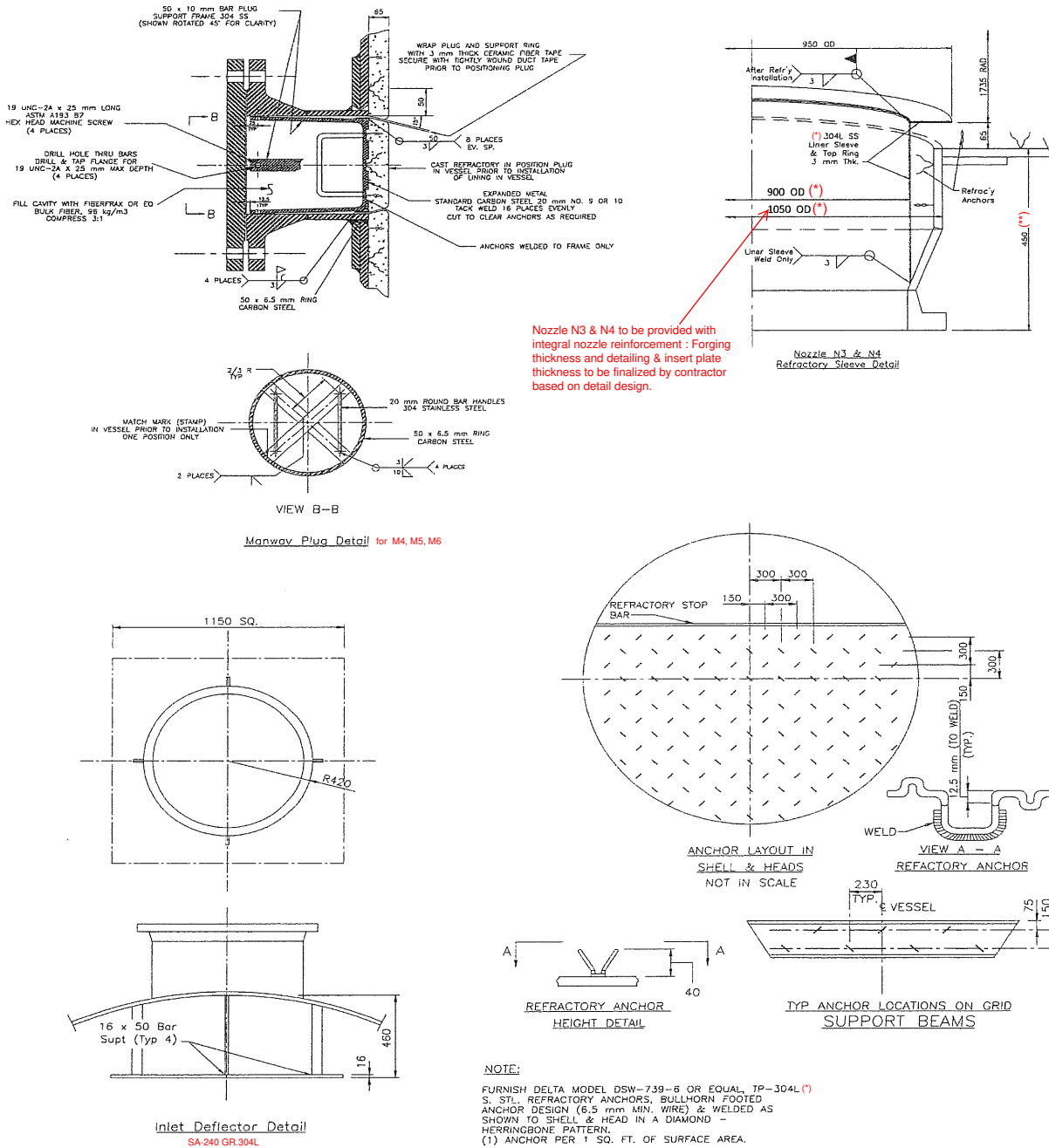
Item Number **088-R-002**

VESSEL SKETCH

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 TechnipFMC  IndianOil	PROJECT		Standby SRU & Additional Tanks	
	CLIENT		IOCL - Paradip Refinery	
DATA SHEET	Project NO. 080557C001	Document No. 080557C-088-SP-0510-001	Rev. No. B	Page 1 of 9

DATA SHEET
SRU (088)
DEGASSING CONTACTOR
088-C-001

			 Written By Senthil Kumar Kasi 2020.04.24 13:11:19 +05'30'	 Checked By Rohithagiri Hemarath 2020.04.24 13:13:19 +05'30'	 Approved By Suresh MS 2020.04.24 18:10:29 +05'30'	 Authorized By Muralidharan Aravindan 2020.04.24 18:10:29 +05'30'
B	24-Apr-2020	ISSUED FOR DESIGN	KSK	KH	MSS	JMC
A	05-Dec-2019	ISSUED FOR DESIGN	KSK	KH	MSS	JMC
REV.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED	AUTHORIZED

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 TechnipFMC  IndianOil	PROJECT		Standby SRU & Additional Tanks	
	CLIENT		IOCL- Paradip Refinery	
DATA SHEET	Project No. 080557C001	Document No. 080557C-088-SP-0510-001	Rev. No. B	Page 2 of 9

The following notes to be considered for :

PDRP4220-8430-DS-087-2003 Rev. F2 (**088-C-001** Equipment Datasheet for Degassing Contactor)

General Notes

- 1. Information shown below supersedes the information indicated in the following pages.**
- This document shall be read along with IOCL Specifications, Technip Specifications & FWEL Specifications.
- Wherever "IOCL" is mentioned inside FWEL document, the same shall be read as PMC.
- Wherever "Vendor" is mentioned, same shall be read as CONTRACTOR & VENDOR.
- All dimensions in mm unless specified otherwise.
- All thicknesses specified on the drawing / sketch are minimum after forming and machining. The LSTK contractor / Detail Engineering Contractor (DEC) shall be responsible for detail design.
- All Nozzle sizes, Projections, Elevations & Locations are preliminary and to be finalized during detail design.
- Flange ratings shall also be checked for impact due to loads from connected piping & shall be increased, if required. See code requirements .
- All removable Internals shall be designed to pass through Manhole.
- All carbon steel material shall be in killed quality.
- SS316 spiral wound gasket with graphite filler, SS316 inner ring & SS316 outer ring shall be used as gasket material.
- Local load analysis for process nozzles shall be carried out as per WRC 107 / 297 or FEA.
- Skirt Height and Anchorage are preliminary. 4.6 type anchor bolt considered. To be finalized by DEC.
- For Additional Technical Requirements, refer other specifications in ITB.

Specific Notes for **088-C-001**

- Quantity : ONE.
- Butt weld seams shall be fully radiographed.
- Refer Painting specification for details of surface preparation and Painting for external surface of Vessel.
- All openings $\geq 20''$ NB shall also be verified as per Appendix 1-7 of the Code.
- All pressure parts, all attachments welded to pressure parts & wetted surfaces by process shall meet the requirement of NACE MR0103.
- All Pressure part and non-pressure part material shall be as per ASME. ASTM material is not to be used. Wherever ASTM is specified in this document, the same to be read as ASME.
- Wherever external steam jacketing required on nozzles, Slip-on RF (SORF) flanges to be provided on nozzles.
- Column TL-TL increased from licensor data sheet for Mechanical reasons.
- For details of Claus catalyst, Denstone support bed & Denstone hold down bed, refer to specification D6-086-C-001-1 elsewhere attached in tender documents.
- Claus catalyst, Denstone support bed & Denstone hold down bed : Free issue material to Contractor by IOCL.

 TechnipFMC 	PROJECT		Standby SRU & Additional Tanks		
	CLIENT		IOCL- Paradip Refinery		
DATA SHEET		Project No. 080557C001	Document No. 080557C-088-SP-0510-001	Rev. No. B	Page 3 of 9

25. Except as indicated in note.24, all other internals to be supplied by Contractor.
26. As indicated in Process data sheet, configuration of Liquid Sulphur drain nozzle shall be tangential to the bottom Head.
27. External steam tracing shall be provided by means of steam coil or plate coil or Contro trace to maintain 138 Deg.C wall temperature as well as liquid bulk temperature. Thermal guarantee is included in contractor scope.



EQUIPMENT DATA SHEET
PRESSURE VESSEL

088-C-001

**PRESSURE VESSEL
DEGASSING CONTACTOR
088 -C-001**

(*) - TO BE CONFIRMED LATER
(**) - TO BE CONFIRMED BY CONTRACTOR

Note: This MDS is based on Process Data Sheet No.: PDRP-8110-PS-086-0015, Issue. F1

Indian Oil Corporation Limited (IOCL)
Paradip Refinery Project (PDRP)
Paradip, Orissa State, India
~~Contract No: 1-14-4200/4399~~

Rev	Date	Description	Orig By	Checked By	Approved
F2	02-Mar-10	Final Issue	SG		
F1	24-Aug-09	Issue for Enhanced Design	NB	SG	MD
A1	14-May-09	Approved For Design	SG	MD	MD

DSN: 15583

FOSTER WHEELER ENERGY LIMITED

PRESSURE VESSEL

DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0510-001
REV. NO : B
PAGE NO. : 5 / 9

Item Number **088-C-001**

DESIGN DATA

Number of Units	-	ONE	Shell	Nozzle Jacket
Contents	-	Liquid Sulfur & dissolved H ₂ S	Steam	
Toxic / Lethal (Yes / No)	-	No	No	
Sour Service (Yes / No)		Yes	No	
Cyclic Service (Yes / No)		No	No	
Design Pressure (Internal / External)	kg/cm ² (g)	7.0 Note 4.5	Note 4.4	7 FV
Design Temperature (Max / Min)	°C	200	175	240 -
Operating Pressure (Top/ Bot)	kg/cm ² (g)	0.049	1.308	4 -
Operating Temperature (Top/Bot)	°C	138	-	175 175
Hydrotest Pressure (Site Corroded / Shop New)	kg/cm ² (g)	Per Code & Spec.	-	-
Minimum Design Metal temperature	°C	11.3	11.3	
Contents S.G.	-	1.8	-	
Corrosion Allowance (Internal / External)	mm	0.0	0.0	- -

MECHANICAL DATA

Layout			Loads		
Vertical / Horizontal	-	Vertical	Basic Wind Speed	m/s	65
Vessel Diameter	mm	2300 ID	Basic Wind Pressure	N/m ²	As per IS-875
Tan / Tan	mm	7250	Earthquake Factor	-	Note 4.9
Height of Skirt.	mm	6350 (**)	Base Shear	kgf	54969 See Note 4.7
Type of Heads		2:1 Ellipsoidal	Base Moment	kgf-m	473695 See Note 4.7
Shell Thickness	mm	16 15	AGITATOR		
Head Thk (top/bottom)	mm	16 (M.A.F)	Download	kg	-
Type of Supports	-	Skirt	Torque	kg-m	-
Insulation Thickness	mm	100 (**)	Bending Moment	kg-m	-
Insulation Type	-	IH	WEIGHT		
Fireproofing on Skirt		50 (Each Side)	Shipping	kg	14650
Vessel Volume	m ³	33	Empty(Shop Fabricated)	kg	26000
Liquid Volume	m ³	(**)	Operating	kg	110500
Jacket / Coil volume	m ³	-	Hydrotest(Site)	kg	96000
Heat Transfer Area	m ²	-	Internals	kg	(**)

MATERIAL DATA (See Note. 20)

Shell	ASTM A 240 -316L	Bolts (external)	ASTM A 193 Gr. B7M
Heads	ASTM A 240 -316L	Nuts (external)	ASTM A 194 Gr. 2HM
Jacket / Coil Shell	(See Note. 4.11)	Bolts (internal)	SS 316
Jacket / Coil Head	(See Note. 4.11)	Nuts (internal)	SS 316
Nozzle Flanges	ASTM A 182 F316L	Gaskets (external)	Note 4.8
Nozzle Necks	ASTM A 312 TP316L	Gaskets (internal)	Flexible Graphite with SS316L insert (**)
Nozzle Reinforcement	SA 182 F316L	Internal Trays	-
Girth Flanges	-	Internal Demister	316L SS
Skirt (Top at Shell)	ASTM A 240 -316L	Int. Support Grating, Holddown	SS 316L
Skirt (Lower)/Basing	ASTM A 240 -316L	Grating, Perforated plate & Screens	
Insulation Support Clips	ASTM A 240 -316L	Int. Steam Coil for Demister	SS 316L
Stiffening Rings	ASTM A 240 -316L	Internal Supports	ASTM A 240 -316L
Platform Clips	ASTM A 240 -316L	Int. Support & Hold down beams	SA 240 316L
Tailing Lugs	ASTM A 240 -316L	Vortex Breaker	ASTM A 240 -316L
Lifting Lugs	ASTM A 240 -316L	Baffle	SA 240 316L
Int. / Ext. Welded attach.	SA 240 - 316L	Elbow	-
Int. Removable attach.	SA 240 - 316L	External Steam Tracing	SS 316L

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PRESSURE VESSEL
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0510-001
REV. NO : B
PAGE NO. : 6 / 9

Item Number **088-C-001**

FABRICATION / INSPECTION

Design Code	ASME Sec VIII Div-1- 2019 Ed. NDE	
Additional Specification	080557C-088-JSD-0400-001	Radiography
Code Stamp	N/A	Magnetic Particle
Stress Relieving	Per Code&Specs.	Dye Penetrant
Other Heat Treatment	Per Code&Specs.	Ultrasonic
Surface finish (internal)	Clean and Dry	Gas Leak Testing
Surface finish (external)	Refer Painting Specification	PMI
Painting	Refer Painting Specification	Other NDE
Lining	N/A	Hardness Tests
		Impact Tests at
		Full
		Per Code&Specs.
		Per Code&Specs.
		Per Code&Specs.
		N/A
		Per Code&Specs.
		Per Code&Specs.
		Per Code&Specs.
		Per Code&Specs. °C

NOZZLE SCHEDULE

Nozzle	No. off.	Service	NB mm	Rating (#)	Flange	Finish	Stand -out	Elevat -ion	Note		
Process Nozzles					(NOTE.21)						
N1	1	Liquid Sulfur Inlet	150/100	150	RF	125 to 250 AARH	BY CONTRACTOR		c/w Inlet pipe. Notes 3.4 & 3.5		
N2	1	Air Inlet	200/150	150	RF				c/w Sparger. Notes 3.4 & 3.5		
N3	1	Liquid Sulphur Outlet	250/200	150	RF				c/w Weir. Notes 3.4 & 3.5		
N4	1	Air & H ₂ S Outlet	200/150	150	RF				Notes 3.4 & 3.5		
N5	1	Vent	50	150	RFWN						
N6	1	Liquid Sulphur Drain	100/80	150	RF				Vortex Breaker, Notes 3.4 & 3.5		
N7	1	Steam Out	80/50	150	RF				Notes 3.4 & 3.5		
N8A	1	Demister Steam Inlet	25		FS Coup.				Note 3.6		
N8B	1	Demister Steam Inlet	25		FS Coup.				Note 3.6		
N9A	1	Demister Steam Outlet	25		FS Coup.				Note 3.6		
N9B	1	Demister Steam Outlet	25		FS Coup.				Note 3.6	P1	
N10	12 14	Steam To Nozzle Jacket	20		FS Coup.		Note 3.6				
N11	12 14	Condensate from Nozzle Jacket	20		FS Coup.		Note 3.6				
Manways											
M1	1	Manway	600 12 14	150	RFWN	125 to 250 AARH			Above Demister, Note 3.3		
M2	1	Manway	600 12 14	150	RFWN				Above Catalyst, Note 3.3		
M3	1	Manway	600 12 14	150	RFWN				Catalyst Bed, Note 3.3		
M4	1	Manway	600 12 14	150	RFWN				Below Catalyst Bed, Note 3.3		
Instrument Nozzles											
L1A/B	12 14	Level Transmitter	100 x 80	300	RF	125 to 250 AARH	BY CONTRACTOR		Notes 3.4 & 3.5		
L2A/B	12 14	Level Transmitter	100 x 80	300	RF				Notes 3.4 & 3.5		
T1	1	Temperature	80/50	300	RF				Notes 3.4 & 3.5		
T2	1	Temperature	80/50	300	RF				Notes 3.4 & 3.5		
T3	1	Temperature	80/50	300	RF				Notes 3.4 & 3.5		
P1	1	Pressure Trans.	80/50	300	RF				Notes 3.4 & 3.5		
Skirt Nozzles											
SA	1	Skirt Access	500								
SV1-4	4	Skirt Vent	50								
SO	1	Skirt Opening	200								

Notes

- 3.1) Standouts from vessel centre line to flange face, for nozzles in top head from head tan line to flange face (mm)
- 3.2) Elevation is from bottom tan line to nozzle centre line (mm).
- 3.3) Manways C/W blind, gaskets, bolting and davit.
- 3.4) Nozzle to be Steam Jacketed. Nozzle and Jacket NB quoted in table above
- 3.5) Jacketed nozzle flanges to be fabricated as a forging, Material ASTM A182 F316L
- 3.6) Couplings for Demister steam coils and nozzle jackets to be rated 6000#

DEGASSING CONTACTOR

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	Item Number 088-C-001	
VESSEL DESIGN NOTES		
4.1) Flange bolts to straddle the vessel centre lines. 4.2) All dimensions are in millimeters unless otherwise stated. 4.3) All dimensions are from reference tangent line, unless otherwise indicated. 4.4) Vessel shall be designed for steam out conditions : 3.0 kg/cm ² (g) @ 175° C and for FV @ 175° C 4.5) Design pressure is at top of tower. The design pressure at the bottom shall be determined based on tower pressure drop and bottom liquid static head. Pressure drop value to be confirmed by Catalyst supplier. 4.6) Anchor Bolt holes shall straddle the vessel north/south centre lines unless otherwise indicated. 4.7) The thicknesses, weights and Loads shown are for estimation purposes only. Vendor shall calculate and confirm. Thicknesses shown are the minimum acceptable to IOCL. Vendor is responsible for complete mechanical design. 4.8) Gaskets: Spiral wound graphite filled gasket with type 304 SS or 316 SS windings with 304 316SS inner ring and SS 316 outer ring conforming to ASME B16.20 4.9) Refer to PDRP 8210-SP-0001 Refer Specification 080557C-088-JSD-0400-001 for details. 4.10) Skirt height to be confirmed in detail engineering 4.11) Vessel shell and heads to be steam traced with external plate coils / Panel type coils / Contro trace. Mechanical design for plate coils : 7.0 kg/cm ² g & 240°C, FV & 175°C Operating conditions for Plate coils : 4.0kg/cm ² g @ 175°C Insulate for Heat Conservation @ 175°C (100mm) By Others. Insulation thickness to be confirmed by Contractor. 4.12) Install a steam coil above and below the demister pad. 4.13) Nozzles N1, N2, N3, N4, N5, N6, N7, M1, M2, M3, M4, L1, L2, T1, T2, T3 & PI, shall have integral reinforcement employing butt welds that can be examined by radiography (Per ASME VIII Div. 1 FIG UW-16.1 Sketch F) 4.14) Equipment is mounted concrete foundation on grade. Anchor chair reaction in skirt shall be calculated using Brownell & Young Method. Neutral axis shifted method shall be used for calculating the base plate thickness. 4.15) Internal details like wire mesh screen details, perforated plate details & support grid details shall be finalized by contractor based on the Catalyst supplier's design input. Contractor to obtain necessary informations from catalyst supplier through IOCL.		Rev
USED ABBREVIATIONS FV = Full vacuum, N/A = Not Applicable, NB = Nominal Bore, RF = Raised Face, FF = Flat Face, RTJ = Ring Type Joint, SO = Slip On, WN = Weld Neck, LWN = Long Weld Neck, SR = Self Reinforced, LJ = Lap Joint, PWHT = Post Weld Heat Treatment, PT = Penetrant Testing, MT = Magnetic Testing, UT = Ultrasonic Testing, RT = Radiography Testing, HC = Heat Conservation, PP = Personnel Protection, VTA = Vendor to Advise. M.A.F = Minimum after Forming		

	DEGASSING CONTACTOR	
	DATA SHEET (PRESSURE VESSEL)	Rev.: F2
DOC No. : PDRP4220-8430-DS-087-2003		Page 4 of 6

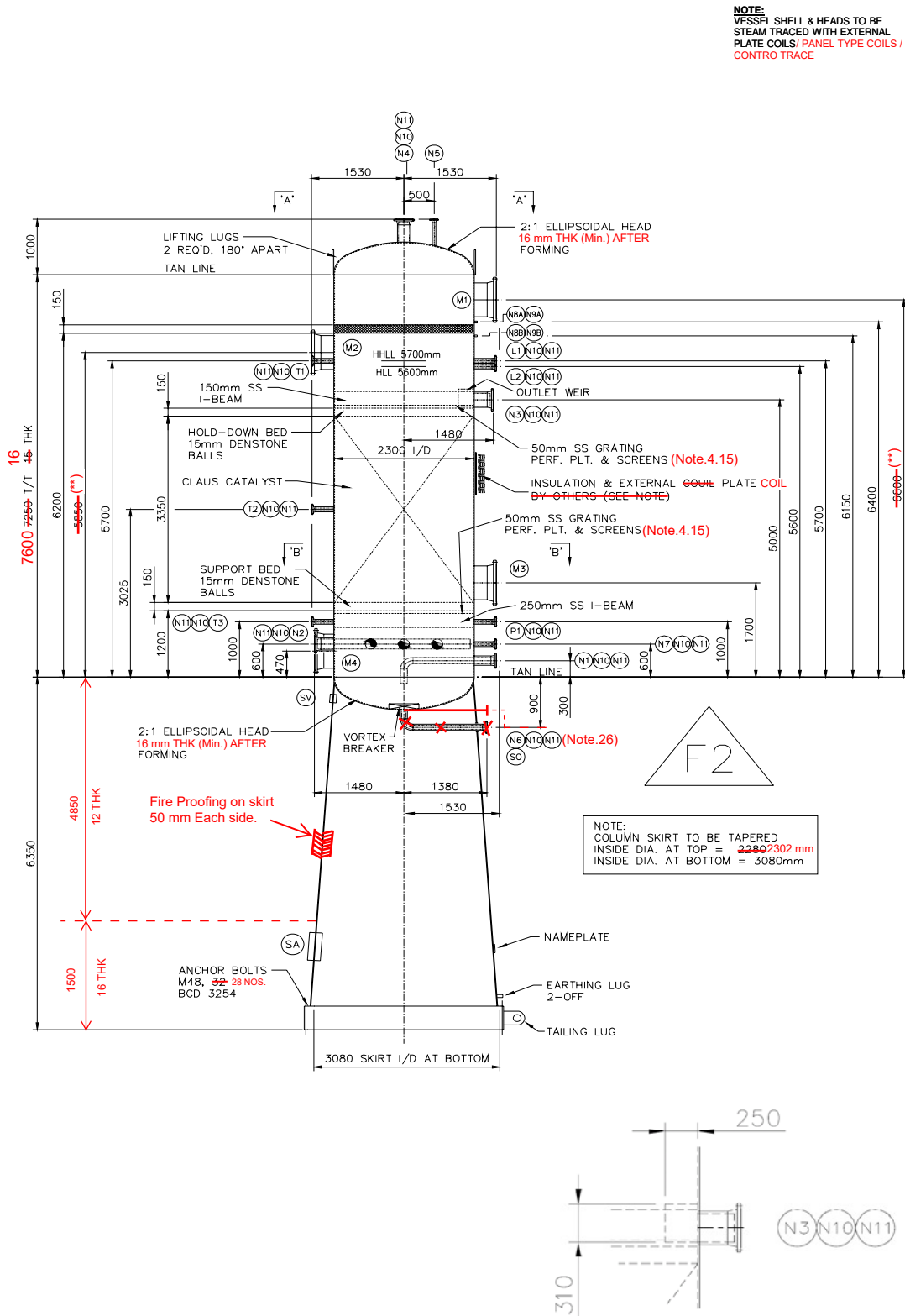
FOSTER WHEELER ENERGY LIMITED
PRESSURE VESSEL
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0510-001
 REV. NO : B
 PAGE NO. : 8 / 9

Item Number **088-C-001**

VESSEL SKETCH

Rev



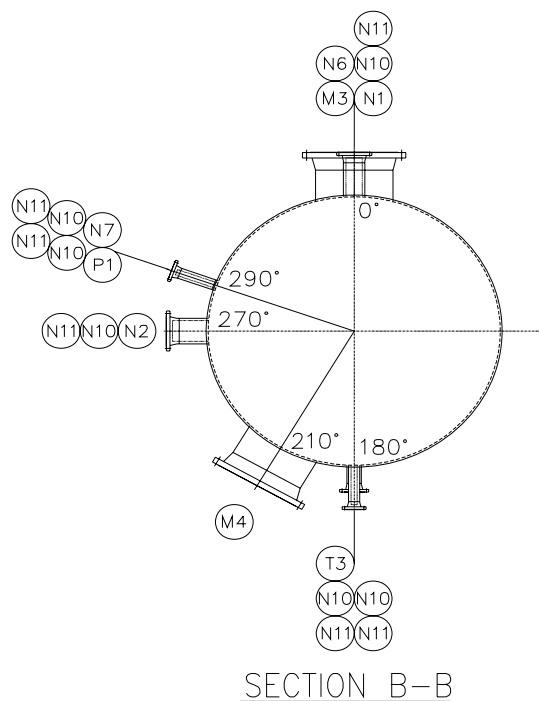
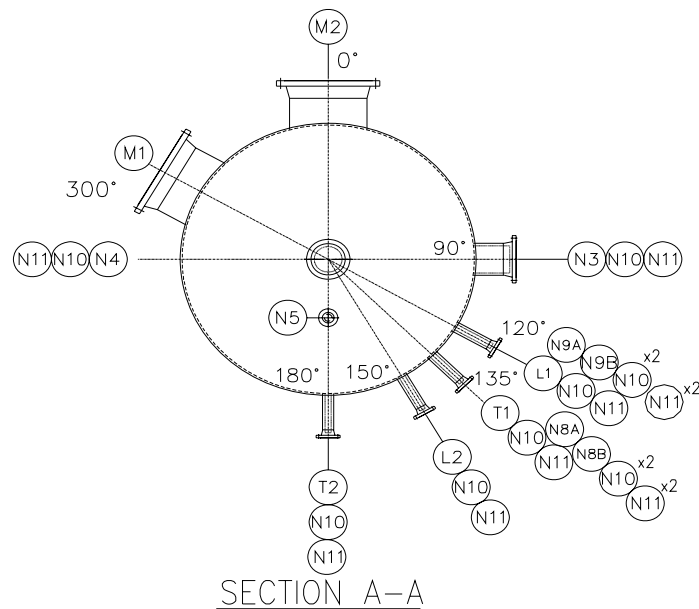
FOSTER WHEELER ENERGY LIMITED
PRESSURE VESSEL
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0510-001
 REV. NO : B
 PAGE NO. : 9 / 9

Item Number **088-C-001**

VESSEL SKETCH

Rev



F2

Nozzle Orientation is preliminary. To be confirmed by Contractor during detail engineering.

	DEGASSING CONTACTOR	
	DATA SHEET (PRESSURE VESSEL)	
	DOC No. : PDRP4220-8430-DS-087-2003	Rev.: F2
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 TechnipFMC		 IndianOil		PROJECT		Standby SRU & Additional Tanks	
				CLIENT		INDIAN OIL CORPORATION LIMITED	
DATA SHEET		Project NO. 080557C001		Document No. 080557C-088-SP-0810-001		Rev. No. A	
						Page 1 of 7	
DATA SHEET SRU (088) ACID GAS KO DRUM 088-V-001							
			 Written By Senthil Kumar Kasi 2019.11.29 12:04:13 +05'30'	 Checked By Hemant K 2019.11.29 14:56:03 +05'30'	 Approved By Suresh MS 2019.11.29 17:52:14 +05'30'	 Authorized By Jesumarian 2019.12.09 20:29:3 +05'30'	
A	29-Nov-2019	ISSUED FOR DESIGN	KSK	KH	MSS	JMC	
REV.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED	AUTHORIZED	

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 	PROJECT	Standby SRU & Additional Tanks IOCL- Paradip Refinery		
	CLIENT	INDIAN OIL CORPORATION LIMITED		
DATA SHEET	Project No. 080557C001	Document No. 080557C-088-SP-0810-001	Rev. No. A	Page 2 of 7

The following notes to be considered for :

PDRP4220-8430-DS-087-2016 (088-V-001 : Equipment Datasheet for Acid Gas KO Drum)

General Notes

1. Information shown below supersedes the information indicated in the following pages.
2. This document shall be read along with IOCL Specifications, Technip Specifications & FWEL Specifications.
3. Wherever "IOCL" is mentioned inside FWEL document, the same shall be read as PMC.
4. Wherever "Vendor" is mentioned, same shall be read as CONTRACTOR & VENDOR.
5. All dimensions in mm unless specified otherwise.
6. All thicknesses specified on the drawing / sketch are minimum after forming and machining. The LSTK Contractor / Detail Engineering Contractor (DEC) shall be responsible for detail design.
7. All Nozzle sizes, Projections, Elevations, Locations are preliminary and to be finalized during detail design.
8. Flange ratings shall also be checked for impact due to loads from connected piping & shall be increased, if required. See code requirements .
9. All removable Internals shall be designed to pass through Manhole.
10. All carbon steel material shall be in killed quality.
11. SS316 spiral wound gasket with graphite filler, SS316 inner ring & CS outer ring shall be used as gasket material.
12. Local load analysis for process nozzles shall be carried out as per WRC 107 / 297 or FEA.
13. Skirt Height and Anchorage are preliminary. 4.6 type anchor bolt considered. To be finalized by DEC.
14. For Additional Technical Requirements, refer other specifications in ITB.

Specific Notes for 088-V-001

15. Quantity : ONE.
16. Butt weld seams shall be fully radiographed.
17. Refer Painting specification for details of surface preparation and Painting.
18. Nozzle reinforcement : All nozzle openings shall be integrally reinforced. All nozzle openings shall be completely reinforced including those openings in skirt.
19. All openings $\geq 20''$ NB shall also be verified as per Appendix 1-7 of the Code
20. All pressure parts, all the attachments welded to pressure parts & all wetted surfaces by process fluid shall meet the requirement of NACE MR0103 + HIC.
21. All Pressure part and non-pressure part material shall be as per ASME. ASTM material is not to be used. Wherever ASTM is specified in this document, the same to be read as ASME.



EQUIPMENT DATA SHEET
 PRESSURE VESSEL

088-V-001

**PRESSURE VESSEL
 ACID GAS KO DRUM
 088-V-001**

(*) - TO BE CONFIRMED LATER
 (**) - TO BE CONFIRMED BY CONTRACTOR

Note: This MDS is based on Process Datasheet No. PDRP4220-8110-PS-086-0009, Rev. 01.

Indian Oil Corporation Limited (IOCL)
Paradip Refinery Project (PDRP)
Paradip, Orissa State, India
~~Contract No: 1-14-4200/4399~~

F1	7-Oct-09	Issued for Enhanced Design	J McCann	G Brown	K Gallacher
A1	14-Aug-09	Issued for design	Sunil Gaba	Manoj Dash	J P Biswas
Rev	Date	Description	Orig By	Checked By	Approved

FOSTER WHEELER ENERGY LIMITED
PRESSURE VESSEL
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0810-001

REV. NO : A

PAGE NO. : 4 / 7

Item Number **088-V-001**

DESIGN DATA

Rev

Number of Units

ONE

Contents

Shell

Jacket / Coil

Toxic / Lethal (Yes / No)

ACID GAS

N/A

Sour Service (Yes / No)

No

-

-

Cyclic Service (Yes / No)

Yes

-

-

Design Pressure (Internal / External)

Kg/cm2(g)

3.8 / F.V

Note 4.4

-

-

Design Temperature (Max / Min)

°C

343

10

-

-

Operating Pressure (Internal / External)

Kg/cm2(g)

0.8

-

-

-

Operating Temperature (Max / Min)

°C

48

16

-

-

Hydrotest Pressure (Site Corroded / Shop New)

Kg/cm2(g)

Per Code / Spec

-

-

Minimum Design Metal temperature

°C

10

-

Contents S.G.

-

0.99

-

Corrosion Allowance (Internal / External)

mm

Note 4.10

-

-

-

MECHANICAL DATA

Layout

Loads

Vertical / Horizontal

-

Vertical

Basic Wind Speed

m/s

65

Vessel Diameter

mm

2200 ID

Basic Wind Pressure

Kg/m²

Per IS 875

Tan / Tan

mm

6000

Earthquake Factor

-

Note 4.9

Height of BTL

mm

~~3500 (Hold)~~

Base Shear

kgf

~~18500 (Note 4.7)~~

Type of Heads

2:1 Ellipsoidal

Base Moment

kgf-m

~~93000 (Note 4.7)~~

Shell Thickness

mm

~~15~~

AGITATOR

Download

kg

-

Head Thk (top/bottom)

mm

~~12~~

~~12~~

Torque

kg-m

-

Type of Supports

-

Skirt

Bending Moment

kg-m

-

Insulation Thickness

mm

80

WEIGHT

Insulation Type

-

IH

Shipping

kg

~~10200~~

Fireproofing

-

(**)

Empty (Shop Fabricated)

kg

15,000

Vessel Volume

m³

25.6

Operating

kg

40,700

Liquid Volume

m³

11.1

Hydrotest (at site)

kg

55,000

Jacket / Coil volume

m³

-

Internals

kg

(**)

Heat Transfer Area

m²

-

MATERIAL DATA (SEE NOTE.21)

Shell

ASTM A 516 60N + HIC

Bolts (external)

ASTM A 193 Gr B7M

Heads

ASTM A 516 60N + HIC

Nuts (external)

ASTM A 194 Gr 2HM

Coil Shell

-

Bolts (internal)

SS 316

Jacket / Coil Head

-

Nuts (internal)

SS 316

Nozzle Flanges

SA 350 Gr.LF2 Cl.1

Gaskets (external)

Note 4.8

Nozzle Necks

SA350Gr.LF2 Cl.1 / SA333 Gr.6

Gaskets (internal)

-

Nozzle Reinforcement

SA 350 Gr.LF2 Cl.1

Internals

ASTM A 516 Gr 60N + HIC

Girth Flanges

-

Demister pad & Grids

SS 316

Skirt (Upper)

ASTM A516 60N + HIC

Internal Flanges

-

Skirt (Lower)/ Basing

SA 516 GR.70

Shell Clad or Overlay

-

Insulation Supports

ASTM A 516 Gr 70N

Head Clad or Overlay

-

Stiffening Rings

ASTM A 516 60N + HIC

Demister Support Beam

SA 516 GR.60N + HIC

Platform Clips (If Any)

ASTM A 516 60N + HIC

Vortex Breaker

ASTM A 516 Gr 60N + HIC

Tailing Lugs

ASTM A 516 Gr.70

Wear Plate

-

Lifting Lugs

ASTM A 516 60N + HIC

Elbow

ASTM A 420 WPL6 (SEAMLESS)

WELDED EXTERNALS

: SA 516 GR 60N + HIC

ACID GAS KO DRUM

DATA SHEET (PRESSURE VESSEL)

Rev F1

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FOSTER WHEELER ENERGY LIMITED
PRESSURE VESSEL
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0810-001
REV. NO : A
PAGE NO. : 5 / 7

Item Number **088**-V-001

FABRICATION / INSPECTION

Rev

Design Code	ASME SEC VIII DIV 1-ED. 2019	NDE	
Additional Specification	080557C-088-JSD-0400-001	Radiography	Full (Note 4.15)
Code Stamp	No	Magnetic Particle	Per Code & Specs
Stress Relieving	Yes	Dye Penetrant	Per Code & Specs
Other Heat Treatment	Per code / Specs	Ultrasonic	Per Code & Specs
Surface finish (internal)	Clean and Dry	Gas Leak Testing	N/A
Surface finish (external)	REFER PAINTING SPECIFICATION	PMI	Per Specs
Painting	REFER PAINTING SPECIFICATION	Other NDE	Per Code & Specs
Lining	N/A	Hardness Tests	Per Code & Specs
		Impact Tests	Per Code & Specs

Specified Flange Rating is indicative. However Contractor/
Vendor to verify the adequacy for connected piping Loads.

NOZZLE SCHEDULE

Nozzle	No. off.	Service	NB mm	Rating (#)	Flange	Finish	Stand -out	Elevat -ion	Note	
Process Nozzles										
N1	1	ACID GAS INLET	500 ⁹⁰⁰ (**)	150	SR-RFWN	125 to 250 AARH	BY VENDOR	3650	W/ INLET DEFLECTOR	F1
N2	1	ACID GAS OUTLET	500 ⁹⁰⁰ (**)	150	SR-RFWN		BY VENDOR	SEE SKETCH		F1
N3	1	SOUR WATER OUTLET	80	150	SR-RFWN		BY VENDOR	-1000	W/ VORTEX BREAKER	F1
N4	1	VENT	50	150	RFWN		BY VENDOR	SEE SKETCH		F1
N5	1	DRAIN	50	150	RFWN		BY VENDOR	SEE SKETCH		F1
N6	1	UTILITY CONNECTION	50	150	RFLWN		1400	500		F1
N7	1	RELIEF VALVE	100	#300	SR-RFWN		BY VENDOR	SEE SKETCH		F1
N8	1	AIR MOVER	100	150	SR-RFWN		BY VENDOR	SEE SKETCH	Note 3.4	F1
Manways										
M1	1	MANWAY	600	150	SR-RFWN	125 to 250 AARH	1500	550	Note 3.2	F1
Instrument Nozzles										
L1 A/B	2	LEVEL BRIDDLE	80	300	SR-RFWN	125 to 250 AARH	1400	SEE SKETCH		F1
L2 A/B	2	LEVEL TRANSMITTER	80	300	SR-RFWN		1400	SEE SKETCH		F1
L3 A/B	2	LEVEL TRANSMITTER	80	300	SR-RFWN		1400	BY CONTRACTOR	Note. 4.16	
L4 A/B	2	LEVEL TRANSMITTER	80	300	SR-RFWN		1400	BY CONTRACTOR	Note. 4.16	
Skirt Openings										
SA	1	SKIRT ACCESS	500 ID					-2340 (HOLD)		F1
SV 1~6	6	SKIRT VENT	100					-520-		F1

Notes:

- Standout for nozzle in shell shall be from vessel C.L to flange face and for nozzles in head shall be from tan line to flange face.
- C/W blind, gaskets, bolting & davit.
- Provide adequate skirt opening for nozzle N3.
- C/W blind, gaskets and bolting.
- All instrument paired nozzles to be Jig-Set.

ACID GAS KO DRUM

DATA SHEET (PRESSURE VESSEL)

Rev F1

DOC No. : PDRP4220-8430-DS-087-2016

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FOSTER WHEELER ENERGY LIMITED

PRESSURE VESSEL

DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0810-001
REV. NO : A
PAGE NO. : 6 / 7

Item Number **088-V-001**

VESSEL DESIGN NOTES

Rev

- 4.1) Flange bolts to straddle the principal vessel centrelines.
- 4.2) All dimensions are in millimetres unless otherwise stated.
- 4.3) All dimensions are from reference tangent line, unless otherwise indicated.
- 4.4) Vessel shall be designed for full vacuum (FV) @ 175° C.
- 4.5) Design Pressure excludes static head of liquid. Vendor to calculate based on maximum liquid level and Specific gravity and incorporate into design calculations.
- 4.6) Anchor Bolt holes shall straddle the North/ South centre lines unless otherwise indicated.
- 4.7) The thicknesses, weights base shear and moments are shown for estimation purposes only. Vendor shall calculate and confirm. Thicknesses shown are the minimum acceptable to IOCL. Vendor is responsible for complete mechanical design.
- 4.8) Gaskets: Spiral wound graphite filled gasket with type ~~304 SS~~ or 316 SS windings with ~~304~~/316 SS inner ring and carbon steel outer ring conforming to ASME B16.20.
- 4.9) ~~See clause 3.9 of Doc. No. PDRP-8820-SP-0001.~~ Refer Specification 080557C-088-JSD-0400-001 for details.
- 4.10) Corrosion allowance
- a) for vessel 6 mm
- b) for Skirt Supp. 1.5 mm & FOR DEMISTER SUPPORT BEAM : 6 mm C.A (Total)
- 4.11) Vessel is in sour service and the below requirements shall be applicable:
- a) Vessel fabrication and material requirements shall meet the requirements of NACE MRO103-~~2007~~ and NACE ~~RP0472-2008~~. **Vessel shall be fabricated using HIC Certified plates.**
- b) Vessel shall be subjected to PWHT.
- c) Refer to specification SS 5.11 for full details of requirements.
- ~~d) Compliance to spec. PDRP-8440-SP-0026 is required.~~
- 4.12) Longitudinal weld joints in dished ends subject to 100% radiography.
- 4.13) Skirt Hot box is required as per spec. **PDRP-8430-SP-0025. Hot box analysis shall be performed using FEA.**
- 4.14) Mesh Pad shall be designed to be installed from bottom.
- Mesh Pad shall be furnished and installed by the vendor as per the MESH PAD PROCESS DATA given below:

PROPERTY		VAPOUR	LIQUID
MASS FLOW	kg/hr	24720	
TEMPERATURE	°C	48	
PRESSURE	kg/cm ² g	0.8	
MOL WT	-	33.81	18.06
COMPRESSIBILITY	-	1	
VISCOSITY	CP	0.014	0.6
DENSITY	kg/cm ³	2.267	990
SURF. TENS.	dynes/cm	-	78
REMOVAL EFFICIENCY		99%>100	μm
PRES. DROP ALLOWED	kg/cm ²		

- 4.15) Full Radiography shall be interpreted as 100% radiography (RT-1), Not RT-2.
- 4.16) Apart from L3 A/B & L4 A/B, requirement of additional Level Transmitter nozzles shall be confirmed by contractor during detail Engineering.**

USED ABBREVIATIONS

FV = Full vacuum, N/A = Not Applicable, NB = Nominal Bore, RF = Raised Face, IBR = Indian Boiler Regulations
FF = Flat Face, RTJ = Ring Type Joint, SO = Slip On, WN = Weld Neck, LWN = Long Weld Neck, SR = Self Reinforced,
LJ = Lap Joint, PWHT = Post Weld Heat Treatment, PT = Penetrant Testing, MT = Magnetic Testing,
UT = Ultrasonic Testing, RT = Radiography Testing,
HC = Heat Conservation, PP = Personnel Protection, VTA = Vendor to Advise.

ACID GAS KO DRUM

DATA SHEET (PRESSURE VESSEL)

DOC No. : PDRP4220-8430-DS-087-2016

Rev F1

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FOSTER WHEELER ENERGY LIMITED

PRESSURE VESSEL

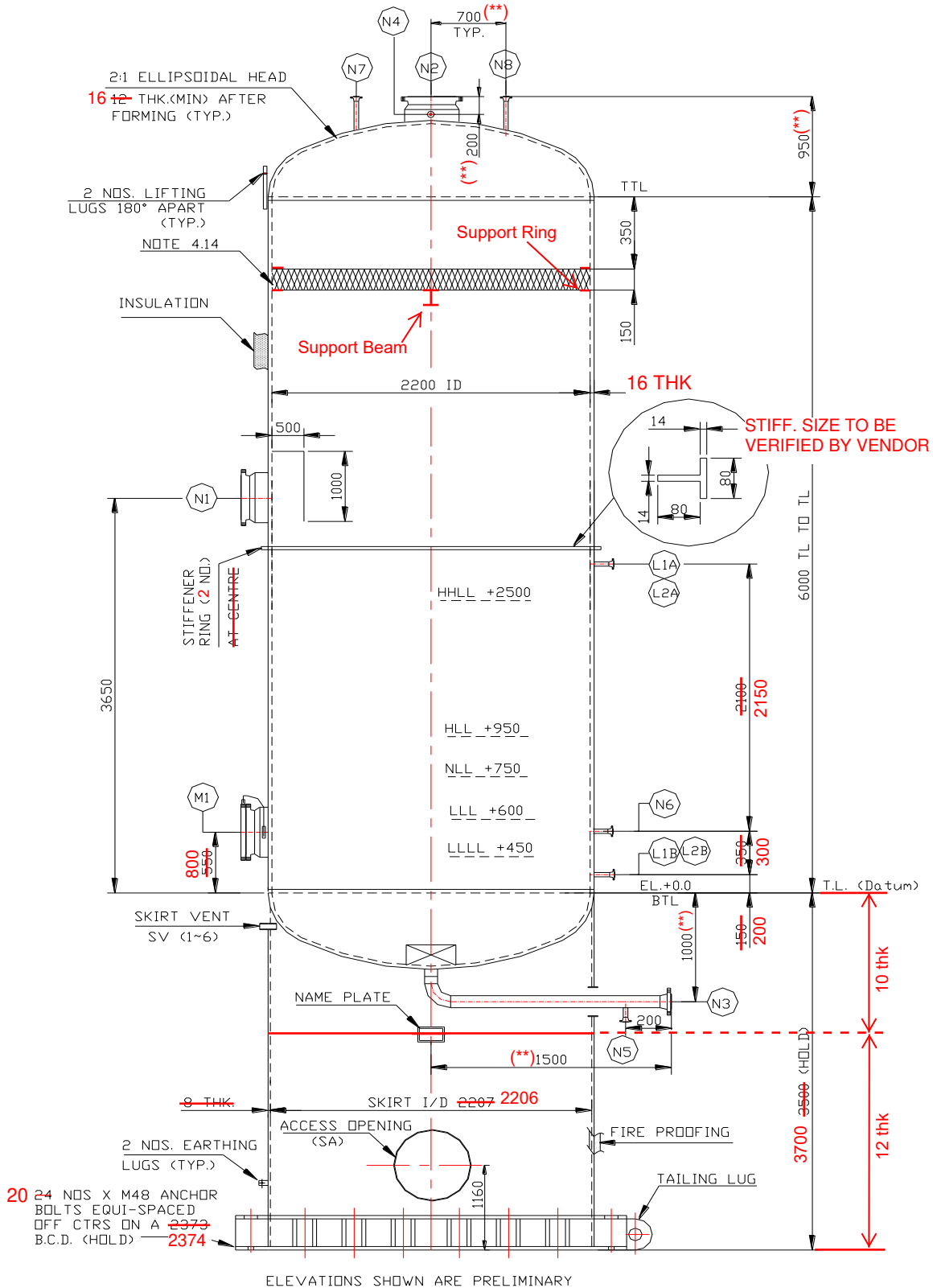
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0810-001
 REV. NO : A
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Item Number **088-V-001**

VESSEL SKETCH

Rev



F1

F1

F1

F1

ACID GAS KO DRUM

DATA SHEET (PRESSURE VESSEL)

DOC No. : PDRP4220-8430-DS-087-2016

Rev F1

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 TechnipFMC		 IndianOil		PROJECT		Standby SRU & Additional Tanks	
				CLIENT		INDIAN OIL CORPORATION LIMITED	
DATA SHEET		Project NO. 080557C001		Document No. 080557C-088-SP-0810-002		Rev. No. A	
						Page 1 of 7	
DATA SHEET SRU (088) SWS ACID GAS KO DRUM 088-V-002							
			 Written By Senthikumar Kasi 2019.11.29 16:03:05	 Checked By Hemant K 2019.11.29 16:06:21 +05'30'	 Approved By Suresh MS 2019.11.29 16:32:42 +05'30'	 Authorized By Muralidharan 2019.12.09 20:30:21 +05'30'	
A	29-Nov-2019	ISSUED FOR DESIGN	KSK	KH	MSS	JMC	
REV.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED	AUTHORIZED	

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CONFIDENTIAL – Not to disclose without Authorization

 	PROJECT	Standby SRU & Additional Tanks IOCL- Paradip Refinery		
	CLIENT	INDIAN OIL CORPORATION LIMITED		
DATA SHEET	Project No. 080557C001	Document No. 080557C-088-SP-0810-002	Rev. No. A	Page 2 of 7

The following notes to be considered for :

PDRP4220-8430-DS-087-2017 (088-V-002 : Equipment Datasheet for SWS Acid Gas KO Drum)

General Notes

1. Information shown below supersedes the information indicated in the following pages.
2. This document shall be read along with IOCL Specifications, Technip Specifications & FWEL Specifications.
3. Wherever "IOCL" is mentioned inside FWEL document, the same shall be read as PMC.
4. Wherever "Vendor" is mentioned, same shall be read as CONTRACTOR & VENDOR.
5. All dimensions in mm unless specified otherwise.
6. All thicknesses specified on the drawing / sketch are minimum after forming and machining. The LSTK contractor / Detail Engineering Contractor (DEC) shall be responsible for detail design.
7. All Nozzle sizes, Projections, Elevations, Locations are preliminary and to be finalized during detail design.
8. Flange ratings shall also be checked for impact due to loads from connected piping & shall be increased, if required. See code requirements .
9. All removable Internals shall be designed to pass through Manhole.
10. All carbon steel material shall be in killed quality.
11. SS316 spiral wound gasket with graphite filler, SS316 inner ring & CS outer ring shall be used as gasket material.
12. Local load analysis for process nozzles shall be carried out as per WRC 107 / 297 or FEA.
13. Skirt Height and Anchorage are preliminary. 4.6 type anchor bolt considered. To be finalized by DEC.
14. For Additional Technical Requirements, refer other specifications in ITB.

Specific Notes for 088-V-002

15. Quantity : ONE.
16. Butt weld seams shall be fully radiographed.
17. Refer Painting specification for details of surface preparation and Painting.
18. Nozzle reinforcement : All nozzle openings shall be integrally reinforced. All nozzle openings shall be completely reinforced including those openings in skirt.
19. All openings $\geq 20''$ NB shall also be verified as per Appendix 1-7 of the Code
20. All pressure parts, all the attachments welded to pressure parts & all wetted surfaces by process fluid shall meet the requirement of NACE MR0103 + HIC.
21. All Pressure part and non-pressure part material shall be as per ASME. ASTM material is not to be used. Wherever ASTM is specified in this document, the same to be read as ASME.



EQUIPMENT DATA SHEET
 PRESSURE VESSEL

088-V-002

PDRP4220-8430-DS-087-2017

PRESSURE VESSEL
SWS ACID GAS KO DRUM
088-V-002

(*) - TO BE CONFIRMED LATER
 (**) - TO BE CONFIRMED BY CONTRACTOR

Note: This MDS is based on process Datasheet No. PDRP4220-8110-PS-086-0010, Rev. 01.

Indian Oil Corporation Limited (IOCL)
Paradip Refinery Project (PDRP)
Paradip, Orissa State, India
~~Contract No: 1 14 4200/4399~~

			<i>Paul McNeil</i>	<i>Ian G Brown</i>	<i>K. Gallacher</i>
F1	2-Oct-09	Issued for Enhanced Design	Paul McNeil	Ian G Brown	Kevin Gallacher
A1	14-Aug-09	Issued for design	Sunil Gaba	Manoj Dash	J P Biswas
Rev	Date	Description	Orig By	Checked By	Approved

TA

DSN: 15639

FOSTER WHEELER ENERGY LIMITED
PRESSURE VESSEL
DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0810-002
REV. NO : A
PAGE NO. : 4 / 7

Item Number **088-V-002**

DESIGN DATA

Number of Units

ONE

Contents

Shell

Jacket / Coil

Toxic / Lethal (Yes / No)

SWS GAS

N/A

Sour Service (Yes / No)

No

-

-

Cyclic Service (Yes / No)

Yes

-

-

Design Pressure (Internal / External)

Kg/cm2(g)

No

-

-

Design Temperature (Max / Min)

°C

3.8/ F.V | **Note 4.4**

-

-

Operating Pressure (Internal / External)

Kg/cm2(g)

343

10

-

-

Operating Temperature (Max / Min)

°C

0.8

-

-

-

Hydrotest Pressure (Site Corroded / Shop New)

Kg/cm2(g)

90

16

-

-

Minimum Design Metal temperature

°C

Per Code / Spec

-

-

Contents S.G.

-

10

-

-

Corrosion Allowance (Internal / External)

mm

0.966

-

-

Note 4.10

-

-

-

MECHANICAL DATA

Layout

Loads

Vertical / Horizontal

-

Vertical

Basic Wind Speed

m/s

65

Vessel Diameter

mm

1600 ID

Basic Wind Pressure

Kg/m²

Per IS 875

Tan / Tan

mm

4400

Earthquake Factor

-

Note 4.9

Height of BTL

mm

3400 (HOLD)

Base Shear

kgf

8250 (Note 4.7)

Type of Heads

2:1 Ellipsoidal

Base Moment

kgf-m

33500 (Note 4.7)

Shell Thickness

mm

TS

AGITATOR

Download

kg

-

Head Thk (top/bottom)

mm

TS

Torque

kg-m

-

Type of Supports

-

Skirt

Bending Moment

kg-m

-

Insulation Thickness

mm

80

WEIGHT

Insulation Type

-

IH

Shipping

kg

5500

Fireproofing

-

()**

Empty (Shop Fabricated)

kg

6,800

Vessel Volume

m³

9.9

Operating

kg

20,100

Liquid Volume

m³

4.46

Hydrotest (at site)

kg

27,300

Jacket / Coil volume

m³

-

Internals

kg

-

Heat Transfer Area

m²

-

MATERIAL DATA (SEE NOTE 25)

Shell

ASTM A 516 **60N + HIC**

Bolts (external)

ASTM A 193 Gr.B7M

Heads

ASTM A 516 **60N + HIC**

Nuts (external)

ASTM A 194 Gr. 2HM

Coil Shell

-

Bolts (internal)

-

Jacket / Coil Head

-

Nuts (internal)

-

Nozzle Flanges

SA 350 Gr.LF2 Cl.1

Gaskets (external)

Note 4.8

Nozzle Necks

SA350Gr.LF2 Cl.1 / SA333 Gr.6

Gaskets (internal)

-

Nozzle Reinforcement

SA 350 Gr.LF2 Cl.1

Internals

ASTM A 516 **60N + HIC**

Girth Flanges

-

Internal Trays

-

Skirt (Upper)

ASTM A 516 **60N + HIC**

Internal Flanges

-

Skirt (Lower)/ Basing

SA 516 GR.70

Shell Clad or Overlay

-

Insulation Supports

ASTM A 516 Gr 70N

Head Clad or Overlay

-

Stiffening Rings

ASTM A 516 **60N + HIC**

Internal Supports

-

Platform Clips (If Any)

ASTM A 516 **60N + HIC**

Vortex Breaker

ASTM A 516 **60N + HIC**

Tailing Lugs

ASTM A **516 Gr.70**

Wear Plate

-

Lifting Lugs

ASTM A 516 **60N + HIC**

Elbow

ASTM A **420 WPL6 (SEAMLESS)**

WELDED EXTERNALS

: SA 516 GR 60N + HIC

SWS ACID GAS KO DRUM

DATA SHEET (PRESSURE VESSEL)

Rev F1

DOC No. : PDRP4220-8430-DS-087-2017

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Rev

[illegible]

NOZZLE SCHEDULE

F1	F1
F1	F1
F1	F1
F1	F1
F1	F1
F1	F1
F1	
F1	
F1	

- 3.1) Standout for nozzle in shell shall be from vessel C.L to flange face and for nozzles in head shall be from tan line to flange face.
- 3.2) C/W blind, gaskets, bolting and davit.
- 3.3) C/W blind, gaskets and bolting.
- 3.4) Provide adequate skirt opening for nozzle N3
- 3.5) All instrument paired nozzles to be Jig-Set.

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FOSTER WHEELER ENERGY LIMITED

PRESSURE VESSEL

DATA SHEET

TECHNIPFMC DOC. NO : 080557C-088-SP-0810-002

REV. NO : A

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Item Number **088-V-002**

VESSEL DESIGN NOTES

Rev

- 4.1) Flange bolts to straddle the vessel principal centrelines.
- 4.2) All dimensions are in millimetres unless otherwise stated.
- 4.3) All dimensions are from reference tangent line, unless otherwise indicated.
- 4.4) Vessel shall be designed for full vacuum (FV) @ 175° C.
- 4.5) Design Pressure excludes static head of liquid. Vendor to calculate based on maximum liquid level and Specific gravity and incorporate into design calculations.
- 4.6) Anchor Bolt holes shall straddle the north/south centrelines unless otherwise indicated.
- 4.7) The thicknesses, weights and loads are shown for estimation purposes only. Vendor shall calculate and confirm. Thicknesses shown are the minimum acceptable to IOCL. Vendor is responsible for complete mechanical design.
- 4.8) Gaskets: Spiral wound graphite filled gasket with type ~~304 SS~~ or 316 SS windings with ~~304~~/316 SS inner ring and carbon steel outer ring conforming to ASME B16.20.
- 4.9) ~~See clause 3.9 of Doc. No. PDRP-8820-SP-0001.~~ Refer Specification 080557C-088-JSD-0400-001 for details.
- 4.10) Corrosion allowance
- for vessel 6 mm
 - for Skirt Supp. 1.5 mm
- 4.11) Vessel is in sour service and the following requirements are applicable:
- Vessel fabrication and material requirements shall meet the requirements of NACE MR0103-~~2007~~ and NACE ~~RP0472-2009~~. **Vessel shall be fabricated using HIC Certified plates.**
SP 0472-2015
 - Vessel shall be subjected to PWHT.
 - Refer to specification SS 5.11 for full details of requirements.
 - ~~Compliance to spec. PDRP-8440-SP-0026 is required.~~
- 4.12) Full Radiography shall be interpreted as 100% radiography (RT-1), Not RT-2.
- 4.13) Skirt Hot Box is required as per specification PDRP-8430-SP-0025. **Hot box analysis shall be performed using FEA.**
- 4.14) Vessel to be steam traced to 93 °C.
- Preliminary steam tracing details : 1"NB, Sch.160 pipe as heating coil wound around the vessel at ~ 150mm pitch, SA 106 Gr.B (3mm corrosion allowance) ;
Thermal design to be performed by contractor to verify that 93 Deg.C can be maintained. Contractor to provide thermal guarantee. Design pressure and design temperature of steam coil to be advised by contractor based on detailed engg.
 - Alternate to steam tracing coil arrangement, panel type tracing, Contro trace or Equivalent) may be provided (whichever is Economical).
- 4.15) Apart from L3 A/B & L4 A/B, requirement of additional Level Transmitter nozzles shall be confirmed by contractor during detail Engineering.

USED ABBREVIATIONS

FV = Full vacuum, N/A = Not Applicable, NB = Nominal Bore, RF = Raised Face, IBR = Indian Boiler Regulations
 FF = Flat Face, RTJ = Ring Type Joint, SO = Slip On, WN = Weld Neck, LWN = Long Weld Neck, SR = Self Reinforced,
 LJ = Lap Joint, PWHT = Post Weld Heat Treatment, PT = Penetrant Testing, MT = Magnetic Testing,
 UT = Ultrasonic Testing, RT = Radiography Testing,
 HC = Heat Conservation, PP = Personnel Protection, VTA = Vendor to Advise.

SWS ACID GAS KO DRUM

DATA SHEET (PRESSURE VESSEL)

DOC No. : PDRP4220-8430-DS-087-2017

Rev F1

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FOSTER WHEELER ENERGY LIMITED
PRESSURE VESSEL
DATA SHEET

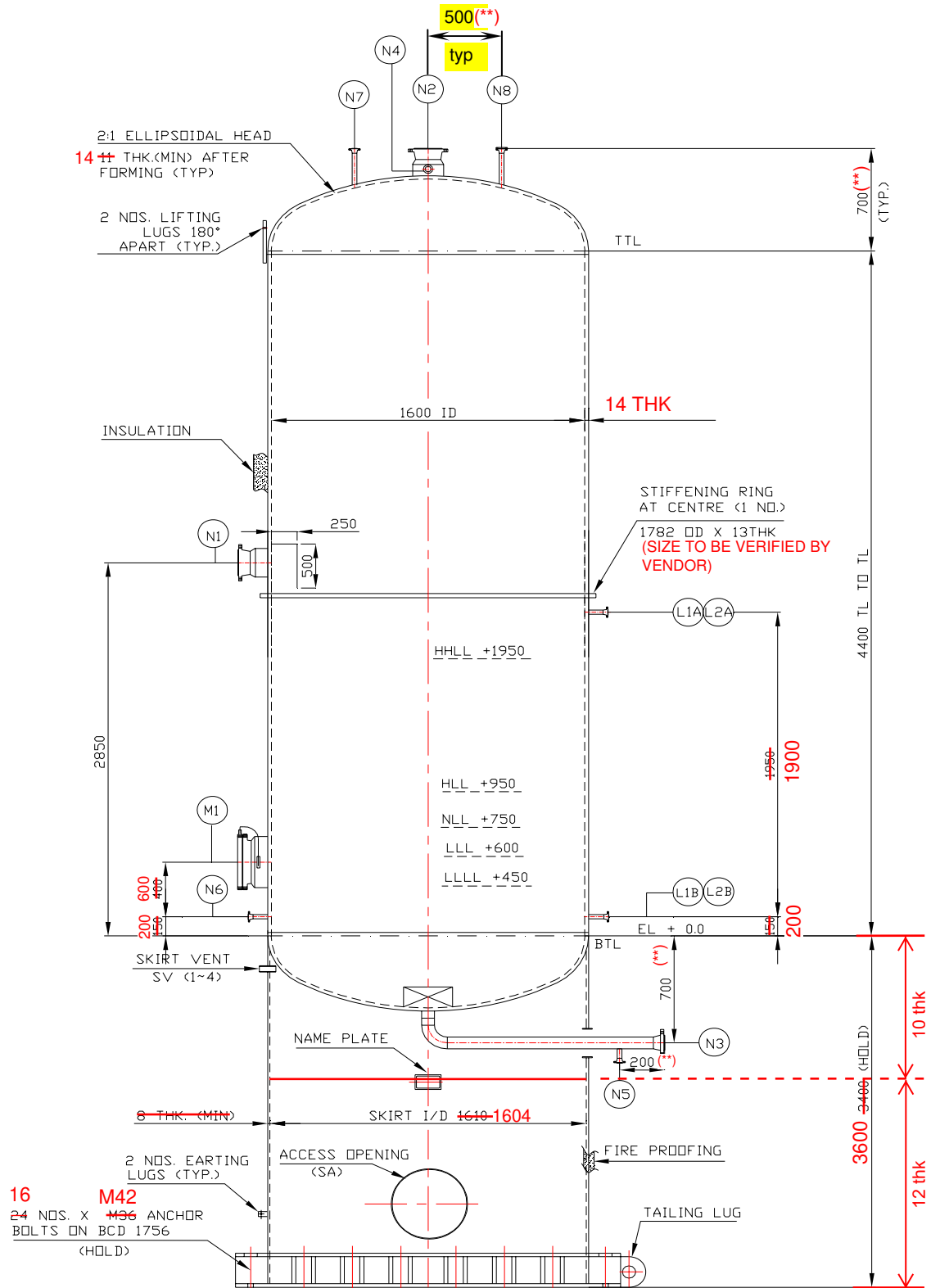
TECHNIPFMC DOC. NO : 080557C-088-SP-0810-002
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Item Number **088-V-002**

VESSEL SKETCH

Rev

F1



ELEVATIONS SHOWN ARE PRELIMINARY

SWS ACID GAS KO DRUM

DATA SHEET (PRESSURE VESSEL)

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 TechnipFMC		 IndianOil		PROJECT		Standby SRU & Additional Tanks	
				IOCL - Paradip Refinery			
		CLIENT		INDIAN OIL CORPORATION LIMITED			
DATA SHEET		Project NO. 080557C001		Document No. 080557C-088-SP-0810-005		Rev. No. A	
						Page 1 of 5	
DATA SHEET SRU (088) 1ST CONDENSER SEAL POT 088-V-005							
			 Senthikumar Kasi 2019.11.29 14:13:14 +05'30'	 Hemant K 2019.11.29 14:55:28 +05'30'	 Suresh MS 2019.11.29 16:33:20 +05'30'	 Jesumarian 2019.12.09 20:30:59 +05'30'	
A	29-Nov-2019	ISSUED FOR DESIGN	KSK	KH	MSS	JMC	
REV.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED	AUTHORIZED	

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 TechnipFMC	 IndianOil	PROJECT	Standby SRU & Additional Tanks IOCL- Paradip Refinery		
		CLIENT	INDIAN OIL CORPORATION LIMITED		
DATA SHEET	Project No. 080557C001	Document No. 080557C-088-SP-0810-005		Rev. No. A	Page 2 of 5

The following notes to be considered for :

PDRP4220-8430-DS-087-2019 (**088-V-005** : Equipment Datasheet for 1st Condenser Seal Pot)

General Notes

- 1. Information shown below supersedes the information indicated in the following pages.**
- This document shall be read along with IOCL Specifications, Technip Specifications & FWEL Specifications.
- Wherever "IOCL" is mentioned inside FWEL document, the same shall be read as PMC.
- Wherever "Vendor" is mentioned, same shall be read as CONTRACTOR & VENDOR.
- All dimensions in mm unless specified otherwise.
- All thicknesses specified on the drawing / sketch are minimum after forming and machining. The LSTK Contractor / Detail Engineering Contractor (DEC) shall be responsible for detail design.
- All Nozzle sizes, Projections, Elevations, Locations are preliminary and to be finalized during detail design.
- Flange ratings shall also be checked for impact due to loads from connected piping & shall be increased, if required. See code requirements .
- All carbon steel material shall be in killed quality.
- Local load analysis for process nozzles shall be carried out as per WRC 107 / 297 or FEA.
- Suitable supporting arrangement for this equipment to be provided by contractor during detail engineering.
- For Additional Technical Requirements, refer other specifications in ITB.

Specific Notes for **088-V-005**

- Quantity : ONE.
- Design Code : ASME Sec VIII Div-1 Ed-2019.
- Contractor to finalize the applicability of IBR during detail engineering.
- All Butt weld seams shall be fully radiographed.
- Refer Painting specification for details of surface preparation and Painting.
- All pressure parts, all the attachments welded to pressure parts & all wetted surfaces by process fluid shall meet the requirement of NACE MR0103 + HIC.
- All Pressure part and non-pressure part material shall be as per ASME. ASTM material is not to be used. Wherever ASTM is specified in this document, the same to be read as ASME.



EQUIPMENT DATA SHEET
 PRESSURE VESSEL

PDRP4220-8430-DS-087-2019

088-V-005

**PRESSURE VESSEL
 1ST CONDENSER SEAL POT
 088-V-005**

Note: This Mechanical Datasheet is based on process datasheet No. PDRP4220-8110-PS-086-0030, Rev. F1.

**Indian Oil Corporation Limited (IOCL)
 Paradip Refinery Project (PDRP)
 Paradip, Orissa State, India
 Contract No: ~~1-14-4200/4399~~**

			<i>Paul McNeil</i>	<i>Ian G Brown</i>	<i>Kevin Gallacher</i>
F1	20-Oct-09	Issued for Enhanced Design	Paul McNeil	Ian G Brown	Kevin Gallacher
A1	14-Aug-09	Issued for Design	Sunil Gaba	Manoj Dash	J P Biswas
Rev	Date	Description	Orig By	Checked By	Approved By



TECHNIPFMC DOC. NO : 080557C-088-SP-0810-005
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088-V-005

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REV. NO : A
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PDRP4220-8430-DS-087-2019

088-V-005

CONTENTS

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Equipments General Notes:

1. Full details of the 1st Condenser Seal Pot is given in attachment 1 (Black & Veatch Drawing).

2. Deleted.

~~3. A preliminary value of 6m is advised for the vendor for cost estimating purpose.~~

~~The seal pot depth is to be revised, during detail engineering, to be based upon " as purchased" blower.~~

4. Minimum sulphur seal pot depth is maximum blower discharge head at minimum ambient tempertaure plus 600mm. The minimum depth is based on the shutoff head of the turbine-driven Claus Air Blower at maximum speed and minimum ambient temperature.

Design Temperature:

5. Operating and Design specifications conditions for the sulphur seal pot is given in the below table:

Property	1st Condenser Seal Pot	LP Steam Jacket
Rundown Line Size (NB), mm	200 x 200	na
Flowrate, kg/hr	15,320	na
Sulphur Density, kg/m ³	1767.9	na
Operating Temperature, °C	177	175
Operating Pressure, kg/cm ² (g)	0.538	4
Design Temperature, °C	200/175	240/175
Design Pressure, kg/cm ² (g)	3.8/ FV	7.0/FV

~~6. Material and Corrosion Allowance to conform to Piping Specifications 3-JAKA.~~

~~Corrosion Allowance for Process Fluid side : 3mm (HOLD), Steam side : 1.5 mm (HOLD)~~

7. All exposed surfaces should be painted in accordance with specifications ~~PDRP-4200-8440-SP-1006.~~

~~Painting specifications.~~

8. Service Content of Condenser Seal Pot is Sulphur. For Sulphur service, following requirements are applicable:

a) Fabrication and Material requirements shall meet the requirements of NACE MR0103-~~2007~~ 2015 & ~~NACE RP0472-2008~~ NACE SP 0472-2015.

b) Refer to specifications SS 5.11 and ~~PDRP-8440-SP-0026~~ for full detail of requirements.

c) Pot shall be subjected to PWHT.

9. Other Applicable specifications are:

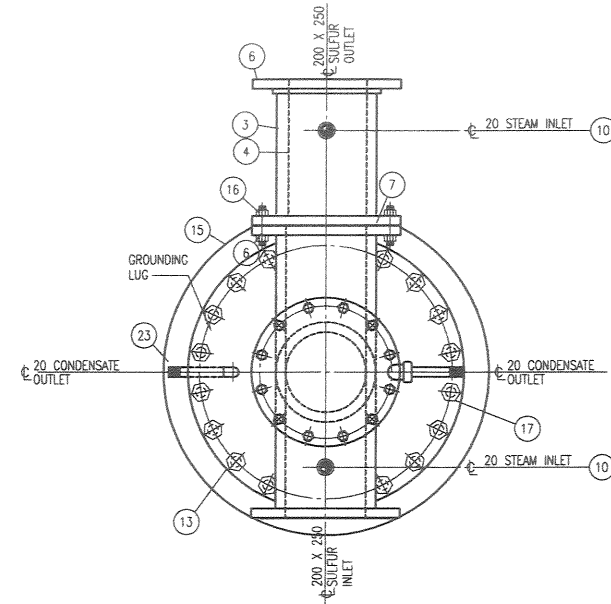
a) 080557C-000-JSS-6300-004 - Job spec. for Welding and NDE of pressure vessels and heat exchangers.

b) 080557C-088-JSD-0400-001 - Engineering Design Basis - Static Equipment

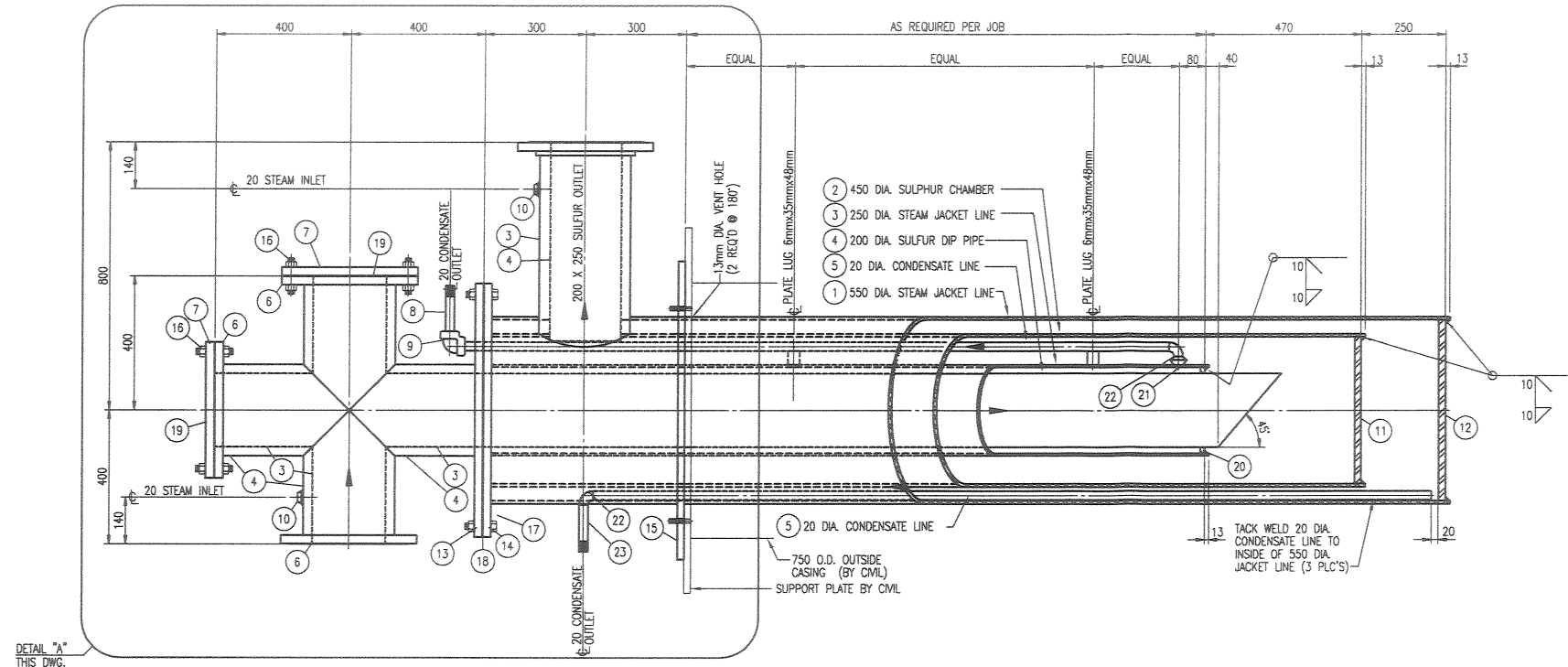
10. Provide jump over section (or similar) for steam from cross to main seal pot 200/250 dia steam jacket.

11. Purchased Claus Air blower design discharge pressure = 1.2 kg/cm² g. The seal pot's depth shall be based on this design discharge pressure of Purchased and installed Claus blowers.

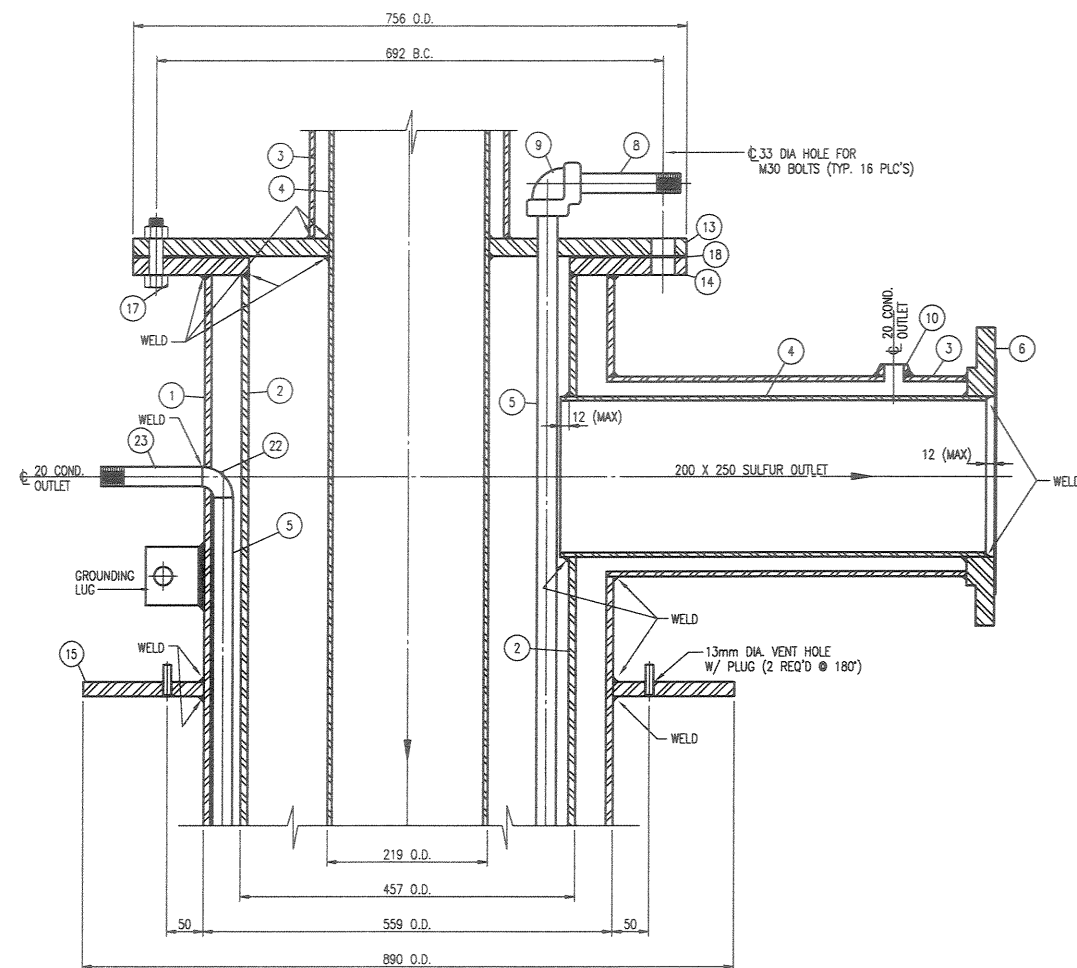
12. Minimum depth of vessels from Sulphur outlet nozzle centerline to inner sulphur dip pipe bottom shall be 7500mm.



TOP VIEW
SCALE: 1:10



ELEVATION
SCALE: 1:10



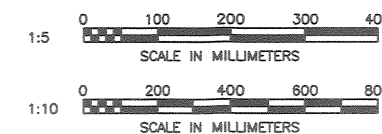
DETAIL "A"
SCALE: 1:5

NOTES:

- 1) FLANGE BOLT HOLES TO STRADDLE NATURAL CENTERLINES
- 2) ~~MATERIAL TO CONFORM TO THE PROJECT PIPING SPEC. IN PROJECT SPECIFICATION 3.1.1.1.~~
- 3) ALL NOZZLE FACES SHALL BE PROTECTED FOR SHIPMENT WITH RUST INHIBITOR AND COVERED WITH WOOD OR PLASTIC COVERS
- 4) REMOVE ANY TEMPORARY SPACERS FOR INTERNAL SUPPORT OF PIPE
- 5) ALL SOCKET OPENINGS SHALL BE PROTECT WITH STEEL OR PLASTIC PLUGS
- 6) AFTER HYDROTEST, CUT OFF THREADS (LEAVING MAX. NIPPLE LENGTH) & INSTALL PROTECTIVE CAP ON END.
- 7) DIMENSIONS ARE IN MILLIMETERS, PIPE SIZES ARE IN MILLIMETERS.
- 8) ALL EXPOSED SURFACES TO BE PAINTED IN ACCORDANCE WITH PAINTING SPECIFICATION.

BILL OF MATERIAL FOR EACH SEAL POT

MARK	QUANTITY	DESCRIPTION		
①	---	550 STANDARD WEIGHT PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3JAKA
②	---	450 STANDARD WEIGHT PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3JAKA
③	---	250 STANDARD WEIGHT PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3JAKA
④	---	200 STANDARD WEIGHT PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3JAKA
⑤	---	20 SCHEDULE 160 PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3JAKA
⑥	4	200 x 406mm O.D.-150# R.F.S.D. REDUCING FLANGE	ASTM A350 LF2 CL.1	PER PIPE SPEC 3JAKA
⑦	2	250-150# R.F. BLIND FLANGE	ASTM A350 LF2 CL.1	PER PIPE SPEC 3JAKA
⑧	1	20 x 150mm LG. SCH. 160 PIPE NIPPLE P&T	ASTM A333 GR. 6	PER PIPE SPEC 3JAKA
⑨	1	20 6000# F.S.S.W. 90° ELBOW	ASTM A350 LF2 CL.1	PER PIPE SPEC 3JAKA
⑩	2	20 6000# SOCK-O-LET	ASTM A350 LF2 CL.1	PER PIPE SPEC 3JAKA
⑪	1	20mm THK. x 435mm DIA. PLATE	A516 GR. 60 +HIC	
⑫	1	20mm THK. x 536mm DIA. PLATE	A516 GR. 60 +HIC	
⑬	1	20mm THK. x 756mm O.D. x 222mm I.D. PLATE (W/ 20 HOLES)	A516 GR. 60 +HIC	
⑭	1	20mm THK. x 756mm O.D. x 437mm I.D. PLATE (W/ 20 HOLES)	A516 GR. 60 +HIC	
⑮	1	20mm THK. x 890mm O.D. x 562mm I.D. PLATE	A516 GR. 60 +HIC	
⑯	24	22 DIA. x 130mm LG. STUD BOT W/ 2 NUTS	ASTM A320 GR. L7M, A194 GR. 7M	PER PIPE SPEC 3JAKA
⑰	20	30 DIA. x 103mm LG. MACHINE BOLT W/ NUT	ASTM A193-B7, A194 GR. 7M SA 320 GR L7M / SA 194 GR.7M	
⑱	1	1.6mm THK. FLEXIBLE GRAPHITE FULL FACE GASKET W/316 S.S. MESH INSERT		
⑲	2	1.6mm THK. 10"-150# R.F. FLEXIBLE GRAPHITE W/316 S.S. MESH INSERT		PER PIPE SPEC 3JAKA
⑳	1	13mm THK. x 251 mm O.D. x 222mm I.D. PLATE	ASTM A516 GR. 60 +HIC	PER ASTM A36
㉑	1	250 x 20 SCH. 160 WELD-O-LET	ASTM A420 LF2	
㉒	2	20 SCH. 160 90° B.W. ELBOW	ASTM A420 GR WPL6	
㉓	1	20 x 150mm LG. SCH. 160 PIPE NIPPLE B&T	ASTM A333 GR. 6	PER PIPE SPEC 3JAKA



NOT TO BE USED
FOR CONSTRUCTION

0	09-MAY-08	ISSUED FOR BDP	ACE	DAO
A		ISSUED FOR BDP	ACE	
NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES

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BLACK & VEATCH CORPORATION	ENGINEER	DRAWN	ALS
	CHECKED	DATE	17JAN08

INDIAN OIL CORPORATION LIMITED PARADIP REFINERY	PROJECT	DRAWING NUMBER	REV
1ST CONDENSER SEAL POT	160796.1000	D01-0110	0
SULFUR SEAL POT	CLIENT DRAWING NUMBER	3210-8110-51-086-001	CLIENT REV

 TechnipFMC		 IndianOil		PROJECT		Standby SRU & Additional Tanks	
				CLIENT		INDIAN OIL CORPORATION LIMITED	
DATA SHEET		Project NO. 080557C001		Document No. 080557C-088-SP-0810-006		Rev. No. A	
						Page 1 of 5	
DATA SHEET SRU (088) 2ND CONDENSER SEAL POT 088-V-006							
			 Written By Senthikumar Kasi 2019.11.29 14:19:25 +05'30'	 Checked By Hemant K 2019.11.29 14:53:52 +05'30'	 Approved By Suresh MS 2019.11.29 16:33:55 +05'30'	 Authorized By Jasumaran 2019.12.09 20:31:32 +05'30'	
A	29-Nov-2019	ISSUED FOR DESIGN	KSK	KH	MSS	JMC	
REV.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED	AUTHORIZED	

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 TechnipFMC	 IndianOil	PROJECT	Standby SRU & Additional Tanks IOCL- Paradip Refinery		
		CLIENT	INDIAN OIL CORPORATION LIMITED		
DATA SHEET	Project No. 080557C001	Document No. 080557C-088-SP-0810-006		Rev. No. A	Page 2 of 5

The following notes to be considered for :

PDRP4220-8430-DS-086-2020 (**088-V-006** : Equipment Datasheet for 2nd Condenser Seal Pot)

General Notes

- 1. Information shown below supersedes the information indicated in the following pages.**
- This document shall be read along with IOCL Specifications, Technip Specifications & FWEL Specifications.
- Wherever "IOCL" is mentioned inside FWEL document, the same shall be read as PMC.
- Wherever "Vendor" is mentioned, same shall be read as CONTRACTOR & VENDOR.
- All dimensions in mm unless specified otherwise.
- All thicknesses specified on the drawing / sketch are minimum after forming and machining. The LSTK Contractor / Detail Engineering Contractor (DEC) shall be responsible for detail design.
- All Nozzle sizes, Projections, Elevations, Locations are preliminary and to be finalized during detail design.
- Flange ratings shall also be checked for impact due to loads from connected piping & shall be increased, if required. See code requirements.
- All carbon steel material shall be in killed quality.
- Local load analysis for process nozzles shall be carried out as per WRC 107 / 297 or FEA.
- Suitable supporting arrangement for this equipment to be provided by contractor during detail engineering.
- For Additional Technical Requirements, refer other specifications in ITB.

Specific Notes for **088-V-006**

- Quantity : ONE.
- Design Code : ASME Sec VIII Div-1 Ed-2019.
- Contractor to finalize the applicability of IBR during detail engineering.
- All Butt weld seams shall be fully radiographed.
- Refer Painting specification for details of surface preparation and Painting.
- All pressure parts, all the attachments welded to pressure parts & all wetted surfaces by process fluid shall meet the requirement of NACE MR0103 + HIC.
- All Pressure part and non-pressure part material shall be as per ASME. ASTM material is not to be used. Wherever ASTM is specified in this document, the same to be read as ASME.



EQUIPMENT DATA SHEET
 PRESSURE VESSEL

PDRP4220-8430-DS-086-2020

088-V-006

PRESSURE VESSEL
2nd CONDENSER SEAL POT
088-V-006

Note: This Mechanical Datasheet is based on process datasheet No. PDRP4220-8110-PS-086-0030, Rev. F1.

Indian Oil Corporation Limited (IOCL)
Paradip Refinery Project (PDRP)
Paradip, Orissa State, India
~~Contract No: 1-14-4200/4399~~

			<i>Paul McNeil</i>	<i>Manoj Dash</i>	<i>K C Gallacher</i>
F1	20-Oct-09	Issued for Enhanced Design	Paul McNeil	Ian G Brown	Kevin Gallacher
A1	14-Aug-09	Issued for Design	Sunil Gaba	Manoj Dash	J P Biswas
Rev	Date	Description	Orig By	Checked By	Approved By



TECHNIPFMC DOC. NO : 080557C-088-SP-0810-006
REV. NO : A
PAGE NO. : 4 / 5

PDRP4220-8430-DS-086-2020

088-V-006

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REV. NO : A
PAGE NO. : 5 / 5

088-V-006

PDRP4220-8430-DS-086-2020

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Equipments General Notes:

1. Full details of the 2nd Condenser Seal Pot is given in attachment 1 (Black & Veatch Drawing).
2. Deleted.
3. ~~A preliminary value of 6m is advised for the vendor for cost estimating purpose.
The seal pot depth is to be revised, during detail engineering, to be based upon " as purchased" blower.~~
4. Minimum sulphur seal pot depth is maximum blower discharge head at minimum ambient temperature plus 600mm. The minimum depth is based on the shutoff head of the turbine-driven Claus Air Blower at maximum speed and minimum ambient temperature.

Design Conditions:

5. Operating and Design specifications conditions for the sulphur seal pot is given in the below table:

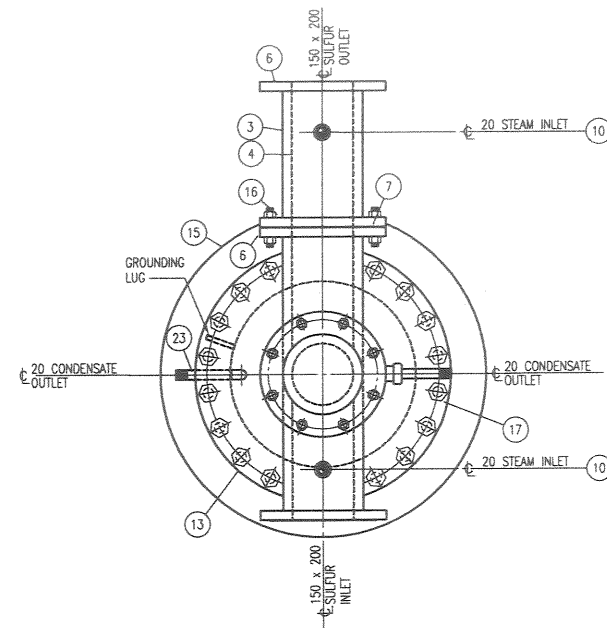
Property	2nd Condenser Seal Pot	LP Steam Jacket
Rundown Line Size (NB), mm	150 x 150	na
Flowrate, kg/hr	4,253	na
Sulphur Density, kg/m ³	1769.7	na
Operating Temperature, °C	171	175
Operating Pressure, kg/cm ² (g)	0.422	4.0
Design Temperature, °C	200/175	240/ 175
Design Pressure, kg/cm ² (g)	3.8/ FV	7.0/ FV

6. ~~Material and Corrosion Allowance to conform to Piping Specifications 3-JAKA.~~
Corrosion Allowance for Process Fluid side : 3mm (HOLD), Steam side : 1.5 mm (HOLD)
7. All exposed surfaces should be painted in accordance with ~~specifications PDRP4200-8440-SP-1006.~~
Painting specifications.
8. Service Content of Condenser Seal Pot is Sulphur. For Sulphur service, following requirements are applicable:
 - a) Fabrication and Material requirements shall meet the requirements of NACE MR0103-~~2007~~ 2015 & ~~NACE RP0472-2008~~ NACE SP 0472-2015.
 - b) Refer to specifications SS 5.11 and ~~PDRP-8440-SP-0026~~ for full detail of requirements.
 - c) Pot shall be subjected to PWHT.
9. Other Applicable specifications are:
 - a) 080557C-000-JSS-6300-004 - Job spec. for Welding and NDE of pressure vessels and heat exchangers.
 - b) 080557C-088-JSD-0400-001 - Engineering Design Basis - Static Equipment
10. Provide jump over section (or similar) for steam from cross to main seal pot 150/200 dia steam jacket.
11. Purchased Claus Air blower design discharge pressure = 1.2 kg/cm² g. The seal pot's depth shall be based on this design discharge pressure of Purchased and installed Claus blowers.
12. Minimum depth of vessels from Sulphur outlet nozzle centerline to inner sulphur dip pipe bottom shall be 7500mm.

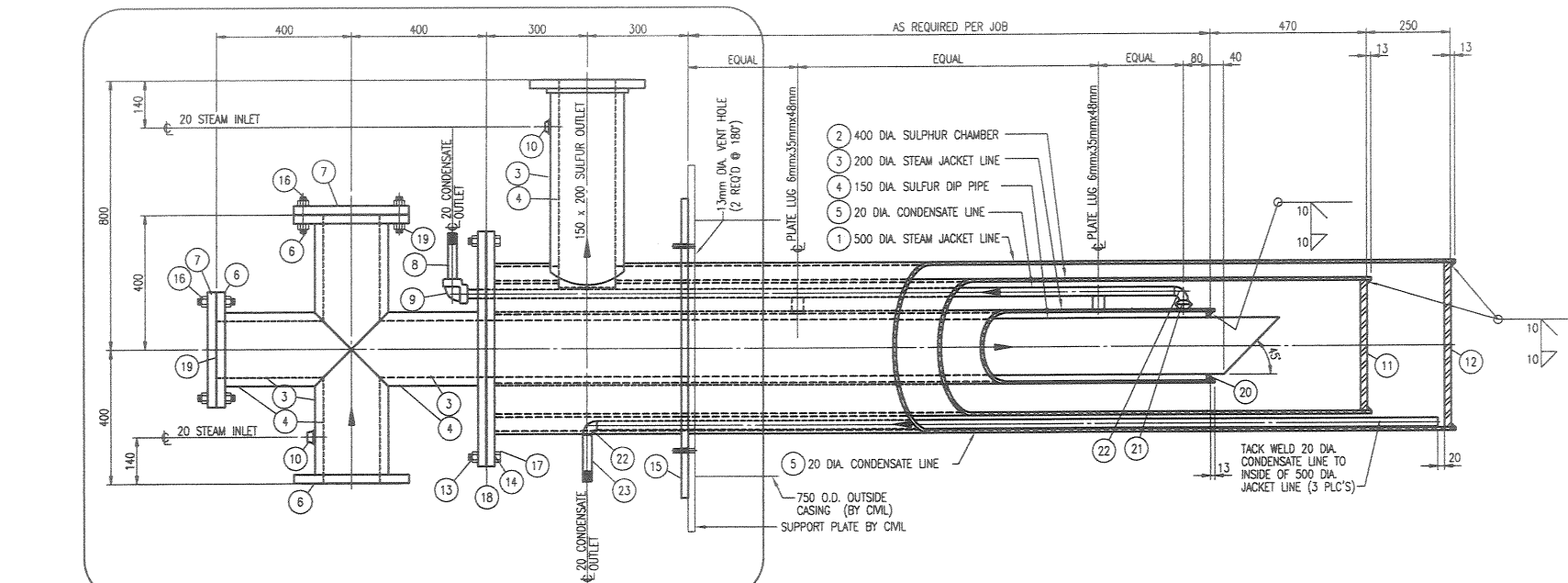
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F1

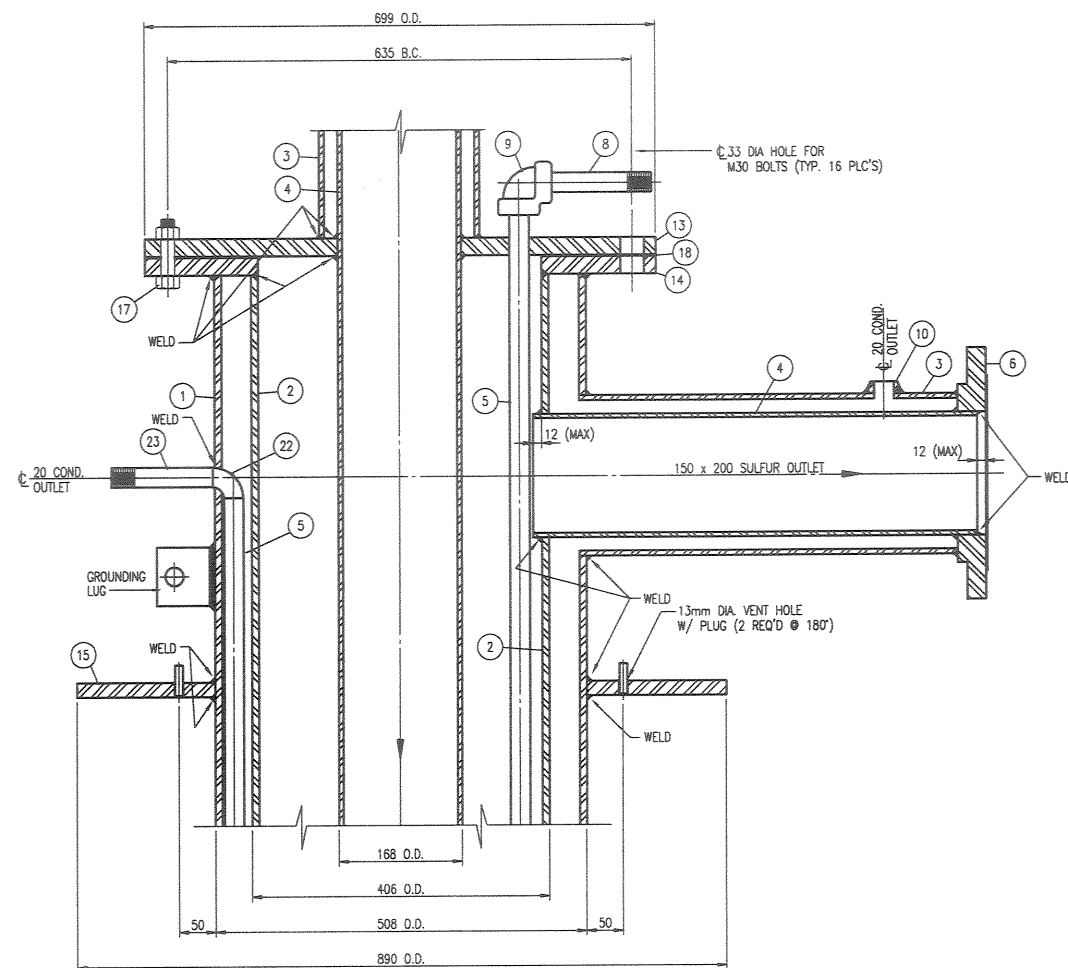
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TOP VIEW
SCALE: 1:10



ELEVATION
SCALE: 1:10



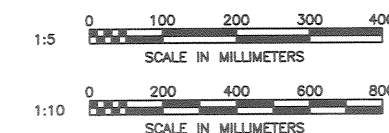
DETAIL "A"
SCALE: 1:5

NOTES:

- 1) FLANGE BOLT HOLES TO STRADDLE NATURAL CENTERLINES
- 2) ~~MATERIAL TO CONFORM TO THE PROJECT PIPING SPEC.~~
~~IN PROJECT SPECIFICATION 3/JAKA~~
- 3) ALL NOZZLE FACES SHALL BE PROTECTED FOR SHIPMENT WITH RUST INHIBITOR AND COVERED WITH WOOD OR PLASTIC COVERS
- 4) REMOVE ANY TEMPORARY SPACERS FOR INTERNAL SUPPORT OF PIPE
- 5) ALL SOCKET OPENINGS SHALL BE PROTECT WITH STEEL OR PLASTIC PLUGS
- 6) AFTER HYDROTEST, CUT OFF THREADS (LEAVING MAX. NIPPLE LENGTH) & INSTALL PROTECTIVE CAP ON END.
- 7) DIMENSIONS ARE IN MILLIMETERS, PIPE SIZES ARE IN MILLIMETERS.
- 8) ALL EXPOSED SURFACES TO BE PAINTED IN ACCORDANCE WITH **PAINTING SPECIFICATION**.

BILL OF MATERIAL FOR EACH SEAL POT

MARK	QUANTITY	DESCRIPTION		
①	500 STANDARD WEIGHT PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3/JAKA	
②	450 STANDARD WEIGHT PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3/JAKA	
③	200 STANDARD WEIGHT PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3/JAKA	
④	150 STANDARD WEIGHT PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3/JAKA	
⑤	20 SCHEDULE 160 PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3/JAKA	
⑥	4 150 x 343mm O.D.-150# R.F.S.O. REDUCING FLANGE	ASTM A350 LF2 CL.1	PER PIPE SPEC 3/JAKA	
⑦	2 200-150# R.F. BLIND FLANGE	ASTM A350 LF2 CL.1	PER PIPE SPEC 3/JAKA	
⑧	1 20 x 150mm LG. SCH. 160 PIPE NIPPLE P&T	ASTM A333 GR. 6	PER PIPE SPEC 3/JAKA	
⑨	1 20 6000# F.S.S.W. 90° ELBOW	ASTM A350 LF2 CL.1	PER PIPE SPEC 3/JAKA	
⑩	2 20 6000# SOCK-O-LET	ASTM A350 LF2 CL.1	PER PIPE SPEC 3/JAKA	
⑪	1 20mm THK. x 384mm DIA. PLATE	A516 GR. 60+HIC		
⑫	1 20mm THK. x 485mm DIA. PLATE	A516 GR. 60+HIC		
⑬	1 20mm THK. x 699mm O.D. x 172mm I.D. PLATE (W/ 20 HOLES)	A516 GR. 60+HIC		
⑭	1 20mm THK. x 699mm O.D. x 386mm I.D. PLATE (W/ 20 HOLES)	A516 GR. 60+HIC		
⑮	1 20mm THK. x 890mm O.D. x 505mm I.D. PLATE	A516 GR. 60+HIC		
⑯	16 20 DIA. x 120mm LG. STUD BOT W/ 2 NUTS	ASTM A320 GR. L7M. A194 GR. 7M	PER PIPE SPEC 3/JAKA	
⑰	20 M30 x 105mm LG. MACHINE BOLT W/ NUT	ASTM A193-B7, A194-GR. 7M SA 320 GR L7M / SA 194 GR.7M		
⑱	1 1.6mm THK. FLEXIBLE GRAPHITE FULL FACE GASKET W/316 S.S. MESH INSERT			
⑲	2 1.6mm THK. 8"-105# R.F. FLEXIBLE GRAPHITE W/316 S.S. MESH INSERT		PER PIPE SPEC 3/JAKA	
⑳	1 13mm THK. x 200 mm O.D. x 172mm I.D. PLATE	ASTM A516 GR 60+HIC	PER ASTM A36	
㉑	1 200 x 20 SCH. 160 WELD-O-LET	ASTM A420 LF2		
㉒	2 20 SCH. 160 90° B.W. ELBOW	ASTM A420 GR WPL6		
㉓	1 20 x 150mm LG. SCH. 160 PIPE NIPPLE B&T	ASTM A333 GR. 6	PER PIPE SPEC 3/JAKA	



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FOR CONSTRUCTION

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A1/ASLO/15 D1
01/22/08 10:21:07

0	09-MAY-08	ISSUED FOR BDP	ACE	DAO
A		ISSUED FOR BDP	ACE	
NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES

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BLACK & VEATCH
CORPORATION
ENGINEER
DRAWN
ALS
CHECKED
DATE
17 JAN 08

INDIAN OIL CORPORATION LIMITED
PARADIP REFINERY
2ND CONDENSER SEAL POT
088-V-008
SULFUR SEAL POT

PROJECT	DRAWING NUMBER	REV
160796.1000 D01-0111		0
CLIENT DRAWING NUMBER	CLIENT REV	
3210-8110-51-086-002		

 TechnipFMC		 IndianOil		PROJECT		Standby SRU & Additional Tanks	
				IOCL - Paradip Refinery			
		CLIENT		INDIAN OIL CORPORATION LIMITED			
DATA SHEET		Project NO. 080557C001		Document No. 080557C-088-SP-0810-007		Rev. No. A	
						Page 1 of 5	
DATA SHEET SRU (088) FINAL CONDENSER SEAL POT 088-V-007							
			 Written By	 Checked By	 Approved By	 Authorized By	2019.11.29 14:23:51 +05'30'
A	29-Nov-2019	ISSUED FOR DESIGN	KSK	KH	MSS	JMC	
REV.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED	AUTHORIZED	

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 TechnipFMC	 IndianOil	PROJECT	Standby SRU & Additional Tanks IOCL- Paradip Refinery		
		CLIENT	INDIAN OIL CORPORATION LIMITED		
DATA SHEET	Project No. 080557C001	Document No. 080557C-088-SP-0810-007		Rev. No. A	Page 2 of 5

The following notes to be considered for :

PDRP4220-8430-DS-086-2021 (**088-V-007** : Equipment Datasheet for Final Condenser Seal Pot)

General Notes

- 1. Information shown below supersedes the information indicated in the following pages.**
- This document shall be read along with IOCL Specifications, Technip Specifications & FWEL Specifications.
- Wherever "IOCL" is mentioned inside FWEL document, the same shall be read as PMC.
- Wherever "Vendor" is mentioned, same shall be read as CONTRACTOR & VENDOR.
- All dimensions in mm unless specified otherwise.
- All thicknesses specified on the drawing / sketch are minimum after forming and machining. The LSTK Contractor / Detail Engineering Contractor (DEC) shall be responsible for detail design.
- All Nozzle sizes, Projections, Elevations, Locations are preliminary and to be finalized during detail design.
- Flange ratings shall also be checked for impact due to loads from connected piping & shall be increased, if required. See code requirements .
- All carbon steel material shall be in killed quality.
- Local load analysis for process nozzles shall be carried out as per WRC 107 / 297 or FEA.
- Suitable supporting arrangement for this equipment to be provided by contractor during detail engineering.
- For Additional Technical Requirements, refer other specifications in ITB.

Specific Notes for **088-V-007**

- Quantity : ONE.
- Design Code : ASME Sec VIII Div-1 Ed-2019.
- Contractor to finalize the applicability of IBR during detail engineering.
- All Butt weld seams shall be fully radiographed.
- Refer Painting specification for details of surface preparation and Painting.
- All pressure parts, all the attachments welded to pressure parts & all wetted surfaces by process fluid shall meet the requirement of NACE MR0103 + HIC.
- All Pressure part and non-pressure part material shall be as per ASME. ASTM material is not to be used. Wherever ASTM is specified in this document, the same to be read as ASME.



EQUIPMENT DATA SHEET
 PRESSURE VESSEL

PDRP4220-8430-DS-086-2021

088-V-007

**PRESSURE VESSEL
 FINAL CONDENSER SEAL POT
 088-V-007**

Note: This Mechanical Datasheet is based on process datasheet No. PDRP4220-8110-PS-086-0030, Rev. F1.

**Indian Oil Corporation Limited (IOCL)
 Paradip Refinery Project (PDRP)
 Paradip, Orissa State, India
~~Contract No: 1-14-4200/4399~~**

			<i>Paul McNeil</i>	<i>Ian G Brown</i>	<i>K. Gallacher</i>
F1	20-Oct-09	Issued for Enhanced Design	Paul McNeil	Ian G Brown	Kevin Gallacher
A1	14-Aug-09	Issued for Design	Sunil Gaba	Manoj Dash	J P Biswas
Rev	Date	Description	Orig By	Checked By	Approved By

DSN: 15634



TECHNIPFMC DOC. NO : 080557C-088-SP-0810-007
REV. NO : A
PAGE NO. : 4 / 5

PDRP4220-8430-DS-086-2021

088-V-007

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PAGE NO

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Notes	3

ATTACHMENT

1	BLACK & VEATCH DRAWING 3210-8110-51-086-003, Re. 0	1 PAGE
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TECHNIPFMC DOC. NO : 080557C-088-SP-0810-007
REV. NO : A
PAGE NO. : 5 / 5

088-V-007

PDRP4220-8430-DS-086-2021

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Rev

Equipments General Notes:

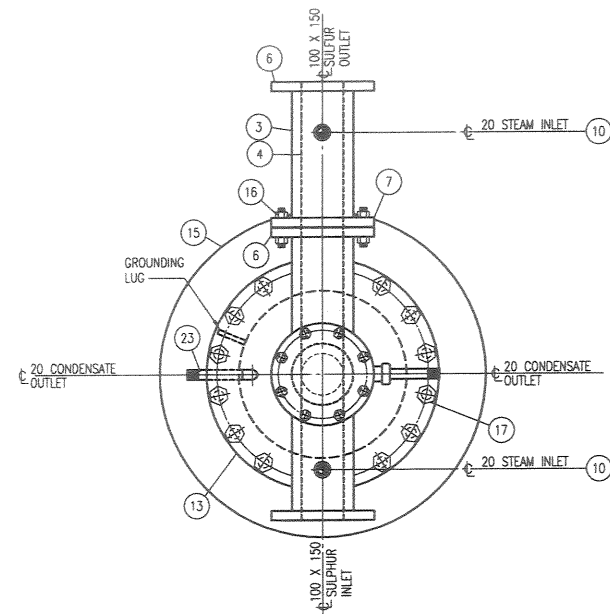
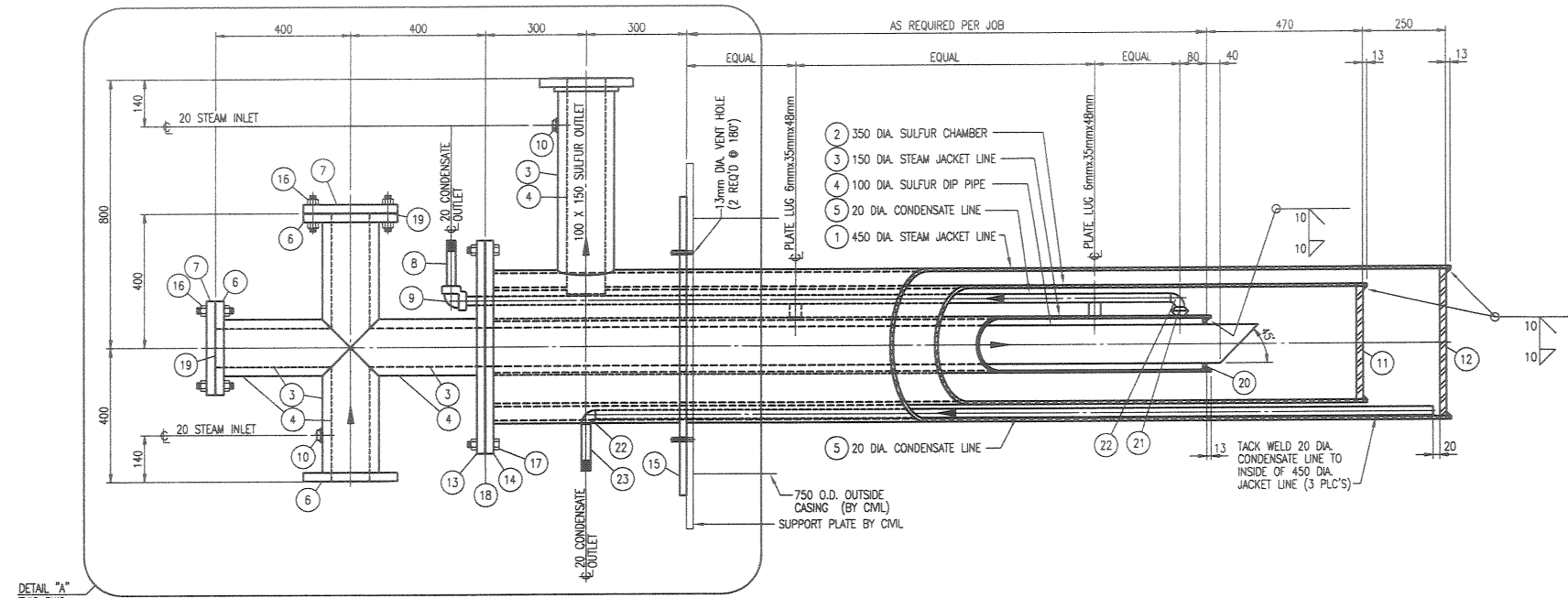
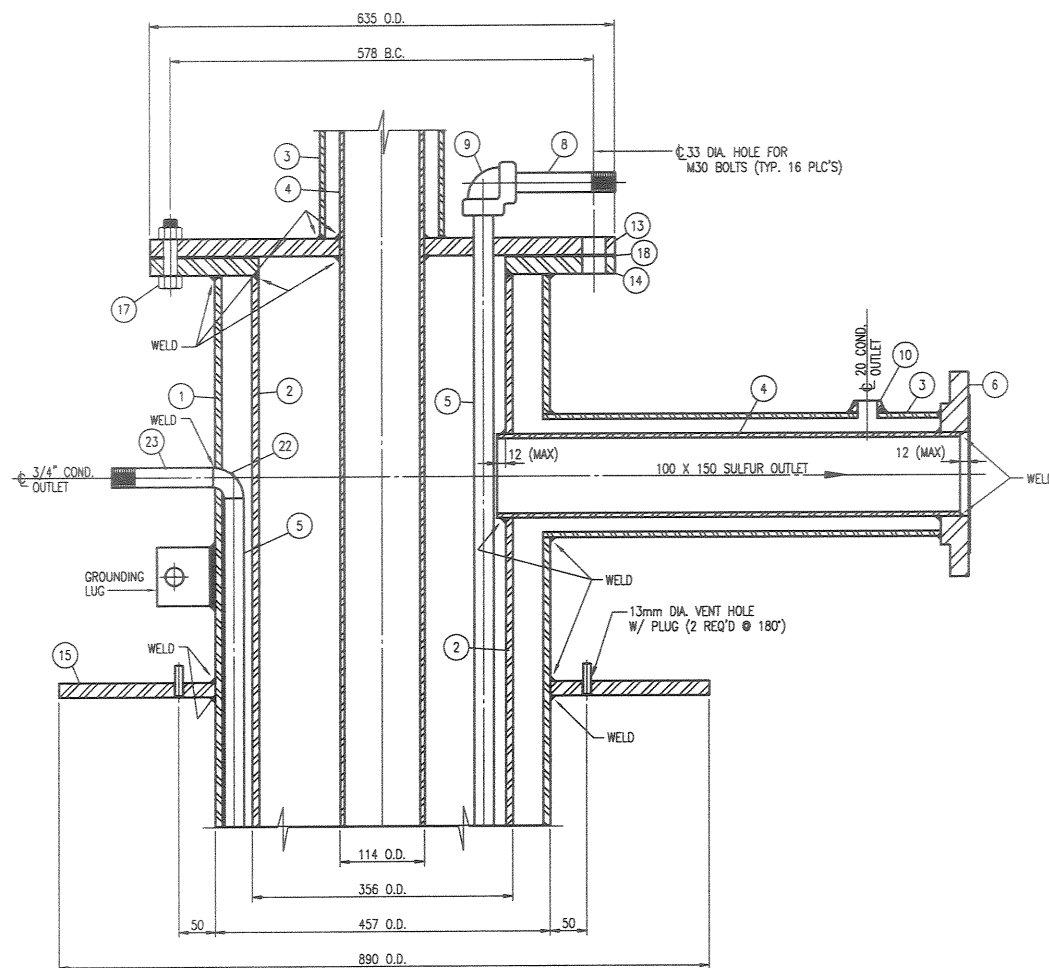
1. Full details of the ~~1st~~ ^{Final} Condenser Seal Pot is given in attachment 1 (Black & Veatch Drawing).
2. Deleted.
3. ~~A preliminary value of 6m is advised for the vendor for cost estimating purpose.
The seal pot depth is to be revised, during detail engineering, to be based upon " as purchased" blower.~~
4. Minimum sulphur seal pot depth is maximum blower discharge head at minimum ambient tempertaure plus 600mm. The minimum depth is based on the shutoff head of the turbine-driven Claus Air Blower at maximum speed and minimum ambient temperature.

Design Conditions:

5. Operating and Design specifications conditions for the sulphur seal pot is given in the below table:

Property	Final Condenser Seal Pot	LP Steam Jacket
Rundown Line Size (NB),mm	100 x 100	na
Flowrate, kg/hr	2,316	na
Sulphur Density, kg/m3	1797.4	na
Operating Temperature, °C	138	175
Operating Pressure, kg/cm ² (g)	0.306	4.0
Design Temperature, °C	200/175	240/ 175
Design Pressure, kg/cm ² (g)	3.8/ FV	7.0/ FV

6. ~~Material and Corrosion Allowance to conform to Piping Specifications 3-JAKA.~~
Corrosion Allowance for Process Fluid side : 3mm (HOLD), Steam side : 1.5 mm (HOLD)
7. All exposed surfaces should be painted in accordance with ~~specifications PDRP-4200-8440-SP-1006.~~
Painting specifications.
8. Service Content of Condenser Seal Pot is Sulphur. For Sulphur service, following requirements are applicable:
- a) Fabrication and Material requirements shall meet the requirements of NACE MR0103-~~2007~~ 2015 & ~~NACE RP0472-2008~~ NACE SP 0472-2015.
- b) Refer to specifications SS 5.11 and ~~PDRP-8440-SP-0026~~
- c) Pot shall be subjected to PWHT.
9. Other Applicable specifications are:
- a) 080557C-000-JSS-6300-004 - Job spec. for Welding and NDE of pressure vessels and heat exchangers.
- b) 080557C-088-JSD-0400-001 - Engineering Design Basis - Static Equipment
10. Provide jump over section (or similar) for steam from cross to main seal pot 100/150 dia steam jacket.
11. Purchased Claus Air blower design discharge pressure = 1.2 kg/cm² g. The seal pot's depth shall be based on this design discharge pressure of Purchased and installed Claus blowers.
12. Minimum depth of vessels from Sulphur outlet nozzle centerline to inner sulphur dip pipe bottom shall be 7500mm.

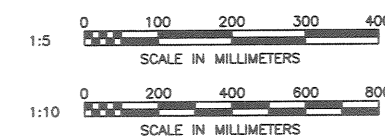
TOP VIEW
SCALE: 1:10ELEVATION
SCALE: 1:10DETAIL "A"
SCALE: 1:5

NOTES:

- 1) FLANGE BOLT HOLES TO STRADDLE NATURAL CENTERLINES
- 2) ~~MATERIAL TO CONFORM TO THE PROJECT PIPING SPEC. IN PROJECT SPECIFICATION 3.1.1.1.~~
- 3) ALL NOZZLE FACES SHALL BE PROTECTED FOR SHIPMENT WITH RUST INHIBITOR AND COVERED WITH WOOD OR PLASTIC COVERS
- 4) REMOVE ANY TEMPORARY SPACERS FOR INTERNAL SUPPORT OF PIPE
- 5) ALL SOCKET OPENINGS SHALL BE PROTECT WITH STEEL OR PLASTIC PLUGS
- 6) AFTER HYDROTEST, CUT OFF THREADS (LEAVING MAX. NIPPLE LENGTH) & INSTALL PROTECTIVE CAP ON END.
- 7) DIMENSIONS ARE IN MILLIMETERS, PIPE SIZES ARE IN MILLIMETERS.
- 8) ALL EXPOSED SURFACES TO BE PAINTED IN ACCORDANCE WITH PIPING PAINTING SPECIFICATION.

BILL OF MATERIAL FOR EACH SEAL POT

MARK	QUANTITY	DESCRIPTION	STANDARD	REMARKS
1	450	STANDARD WEIGHT PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3.1.1.1
2	350	STANDARD WEIGHT PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3.1.1.1
3	150	STANDARD WEIGHT PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3.1.1.1
4	100	STANDARD WEIGHT PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3.1.1.1
5	20	SCHEDULE 160 PIPE	ASTM A333 GR. 6	PER PIPE SPEC 3.1.1.1
6	4	100 x 279mm O.D. - 150# R.F.S.O. REDUCING FLANGE	ASTM A350 LF2 CL. 1	PER PIPE SPEC 3.1.1.1
7	2	150-150# R.F. BLIND FLANGE	ASTM A350 LF2 CL. 1	PER PIPE SPEC 3.1.1.1
8	1	20 x 150mm LG. SCH. 160 PIPE NIPPLE P&T	ASTM A333 GR. 6	PER PIPE SPEC 3.1.1.1
9	1	20 6000# F.S.S.W. 90° ELBOW	ASTM A350 LF2 CL. 1	PER PIPE SPEC 3.1.1.1
10	2	20 6000# SOCK-O-LET	ASTM A350 LF2 CL. 1	PER PIPE SPEC 3.1.1.1
11	1	20mm THK. x 337mm DIA. PLATE	A516 GR. 60 +HIC	
12	1	20mm THK. x 438mm DIA. PLATE	A516 GR. 60 +HIC	
13	1	20mm THK. x 635mm O.D. x 111mm I.D. PLATE (W/ 16 HOLES)	A516 GR. 60 +HIC	
14	1	20mm THK. x 635mm O.D. x 336mm I.D. PLATE (W/ 16 HOLES)	A516 GR. 60 +HIC	
15	1	20mm THK. x 890mm O.D. x 460mm I.D. PLATE	A516 GR. 60 +HIC	
16	16	20 DIA. x 110mm LG. STUD BOT W/ 2 NUTS	ASTM A320 GR. L7M, A194 GR. 7M	PER PIPE SPEC 3.1.1.1
17	16	M30 x 105mm LG. MACHINE BOLT W/ NUT	ASTM A193-B7, A194-GR-7M	SA 320 GR L7M / SA 194 GR. 7M
18	1	1.6mm THK. FLEXIBLE GRAPHITE FULL FACE GASKET W/316 S.S. MESH INSERT		
19	2	1.6mm THK. 6"-105# R.F. FLEXIBLE GRAPHITE W/316 S.S. MESH INSERT		
20	1	13mm THK. x 154 mm O.D. x 118mm I.D. PLATE	ASTM A516 GR. 60 +HIC	PER PIPE SPEC 3.1.1.1
21	1	150 x 20 SCH. 160 WELD-O-LET	ASTM A420 LF2	PER PIPE SPEC 3.1.1.1
22	2	20 SCH. 160 90° B.W. ELBOW	ASTM A420 GR WPL6	
23	1	20 x 150mm LG. SCH. 160 PIPE NIPPLE B&T	ASTM A333 GR. 6	PER PIPE SPEC 3.1.1.1

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FOR CONSTRUCTION

0	09-MAY-08	ISSUED FOR BDP	ACE	DAO
A		ISSUED FOR BDP	ACE	
NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES/CHK/PDE/APP

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BLACK & VEATCH CORPORATION	
ENGINEER	DRAWN ALS
CHECKED	DATE 17JAN08

INDIAN OIL CORPORATION LIMITED PARADIP REFINERY	
FINAL CONDENSER SEAL POT	
088-V-007	
SULFUR SEAL POT	

PROJECT	DRAWING NUMBER	REV
160796.1000	D01-0112	0
CLIENT DRAWING NUMBER	CLIENT REV	
3210-8110-51-086-003		

 TechnipFMC		 IndianOil		PROJECT		Standby SRU & Additional Tanks	
				IOCL - Paradip Refinery			
		CLIENT		INDIAN OIL CORPORATION LIMITED			
DATA SHEET		Project NO. 080557C001		Document No. 080557C-088-SP-0810-008		Rev. No. A	
						Page 1 of 5	
DATA SHEET SRU (088) DEGASSING SEAL POT 088-V-008							
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A	29-Nov-2019	ISSUED FOR DESIGN	KSK	KH	MSS	JMC	
REV.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED	AUTHORIZED	

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 TechnipFMC	 IndianOil	PROJECT	Standby SRU & Additional Tanks IOCL- Paradip Refinery		
		CLIENT	INDIAN OIL CORPORATION LIMITED		
DATA SHEET	Project No. 080557C001	Document No. 080557C-088-SP-0810-008		Rev. No. A	Page 2 of 5

The following notes to be considered for :

PDRP4220-8430-DS-086-2022 (**088-V-008** : Equipment Datasheet for Degassing Seal Pot)

General Notes

- 1. Information shown below supersedes the information indicated in the following pages.**
- This document shall be read along with IOCL Specifications, Technip Specifications & FWEL Specifications.
- Wherever "IOCL" is mentioned inside FWEL document, the same shall be read as PMC.
- Wherever "Vendor" is mentioned, same shall be read as CONTRACTOR & VENDOR.
- All dimensions in mm unless specified otherwise.
- All thicknesses specified on the drawing / sketch are minimum after forming and machining. The LSTK Contractor / Detail Engineering Contractor (DEC) shall be responsible for detail design.
- All Nozzle sizes, Projections, Elevations, Locations are preliminary and to be finalized during detail design.
- Flange ratings shall also be checked for impact due to loads from connected piping & shall be increased, if required. See code requirements .
- All carbon steel material shall be in killed quality.
- Local load analysis for process nozzles shall be carried out as per WRC 107 / 297 or FEA.
- Suitable supporting arrangement for this equipment to be provided by contractor during detail engineering.
- For Additional Technical Requirements, refer other specifications in ITB.

Specific Notes for **088-V-008**

- Quantity : ONE.
- Design Code : ASME Sec VIII Div-1 Ed-2019.
- Contractor to finalize the applicability of IBR during detail engineering.
- All Butt weld seams shall be fully radiographed.
- Refer Painting specification for details of surface preparation and Painting.
- All pressure parts, all the attachments welded to pressure parts & all wetted surfaces by process fluid shall meet the requirement of NACE MR0103 + HIC.
- All Pressure part and non-pressure part material shall be as per ASME. ASTM material is not to be used. Wherever ASTM is specified in this document, the same to be read as ASME.



EQUIPMENT DATA SHEET
PRESSURE VESSEL

PDRP4220-8430-DS-086-2022

088-V-008

**PRESSURE VESSEL
DEGASSING SEAL POT
088-V-008**

Note: This Mechanical Datasheet is based on process datasheet No. PDRP4220-8110-PS-086-0030, Rev. F1.

Indian Oil Corporation Limited (IOCL)
Paradip Refinery Project (PDRP)
Paradip, Orissa State, India
Contract No: 1 14 4200/4399

			<i>Paul McNeil</i>	<i>Ian G Brown</i>	<i>Kevin Gallacher</i>
F1	20-Oct-09	Issued for Enhanced Design	Paul McNeil	Ian G Brown	Kevin Gallacher
A1	14-Aug-09	Issued for Design	Sunil Gaba	Manoj Dash	J P Biswas
Rev	Date	Description	Orig By	Checked By	Approved By

DSN: 15635



TECHNIPFMC DOC. NO : 080557C-088-SP-0810-008
REV. NO : A
PAGE NO. : 4 / 5

PDRP4220-8430-DS-086-2022

088-V-008

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ATTACHMENT

1	BLACK & VEATCH DRAWING 3210-8110-51-086-001, Rev. 0	1 PAGE
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TECHNIPFMC DOC. NO : 080557C-088-SP-0810-008
REV. NO : A
PAGE NO. : 5 / 5

088-V-008

PDRP4220-8430-DS-086-2022

CONTENTS

Rev

Equipments General Notes:

- ~~1st Condenser~~ **Degassing**
- Full details of the ~~1st Condenser~~ Seal Pot is given in attachment 1 (Black & Veatch Drawing).
 - Deleted.
 - ~~A preliminary value of 6m is advised for the vendor for cost estimating purpose.
The seal pot depth is to be revised, during detail engineering, to be based upon " as purchased" blower.~~
 - Minimum sulphur seal pot depth is maximum blower discharge head at minimum ambient temperature plus 600mm. The minimum depth is based on the shutoff head of the turbine-driven Claus Air Blower at maximum speed and minimum ambient temperature.

Design Temperature:

- Operating and Design specifications conditions for the sulphur seal pot is given in the below table:

Property	Degassing Seal Pot	LP Steam Jacket
Rundown Line Size (NB), mm	200 x 200	na
Flowrate, kg/hr	21,889	na
Sulphur Density, kg/m ³	1797.4	na
Operating Temperature, °C	138	175
Operating Pressure, kg/cm ² (g)	0.049	4.0
Design Temperature, °C	200/175	240/175
Design Pressure, kg/cm ² (g)	3.8/ FV	7.0/FV

- ~~Material and Corrosion Allowance to conform to Piping Specifications 3-JAKA.~~
Corrosion Allowance for Process Fluid side : 3mm (HOLD), Steam side : 1.5 mm (HOLD)
- All exposed surfaces should be painted in accordance with ~~specifications PDRP-4200-8440-SP-1006.~~
Degassing Painting specifications.
- Service Content of ~~Condenser~~ Seal Pot is Sulphur. For Sulphur service, following requirements are applicable:
 - Fabrication and Material requirements shall meet the requirements of NACE MR0103-~~2007~~ **2015** & ~~NACE RP0472-2008~~ **NACE SP 0472-2015.**
 - Refer to specifications SS 5.11 and ~~PDRP-8440-SP-0026~~
 - Pot shall be subjected to PWHT.
- Other Applicable specifications are:
 - 080557C-000-JSS-6300-004 - Job spec. for Welding and NDE of pressure vessels and heat exchangers.
 - 080557C-088-JSD-0400-001 - Engineering Design Basis - Static Equipment
- Provide jump over section (or similar) for steam from cross to main seal pot 200/250 dia steam jacket.
- Purchased Claus Air blower design discharge pressure = 1.2 kg/cm² g. The seal pot's depth shall be based on this design discharge pressure of Purchased and installed Claus blowers.
- Minimum depth of vessels from Sulphur outlet nozzle centerline to inner sulphur dip pipe bottom shall be 7500mm.