



OIL & GAS DEVELOPMENT COMPANY LIMITED
PROCUREMENT DEPARTMENT (LOCAL) ISLAMABAD
SCHEDULE OF REQUIREMENT

Material : **FABRICATION AND SUPPLY OF TUBE BUNDLES**

Due Date:

Tender Enquiry No: **PROC/LF/PT/17851/19**

Bid Bond Value : ITEM WISE

EVALUATION WILL BE CARRIED OUT ON ITEM WISE

Attachment(if any) : YES

Sr No	Description	Quantity	Make/Brand offered	Unit	Unit Price (PKR) Inclusive Of All Taxes Except GST	Unit Price (PKR) Inclusive of GST	Total Price (PKR) Inclusive of GST	Delivery Period Offered	deviation from Tender Spec. If Any
1	TUBE BUNDLE FOR NEW SOUR GAS COOLER, EA-206 AS PER ATTACHED DRAWING#PP-DKN-628 & TOR	1		Number					
2	TUBE BUNDLE ALONG WITH FLOATING HEAD FOR NGL FEED BOTTOM EXCHANGER, EA-601-A AS PER ATTACHED DRAWING# PP-DKN-435 & TOR	1		Number					
3	TUBE BUNDLE FOR NGL FRACTIONATOR OVERHEAD CONDENSER, EA-603, AS PER ATTACHED DRAWING# PP-DKN-404 & TOR	1		Number					
4	TUBE BUNDLE FOR GAS COOLER, EA-201, AS PER ATTACHED DRAWING #PP-DKN-628 & TOR	1		Number					
5	TUBE BUNDLE FOR LEAN AMINE COOLER, EA-611, AS PER ATTACHED DRAWING# PP-DKN-627 & TOR	1		Number					
6	TUBE BUNDLE FOR NGL FEED BOTTOM EXCHANGER, EA-601-C, AS PER ATTACHED DRAWING# PP-DKN-437 & TOR	1		Number					

Special Note: The prospective bidders also download the master set of Tender Document

- The prospective bidders may keep in touch with OGDCL web site for downloading the clarifications/amendments (if any) issued by OGDCL.
- BID VALIDITY 120 DAYS FROM TECHNICAL BID OPENING. DELIVERY IN 06 MONTHS ON FOR DAKHNI PLANT FROM LPO ISSUE. 10% ADV. PAYMENT AGAINST BANK GUARANTEE & 90% AFTER SUCCESSFUL INSPECTION & DELIVERY AT SITE.

Discount (if any) shall only be entertained on Schedule of Requirement of Bidding Document (Financial Proposal). If the discount is mentioned elsewhere in the bid, the same shall not be entertained.

BID BOND (ITEM WISE AS MENTIONED BELOW):

ITEM # 1 = Rs.98,000/-

ITEM # 2 = Rs.101,000/-

ITEM # 3 = Rs.75,000/-

ITEM # 4 = Rs.103,000/-

ITEM # 5 = Rs.40,000/-

ITEM # 6 = Rs.98,000/-



OIL & GAS DEVELOPMENT COMPANY LIMITED
PROCUREMENT DEPARTMENT (LOCAL ISLAMABAD)
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Mandatory Checklist

Please confirm the compliance of the following mandatory information along with the bid(s) (failing which bids(s) will not be accepted)

Documents	To be Attached with the Technical/Financial Bids	Compliance	
		Yes <input type="checkbox"/>	No <input type="checkbox"/>
Original Bid Bond	Technical Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Copy of NTN Certificate	Technical Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Copy of GST Certificate	Technical Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Confirmation that the Firm is appearing on FBR's Active Taxpayer List	Technical Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Duly signed and stamped Annexure-A (Un-priced)	Technical Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Duly filled, signed and stamped Annexure-B	Technical Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Duly filled, signed and stamped Annexure-D	Technical Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Duly filled, signed and stamped Annexure-L on Company's Letterhead	Technical Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Duly signed and stamped Annexure-M on Company's Letterhead	Technical Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Duly signed and stamped Annexure-N on Non-Judicial Stamp Paper duly attested by Notary Public	Technical Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Duly filled, signed and stamped Annexure-A (Priced)	Financial Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Duly filled, signed and stamped Annexure-C	Financial Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Duly filled, signed and stamped Annexure-E	Financial Bid	Yes <input type="checkbox"/>	No <input type="checkbox"/>



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PROCUREMENT DEPARTMENT (LOCAL ISLAMABAD)
SCHEDULE OF REQUIREMENT

For the Vendors/Contractors who opt to submit Bank Draft/Call Deposit/Pay order against Bid Bond/Performance Bond, our Accounts Department has finalized an arrangement for online payment to such Vendors/Contractors, which will be processed through (IBFT & LFT) for which following information is required:

i.	IBAN No. (International Bank Account Number 24 Digits)	
ii.	Vendor Name as per Title of their Bank Account	
iii.	Contact No.of Company's CEO/ Owner (Mobile & Landline)	
iv.	Bank Name.	
v.	Bank Branch Name and Code	

Name, Sign and Stamp of the authorized official of the Bidder(s) _____

TERMS OF REFERENCES FOR SUPPLY AND FABRICATION OF TUBE

BUNDLES INSTALLED AT DAKHNI PLANT.

1. All the specifications / dimensions should be as per attached drawings

Sr#	Exchanger Description	Tag #	Drawing No	Type
1.	SOUR GAS COOLER	EA-206	PP-DKN-628	I Type
2.	NGL FRACTIONATOR FEED BOTTOM EXCHANGER	EA-601 A	PP-DKN-435	I Type
3.	NGL FRACTIONATOR OVERHEAD CONDENSER	EA-603	PP-DKN-404	I Type
4.	SOUR GAS COOLER	EA-201	PP-DKN-404	U Type
5.	NGL FRACTIONATOR OVERHEAD CONDENSER	EA-611	PP-DKN-627	I Type
6.	NGL FRACTIONATOR FEED BOTTOM EXCHANGER	EA-601 C	PP-DKN-437	I Type

2. Bidder must review the drawings and if they have any query, they must be cleared 01 week before the opening date of technical bid.
3. **Financial Evaluation will be made item wise.**
4. Only U-stamp authorized manufacturers will be considered for technical evaluation. U Stamp certificate must be valid (minimum) since 2014. If the U stamp certification is in progress the bid will not be evaluated. Certificate to be provided to prove validity.
7. Bidder must be ISO 9001 certified.
8. Bidder should have experience of 05 years (2014~2019) for fabrication of high pressure vessels and exchangers. Also submit a list of its clients to which equipment of similar nature has been supplied most recently.
9. Tube material should be of American / European / Japanese origin and MTC's should be provide at the time of material inspection and to be provided with the shipment.

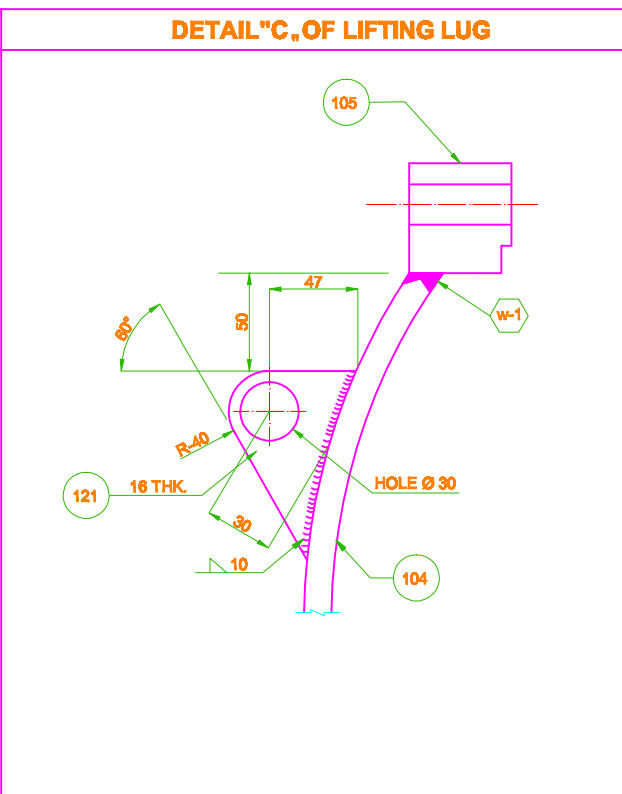
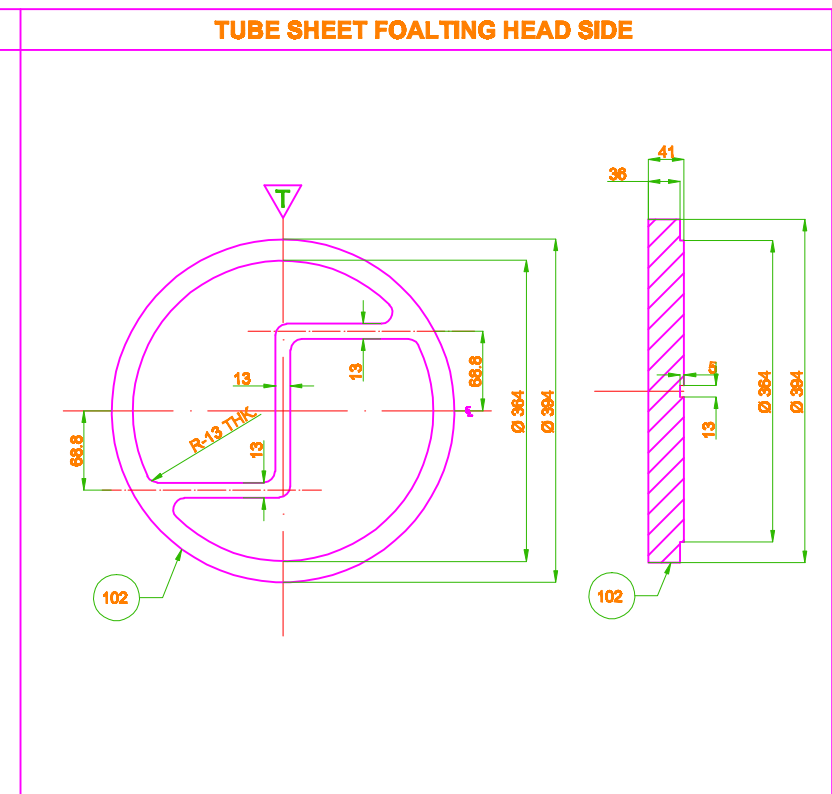
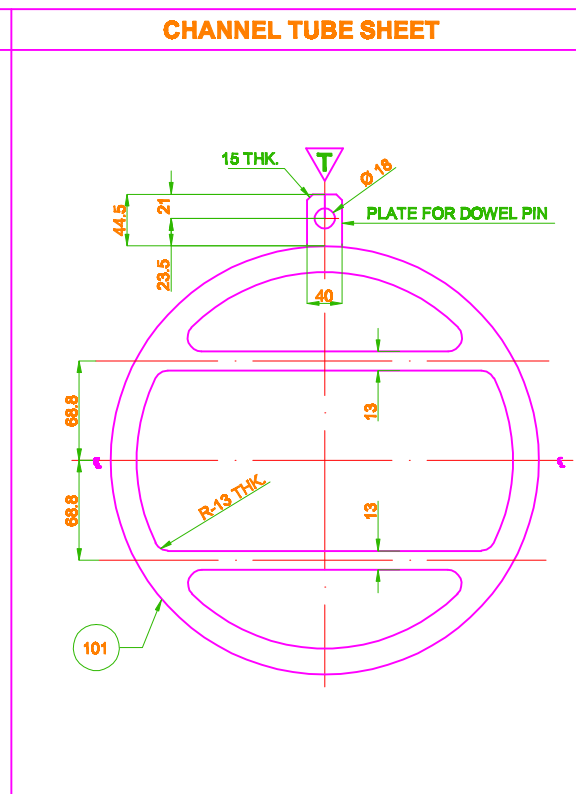
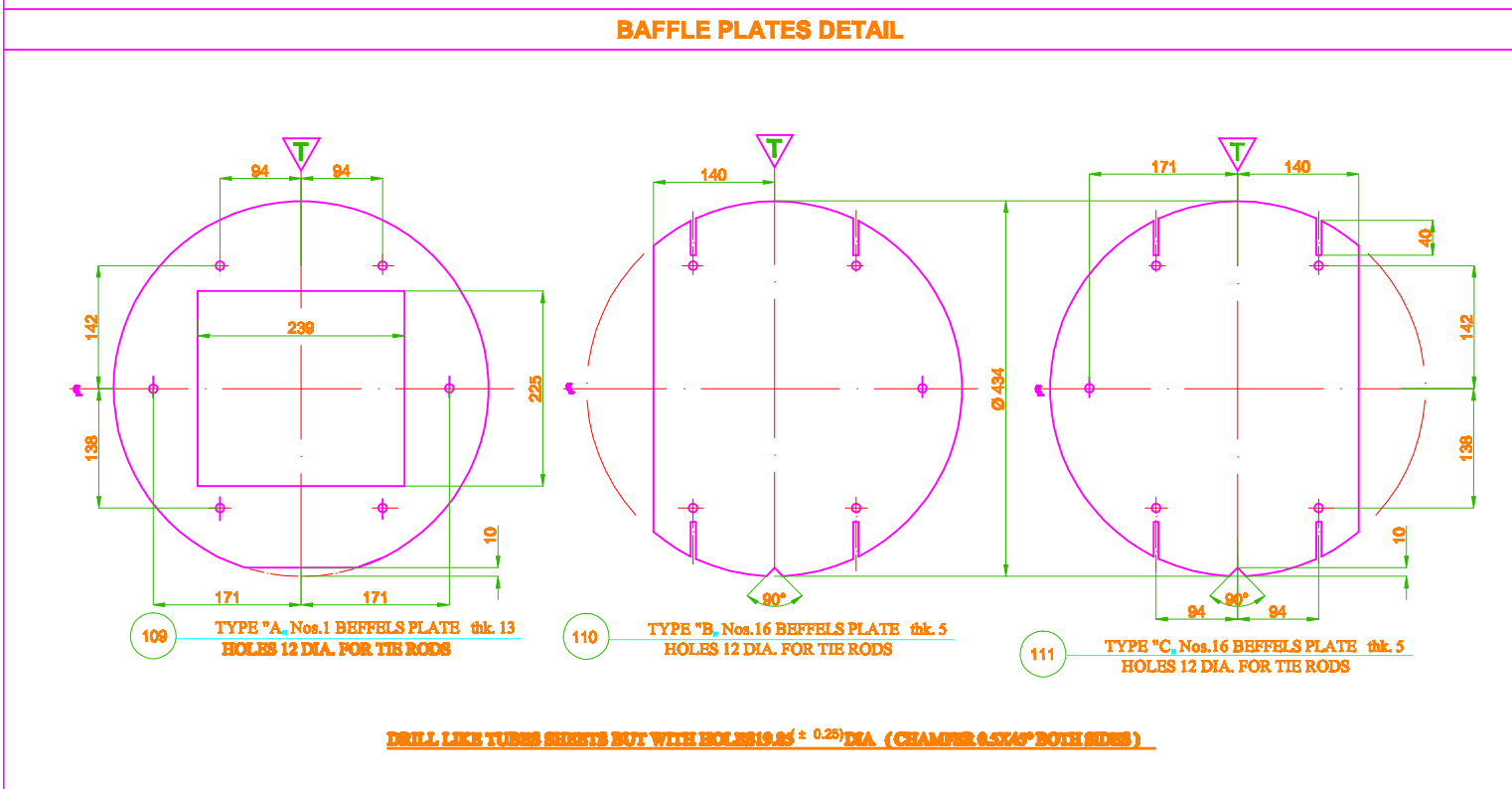
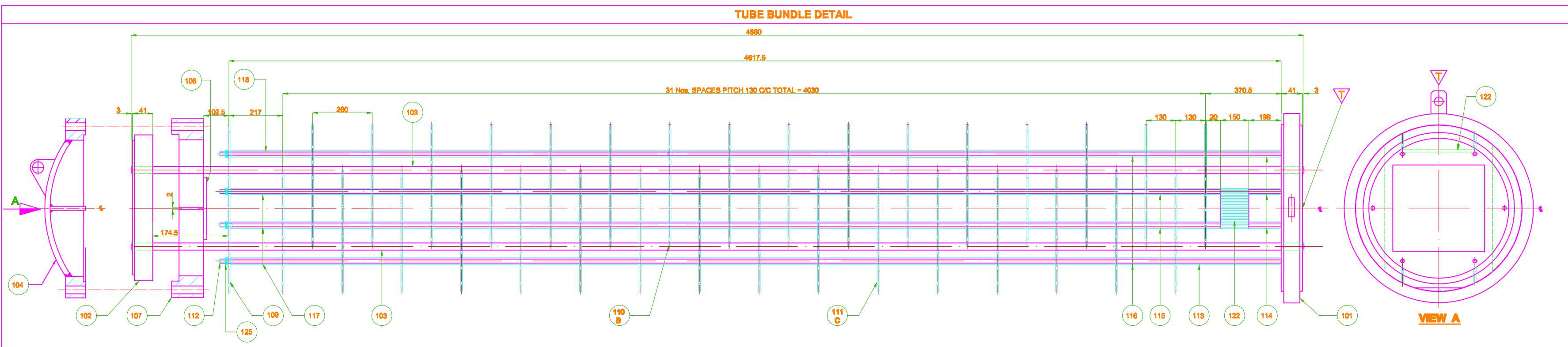
10. Stage inspections may be carried out at manufacturer site by OGDCL representative(s) and bidder will offer for inspection to OGDCL, at following stages;
 - a) After shipment of material and during fabrication.
 - b) Complete physical inspection, after completion of fabrication and before shipment of Tube Bundle.
11. Guarantee / warrantee for the tube bundle for a period of 24 months after shipment. During this period if any leakage/workmanship problem is observed in the tube bundle, the bidder will rectify the problem without any additional material/logistic/services cost.
12. **Delivery period: 06 months after issuance of LPO on FOR basis.**
13. All the above terms & conditions should be clearly confirmed in technical bid and any non-compliance with the above terms and conditions should also be clearly mentioned in the bid.

Specifications of Tube Bundles

Sr#	Description	Parameters	Shell Side	Tube Side
1	New Sour Gas Cooler EA-206 (EA-201-P) Type: AES	Design Pressure Design Temperature Working Pressure Working Temperature Tube sheet design temperature Hydrotest Pressure Fluid Corrosion Allowance Welding efficiency X-ray Stress Relieving Design Code: ASME Sec VIII Div 1 (Summer 85) TEMA R. Additional code: NACE MR-0175, Material U Tubes: SA-213 TP 304 Material Tube sheet: SA-182 F304 Material Baffles: SA-240 304 DWG No:PP-DKN-628	118 Psi 146.6 °C 68 Psi 35/46.6 °C 153.4 Psi Water 3.2 mm 1 100% No	1265 Psi 93.33 °C 1150 Psi 63.88/40.55 °C 1644.5 Psi Sour gas 3.2 mm 1 100% No
2	NGL Fractionator Feed Bottom Exchanger EA-601-A Type: AES	Design Pressure Design Temperature Working Pressure Working Temperature Tube sheet design temperature Hydrotest Pressure Fluid Corrosion Allowance Welding efficiency Radiography Stress Relieving No of passes Design Code: ASME Sec VIII Div 1 (Summer 85) TEMA R. Additional code: NACE MR-0175 Material U Tubes: SA-213 TP 304 Material Tube sheet Front/Rear: SA-182 F304 Material Baffles: SA-240 304 DWG No: PP-DKN-435	750 Psi 332 °C 600 Psi 80/222 °C 150 °C 975 Psi Unstabilized NGL 3.2 mm 1 Full No 1	375 Psi 412 °C 300 Psi 297/133 °C 487.5 Psi Stabilized NGL 3.2 mm 1 Full No 2

3	<p>NGL Fractionator Overhead Condenser EA-603 Type: AES</p>	<p>Design Pressure Design Temperature Working Pressure Working Temperature Tube sheet design temperature Hydrotest Pressure Fluid Corrosion Allowance Welding efficiency Radiography Stress Relieving No of passes Design Code: ASME Sec VIII Div 1 (Summer 85) TEMA R. Additional code: NACE MR-0175, Material U Tubes: SA-179 Material Tube sheet: SA-105 Material Baffles: SA-285 Gr. C DWG No: PP-DKN-404</p>	<p>335 Psi 143.3 °C 295 Psi 96.1/46.1 °C 143.3 °C 503 Psi Light hydrocarbons 3.2 mm 0.85 Spot Yes 1</p>	<p>225 Psi 62.8 °C 70 Psi 35/46.1 °C 338 Psi Cooling water 3.2 mm 0.85 Spot No 4</p>
4	<p>Sour Gas Cooler EA-201 Type: AEU</p>	<p>Design Pressure Design Temperature Working Pressure Working Temperature Tube sheet design temperature Hydrotest Pressure Fluid Corrosion Allowance Welding efficiency X-ray Stress Relieving Design Code: ASME Sec VIII Div 1 (Summer 85) TEMA R. Additional code: NACE MR-0175, Material U Tubes: SA-213 TP 316 Material Tube sheet: SA-182 F304 Material Baffles: SA-240 304 DWG NO: PP-DKN-407</p>	<p>100 Psi 68 °C 64/41 °C 144 °C 150 Psi Cooling water 3.2 mm 0.85 Spot No</p>	<p>1265 Psi 144 °C 35/47 °C 1925 Psi Sour gas 3.2 mm 1 100% Yes</p>

5	NGL Fractionator Overhead Condenser EA-611 Type: AES	Design Pressure Design Temperature Working Pressure Working Temperature Tube sheet design temperature Hydrotest Pressure Fluid Corrosion Allowance Welding efficiency Radiography Stress Relieving No of passes Design Code: ASME Sec VIII Div 1 (Summer 85) TEMA R. Additional code: NACE MR-0175, Material U Tubes: SA-210 Gr. A1 Material Tube sheet: SA-105 Material Baffles: SA-285 Gr. C DWG No: PP-DKN-627	340 Psi 143.3 °C 304 Psi 57.2/51.7 °C 143.3 °C 510 Psi 20 WT% DEA Solution 3.2 mm 0.85 Spot Yes 1	230 Psi 62.8 °C 70 Psi 35/46.1 °C 345 Psi Cooling water 3.2 mm 0.85 Spot No 6
6	NGL Fractionator Feed Bottom Exchanger EA-601-C Type: AES	Design Pressure Design Temperature Working Pressure Working Temperature Tube sheet design temperature Hydrotest Pressure Fluid Corrosion Allowance Welding efficiency Radiography Stress Relieving No of passes Design Code: ASME Sec VIII Div 1 (Summer 85) TEMA R. Additional code: NACE MR-0175, Material U Tubes: SA-213 TP 304 Material Tube sheet Front/Rear: SA-182 F304 Material Baffles: SA-240 304 DWG No: PP-DKN-437	750 Psi 332 °C 600 Psi 80/222 °C 150 °C 975 Psi Unstabilized NGL 3.2 mm 1 Full No 1	375 Psi 412 °C 300 Psi 297/133 °C 487.5 Psi Stabilized NGL 3.2 mm 1 Full No 2



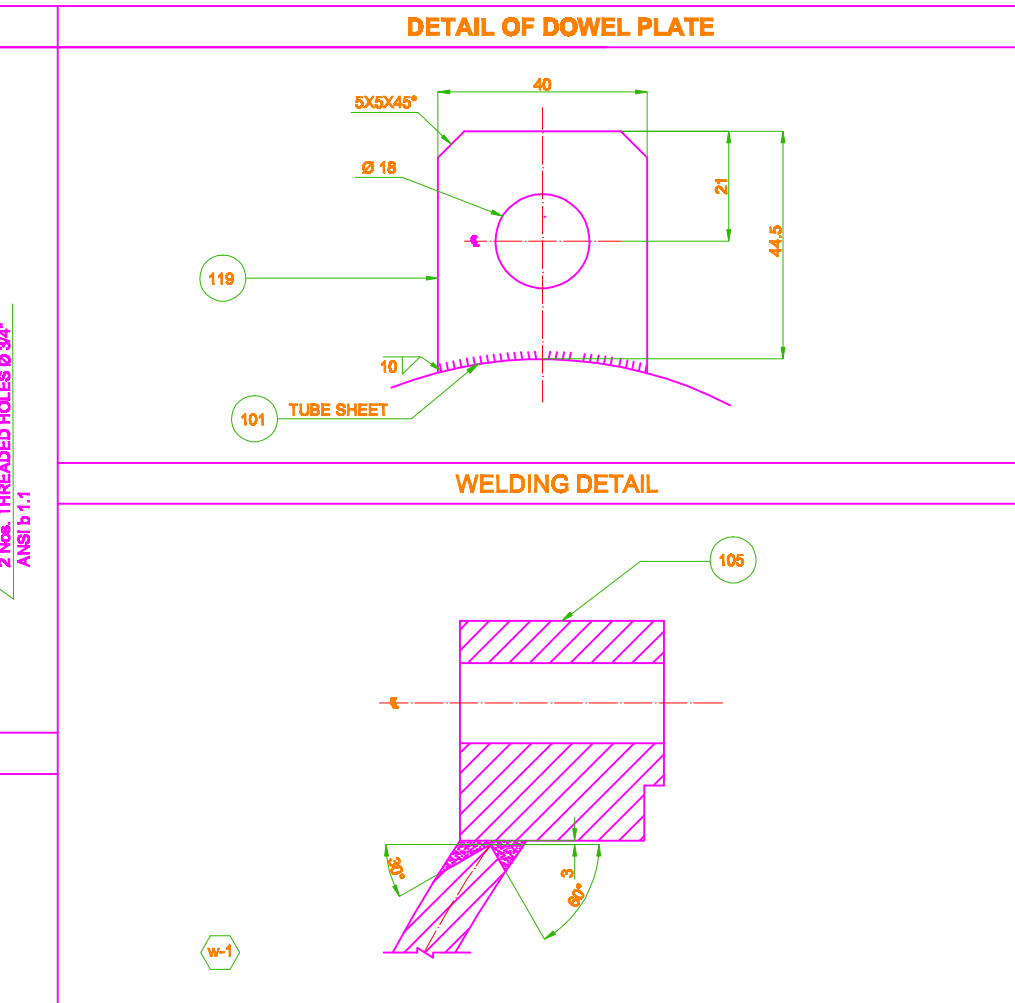
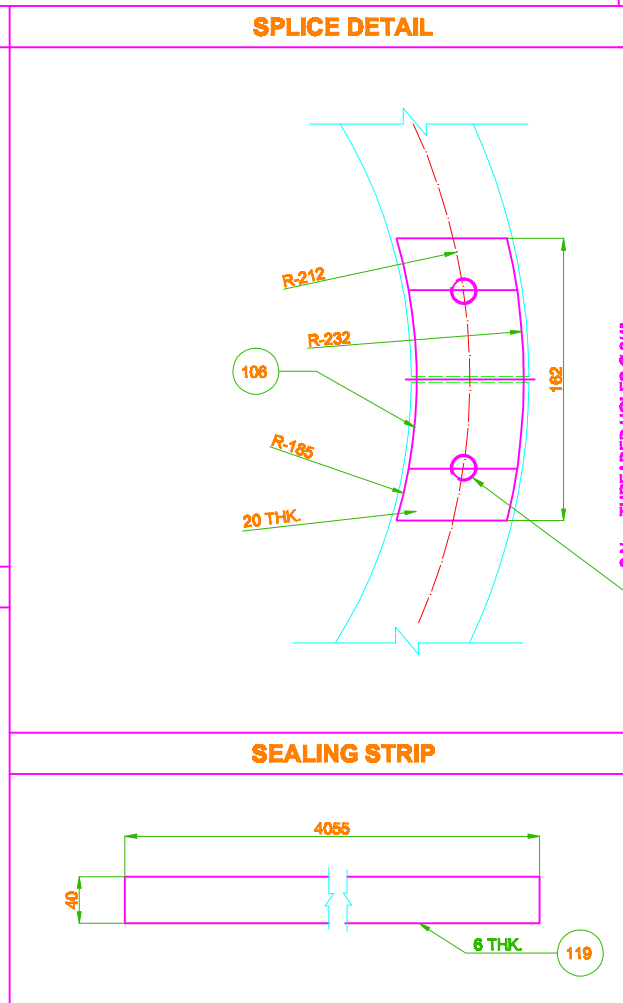
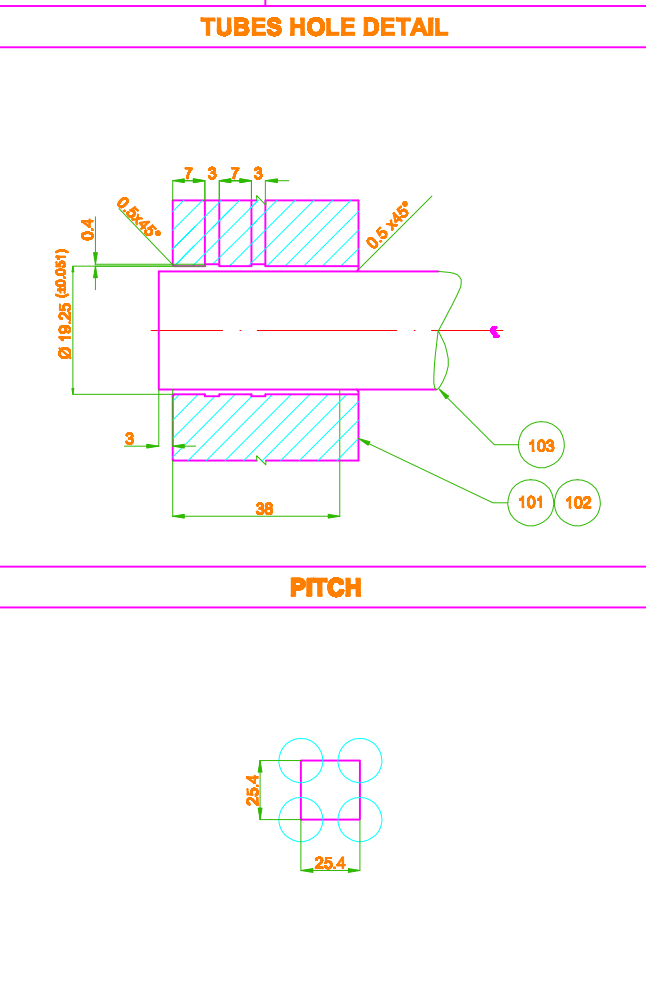
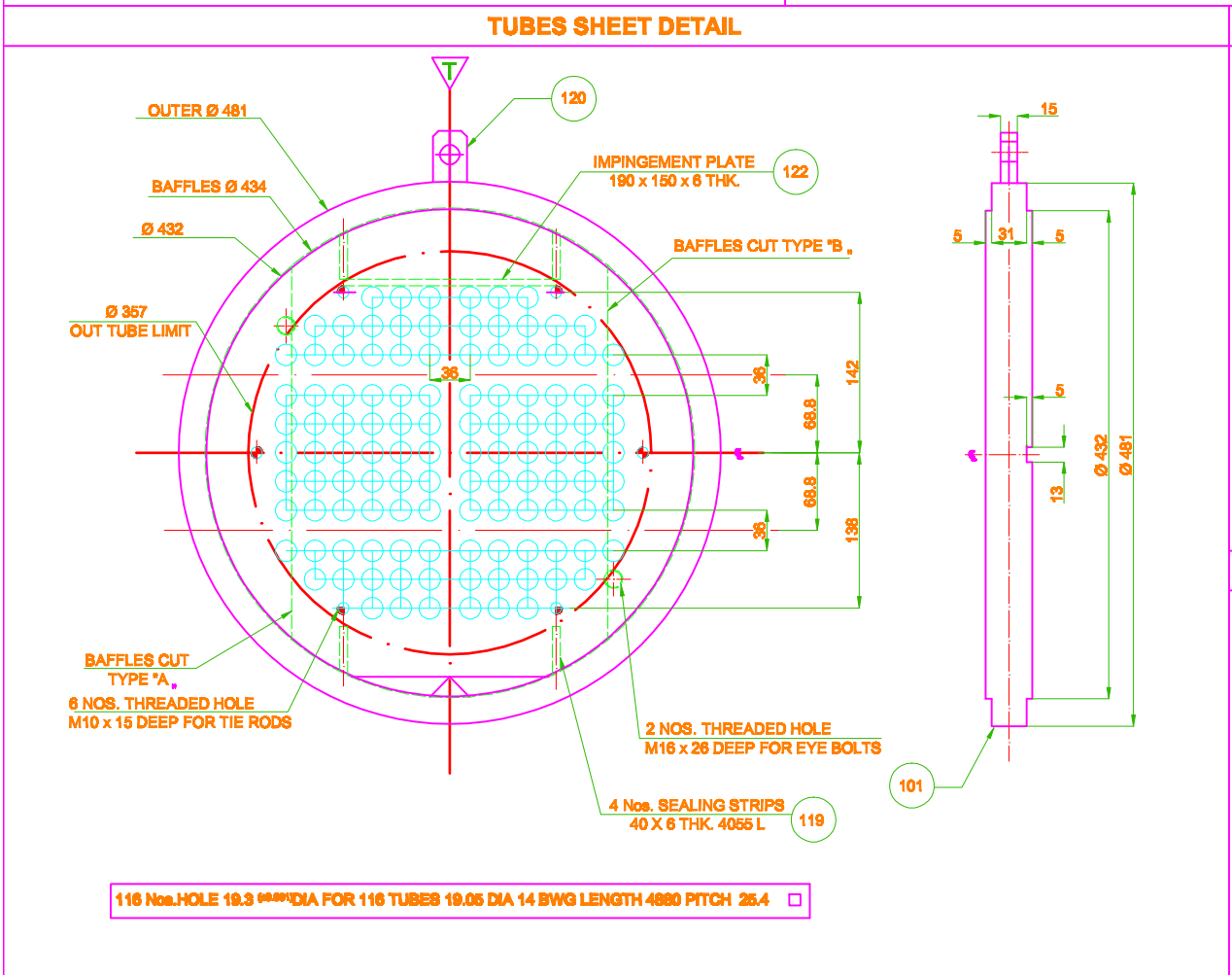
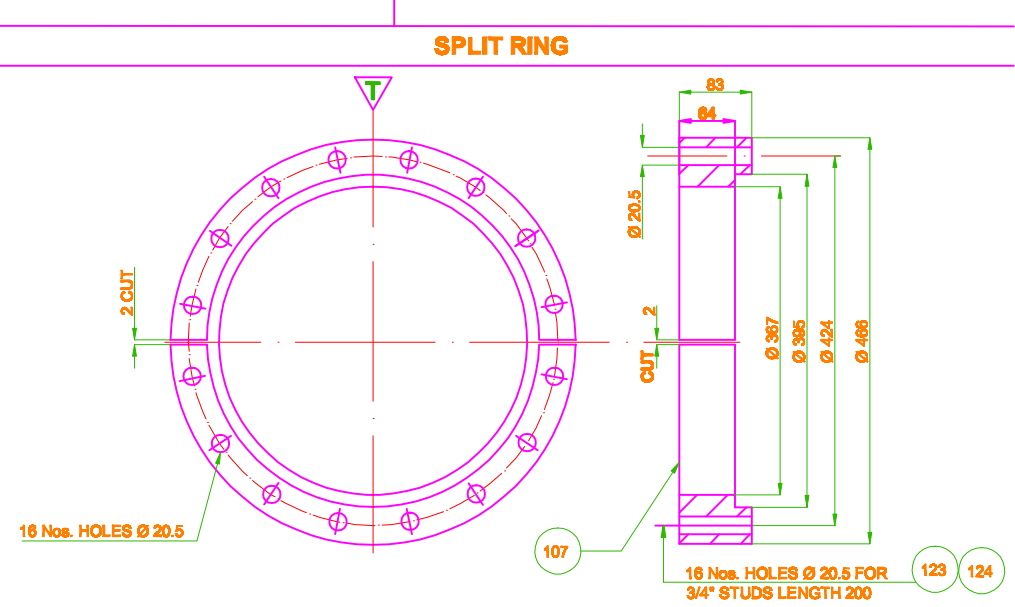
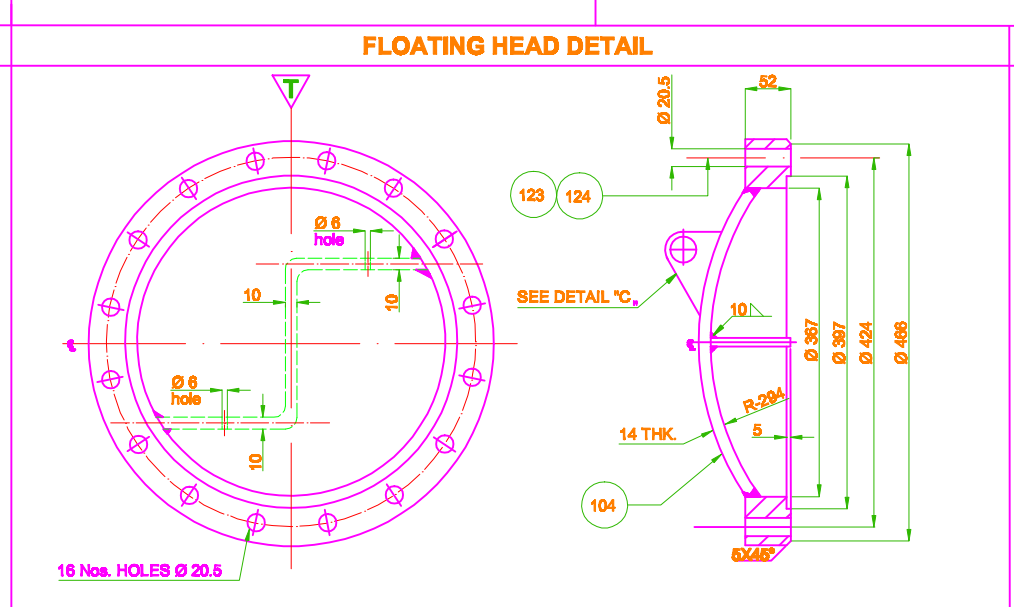
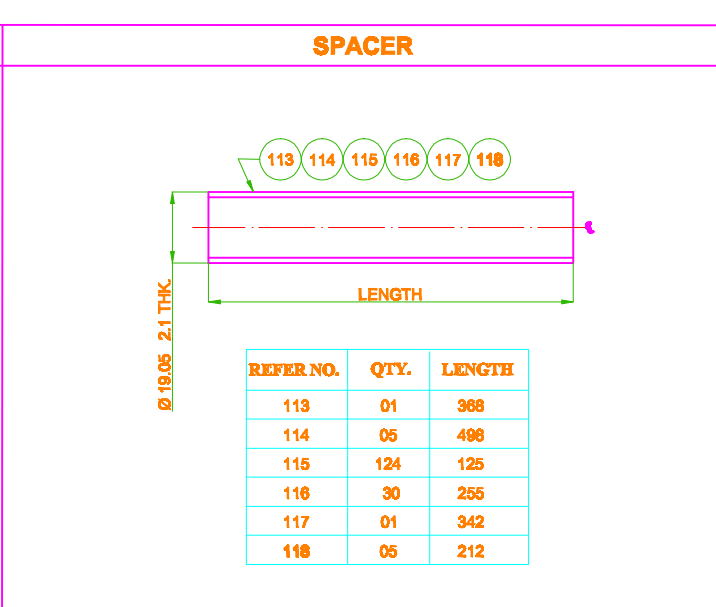
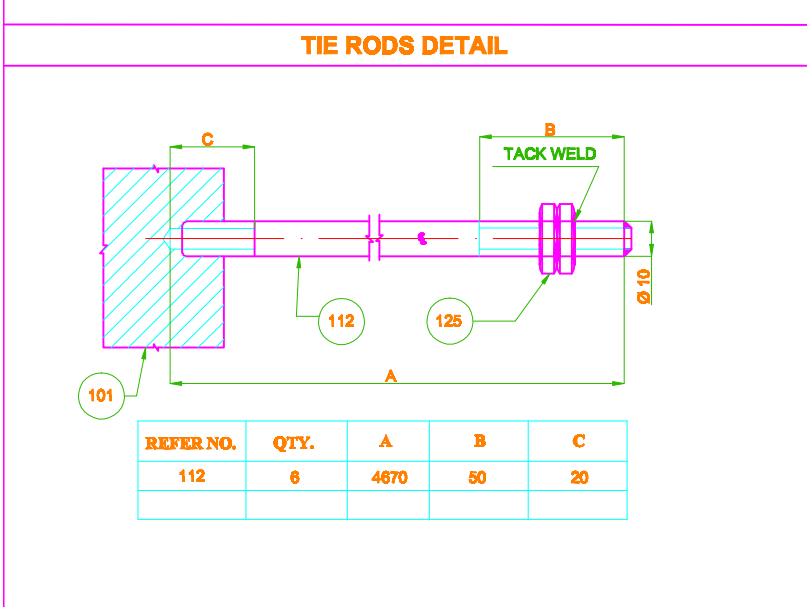
DESIGN DATA

construction code : ASME VIII DIV. 1 (SUMMER 88) - TEMA "R"

	SHELL SIDE	TUBE SIDE
DESIGN PRESSURE	231 Bar / 335 Pal	15.5 Bar / 225 Pal
DESIGN TEMPERATURE	110 / 143.3 °C	62.6 °C
WORKING PRESSURE	20.4 Bar / 295 Pal	4.8 Bar / 70 Pal
WORKING TEMPERATURE (INLET / OUTLET)	98.1 / 48.1 °C	35 / 48.1 °C
TUBE SHEET DESIGN TEMPERATURE	143.3 °C	
HYDROTEST PRESSURE	34.7 Bar / 503 Pal	23.3Bar / 338 Pal
BUBBLE TEST PRESSURE	17 Bar / 25 Pal	
FLUID	LIGHT HYDROCARBONS	COLLING WATER
CORROSION ALLOWANCE	3.2 mm	3.2 mm
WELDING EFFICIENCY	0.85	0.85
X-RAY	spot	spot
PRODUCTION TEST PLATE	NO	NO
STRESS RELIEVING	YES	NO
NUMBER OF PASSES	1	4
INSULATION	/	/
INSPECTION	ENR (ACCORDING TO ASME)	
GEOM CAPACITY	~ 630 LITER	~ 220 LITER
TUBE BUNDLE WEIGHT	880 KG	
ADDITIONAL CODE	NACE MR 01.76/80 NACE RP 04.72	

MATERIAL LIST

REFER NO.	ITEMS	MATERIAL	QTY.
101	CHANNEL SIDE TUBES SHEET 481 OD	SA-105	01
102	FLOATING SIDE TUBES SHEET 394 OD	SA-105	01
103	1 TUBES 19.05 O.D. 14 BWG	SA-179	116
104	FLOATING HEAD	SA-516 Gr.70	01
105	FLOATING HEAD FLANGE	SA-105	01
106	PASSES PARTITION PLATE 10 THK.	SA-516 Gr.70	03
107	SPLIT RING	SA-105	01
108	SPUCE PLATE	SA-516 Gr.70	01
109	BAFFLE PLATS Ø 434 (TYPE A)	SA-285 Gr.C	01
110	BAFFLE PLATS Ø 434 (TYPE B)	SA-285 Gr.C	16
111	BAFFLE PLATS Ø 434 (TYPE C)	SA-285 Gr.C	16
112	TIE RODS Ø 10 x 4670 L	SA-36	06
113	SPACER 19.05 O.D. 14 BWG	SA-179	01
114	SPACER 19.05 O.D. 14 BWG	SA-179	05
115	SPACER 19.05 O.D. 14 BWG	SA-179	124
116	SPACER 19.05 O.D. 14 BWG	SA-179	30
117	SPACER 19.05 O.D. 14 BWG	SA-179	01
118	SPACER 19.05 O.D. 14 BWG	SA-179	05
119	SEALING STRIPS 40 x 6 THK x 4055 L	SA-285 Gr.C	04
120	PLATE FOR DOWEL PIN	SA-36	01
121	LIFTING LUG	SA-516 Gr.70	01
122	IMPINGEMENT PLATE 190 x 150 x 6 THK.	SA-285 Gr.C	01
123	STUDS Ø 3/4" x 200 L	SA-193 B 7	16
107	NUTS Ø 3/4"	SA-194 2H	32
124	NUTS M10	SA-194 2H	12



- #### NOTES:-
- ALL DIMENSIONS ARE IN MILLIMETER OTHERWISE STATED
 - BUNDLE ACCEPT AFTER HYDROTEST
 - MATCH MARK FOR ASSEMBLY
 - PROVIDE PRODUCTION IMPACT TEST AS REQUIRED OF QDCCL
 - SEALING STRIPS SHOULD BE TACK WELD WITH BAFFLE PLATES.

Rev. No	Revision Note	Drawn By	Checked By	Approved By
Rev. 1	ISSUE FOR FABRICATION			
Rev. 0	ISSUE FOR APPROVAL			

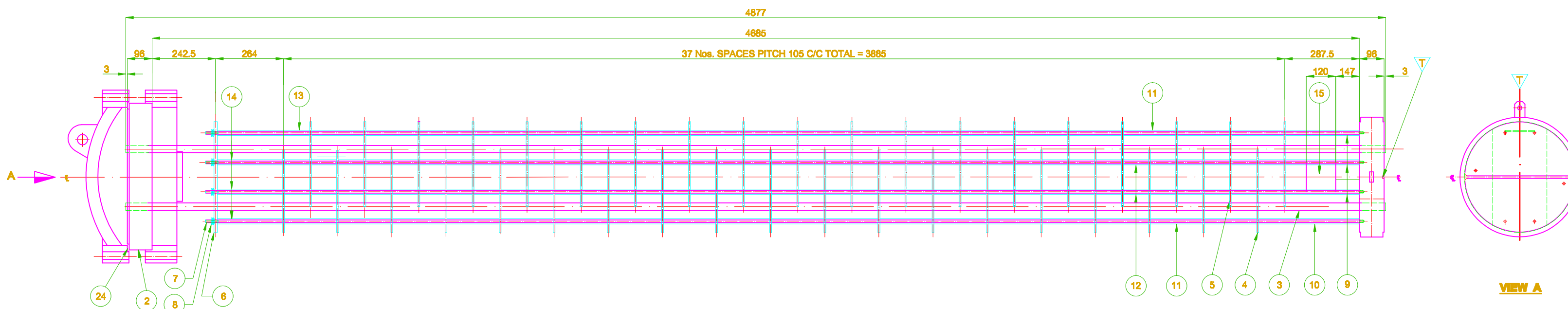
OIL & GAS DEVELOPMENT COMPANY LTD.
PLANTS & PROCESS DEPARTMENT
Dakhni Gas Processing Plant

TITLE: Tube Bundle Of NGL Fractionator Overhead Condenser EA-603 TYPE-(AES)

CAD BY	CHECKED BY	APPROVED BY	DRAWING NO.
V. SANKAR 05/2/20	Hamid Raza		PP-DKN-404
Dr. Tech. Officer (Designing)	Plant Manager		

scale: NTS Drawing Code: PH_01 Rev.1 Date: 19-12-2019

TUBE BUNDLE DETAIL

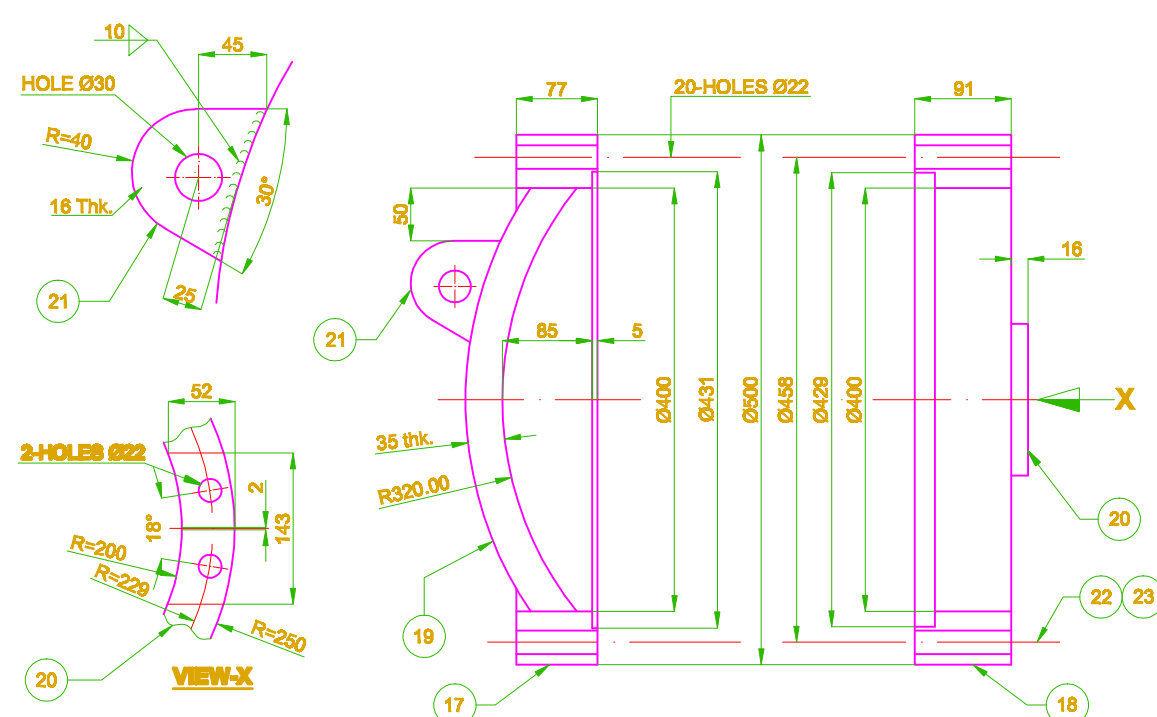


DESIGN DATA

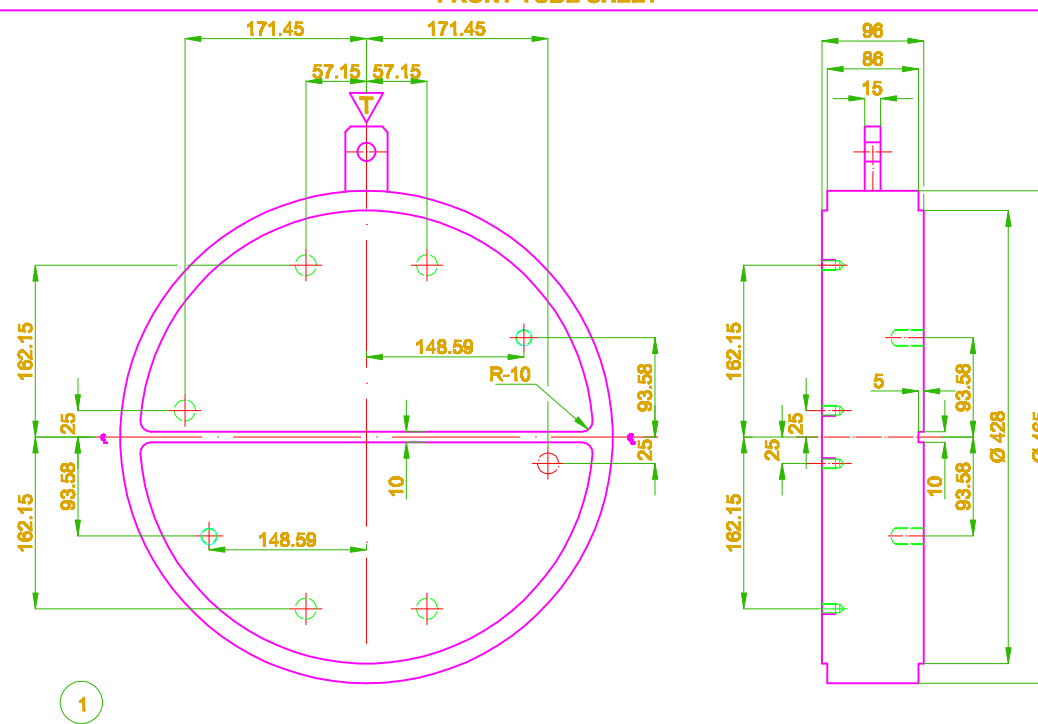
DESIGN CODE	ASME SECTION VIII DIV.1 ED 2004 (ADDENDA 2005)	
DESIGN STANDARD	TEMA STANDARDS	
	SHELL SIDE	TUBE SIDE
DESIGN PRESSURE Psig (KPa)	750 (5171.05)	375 (2685.52)
DESIGN TEMPERATURE °F (°C)	630 (332.222)	773.5 (411.944)
HYDROSTATIC TEST PRESSURE Psig (KPa)	975 (6722.36)	487.5 (3361.18)
OPERATING PRESSURE Psig (KPa)	600 (4136.84)	300 (2068.42)
OPERATING TEMPERATURE (IN/OUT) °F (°C)	140 (60) / 432 (222.22)	568 (297.778) / 272 (133.333)
CORROSION ALLOWANCE mm	—	—
JOINT EFFICIENCY	1.00	1.00
RADIOGRAPHY	FULL	FULL
FLUID CONTAINED / SERVICE	UNSTABILISED NGL/NON LETHAL	STABILISED NGL/NON LETHAL
STRESS RELIEVING	NO	NO
NO.OF PASSES	1	2
INSULATION mm	—	—
MINIMUM DESIGN METAL TEMP. °F (°C)	-20 (-28.88)	-20 (-28.88)
IMPACT TEST	NO	NO

VIEW A

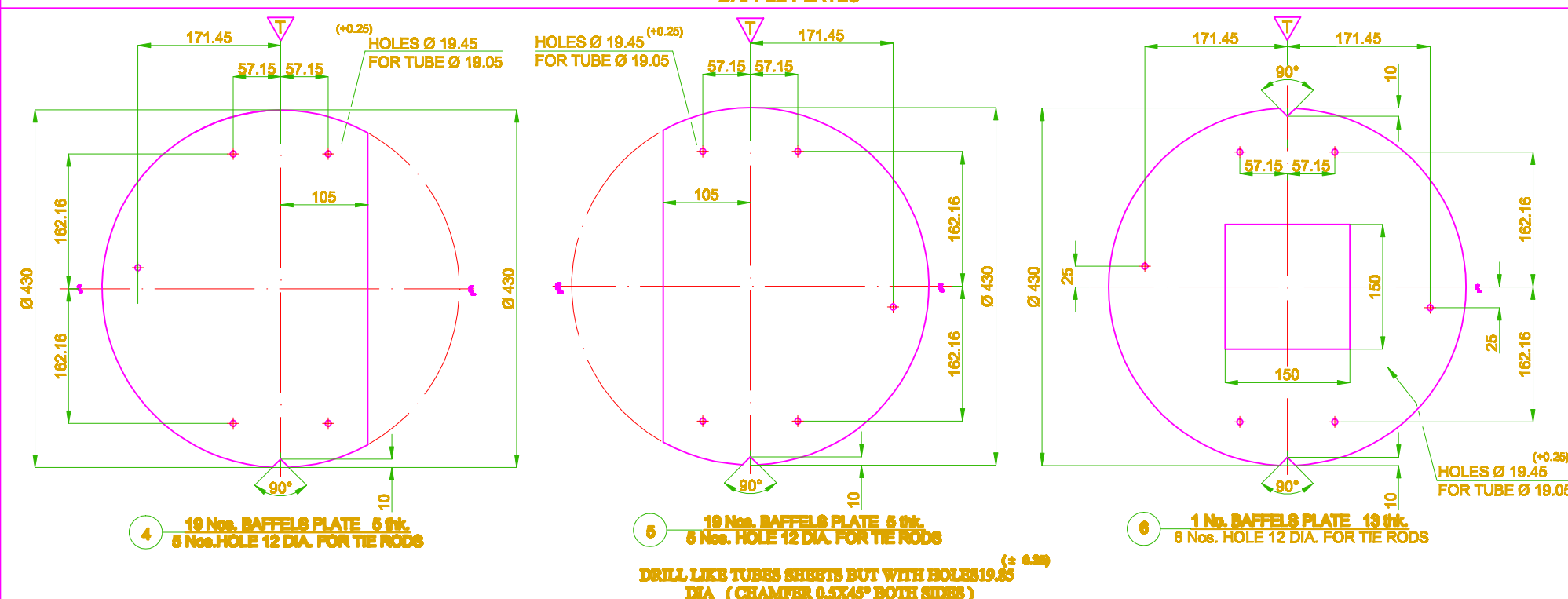
FLOATING HEAD & BACKING RING



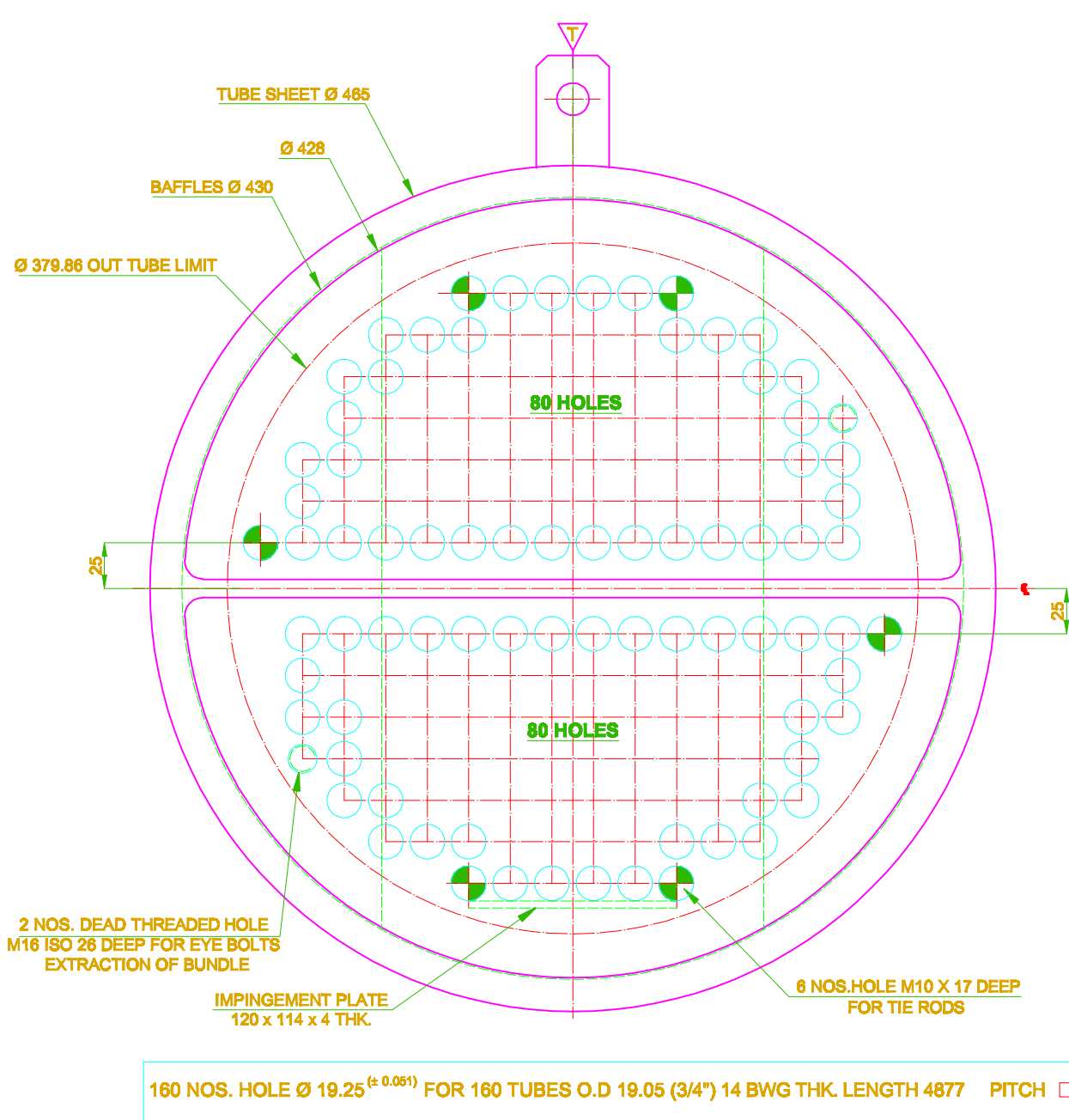
FRONT TUBE SHEET



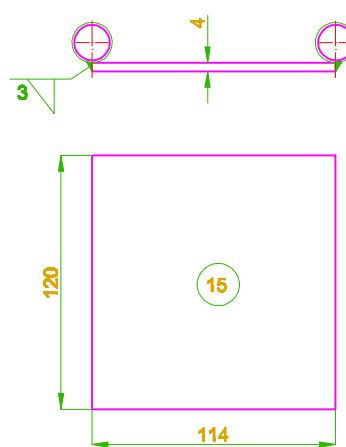
BAFFLE PLATES



TUBE SHEET HOLE DETAIL



IMPINGEMENT PLATE



REAR TUBE SHEET

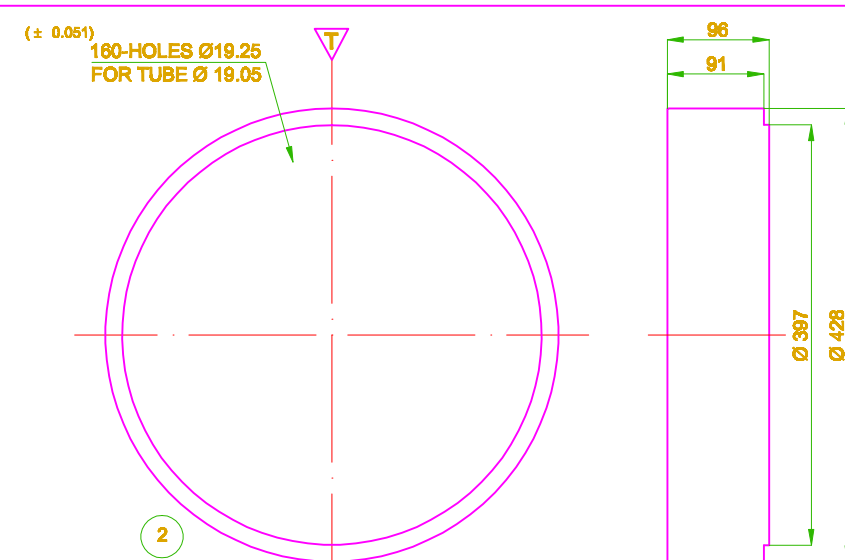
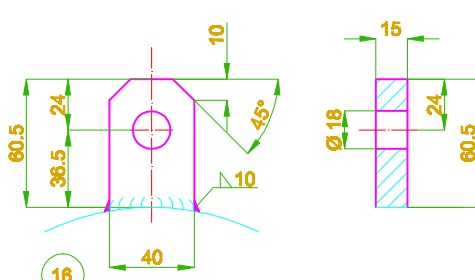
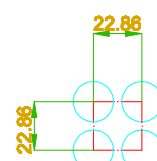


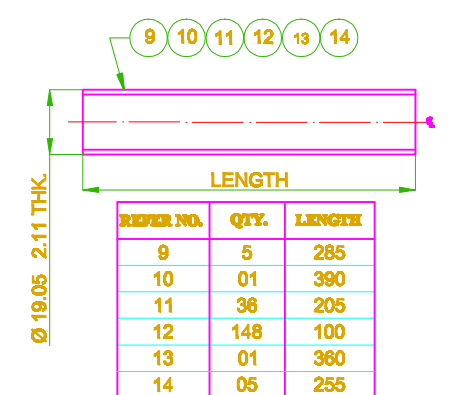
PLATE FOR DOWEL PLATE



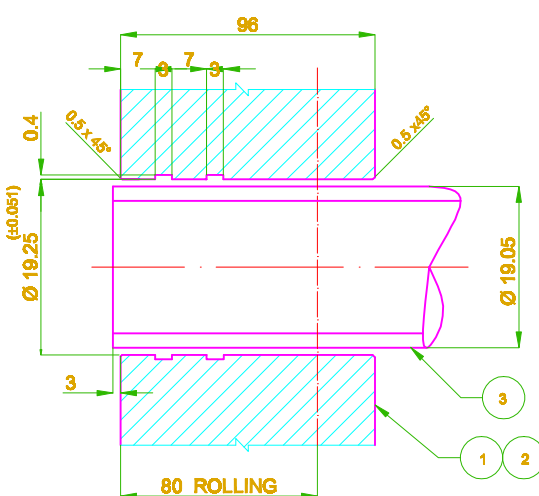
HOLE PITCH



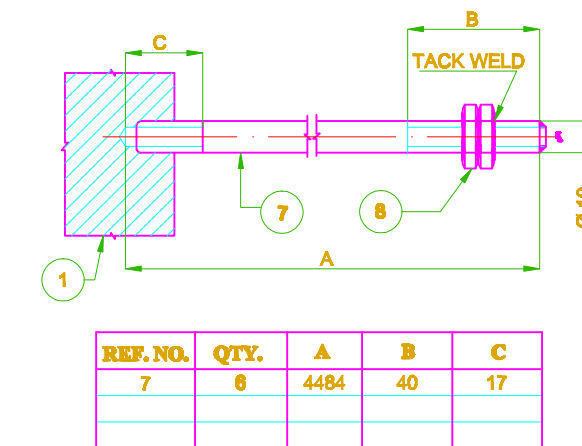
SPACER



TUBE HOLES DETAIL



TIE ROD



PART NO.	DESCRIPTION	QTY.	MATERIAL	WEIGHT KGS.
26				
25				
24	GASKET O.D.428 x I.D.406 x 3 THK.	1	see spiral wound	—
23	HEX. NUT 3/4" UNC	40	SS-304	—
22	STUD BOLT 3/4" UNC L=330	20	SS-304	—
21	LIFTING LUG PLATE 16 x 70 x 100	1	SA-240 304	.36
20	SPLICE PLATE 16 x 62 x 143	2	SA-240 304	1.00
19	FLOATING HEAD COVER I.D.400 x 35 THK.	1	SA-240 304	36.60
18	BACKING RING Ø600 x Ø400 x 91 THK.	1	SA-182 F304	60.60
17	FLOATING HEAD FLANGE Ø600 x Ø400 x 77 THK.	1	SA-182 F304	36.40
16	DOWEL PIN PLATE 40 X 60.5 X 15 THK.	1	SA-240 304	0.5
15	IMPINGEMENT PLATE 114 X 120 X 4 THK.	1	SA-240 304	1.00
14	SPACER Ø 18.05 X 2.11 THK. L = 255	5	SA-213 TP304	1.10
13	SPACER Ø 18.05 X 2.11 THK. L = 360	1	SA-213 TP304	0.36
12	SPACER Ø 18.05 X 2.11 THK. L = 100	148	SA-213 TP304	13.20
11	SPACER Ø 18.05 X 2.11 THK. L = 205	36	SA-213 TP304	6.60
10	SPACER Ø 18.05 X 2.11 THK. L = 360	1	SA-213 TP304	0.66
9	SPACER Ø 18.05 X 2.11 THK. L = 285	5	SA-213 TP304	1.25
8	NUT M10	12	SS-304	0.20
7	TIE RODS Ø10 L= 4484	6	SS-304	16.86
6	SUPPORT BAFFLE PLATE Ø 430 x 13 THK.	1	SA-240 304	12.60
5	BAFFLE PLATE Ø 430 x 5 THK.	19	SA-240 304	67.66
4	BAFFLE PLATE Ø 430 x 5 THK.	19	SA-240 304	67.66
3	TUBES O.D 19.05 (3/4") X 2.11 THK. L 4877	160	SA-213 TP304	686
2	REAR TUBE SHEET Ø 428 x 96 THK.	1	SA-182 F304	80
1	FRONT TUBE SHEET Ø 485 x 96 THK.	1	SA-182 F304	103

MATERIAL LIST

- NOTES:**
1. MATCH MARK FOR ASSEMBLY
 2. ALL DIMENSIONS ARE IN MILLIMETER OTHERWISE STATED
 3. BUNDLE ACCEPT AFTER HYDROTEST
 4. PROVIDE PRODUCTION IMPACT TEST AS REQUIRED OF OGDCL

Rev. NO	DESCRIPTION	QTY.	MATERIAL	WEIGHT KGS.
Rev. 1	Issue For Fabrication			
Rev. 0	Issue For Approval			
Rev. NO	Revision Note.			

Cad By / Checked By / Approved By

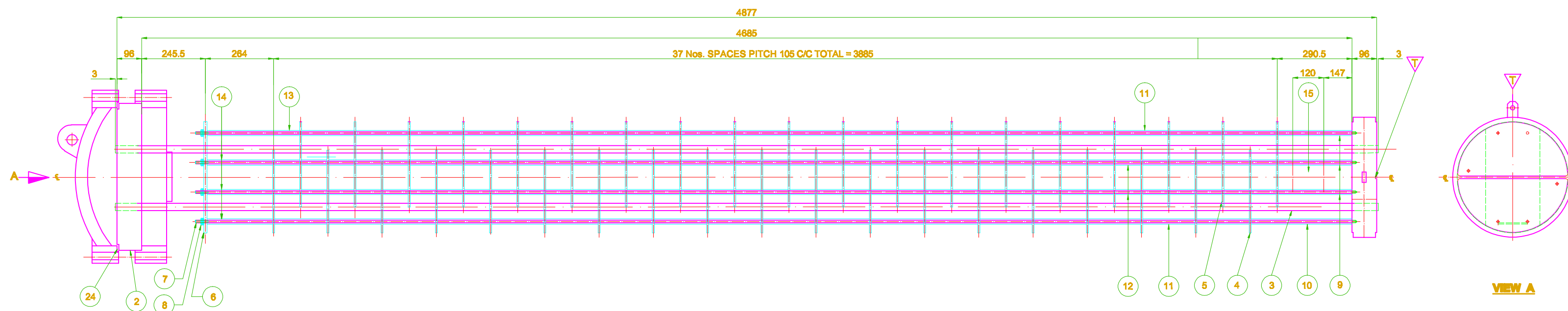
OIL & GAS DEVELOPMENT COMPANY LTD.
PROCESS & PLANTS DEPARTMENT
 Dakhni Gas Processing Plant

Tube Bundle Of NGL Fractionator Feed Bottom Exchanger EA-601C (P)

REF. NO.	QTY.	A	B	C
7	6	4484	40	17

CAD BY: J.S.R./A.R. OR/ASD (Sr.T.O Drafting)
 CHECKED BY: Saad Ullah Khan (S.E (Mech.))
 APPROVED BY: Hamid Raza (Plant Manager)
 scale: NTS
 Computer Code: PN_01
 Rev. 1
 Date: 06-03-2016

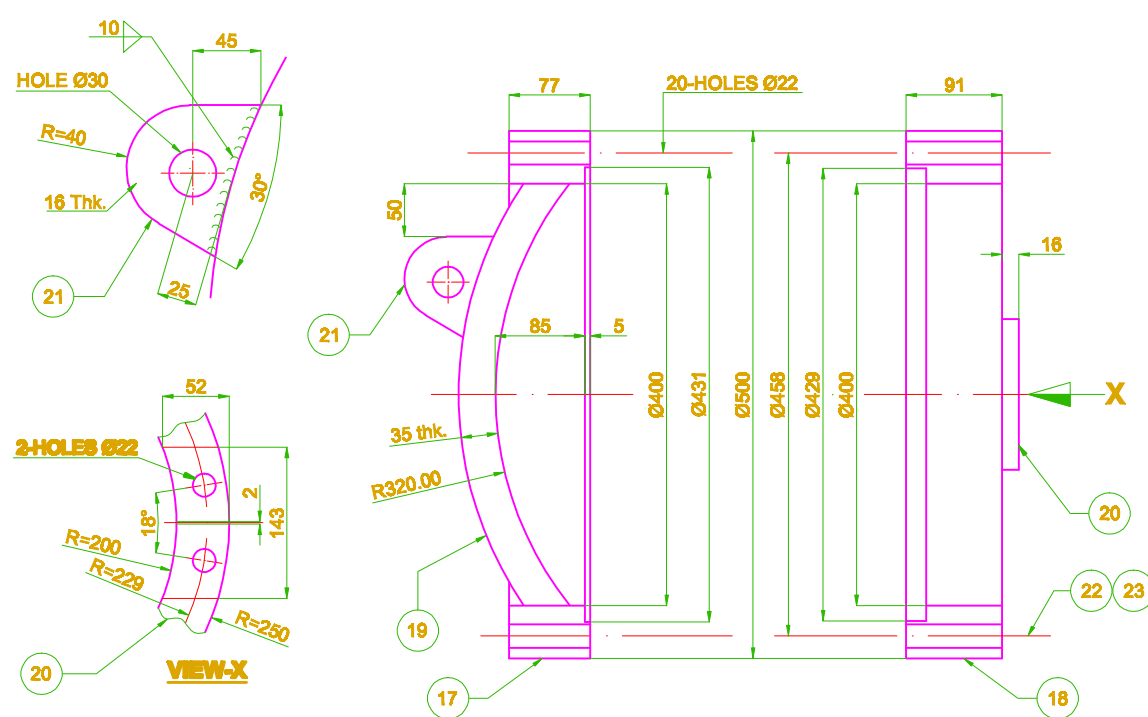
TUBE BUNDLE DETAIL



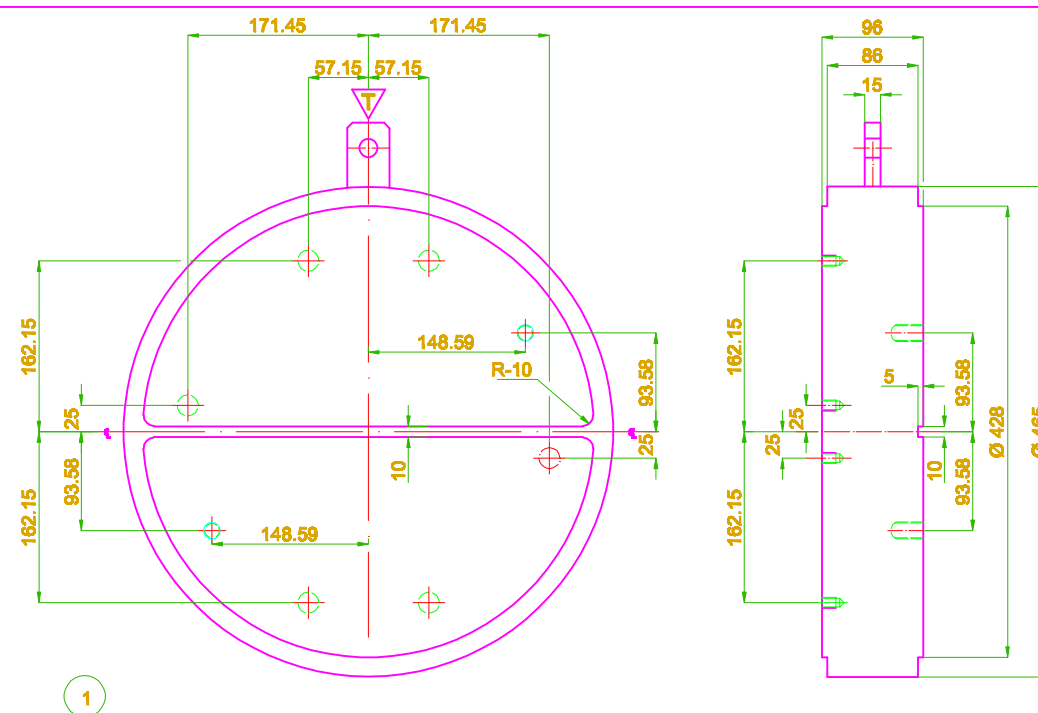
DESIGN DATA

DESIGN CODE	ASME SECTION VIII DIV.1 ED 2004 (ADDENDA 2008)	
DESIGN STANDARD	TEMA STANDARDS	
	SHELL SIDE	TUBE SIDE
DESIGN PRESSURE	Paig (KPa) 750 (5171.05)	375 (2585.52)
DESIGN TEMPERATURE	°F (°C) 630 (332.222)	773.5 (411.944)
HYDROSTATIC TEST PRESSURE	Paig (KPa) 975 (6722.38)	487.5 (3361.18)
OPERATING PRESSURE	Paig (KPa) 600 (4136.84)	300 (2068.42)
OPERATING TEMPERATURE (IN/OUT)	°F (°C) 140 (60) / 432 (222.22)	568 (297.778) / 272 (133.333)
CORROSION ALLOWANCE	mm	—
JOINT EFFICIENCY	1.00	1.00
RADIOGRAPHY	FULL	FULL
FLUID CONTAINED / SERVICE	UNSTABILISED NGL/NON LETHAL	STABILISED NGL/NON LETHAL
STRESS RELIEVING	NO	NO
NO.OF PASSES	1	2
INSULATION	mm	—
MINIMUM DESIGN METAL TEMP.	°F (°C) -20 (-28.88)	-20 (-28.88)
IMPACT TEST	NO	NO

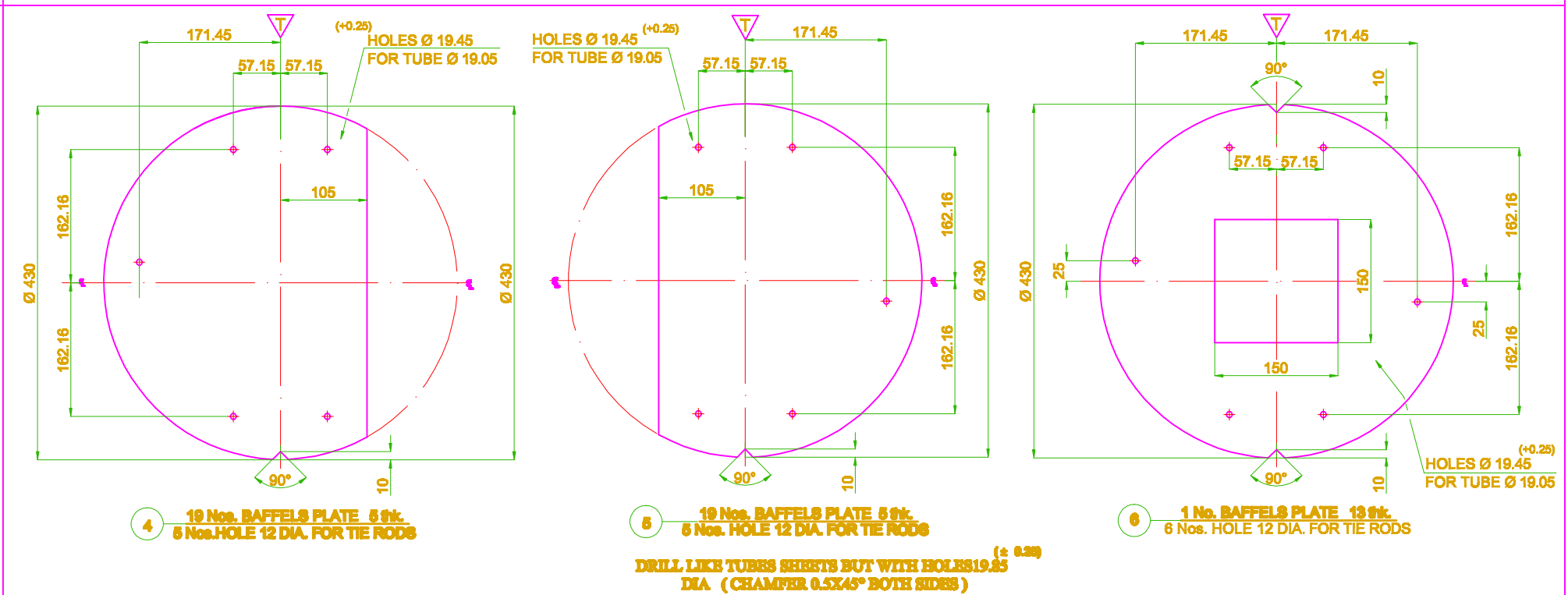
FLOATING HEAD & BACKING RING



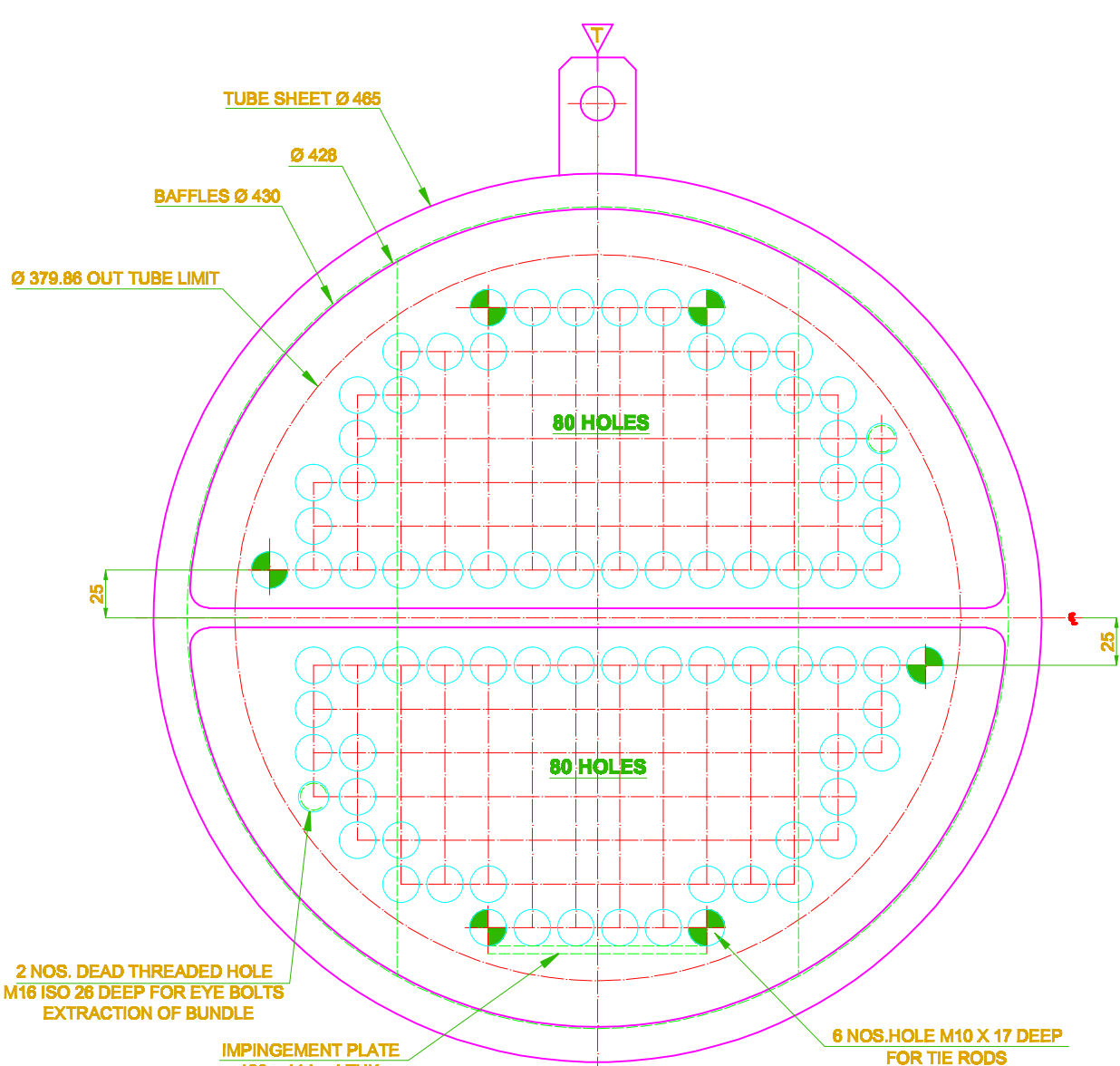
FRONT TUBE SHEET



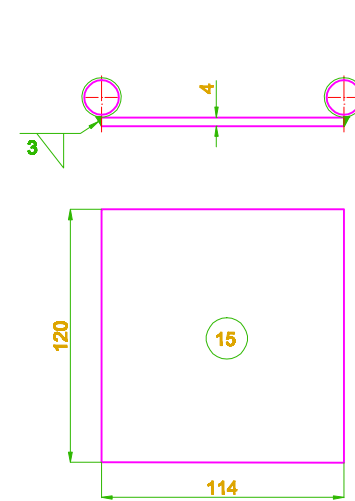
BAFFLE PLATES



TUBE SHEET HOLE DETAIL



IMPINGEMENT PLATE



REAR TUBE SHEET

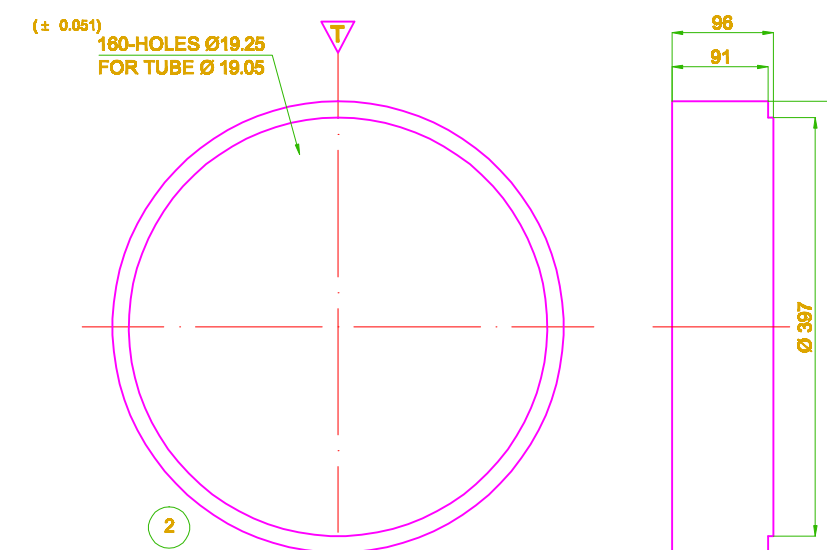
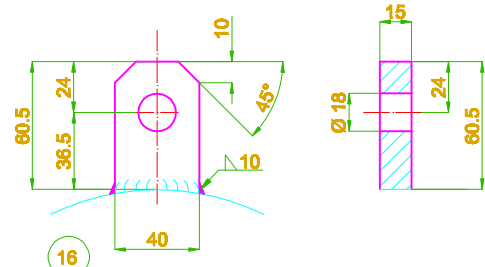
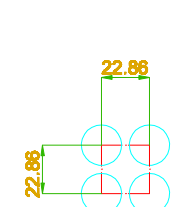


PLATE FOR DOWEL PLATE



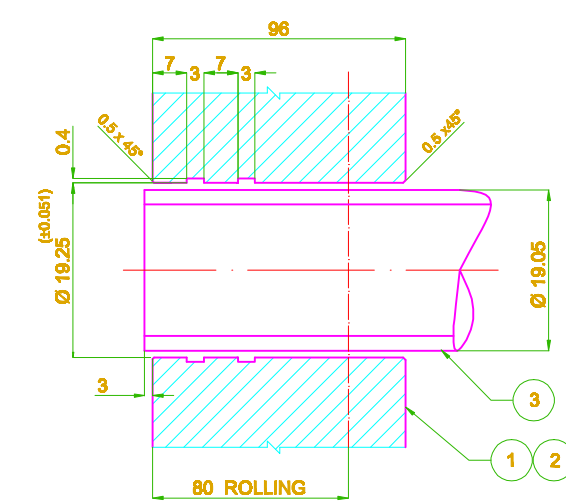
HOLE PITCH



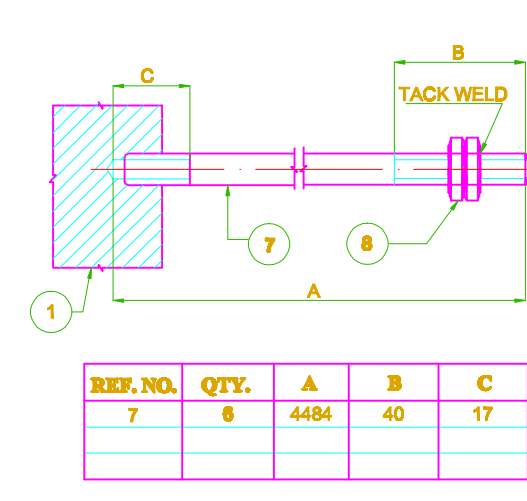
SPACER

REFER NO.	QTY.	LENGTH
9	5	288
10	01	393
11	36	205
12	148	100
13	01	360
14	05	255

TUBE HOLES DETAIL



TIE ROD



PART NO.	DESCRIPTION	QTY.	MATERIAL	WEIGHT KGS.
26				
25				
24	GASKET O.D.428 x I.D.408 x 3 THK.	1	as spiral wound	—
23	HEX. NUT 3/4" UNC	40	SS-304	—
22	STUD BOLT 3/4" UNC L=330	20	SS-304	—
21	LIFTING LUG PLATE 18 x 70 x 100	1	SA-240 304	.35
20	SPICE PLATE 16 x 62 x 143	2	SA-240 304	1.00
19	FOLATING HEAD COVER I.D.400 x 35 THK.	1	SA-240 304	38.60
18	BACKING RING Ø500 x Ø400 x 91 THK.	1	SA-182 F304	50.50
17	FOLATING HEAD FLANGE Ø500 x Ø400 x 77 THK.	1	SA-182 F304	39.40
16	DOWEL PIN PLATE 40 X 60.5 X 15 THK.	1	SA-240 304	0.5
15	IMPINGEMENT PLATE 114 X 120 X 4 THK.	1	SA-240 304	1.00
14	SPACER Ø 19.05 X 2.11 THK. L = 255	5	SA-213 TP304	1.10
13	SPACER Ø 19.05 X 2.11 THK. L = 360	1	SA-213 TP304	0.35
12	SPACER Ø 19.05 X 2.11 THK. L = 100	148	SA-213 TP304	13.20
11	SPACER Ø 19.05 X 2.11 THK. L = 205	36	SA-213 TP304	6.80
10	SPACER Ø 19.05 X 2.11 THK. L = 360	1	SA-213 TP304	0.65
9	SPACER Ø 19.05 X 2.11 THK. L = 285	5	SA-213 TP304	1.25
8	NUT M10	12	SS-304	0.20
7	TIE RODS Ø 10 L= 4484	6	SS-304	16.65
6	SUPPORT BAFFLE PLATE Ø 430 x 13 THK.	1	SA-240 304	12.50
5	BAFFLE PLATE Ø 430 x 5 THK.	19	SA-240 304	67.65
4	BAFFLE PLATE Ø 430 x 5 THK.	19	SA-240 304	67.65
3	TUBES O.D 19.05 (3/4") X 2.11 THK. L 4877	160	SA-213 TP304	686
2	REAR TUBE SHEET Ø 428 x 96 THK.	1	SA-182 F304	80
1	FRONT TUBE SHEET Ø 465 x 96 THK.	1	SA-182 F304	103

MATERIAL LIST

NOTES:

1. MATCH MARK FOR ASSEMBLY
2. ALL DIMENSIONS ARE IN MILLIMETER OTHERWISE STATED
3. BUNDLE ACCEPT AFTER HYDROTERT
4. PROVIDE PRODUCTION IMPACT TEST AS REQUIRED OF ODCL

Rev. No	Revision Note	Cad By	Checked By	Approved By
Rev. 1	Issue For Fabrication			
Rev. 0	Issue For Approval			

OIL & GAS DEVELOPMENT COMPANY LTD.
PROCESS & PLANTS DEPARTMENT
Dakhni Gas Processing Plant

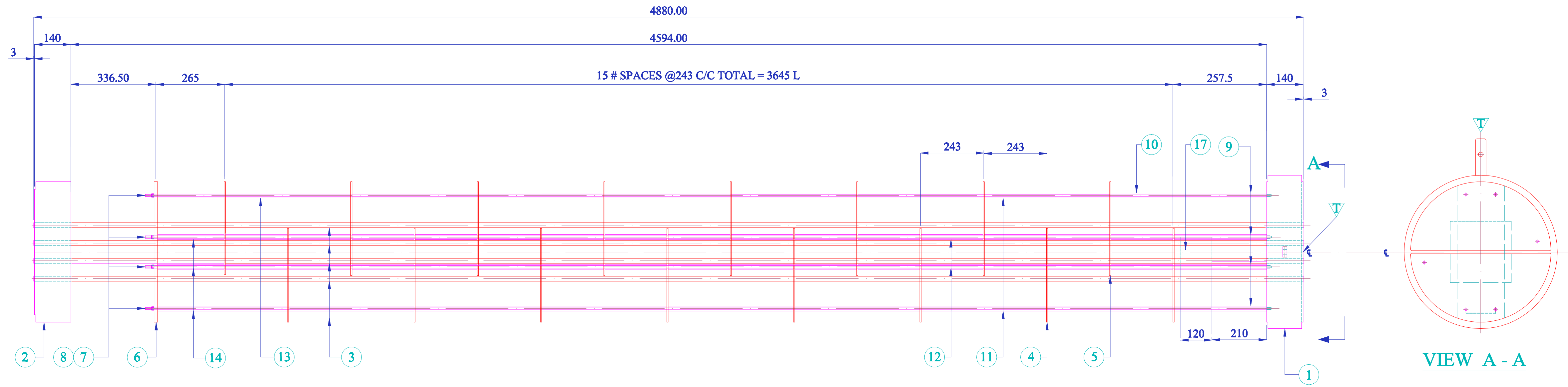
TITLE: Tube Bundle Of NGL Fractionator Feed Bottom Exchanger EA-601A (P)
 TYPE-(AES)

CAD BY	CHECKED BY	APPROVED BY	DRAWING NO.
J.A.SIVAJI	Alghen Khan Niaz	Hamid Raza	PP-DXN-435
Br.T.O (Drafting)	J.E (Mech)	Plant Manager	

scale: NTS Computer Code PH_01 Rev. 1 Date 20-02-2016

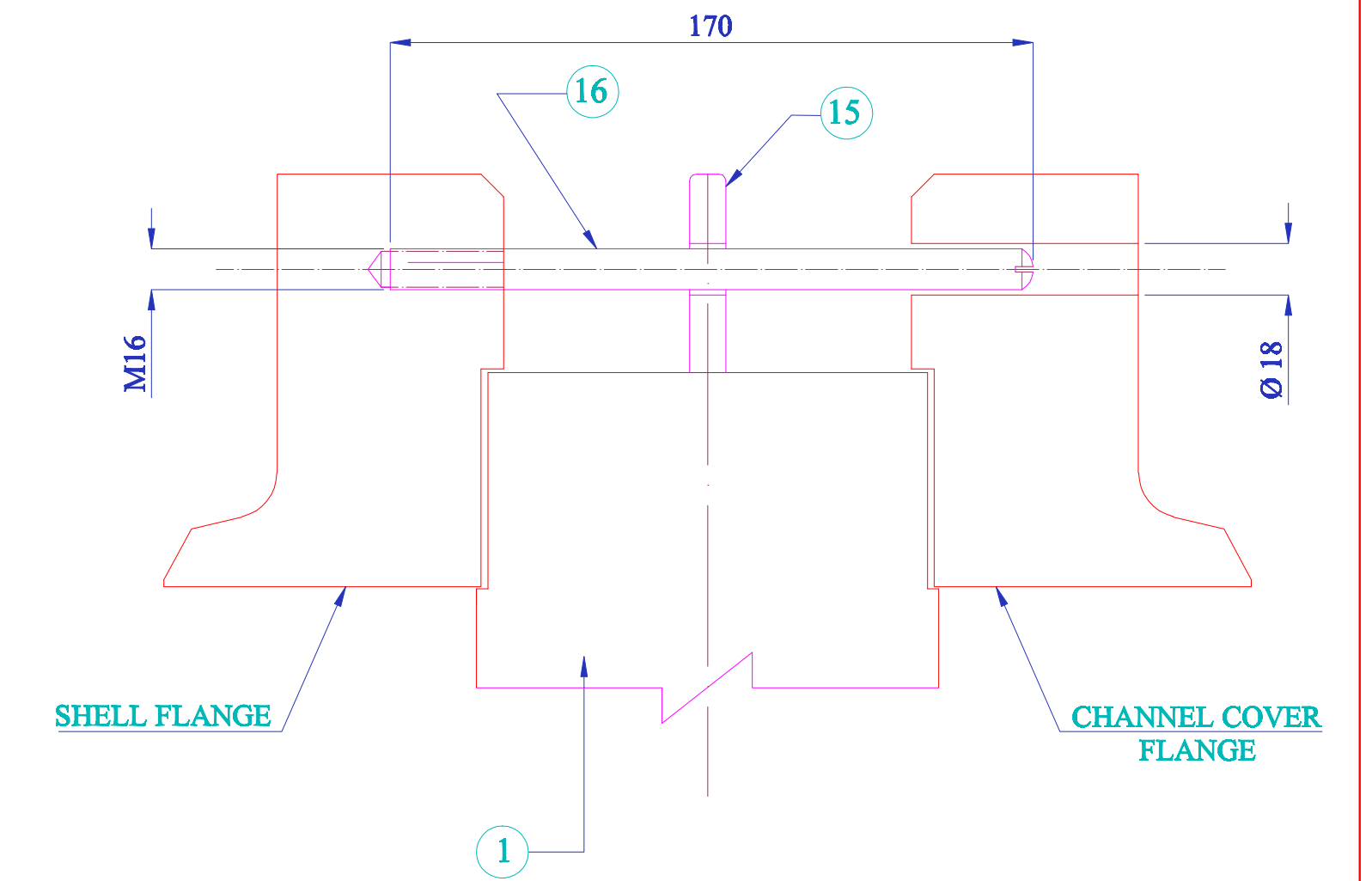
160 NOS. HOLE Ø 19.25 (+0.051) FOR 160 TUBES O.D 19.05 (3/4") 14 BWG THK. LENGTH 4877 PITCH □

TUBE BUNDLE ASSEMBLY

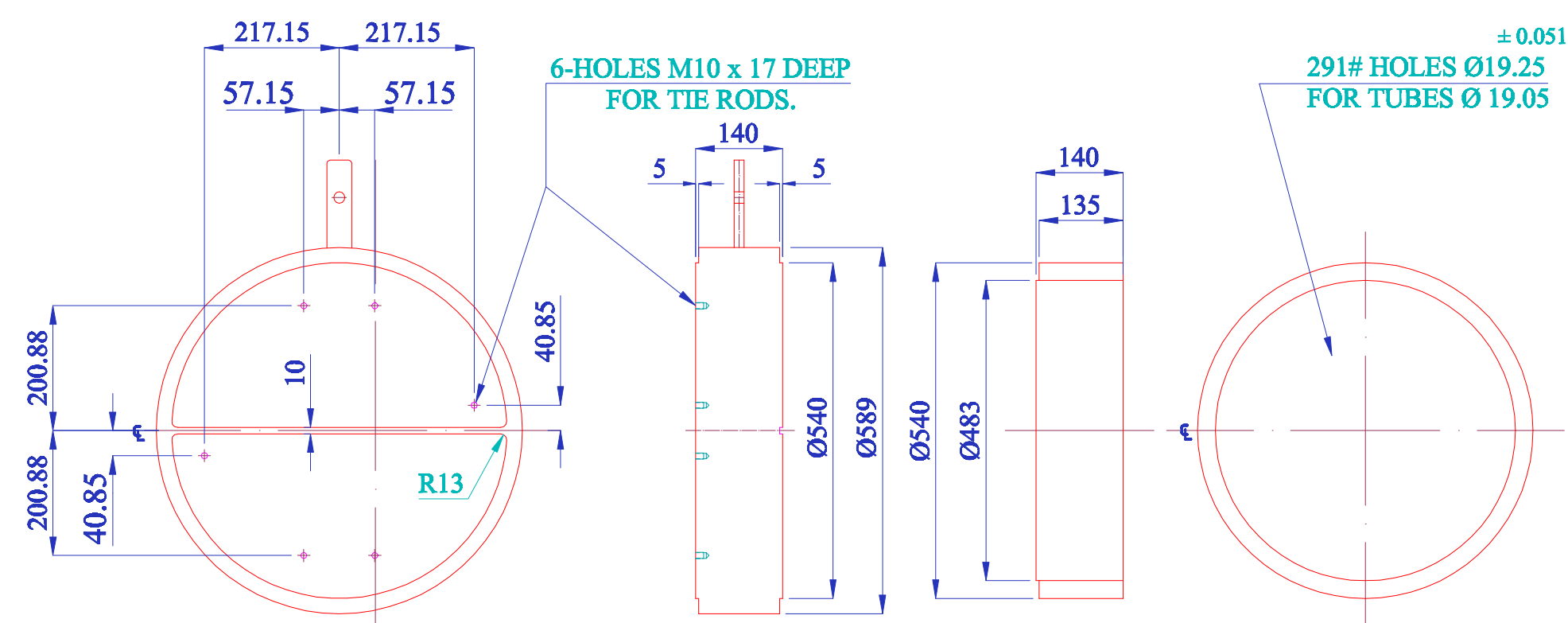


VIEW A - A

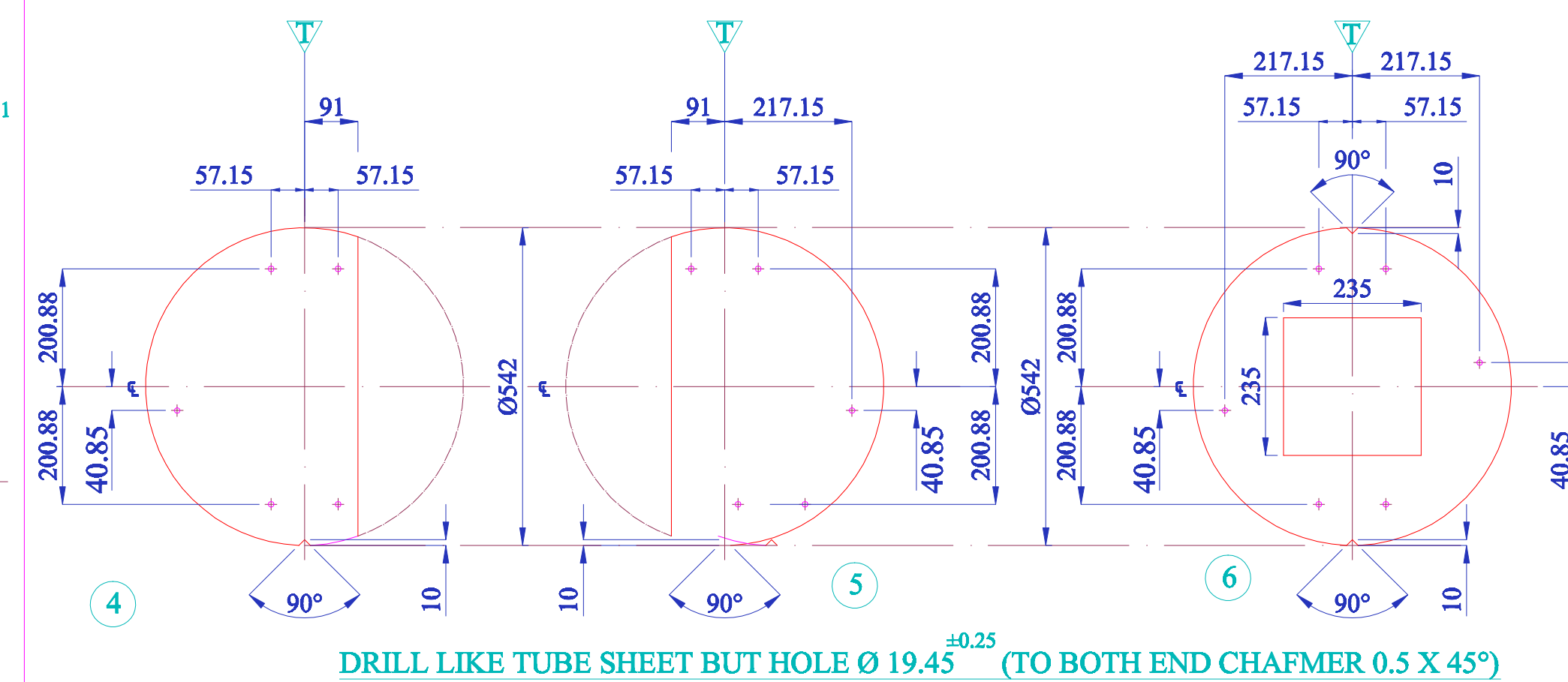
DOWEL PIN ARRANGEMENT



TUBE SHEETS

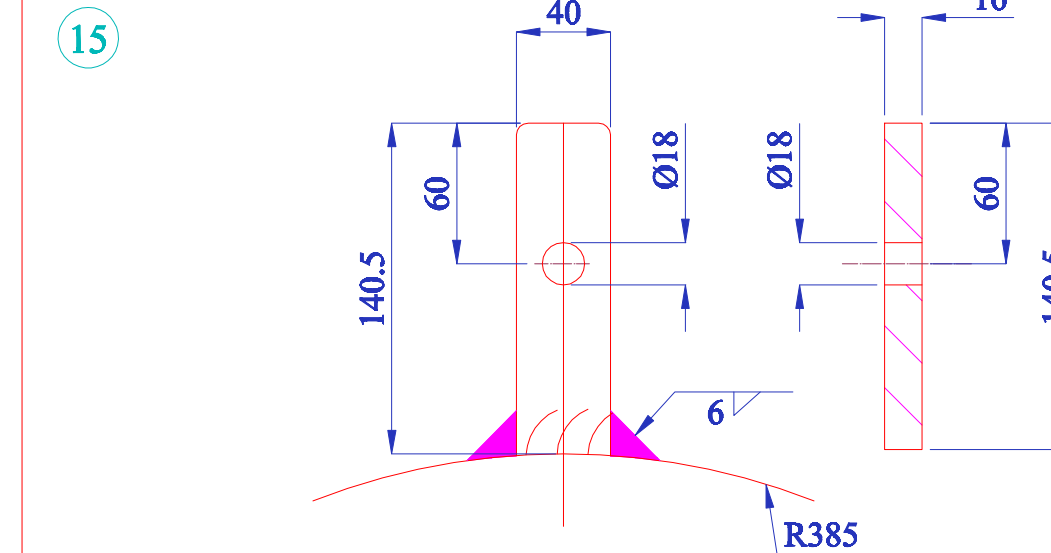


BAFFLES

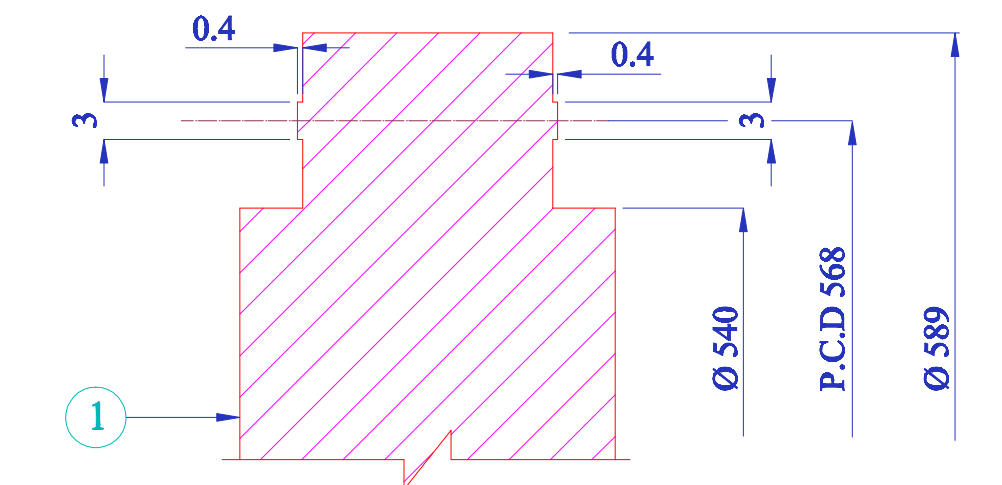


DRILL LIKE TUBE SHEET BUT HOLE Ø 19.45 (TO BOTH END CHAMFER 0.5 X 45°)

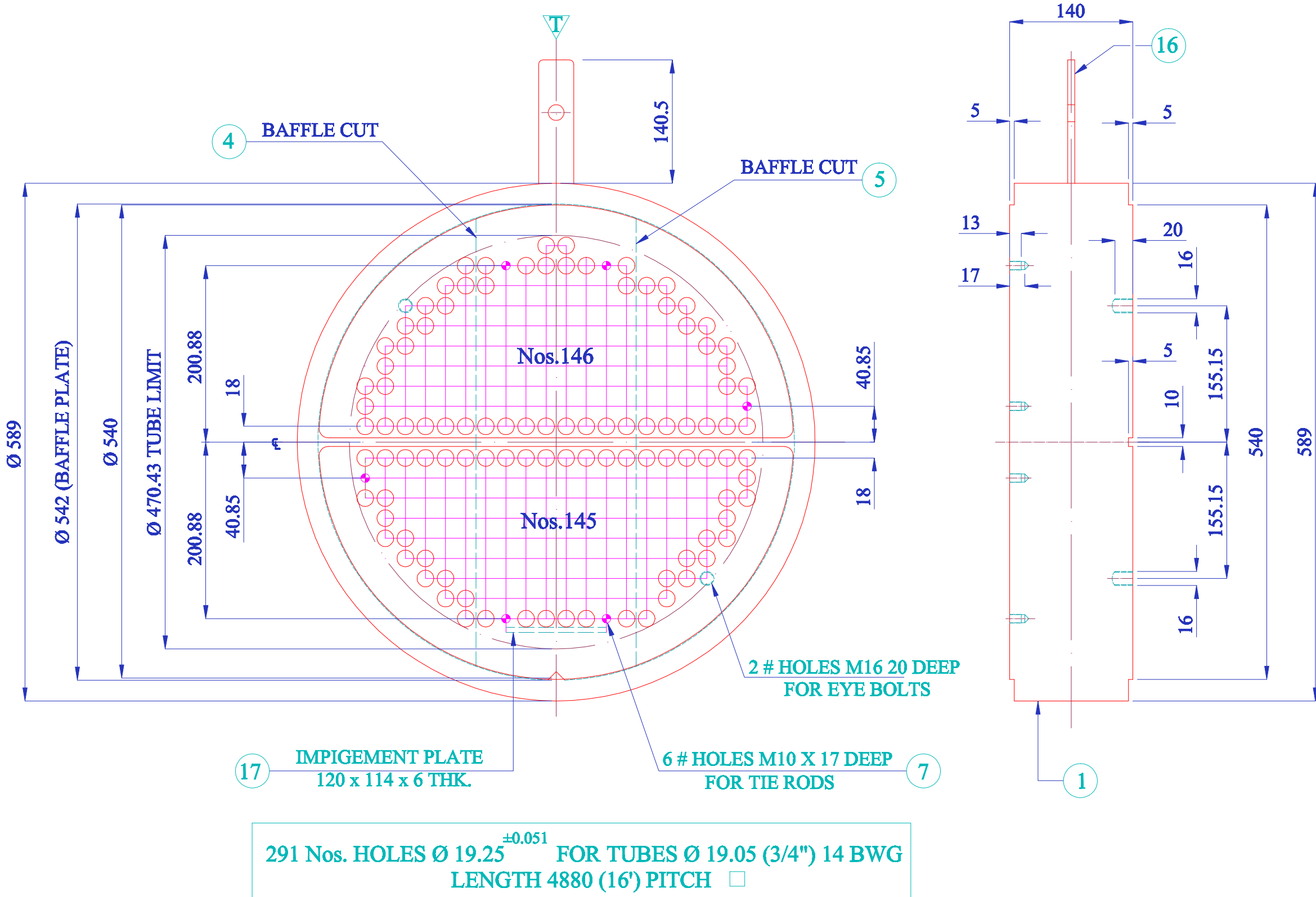
DOWEL PIN PLATE



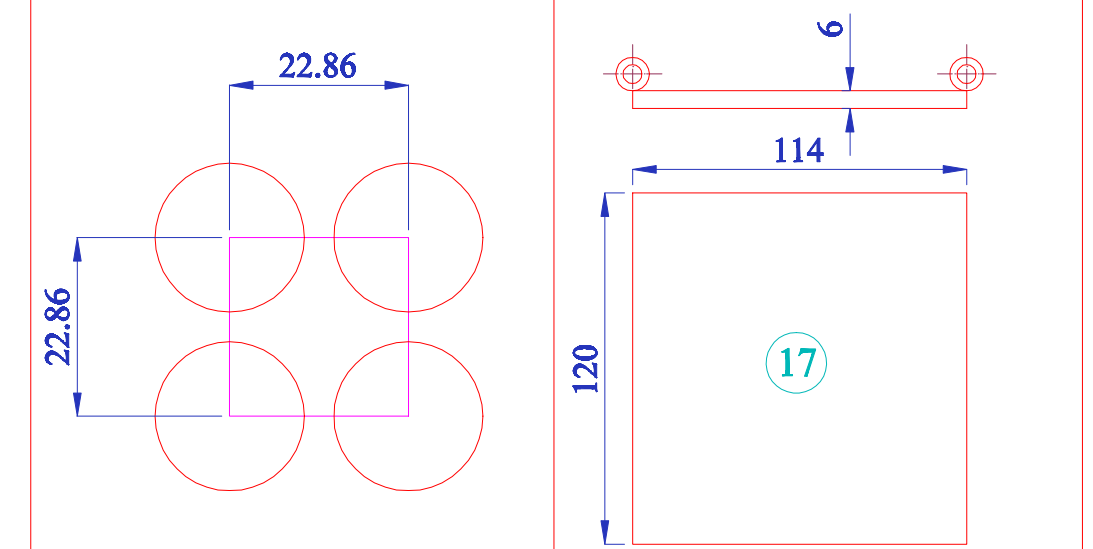
GROVE FOR GASKET



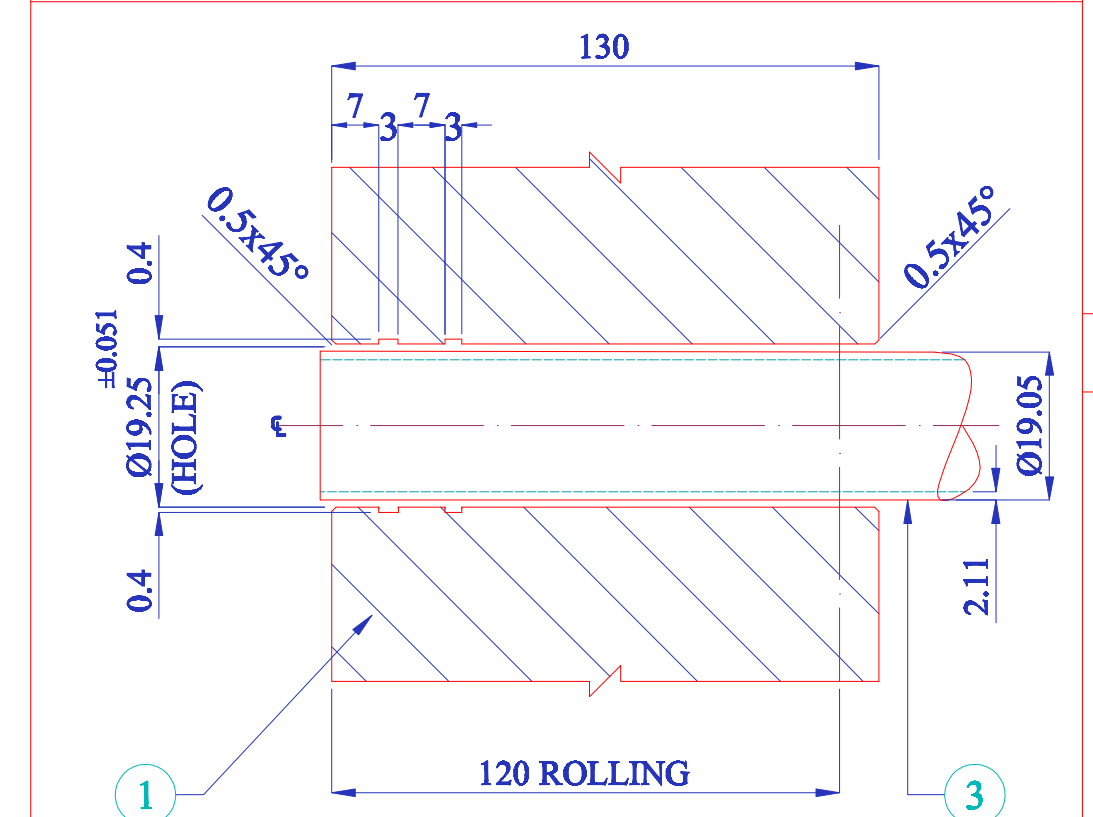
TUBE SHEETS HOLE DETAIL



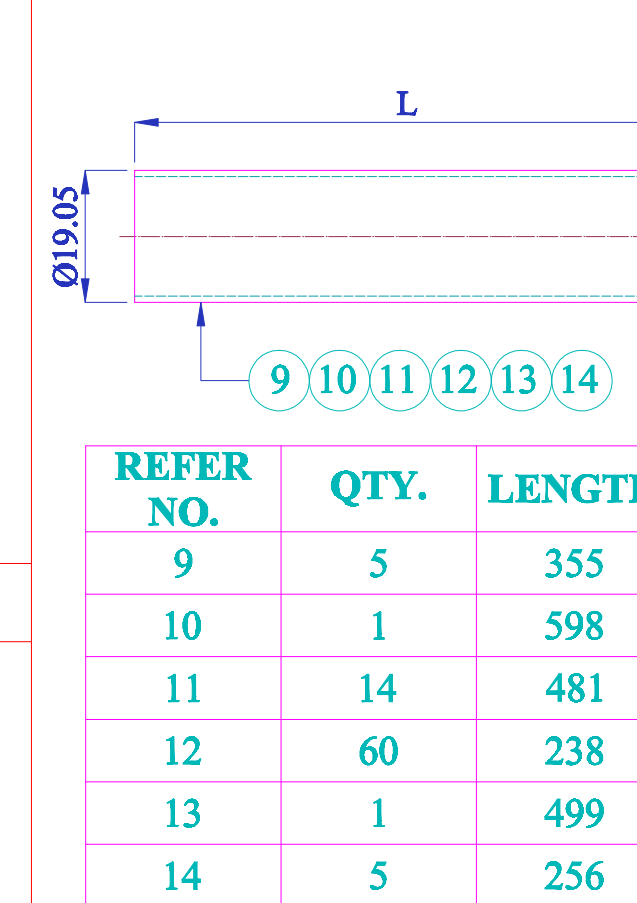
HOLE PITCH DETAIL IMPINGEMENT PLATE



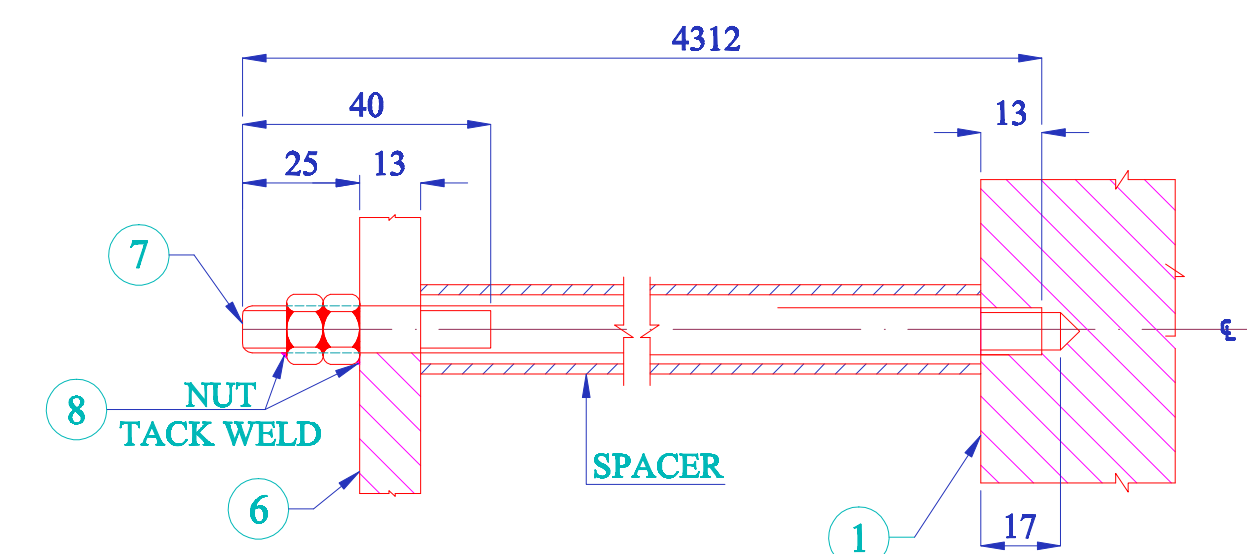
TUBE SHEET HOLE DETAIL



SPACERS DETAIL



TIE RODS DETAIL



DESIGN DATA

DESIGN CODE	ASME SECTION VIII DIV.1 ED 2004 (ADDENDA2005)	
	SHELL SIDE	TUBE SIDE
DESIGN STANDARD	TEMA STANDARDS	
DESIGN PRESSURE Psig	118	1265
DESIGN TEMPERATURE °C	146.667	93.33
Hydrostatic Test Pressure Psig	153.4	1644.5
OPER. PRESSURE Psig	68	1150
Oper. Temperature (IN/OUT) °C	35 / 46.667	63.88 / 40.55
CORROSION ALLOWANCE mm	---	---
JOINT EFFICIENCY	1.00	1.00
RADIOGRAPHY	FULL	FULL
FLUID CONTAINED / SERVICE	Water / Non Lethal	Sour Gas/Non Lethal
STRESS RELIEVING	NO	NO
NO. OF PASSES	1	2
INSULATION mm	---	---
MIN. DESIGN METAL TEMP. °C	-28.88	-28.88
IMPACT TEST	NO	NO

MATERIAL LIST

PART NO.	DESCRIPTION	QTY	MATERIAL
1	FRONT TUBE SHEET Ø589 x 140Thk.	1	SA-182-F.304
2	REAR TUBE SHEET Ø540 x 140Thk.	1	SA-182-F.304
3	TUBE Ø 19.05 x 2.11Thk.(14 BWG) L=4880	291	SA-213-TP.304
4	BAFFLE PLATE Ø 542 X 5 THK.	8	SA-240-304
5	BAFFLE PLATE Ø 542 X 5 THK.	8	SA-240-304
6	BAFFLE PLATE Ø 542 X 5 THK.	1	SA-240-304
7	TIE RODS Ø 10 X L = 4312	6	AISI-304
8	NUTS M10	12	AISI-304
9	SPACER Ø 19.05 (3/4") X 2.11 THK. L = 355	5	SA-213-TP.304
10	SPACER Ø 19.05 (3/4") X 2.11 THK. L = 598	1	SA-213-TP.304
11	SPACER Ø 19.05 (3/4") X 2.11 THK. L = 481	14	SA-213-TP.304
12	SPACER Ø 19.05 (3/4") X 2.11 THK. L = 238	60	SA-213-TP.304
13	SPACER Ø 19.05 (3/4") X 2.11 THK. L = 499	1	SA-213-TP.304
14	SPACER Ø 19.05 (3/4") X 2.11 THK. L = 256	5	SA-213-TP.304
15	DOWEL PLATE 40 X 140.5 X 16 THK.	1	SA-182-F.304
16	DOWEL PIN Ø 16 X L = 170	1	SA-516-Gr.60
17	IMPINGEMENT PLATES 120 X 114 X 6 THK.	1	SA-240-304

Rev. 0	PROVISIONAL DRAWING			
Rev.N0	Revision Note.	Cad By	Checked By	Approved By



OIL & GAS DEVELOPMENT COMPANY LTD.
PROCESS & PLANTS DEPARTMENT
DAKHNI Oil Field

TITLE:- TUBE BUNDLE OF EA-206A/B (OLD EA-201A/B - P) TYPE (AES)			
CAD BY S.ARWAR O.B.A.I.D Tech.Officer(Draughting)	CHECKED BY Quaid Jamal A.E (Mech.) Computer Code PN.01	APPROVED BY Yahya Tajveed Plant Manager Rev. 0	DRAWING NO. PP-DKN-628 Date 19-03-2014
Scale: NTS			