



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

**Material :RE-TUBING OF U-TUBE BUNDLE OF HEAT EXCHANGER FOR
INLET GAS COOLER/HEATER OF UCH-GAS PLANT.**

Due Date:

Tender Enquiry No: PROC/LF/PT-18677/22

Bid Bond Value : RS.660,000.00

Attachment(if any) : YES

EVALUATION WILL BE CARRIED OUT ON OUR CHOICE

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	RE-TUBING OF U-TUBE BUNDLE FOR SHELL & TUBE HEAT EXCHANGER TYPE BEU ASY: INLET GAS COOLER/HEATER, UCH-I GAS PLANT (AS PER ATTACHED SOR, SPECS AND DRAWINGS).	1		Number					
2	SERVICES FOR RE-TUBING OF U-TUBE BUNDLE FOR SHELL & TUBE HEAT EXCHANGER TYPE BEU ASY: INLET GAS COOLER/HEATER, UCH-I GAS PLANT (AS PER ATTACHED SOR, SPECS AND DRAWINGS).	1		Number					
3	TRANSPORTATION OF U-TUBE BUNDLE	1		Number					
4	TUBE SHEETS (OPTIONAL) AS PER DETAIL ATTACHED.	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: 180 DAYS FROM TECHNICAL BID OPENING, DELIVERY PERIOD: 150 DAYS AFTER ISSUANCE OF LPO ON FOR UCH C PLANT, BALOCHISTAN. PAYMENT 20% ADVANCE AGST BANK GUARANTEE, 80% AFTER SUCCESSFUL DELIVERY & INSPECTION. PERFORMANCE BOND VALID UPTIL 12 MONTHS AFTER INSTALLATION.**

EVALUATION CRITERIA:

Financial Evaluation criteria shall be from Item Nos.1-3 i.e.(1+2+3).



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

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	
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"/>




**OIL & GAS DEVELOPMENT COMPANY LIMITED
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) _____

	Oil & Gas Development Company Ltd Islamabad, Pakistan.	Controlled Documents # SPEC- ANNEXURE "A"
	Title: Specifications for U-Tube Bundle of Inlet Gas Cooler Heater (UCH-I Plant)	Date: 28 January 2022

TERMS OF REFERENCE (TOR)

DATA SHEET & DIMENSIONS:

Heat Exchanger Specification Sheets & Drawings attached.



MATERIAL OF CONSTRUCTION:


Part Description	Material	Remarks
Tube Sheet	A-182 Gr-304L	Existing Tube sheet shall be reused
Tubes	A-249 TP 304L	Tubes shall be Eddy Current Tested
Tie Rods / Spacer Tubing	SS-304L	Existing material of construction (CS Grade) shall be replaced with SS-304L Grade
Baffles	A-240 Gr-304L	
Seal Bar/Slide bar	A-240 Gr-304L	
All Other Parts	SS-304L	

SCOPE OF WORK/SUPPLY:

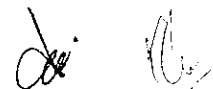
Following is the supplier is SOW unless stated otherwise:


- 1- OGDCL will provide available engineering data and drawings only.
- 2- Supplier shall develop and share QIP, method statements and drawings before start of fabrication works.
- 3- Supplier shall be responsible for transportation of Heat Exchanger bundle (old) from OGDCL Uch Gas Field.
- 4- OGDCL has 02 nos. of 30 ton cranes available at site and may be utilized for loading of bundle on transportation vehicle.
- 5- Supplier shall provide all Material (Tubes, Baffles, Tie rods, Nuts, Spacer, Seal Bars/Slide Bars etc.), Consumables & services of Fabrication Work for Re-tubing of Inlet Gas Cooler (U-Tube Heat Exchanger) as per OGDCL provided Engineering Data/Drawings/ revised material specs.
- 6- Shop fabrication drawings (as-built).
- 7- Removal of Old Tube bundle from existing tube sheet.
- 8- Insertion of New Tubes (Tube Material A-249 TP 304L).
- 9- Installation of new Baffles, Tie rods, Spacer, Seal Bars/Slide Bars & Tube Sheets (optional)

	Oil & Gas Development Company Ltd Islamabad, Pakistan.	Controlled Documents # SPEC- ANNEXURE "A"
	Title: Specifications for U-Tube Bundle of Inlet Gas Cooler Heater (UCH-I Plant)	Date: 28 January 2022

- 10- Tubes shall be roller expanded to Tube Sheets with 100% inspection of each expansion joint by ASME Inspector, the same shall be incorporated in QIP.
- 11- QA/QC of Entire Work.
- 12- Minimum wall thickness of tubes shall be as per API 660 (Latest edition).
- 13- PWHT, NDT & Hydro Testing as per Applicable TEMA/API/ASME Codes & Standards.
- 14- ASME R-Stamp.
- 15- Loading of Tube Bundle at Supplier W/shop and transportation to OGDCL Uch Gas Field.
- 16- OGDCL can provide 02 nos. of 30-TON Cranes available at UCH Gas Field for unloading of heat exchanger bundle at site.
- 17- Hydro Testing of U-Tube Bundle at OGDCL Uch Gas Field Site. This activity will be carried out during Annual Turnaround Maintenance (ATA) in October-2022 and supplier should mobilize team for witnessing test. In-case of leakage/rework required, the bundle will be rejected until the leakage is rectified on site. Therefore, supplier should arrange resources accordingly.
- 18- Supplier should share inspection reports of QA-QC team / ASME inspector with OGDCL periodically throughout the course of fabrication, as per approved QIP.



	Oil & Gas Development Company Ltd Islamabad, Pakistan.	Controlled Documents # SPEC- ANNEXURE "A"
Title: Specifications for U-Tube Bundle of Inlet Gas Cooler Heater (UCH-I Plant)		Date: 28 January 2022

TERMS & CONDITINS:

- 1- Country of Origin for all material should be Europe / Korea / Japan. (OGDCL may ask for other documentary proof for country of origin e.g. firm copies of purchase orders to material suppliers, copies of work orders to service providers, import documents, WEBOC / Customs clearing documents etc.)
- 2- Certified material should be used and supplier to provide Material Test Certificates (MTCs).
- 3- ASME Code Sect. VIII Div.1, TEMA Class R and API 660 will apply.
- 4- OGDCL Representative will carry out stage wise inspection at Supplier Works at below mentioned stages (as per pre-approved QIP).
 - i. To witness the condition of tube sheet
 - ii. After receipt of material with MTC's
 - iii. Before insertion/installation of tube bundle
 - iv. Final inspection at supplier Workshop
 - v. Hydro-testing at Uch Gas Field
- 5- Old tube bundle along with all waste/scrape material shall be delivered to Uch Gas Field.
- 6- Carbon Steel shall not be used for construction of any part of Tube Bundle.
- 7- It is mandatory requirement that the supplier/manufacturer have 05 years past experience of manufacturing the similar type & size of equipment. (Supporting documents/purchase order copies to be provided with technical bid).



P.O. no: P181/0002 : Job no: 558312
 Date: 12/ 9/96 : Gr: SP : Item no: 10-E-100 & 20-E-100
 Customer: PETROSIN : HORIZONTAL
 Service: INLET GAS COOLER / HEATER : U-TUBE
 No. Shells: 1 Par. 1 Ser. 1 : Surface Sq. Ft.: 2627. Ea. 2627. Total
 Size: 37 X 222 Type: B E U

278 "U" Tubes X1.00 O.D X.0650 (A.W.) THK X 222 In.STR.Lg. 1.25 SQUARE Pitch
 Tubes: SA-249TP304L
 Shell & Cover: SA-516-70 NORMALIZED
 Channel & Cover: SA-240-304L

Tubesheets: SA-182-F304L
 Cross Baffles: SA-516-70N No. 8 Pitch 23.750 Cut 40.00% SGL SEG VERT

Code requirements: SHELL SECT VIII STAMP YES CHANNEL SECT VIII STAMP YES
 Natl. Board # YES Canadian Reg. # NO Tema R
 Weight Ea Dry: 27000. Wet 38000. Bundle 12000.

	Shell	Tubes
Design Pressure psi	150 ✓	950
Test Pressure psi	263	1430
Design Temp/MDMT degF	400 (204°C) / 20 (-7°C)	200 (93°C) / 20 (-7°C)
Corrosion Allowance	.1250	.0000
No. of Passes	1	2
Radiograph	SPOT	FULL
Stress Relieve degF	1150	-
Paint: SANDBLAST AND PAINT PER DOC.# 1000-PF-A001		

Remarks:

1. Two identical units are required.
2. Tubes are roller expanded to tubesheets.
3. Gaskets : Tube side - 304L S.S. D.J. GRAPH.
 Shell side - Steel D.J. GRAPHITE.
4. SPARES: 10 % studs & nuts and two (2) sets of gasket for each unit is required.
5. Nozs. "T1" & "T2 are 18"-600# "HB" type neck.
6. Exchangers pressurized with 10 psig Nitogen before shipment.

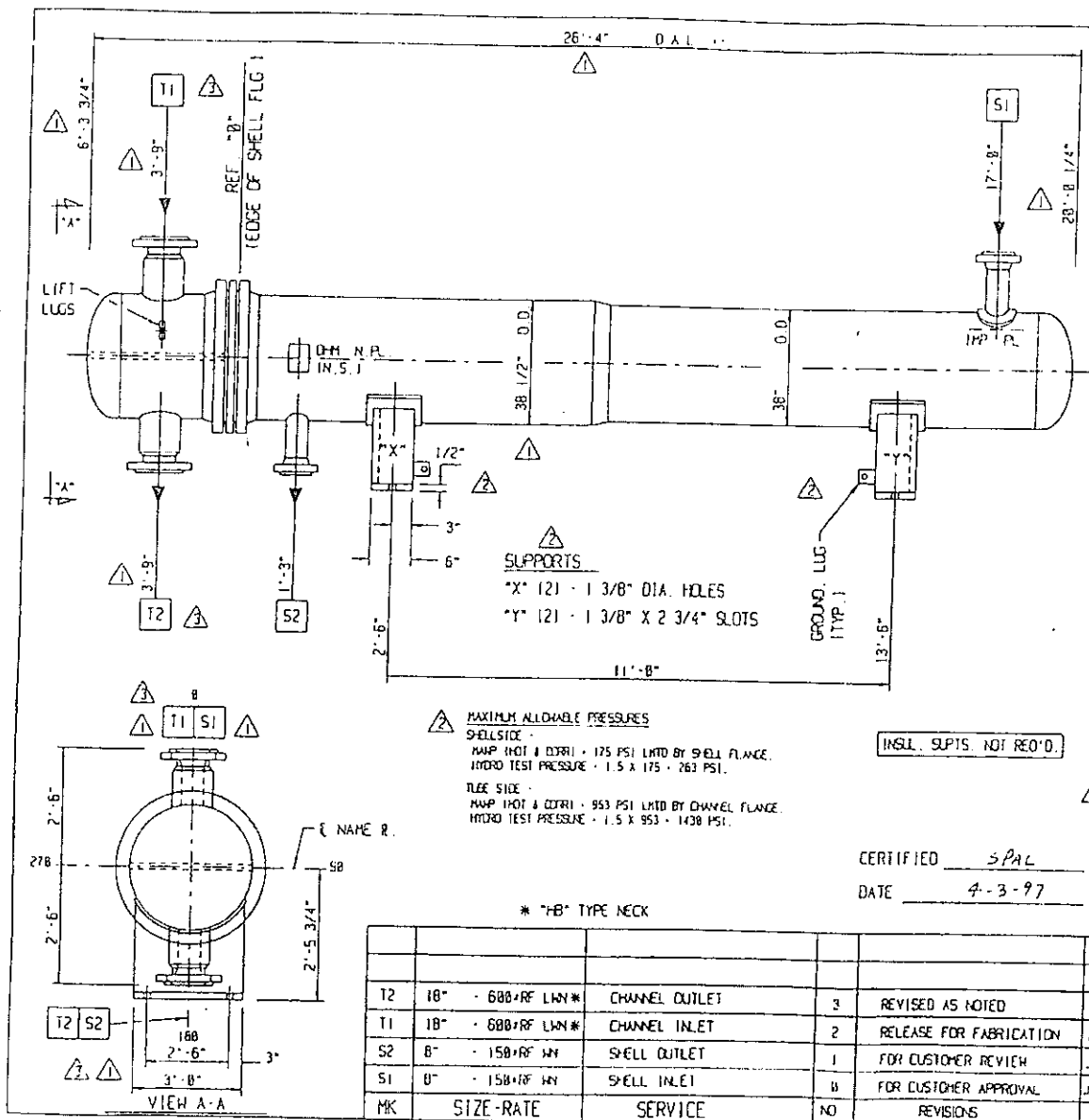
SKETCH

Supports: Std. Special

NOZZLES

Label	Size & Type	Bore x Sch	Proj	Weld Pad	Comment
1 Shl INLET	8.00"- 150#RF WN	7.625xXH	30.000	12.625x .500	S1
2 Shl OUTLET	8.00"- 150#RF WN	7.625xXH	30.000	.000x .000	S2
11 Fch INLET	18.00"- 600#RF LWN	18.000x2.59	30.000	.000x .000	T1 (note
12 Fch OUTLET	18.00"- 600#RF LWN	18.000x2.59	30.000	.000x .000	T2 (note

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DESIGN DATA		SHELL	TUBE
DESIGN PRESSURE P S I G		150	950
TEST PRESSURE P S I G		263	1430
DESIGN TEMPERATURE DEG F (C) IMAX / MIN		400(204) / 201(-7)	200(93) / 201(-7)
CORROSION ALLOWANCE		1250 * 13 2mm	8000 * (0.0mm)
NUMBER OF PASSES		1	2
RADIOGRAPHIC EXAMINATION		SPOT	FULL
HEAT TREAT REQUIRED		YES	NO

ESTIMATED HEIGHTS, LBS		
DRY	27000	
BUCKLE	12000	
NET	39000	

SPECIFICATIONS
 ASME CODE SECT. VIII, DIV. 1, 1995 ED 1995 ADD STAMP YES!
 TEMA CLASS R and API-660 APPLIES
 NATIONAL BOARD REGISTRATION REQUIRED
 CUSTOMER SPECS: 1888-PF-ABB1, ANNEXURE 11

MATERIAL	
CHANNEL:	SA-240-304L
SHELL:	SA-516-70N
TUBESHEETS:	SA-182-F304L
BAFFLES:	SA-516-70N
TUBES:	SA-249TP304L
(278 U-TUBES) 1" O.D. X .065" I.A.W. X 18'-6" STR. LG	
TUBE PITCH 1 1/4" - [E]	SURFACE 2627 SQ FT (244 sq m)

GENERAL NOTES
 ALL BOLT HOLES TO STRADDLE NATURAL CENTER LINES.
 BODY FLANGE GASKETS:
 (TUBESIDE) - .1250" THK. 304L S.S. DOUBLE JACKETED
 W/ GRAPHITE FILLER
 (SHELLSIDE) - .1250" THK. C. STL. DOUBLE JACKETED
 W/ GRAPHITE FILLER
 18X STUDS & NUTS AND TWO 121 SETS OF GASKETS FOR EACH UNIT
 IS REQUIRED FOR SPARE.

PAINT (PER DOC # 1888-PF-ABB1):
 TUBESIDE - NO PAINT
 SHELLSIDE - SANDBLAST ALL EXT. C. STL SURFACES TO A "NEAR-WHITE" METAL FINISH PER SSPC-SP-18. PRIME WITH ONE (1) COAT OF INORGANIC ZINC SILICATE TO 75 MICRONS D.F.T. FINISH WITH ONE (1) COAT OF ALUMINIUM SILICATE TO 25 MICRONS D.F.T. (TOTAL D.F.T. TO BE 98 - 100 MICRONS) FINISH COLOR TO BE SILVER. BOLTS HOLES, FLG. FACES OUTSIDE GASKET SURFACES, ETC. SHALL RECEIVE THE REQUIRED COATINGS.
 TYPE UNIT: B E U SIZE: 37-222

MAXIMUM ALLOWABLE PRESSURES
 SHELLSIDE -
 MAP (HOT & COLD) - 175 PSI LMTD BY 9" BALL FLANGE.
 HYDRO TEST PRESSURE - 1.5 X 175 = 263 PSI.
 TUBESIDE -
 MAP (HOT & COLD) - 953 PSI LMTD BY CHANNEL FLANGE.
 HYDRO TEST PRESSURE - 1.5 X 953 = 1430 PSI.

CERTIFIED SPAL
 DATE 4-3-97

* "HB" TYPE NECK

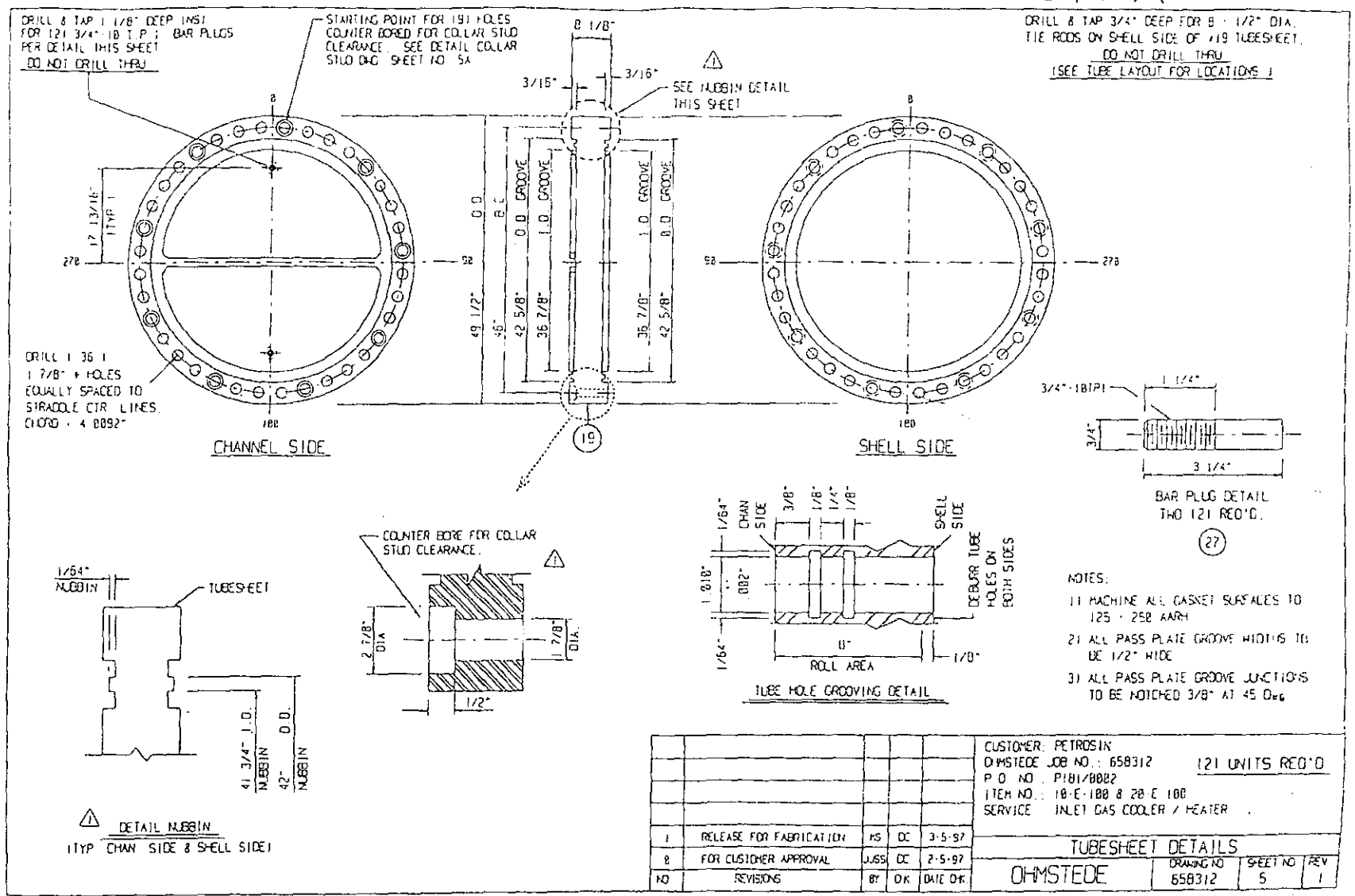
ITEM NO.	SIZE	RATE	SERVICE	NO.	REVISIONS	BY	CHK	DATE
T2	18"	680*RF LWN*	CHANNEL OUTLET	3	REVISED AS NOTED	MSS	DC	4-3-97
T1	18"	680*RF LWN*	CHANNEL INLET	2	RELEASE FOR FABRICATION	MSS	DC	3-5-97
S2	8"	150*RF WY	SHELL OUTLET	1	FOR CUSTOMER REVIEW	JLSS	DC	2-5-97
S1	8"	150*RF WY	SHELL INLET	0	FOR CUSTOMER APPROVAL	JLSS	DC	1-3-97
MK	SIZE-RATE		SERVICE	NO	REVISIONS	BT	OK	DATE OK

CUSTOMER: PETROSIN
 OHMSTEDE JOB NO.: 658312 121 UNITS REQ'D
 P.O. NO.: P181/8882
 ITEM NO.: 18-E-180 & 28-E-180
 SERVICE: INLET GAS COOLER / HEATER

ASSEMBLY AND SPECIFICATIONS			
OHMSTEDE	DRAWING NO 658312	SHEET NO 1	REV 3

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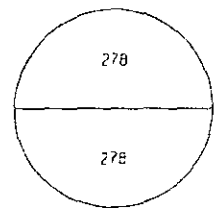
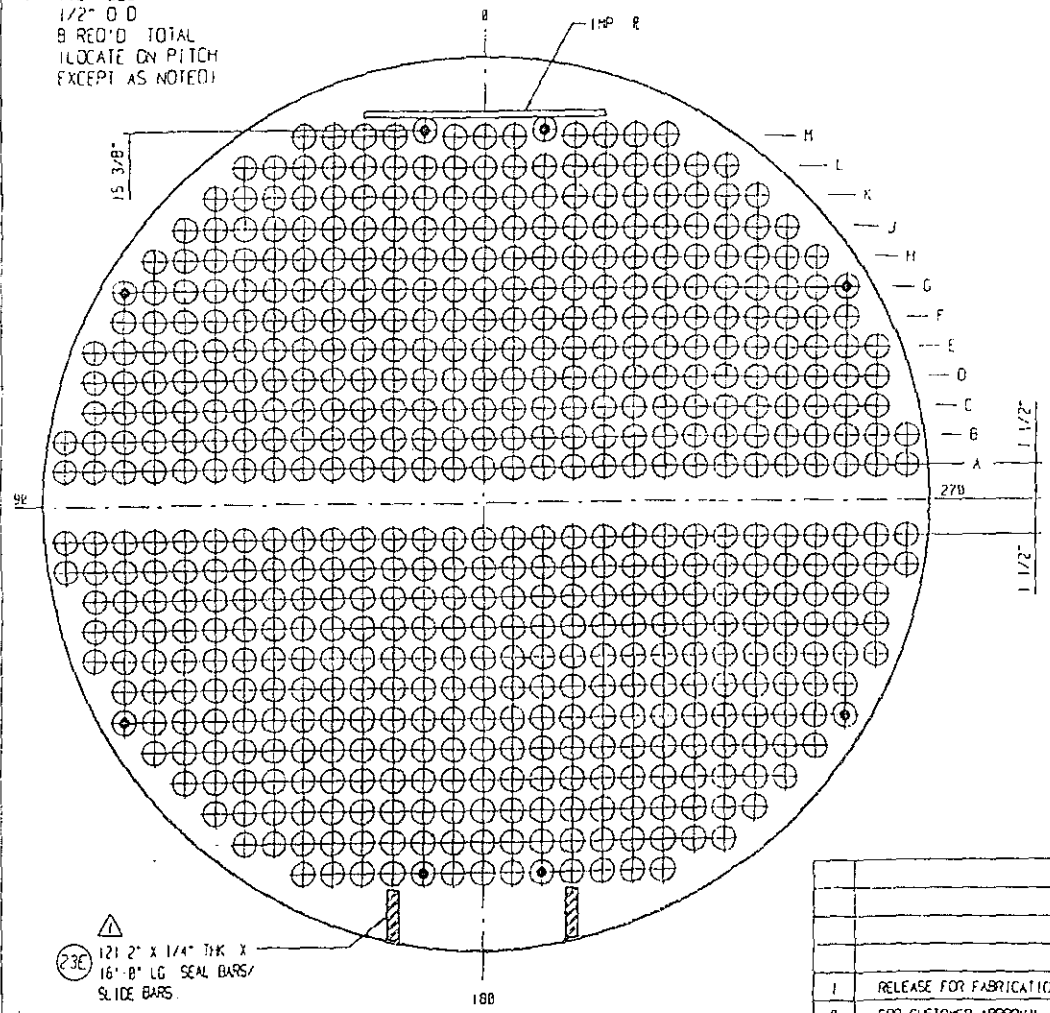
P-2/A
UG-1694



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CUSTOMER: PETROSIN			
OHMSTEDE JOB NO.: 658312		121 UNITS REQ'D	
P O NO.: P181/002			
ITEM NO.: 18-E-100 & 28-E-100			
SERVICE: INLET GAS COOLER / HEATER			
TUBESHEET DETAILS			
1	RELEASE FOR FABRICATION	HS	DC 3-5-97
2	FOR CUSTOMER APPROVAL	JWS	DC 2-5-97
NO	REVISIONS	BY	CHK DATE
OHMSTEDE		DRAWING NO	SHEET NO / REV
		658312	5 / 1

TIE RODS
 1/2" O D
 8 REQ'D TOTAL
 (LOCATE ON PITCH
 EXCEPT AS NOTED)



TUBE DISTRIBUTION

NOTES:

- 1) DRILL AND REAM TUBE HOLES IN TUBESHEETS TO 1.0100" ± .002" DIA FOR 27B - 1" O D U-TUBES
TOTAL HOLES = 556
- 2) TUBE PITCH = 1 1/4" SQUARE
- 3) NUMBER OF PASSES = 2
- 4) SEE DRAWING SHEET NO. 5 FOR TUBE HOLE GROOVING DETAILS
- 5) BAFFLE O D. = 36 13/16"
- 6) O.T.L. = 36 7/16"

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23C
 121 2" X 1/4" THK X
 16" LG SEAL BARS/
 SLIDE BARS

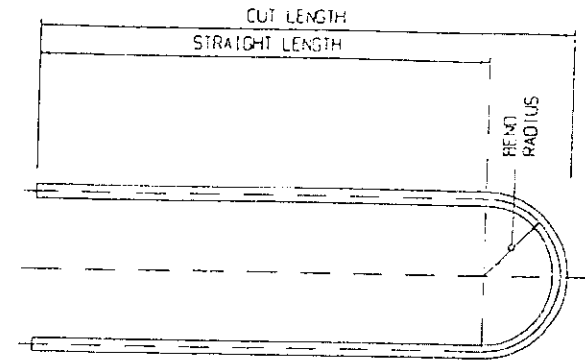
VIEW LOOKING AT SHELL SIDE OF NO. 19 TUBESHEET

NO	REVISIONS	BY	CHK	DATE
1	RELEASE FOR FABRICATION	MS	DC	3-5-97
2	FOR CUSTOMER APPROVAL	JSS	DC	2-5-97

CUSTOMER: PETROSIN
 OHMSTEDE JOB NO: 658312 121 UNITS REQ'D
 P.O. NO: P181/8882
 ITEM NO: 19-E-100 & 20-E-100
 SERVICE: INLET GAS COOLER / HEATER

TUBE LAYOUT		
DRAWING NO	SHEET NO	REV
OHMSTEDE 658312	6	1

ROW	NO OF TUBES	BEND RADIUS	BEND DIAMETER	BEND LENGTH	STRAIGHT LENGTH	CUT LENGTH	ORDER LENGTH
A	29	1 1/2"	3"	8'-4 3/4"	18'-6"	18'-0"	37'-4 3/4"
B	29	2 3/4"	5 1/2"	8'-9 11/16"	18'-6"	18'-9 1/4"	37'-8 11/16"
C	27	4"	8"	1'-8 5/8"	18'-6"	18'-10 1/2"	38'-8 5/8"
D	27	5 1/4"	10 1/2"	1'-4 1/2"	18'-6"	18'-11 3/4"	38'-4 1/2"
E	27	6 1/2"	13"	1'-8 7/16"	18'-6"	19'-1"	38'-8 7/16"
F	25	7 3/4"	15 1/2"	2'-0 3/8"	18'-6"	19'-2 1/4"	39'-8 3/8"
G	23	9"	18"	2'-4 5/16"	18'-6"	19'-3 1/2"	39'-4 5/16"
H	23	10 1/4"	20 1/2"	2'-0 1/4"	18'-6"	19'-4 3/4"	39'-8 1/4"
J	21	11 1/2"	23"	3'-0 3/16"	18'-6"	19'-6"	40'-8 3/16"
K	19	12 3/4"	25 1/2"	3'-4 1/16"	18'-6"	19'-7 1/4"	42'-4 1/16"
L	17	14"	28"	3'-0"	18'-6"	19'-8 1/2"	40'-0"
M	11	15 1/4"	30 1/2"	3'-11 15/16"	18'-6"	19'-9 3/4"	40'-11 15/16"



TOTAL NO. REQUIRED: 278 U-TUBES.

SIZE: 1" O.D. X 055 I.A.H.I

MATERIAL: SA-249TP304L, EACH TUBE SHALL BE SUBJECTED TO EDDY CURRENT TESTING PER SA-458.

MAXIMUM OUT-OF-ROUNDNESS OF TUBES AT U-BENDS NOT TO EXCEED 10%.

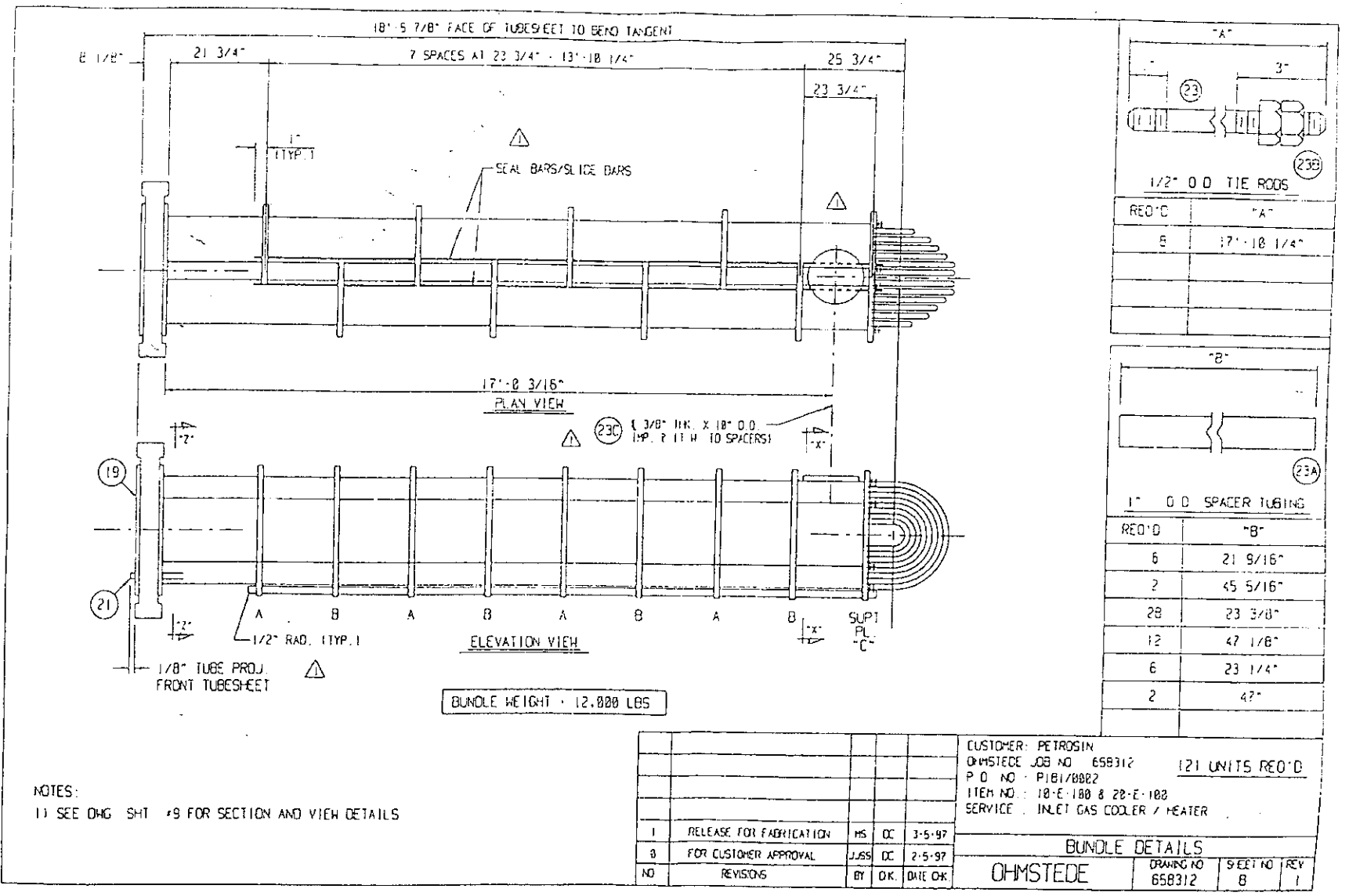
QUANTITIES SHOWN ARE FOR ONE (1) SET OF U-BENDS. ONE (2) SETS REQ'D. TOTAL.

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				CUSTOMER: PETROSIN				
				OHMSTEDE JOB NO.: 658312		121 UNITS REQ'D		
				P.O. NO.: P181/0802				
				ITEM NO.: 10-E-100 & 20-E-100				
				SERVICE: INLET GAS COOLER / HEATER				
I	RELEASE FOR FABRICATION	MS	CC	3-5-97	TUBE BENDING SCHEDULE			
B	FOR CUSTOMER APPROVAL	JES	CC	2-5-97				
NO	REVISIONS	BY	CHK.	DATE CHK.	OHMSTEDE	DRAWING NO. 658312	SHEET NO. 7	REV. 1

P-2/3

INLET GAS COOLER / HEATER



"A"	
REQ'D	"A"
6	17" ± 1/4"
"B"	
REQ'D	"B"
6	21 9/16"
2	45 5/16"
28	23 3/8"
12	47 1/8"
6	23 1/4"
2	47"

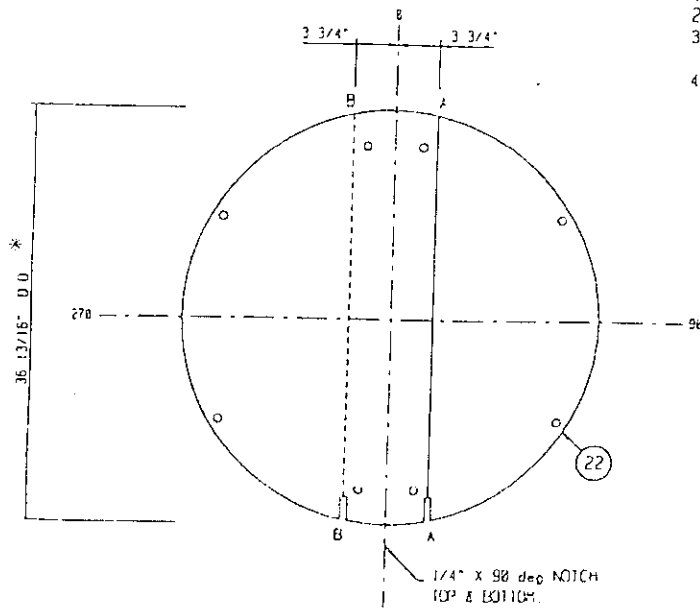
NOTES:
1) SEE OHG SHT #9 FOR SECTION AND VIEW DETAILS

1	RELEASE FOR FABRICATION	MS	DC	3-5-97
2	FOR CUSTOMER APPROVAL	JSS	DC	2-5-97
NO	REVISIONS	BY	DK	DATE OK

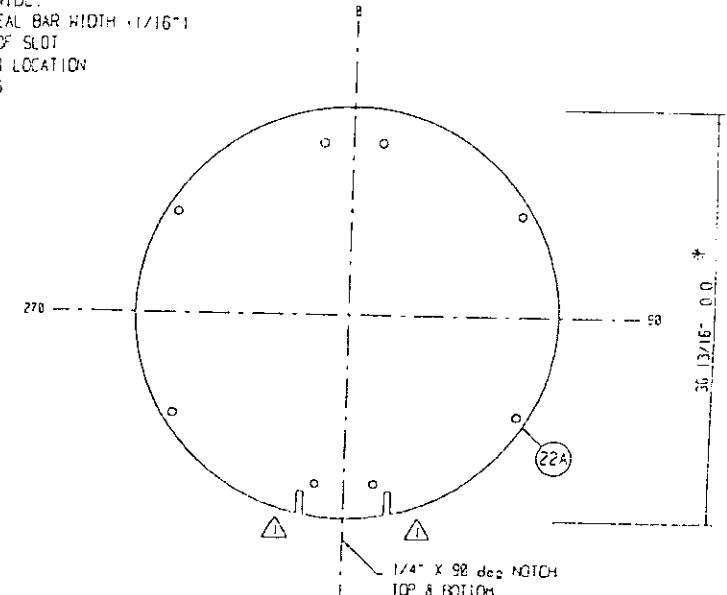
CUSTOMER: PETROSIN			
OHMSTEDE JOB NO. 658312		121 UNITS REQ'D	
P.O. NO.: P181/8882			
ITEM NO.: 18-E-100 & 28-E-100			
SERVICE: INLET GAS COOLER / HEATER			
BUNDLE DETAILS			
OHMSTEDE	DRAWING NO. 658312	SHEET NO. 8	REV. 1

Page 2 of 2

SEAL BAR NOTES:
 1) CUT SLOTS IN BAFFLES ONLY.
 2) CUT SLOTS 5/16" WIDE.
 3) CUT SLOT DEPTHS (SEAL BAR WIDTH + 1/16")
 FROM OUTSIDE EDGE OF SLOT
 4) FOR SEAL BAR SIZE & LOCATION
 SEE CHG. SHIT NO. 6



188
 VIEW XX D UNFILLS
 3/8" THK
 4 - REQ'D. CUT AA
 4 - REQ'D. CUT BB



188
 VIEW XX D SUPP 1 & 2
 5/8" THK
 1 - REQ'D.

- NOTES
- 1) DRILL TUBE HOLES IN BAFFLES 1/64" DIA. & DEBURR
 - 2) DRILL TIE ROD HOLES 9/16" DIA.
SEE TUBE LAYOUT FOR LOCATION.
 - 3) RADIUS ALL CORNERS ON BAFFLE CUTS.
 - 4) CHECK SHELL I.D. BEFORE MACHINING BAFFLE O.D.
 - 5) MACHINE O.D. OF BAFFLES TO 250 AARH

					CUSTOMER: PETROSIN
					OHMSTEDE JOB NO.: 658312
					P.O. NO.: P181/8802
					ITEM NO.: 18-E-188 & 20-E-188
					SERVICE: INLET GAS COOLER / HEATER
					121 UNITS REQ'D
					BAFFLE DETAILS
1	RELEASE FOR FABRICATION	MS	DC	3-5-97	OHMSTEDE
0	FOR CUSTOMER APPROVAL	JESS	DC	2-5-97	
NO	REVISIONS	BT	OK	DATE OK	
					DRAWING NO 658312
					SHEET NO 9
					REV 1

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OHMSTEDE, IN - BILL OF MATERIALS

SHE 1 OF
BY SP CKD

CUSTOMER: PETROFIN
JOB NO.: 658312

CUST. P.O.: P18170002
FAB. START: 03-10-97

ITEM NO.: 10-E-100 & 20-E-100
DEL. DATE: 05-27-97

***** NOTE: BILL REFLECTS QTY'S FOR (1) UNIT. NO. OF UNITS REQ'D IS 2 *****

ITEM	QUAN	DESCRIPTION	MATERIAL	PO	SOURCE	DUE
TUBES						
21	278	"U" TUBES 1" O.D.X .0650" (A.W.) THK PER BEND SCHEDULE	SA-249TP304L	617927	TUBES, INC	5/2
	31	TUBES SHALL BE EDDY CURRENT TESTED PER SA-450.				
FORGED RING MATERIAL						
3	1	FLG 49 1/2" O.D.X 37" I.D.X 9 1/8" THK (f)	SA-182-F304L	618377	Coxell Co	4/4
7	1	FLG 49 1/2" O.D.X 37" I.D.X 7 13/16" THK (f)	SA-105N	1	1	1
TUBESHEETS & COVERS						
19	1	TUBESHEET 49 1/2" O.D.X 8 1/8" THK (f)	SA-182-F304L	618377	Coxell Co	4/4
BAFFLES						
22	8	BAFFLES 37 3/16" O.D.X 3/8" THK	SA-516-70N	618318	Tex Plate	3/14
23A	1	SUPT PL. 37 3/16" O.D.X 5/8" THK	SA-516-70N	1	1	1

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REV. 01/11/97

OHMSTEDE, INC. - BILL OF MATERIALS

SHEET 6 OF 8
BY MS CKD oc

CUSTOMER: PETROSIN
JOB NO.: 658312

CUST. P.O.: P181/0002
FAB. START: 03-10-97

ITEM NO.: 10-E-100 & 20-E-100
DEL. DATE: 05-27-97

***** NOTE: BILL REFLECTS QTY'S FOR (1) UNIT. NO. OF UNITS REQ'D IS 2 *****

ITEM	QUAN	DESCRIPTION	MATERIAL	PO	SOURCE	DUE
MISC. MATERIAL						
65	1	STD. OHMSTEDE NAMEPLATE	STN. STL.			
61	1	NAMEPLATE BRKT. 1/4" THK. X 4 1/4" X 6 1/2" LG.	SA-516-70		STOCK	
61A	1	NAMEPLATE BRKT. 3/16" THK. X 5 1/2" X 6 1/2" LG.	304 S.S.		STOCK	
62	2	LIFTING LUGS, 1/2" THK. X 4" X 4" LG.	SA-240-304L		STOCK	
23	8	1/2" DIA. ROD X 17'-10 1/4" LG. (TIE RODS)	H. R. STL.	525248	ALLIED METALS	3-2
23B	16	1/2" HEAVY HEX TIE ROD NUTS	C. STL.		STOCK	
23A	8	1" O.D. X 16 BWG X 17'-8 3/4" LG. (SPACERS)	A-214		STOCK	
23C	1	PLATE 10" O.D. X 3/8" THK. (IMP. PL.)	SA-516-70		STOCK	
23E	2	SEAL BARS 2" X 1/2" THK. X 16'-0" LG. (1/4")	SA-36		STOCK	
4A	1	PASS PLATES 36 7/8" X 3/8" THK. X 67 1/4" LG.	SA-240-304L	525280	NAMASCO	3-2
99		COST TO COVER PAINTING PER NOTE ON DWG. #658312, SHT. #1	PER DWG.	525248	ALLIED METALS	3-2
100		COST TO COVER P.W.H.T. OF SHELL PER NOTE ON DWG. #658312, SHT. #4.				
50	2	3/4" - 10 N.C. THD. STUDS X 8" LG. (JACKSCREWS)	C. STL.			
		W/ WRENCH FLATS ON END PER DWG. #658312, SHT. #13		525243	MTS	5-
51	2	3/4" - 10 N.C. THD. STUDS X 8 1/4" LG. (JACKSCREWS)	304 S.S.			
		W/ WRENCH FLATS ON END PER DWG. #658312, SHT. #13		525243	MTS	5-

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