



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

Material : **SUPPLY OF U TUBE BUNDLE INCLUDING ACCESSORIES**

Due Date:

Tender Enquiry No: **PROC/LF/PT/17951/20**

Bid Bond Value : **RS.400,000.00**

EVALUATION WILL BE CARRIED OUT ON FULL

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	U-TUBE BUNDLE FOR SHELL & TUBE HEAT EXCHANGER TYPE BEU ASY: INLET GAS COOLER/HEATER, UCH-I GAS PLANT (As per attached Specs and Drawings)	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.
- DELIVERY WITHIN 150 DAYS FROM ISSUANCE OF LPO TO UCH GAS PLANT, DERA BUGTI, BALOCHISTAN. BID VALIDITY 120 DAYS FROM TECHNICAL BID OPENING. 20% ADV. AGAINST BANK GUARANTEE & 80% 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.

1. SCOPE OF WORK:

CONTRACTOR SCOPE:

- Procurement of Material for Fabrication of U-Tube Bundle including Consumables
- Fabrication of U-Tube Bundle
- Expansion of Tubes to Tube Sheet
- Installation of Baffles, Tie rods, Spacers & Tube Sheets
- QA/QC of Entire Work
- ASME U Stamp
- Non Destructive Testing (As per Applicable TEMA/API/ ASME Codes & Standards)
- Packing arrangement for safe transportation
- Loading of Tube Bundle at manufacturer's W/Shop for transportation to Uch site
- Transportation up to OGDCL Uch Gas Field Site
- Hydro Testing of U-Tube at OGDCL Uch Gas Field Site (This activity will be carried out during ATA in October-2020). In case of any ambiguity caused during hydro-testing, contractor will be liable to resolve at Uch site without any cost impact.

OGDCL SCOPE:

- Provision of available Engineering Data & Drawings
- Stage wise inspection by OGDCL or Third Party Inspector (OGDCL will nominate representative for stage wise inspection at contractor's Works, schedule for inspection to be submitted by bidder in technical bid)
- Unloading of tube bundle at Uch Gas Field site
- Gaskets for Hydro Test & Box-up at site
- Dismantling of old tube bundle from heat exchanger at site
- Insertion of new tube bundle in shell at site.

2. MATERIAL OF CONSTRUCTION:

Part Description	Material
Tube Sheet	A-182 Gr-304L
Tubes	A-249 TP 304L (Tubes shall be Eddy Current Tested)
Tie Rods/Spacer Tubing	SS-304L
Baffles/Seal Bar/Slide bar	A-240 Gr-304L
All Other Parts	SS-304L

3. TERMS & CONDITIONS:

- Country of Origin for procurement of material should be Europe / Korea / Japan.
- MTC's of material must be provided with bundle.
- Carbon Steel must not be used for construction of any part of Tube Bundle.
- ASME Code Sect. VIII Div.I, TEMA Class R and API 660 applies.
- Delivery time: 150 days after issuance of LPO
- It is mandatory that the Company has past experience of at least 08 years of manufacturing same type & size of equipment (literature to be provided with technical bid).



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	
		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"/>



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) _____

92



P.O. no: P181/0002	: Job no: 658312
Date: 12/ 9/96 : By: 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
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:

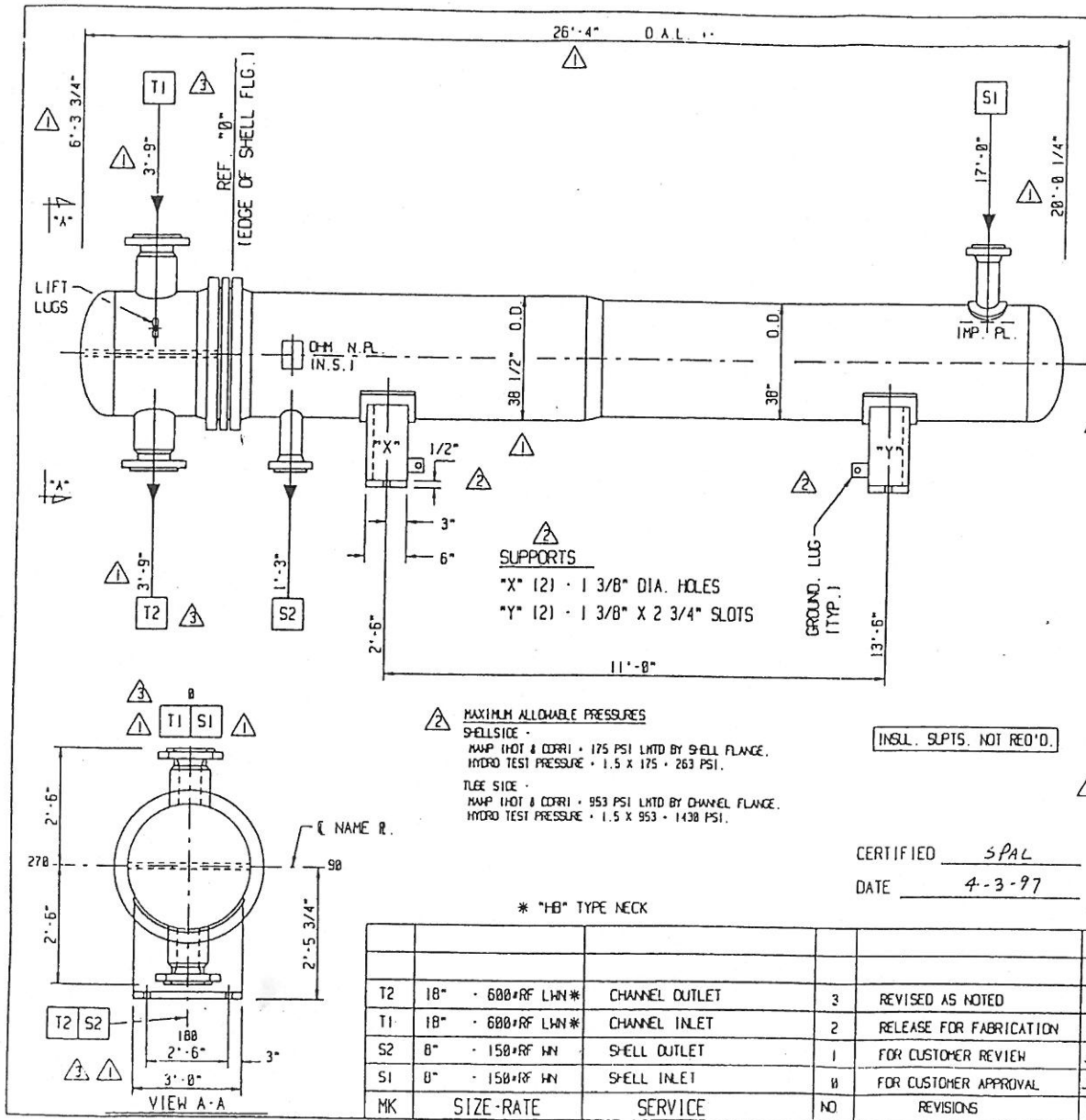
1. Two identical units are required.
2. Tubes are roller expanded to tubesheets.
3. Gaskets : Tube side - 304L S.S. D.J. GRAPH.
Shell side - Steel D.J. GRAPHITE.
4. SPARES: 10 % studs & nuts and two (2) sets of gasket for each unit is required.
5. Nozs. "T1" & "T2 are 18"-600# "HB" type neck.
6. Exchangers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



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) (MAX / MIN)	400(204) / 201(-7)	200(93) / 201(-7)	
CORROSION ALLOWANCE	1250" (3.2mm)	0000" (0.0mm)	
NUMBER OF PASSES	1	2	
RADIOGRAPHIC EXAMINATION	SPOT	FULL	
HEAT TREAT REQUIRED	YES	NO	

ESTIMATED HEIGHTS, LBS		
DRY: 27000	BUNDLE: 12000	NET: 30000

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: 1000-PF-A001, 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" (A.W.) X 18'-6" STR. LG.
 TUBE PITCH 1 1/4" 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
 10% STUDS & NUTS AND THD (2) SETS OF GASKETS FOR EACH UNIT
 IS REQUIRED FOR SPARE.

PAINT (PER DOC. # 1000-PF-A001):
 TUBESIDE: NO PAINT
 SHELLSIDE: SANDBLAST ALL EXT. C. STL. SURFACES TO A "NEAR-WHITE" METAL FINISH PER SSPC-SP-10. PRIME WITH ONE (1) COAT OF INORGANIC ZINC SILICATE TO 75 MICRONS D.F.T. FINISH WITH ONE (1) COAT OF ALUMINIUM SILICONE TO 25 MICRONS D.F.T. (TOTAL D.F.T. TO BE 90 - 100 MICRONS) FINISH COLOR TO BE SILVER. BOLTS, HOLES, FLG. FACES OUTSIDE GASKET SURFACES, ETC. SHALL RECEIVE THE REQUIRED COATINGS.

CERTIFIED SPAL
 DATE 4-3-97

MAXIMUM ALLOWABLE PRESSURES
 SHELLSIDE -
 MAMP (HOT & CDR) - 175 PSI LMTD BY SHELL FLANGE.
 HYDRO TEST PRESSURE - 1.5 X 175 = 263 PSI.
 TUBE SIDE -
 MAMP (HOT & CDR) - 953 PSI LMTD BY CHANNEL FLANGE.
 HYDRO TEST PRESSURE - 1.5 X 953 = 1430 PSI.

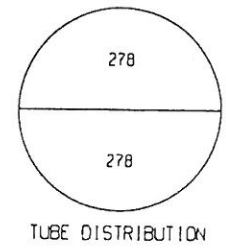
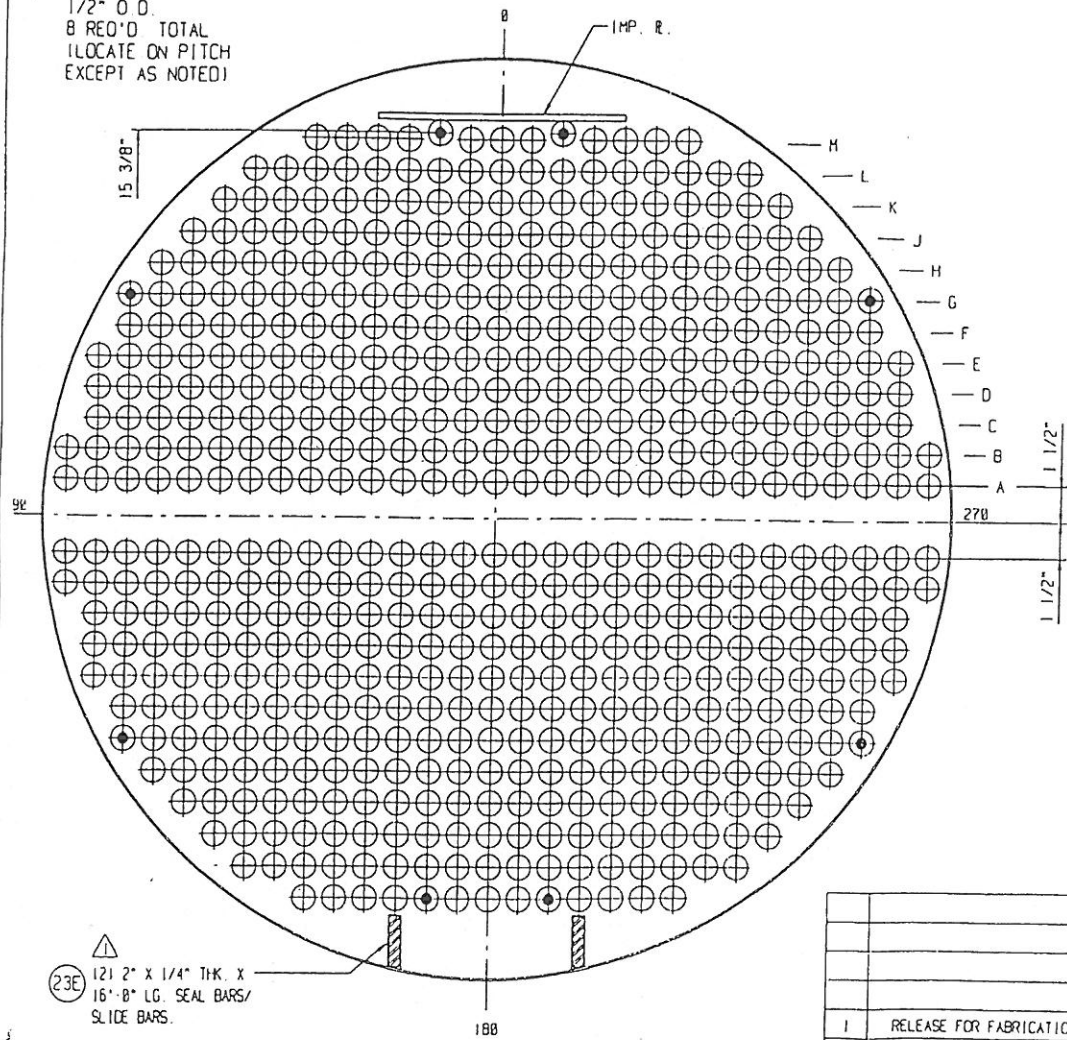
* "H" TYPE NECK

NO	SIZE-RATE	SERVICE	NO	REVISIONS	BY	OK	DATE OK
T2	18" - 600*RF LWN*	CHANNEL OUTLET	3	REVISED AS NOTED	MSS	DC	4-3-97
T1	18" - 600*RF LWN*	CHANNEL INLET	2	RELEASE FOR FABRICATION	MSS	DC	3-5-97
S2	8" - 150*RF HN	SHELL OUTLET	1	FOR CUSTOMER REVIEW	JSS	DC	2-5-97
S1	8" - 150*RF HN	SHELL INLET	0	FOR CUSTOMER APPROVAL	JSS	DC	1-3-97
MK	SIZE-RATE	SERVICE	NO	REVISIONS	BY	OK	DATE OK

CUSTOMER: PETROSIN
 OHMSTEDE JOB NO.: 658312 (21 UNITS REQ'D)
 P.O. NO.: P101/0002
 ITEM NO.: 10-E-100 & 20-E-100
 SERVICE: INLET GAS COOLER / HEATER

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

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

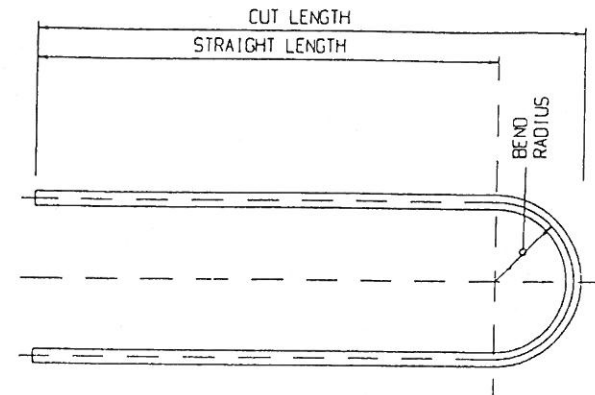


- NOTES:
- 1) DRILL AND REAM TUBE HOLES IN TUBESHEETS TO 1.0100" ± .002" DIA FOR 278 - 1" O.D. U-TUBES. TOTAL HOLES = 556
 - 2) TUBE PITCH = 1 1/4" SQUARE.
 - 3) NUMBER OF PASSES = 2
 - 4) SEE DRAWING SHEET NO. 5 FOR TUBE HOLE GROOVING DETAILS
 - 5) BAFFLE O.D. = 36 13/16"
 - 6) O.T.L. = 36 7/16"

VIEW LOOKING AT SHELL SIDE OF NO. 19 TUBESHEET

				CUSTOMER PETROSIN			
				OHMSTEDE JOB NO : 658312 121 UNITS REQ'D			
				P.O. NO. : P181/8802			
				ITEM NO. : 10-E-100 & 20-E-100			
				SERVICE : INLET GAS COOLER / HEATER			
1	RELEASE FOR FABRICATION	MS	DC	3-5-97	TUBE LAYOUT		
8	FOR CUSTOMER APPROVAL	J.SS	DC	2-5-97			
NO	REVISIONS	BT	DK	DATE DK			
				OHMSTEDE	DRAWING NO. 658312	SHEET NO. 6	REV. 1

ROW	NO OF TUBES	BEND RADIUS	BEND DIAMETER	BEND LENGTH	STRAIGHT LENGTH	CUT LENGTH	ORDER LENGTH
A	29	1 1/2"	3"	0'-4 3/4"	18'-6"	18'-8"	37'-4 3/4"
B	29	2 3/4"	5 1/2"	0'-8 11/16"	18'-6"	18'-9 1/4"	37'-8 11/16"
C	27	4"	8"	1'-0 5/8"	18'-6"	18'-10 1/2"	38'-0 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'-0 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'-8 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'-0 3/16"
K	19	12 3/4"	25 1/2"	3'-4 1/16"	18'-6"	19'-7 1/4"	40'-4 1/16"
L	17	14"	28"	3'-8"	18'-6"	19'-8 1/2"	40'-8"
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 .085 (A.W.)

MATERIAL: SA-249TP304L, EACH TUBE SHALL BE SUBJECTED TO EDDY CURRENT TESTING PER SA-450.

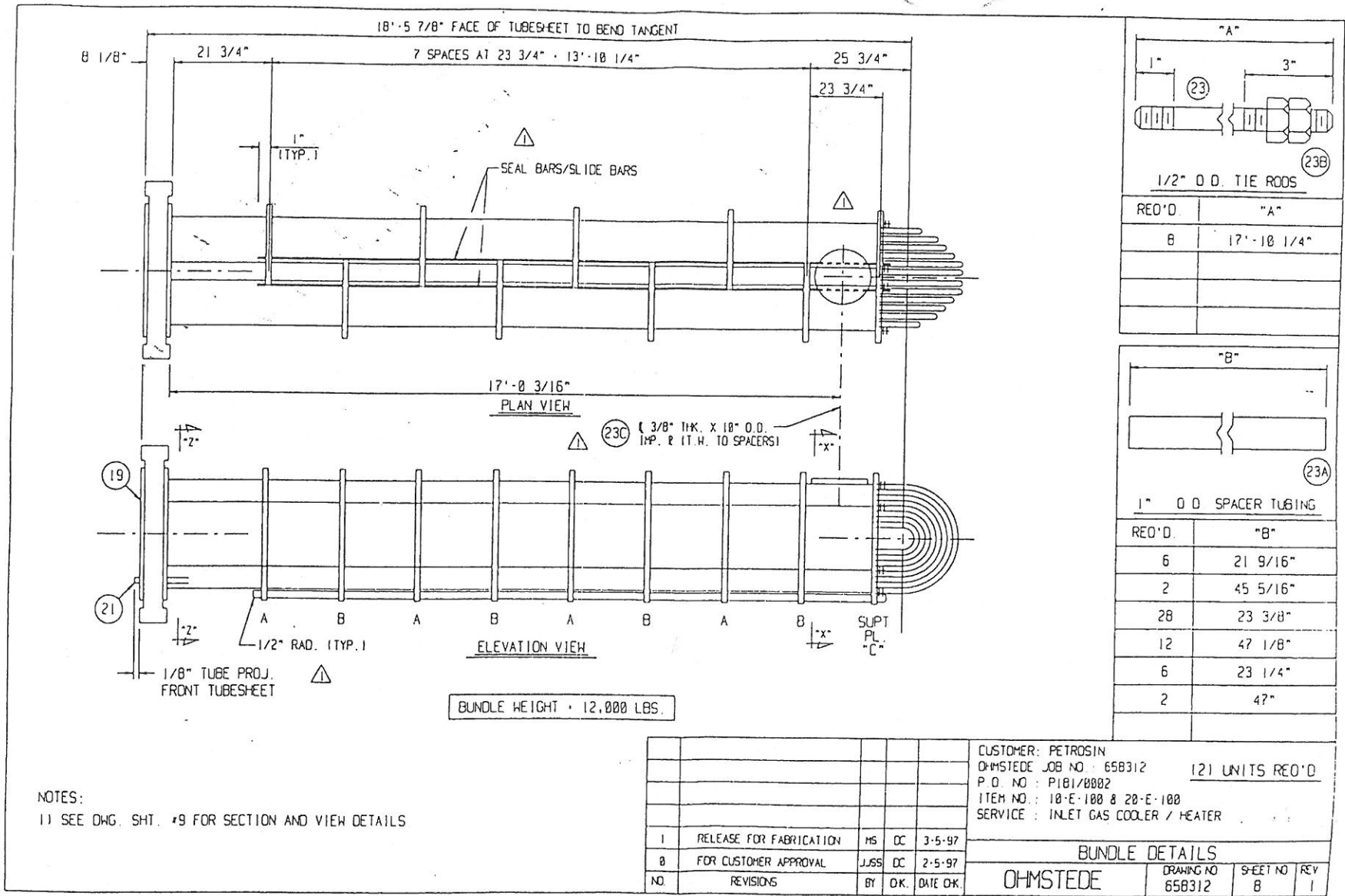
MAXIMUM OUT-OF-ROUNDNESS OF TUBES AT U-BENDS NOT TO EXCEED 10%.

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

					CUSTOMER: PETROSIN			
					OHMSTEDE JOB NO.: 658312 (2) UNITS REQ'D			
					P.O. NO.: P181/0002			
					ITEM NO.: 10-E-100 & 20-E-100			
					SERVICE: INLET GAS COOLER / HEATER			
1	RELEASE FOR FABRICATION	MS	DC	3-5-97	TUBE BENDING SCHEDULE			
B	FOR CUSTOMER APPROVAL	JSS	DC	2-5-97				
NO	REVISIONS	BY	CHK.	DATE OK				
					OHMSTEDE	DRAWING NO 658312	SHEET NO 7	REV 1

P-2/3

U-TUBE BUNDLE OF INLET GAS COOLER / HEATER (H₂S)



"A"	
1"	3"
(23)	
1/2" O.D. TIE RODS (23B)	
REQ'D	"A"
8	17' - 10 1/4"
"B"	
(23A)	
1" O.D. SPACER TUBING	
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"

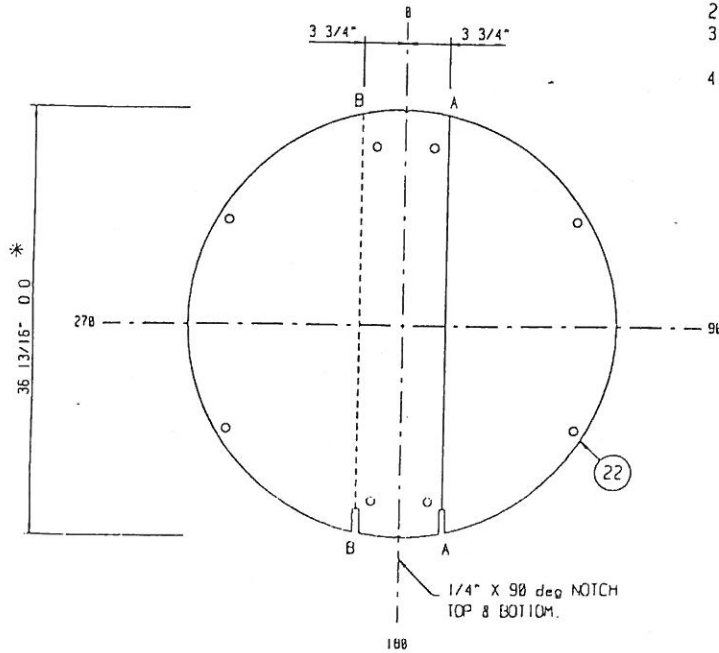
NOTES:
1) SEE DWG. SHT. #9 FOR SECTION AND VIEW DETAILS

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

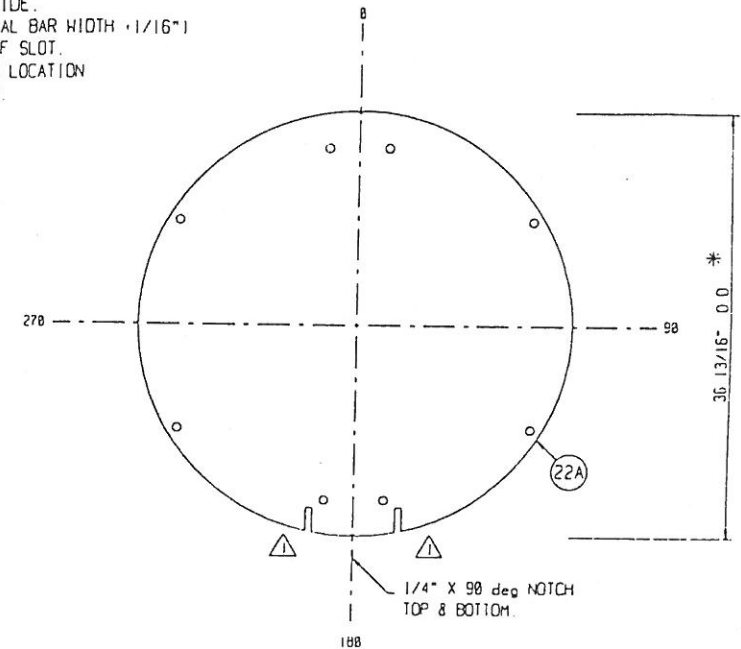
CUSTOMER: PETROSIN
OHMSTEDE JOB NO.: 658312 (21) UNITS REQ'D
P.O. NO.: P181/8882
ITEM NO.: 10-E-100 & 20-E-100
SERVICE: INLET GAS COOLER / HEATER

BUNDLE DETAILS			
OHMSTEDE	DRAWING NO. 658312	SHEET NO. 8	REV. 1

- 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 DWG. SHT. NO. 6.



VIEW ZZ OF BAFFLES
 3/8" THK
 4 - RED'D CUT AA
 4 - RED'D CUT BB



VIEW XX OF SUP' R "C"
 5/8" THK
 1 - RED'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 AARR.

						CUSTOMER: PETROSIN
						OHMSTEDE JOB NO.: 658312
						P.O. NO.: P181/8882
						ITEM NO.: 10-E-100 & 20-E-100
						SERVICE: INLET GAS COOLER / HEATER
						(2) UNITS RED'D.
BAFFLE DETAILS						
1	RELEASE FOR FABRICATION	HS	DC	3-5-97	DRAWING NO	9-EET NO
B	FOR CUSTOMER APPROVAL	JSS	DC	2-5-97	658312	9
NO	REVISIONS	BY	OK	DATE OK	OHMSTEDE	REV
						1

OHMSTEDE, IN' - BILL OF MATERIALS

SHE 1 OF
BY SP CKD

CUSTOMER: PETROFIN
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
TUBES						
21	278	"U" TUBES 1" O.D.X .0650" (A.W.) THK PER BEND SCHEDULE	SA-249TP304L	617927	TUBES, INC	5/2
		3) 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	Cull/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	Cull/CO	4/4
BAFFLES						
22	8	BAFFLES 37 3/16" O.D.X 3/8" THK	SA-516-70N	618318	Tex Plate	3/14
22A	1	SUPT PL. 37 3/16" O.D.X 5/8" THK	SA-516-70N	1	1	1

OHMSTEDE, INC. - BILL OF MATERIALS

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 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-

GENERAL NOTES

1. ALL BOLT HOLES SHALL STRADDLE NORMAL CENTERLINES EXCEPT AS NOTED.
2. ALL EXTERNAL BOLTING SHALL BE COATED FULL LENGTH WITH AN ANTI-SEIZE COMPOUND.
3. ALL MACHINED SURFACES AND THREADED CONNECTIONS SHALL BE COATED WITH A READILY REMOVABLE RUST PREVENTATIVE.
4. THE INSIDE AND OUTSIDE OF THE EXCHANGER SHALL BE CLEAN AND FREE OF ALL SLAG, LOOSE SCALE, DIRT, GRIT, WELD SPLATTER, PIECES OF METAL, PAINT, OIL, AND OTHER FOREIGN MATTER BEFORE HYDROTESTING AND PAINTING. THE EXCHANGER SHALL BE THOROUGHLY DRIED INSIDE AND OUTSIDE AFTER HYDROTEST. SURFACE PREPARATION AND PAINTING MATERIALS SHALL BE KEPT OUT OF THE EXCHANGER.
- △ 5. SUPPORT AND NOZZLE PADS SHALL BE PROVIDED WITH A 1/4" NPT TEST HOLE. PADS SHALL BE AIR AND SOAP SLUDS TESTED AT 25 PSIG PRIOR TO HYDROTEST. TEST HOLES SHALL BE PLUGGED WITH HEAVY GREASE PRIOR TO SHIPMENT.
6. ALL THREADED CONNECTIONS SHALL BE PLUGGED TO PREVENT DAMAGE. ALL FLANGED OPENINGS SHALL BE BLIND FLANGED (SEE NOTE "B" ON Dwg. SHT. #16).
7. THE EXCHANGER ITEM NO. AND THE OHMSTEDE SERIAL NO. SHALL BE DIE-STAMPED ON THE PERIPHERAL EDGE OF EACH BODY FLANGE AND TUBESHEET. THE EXCHANGER ITEM NO., THE PURCHASE ORDER NO., AND THE EXCHANGER SHIPPING WEIGHT SHALL BE STENCILED ON THE SIDE OF THE SHELL IN A CONSPICUOUS LOCATION, IN LETTERS AT LEAST 3" HIGH.
- ✓ 8. AS A MINIMUM, A HELIUM LEAK TEST AT 5 PSIG WILL BE PERFORMED TO VERIFY TUBE-TO-TUBESHEET JOINTS.
9. ALL MATING BODY FLANGES AND TUBESHEETS SHALL BE MATCH MARKED FOR PERMANENT ASSEMBLY REFERENCE.
10. HYDROTEST PRESSURE SHALL BE HELD FOR A PERIOD OF ONE (1) HOUR MINIMUM. HYDROTEST SHALL BE CONDUCTED USING POTABLE WATER WITH A MAXIMUM CHLORIDE ION CONTENT OF 30 PPM. MINIMUM WATER TEMPERATURE FOR HYDROTEST SHALL BE 60 DEG. F. THE SHELLSIDE AND THE TUBESIDE SHALL BE TESTED SEPARATELY IN SUCH A MANNER THAT LEAKS AT THE TUBE JOINTS CAN BE DETECTED FROM AT LEAST ONE SIDE.
11. THE PERMISSIBLE OUT-OF-ROUNDNESS OF THE COMPLETED SHELL SHALL ALLOW A METAL TEMPLATE TO PASS COMPLETELY THROUGH THE SHELL WITHOUT BINDING. THE TEMPLATE SHALL CONSIST OF TWO RIGID DISCS, EACH WITH A DIAMETER EQUAL TO THAT OF THE BAFFLES, RIGIDLY MOUNTED ON A SHAFT AND SPACED NOT LESS THAN 12" APART.
12. GASKET CONTACT SURFACES (OTHER THAN NOZZLES) SHALL HAVE A FINISH EQUIVALENT TO 125 - 250 AARH. THE FLATNESS TOLERANCE (MAXIMUM DEVIATION FROM A PLANE) ON PERIPHERAL GASKET CONTACT SURFACES SHALL BE 1/32", AS DETERMINED BY THE USE OF A STRAIGHTEDGE. GIRTH FLANGE TOLERANCE SHALL BE MEASURED AFTER THE FLANGE HAS BEEN WELDED TO THE CYLINDER OR HEAD. FLATNESS TOLERANCE ON THE TUBESHEET SHALL BE MEASURED AFTER THE TUBES HAVE BEEN ROLLER EXPANDED.
13. FINAL VISUAL WELD INSPECTION SHALL BE PERFORMED AFTER ANY REQUIRED PWHT.
14. IF FULL RADIOGRAPHY IS NOT SPECIFIED, AT LEAST ONE SPOT RADIOGRAPH SHALL BE MADE OF EACH CATEGORY A AND B JOINT AS DEFINED BY ASME CODE, SECTION VIII, DIV. 1. NOZZLE WELDS ARE EXCLUDED FROM THIS REQUIREMENT.
15. SPOT RADIOGRAPHS SHALL INCLUDE EACH START AND STOP OF WELDS MADE BY THE AUTOMATIC SUBMERGED ARC WELDING PROCESS.
16. SPOT RADIOGRAPHS SHALL BE AT LEAST 10" LONG, OR SHALL BE FULL LENGTH WHERE THE WELD IS LESS THAN 10" LONG. SPOT RADIOGRAPHS SHALL MEET THE SLAG AND POROSITY STANDARDS OF ASME CODE SECTION VIII, DIV. 1, FOR FULLY RADIOGRAPHED JOINTS.
17. HT EXAMINATIONS AND ACCEPTANCE CRITERIA SHALL BE PER ASME CODE SECTION VIII, DIV. 1, APPENDIX 6. PT EXAMINATIONS AND ACCEPTANCE CRITERIA SHALL BE PER ASME CODE SECTION VIII, DIV. 1, APPENDIX 8.
18. REQUIREMENTS FOR WELD HARDNESS EXAMINATIONS ARE AS FOLLOWS: WELD METAL AND HEAT AFFECTED ZONE OF PRESSURE-RETAINING WELDS IN COMPONENTS MADE OF P-1 MATERIALS SHALL BE EXAMINED. EXAMINATIONS SHALL BE MADE AFTER ANY REQUIRED PWHT. HARDNESS TESTS SHALL BE MADE USING A 10 MM BALL. HARDNESS SHALL NOT EXCEED 200 BHN FOR P-1 MATERIALS. ONE LONG. WELD, ONE CIRC. WELD, AND EACH CONNECTION-TO-COMPONENT WELD WHERE THE CONNECTION IS 2" NPS OR LARGER, SHALL BE EXAMINED. IF MORE THAN ONE WELD PROCEDURE IS USED TO FABRICATE LONG OR CIRC. WELDS, HARDNESS READINGS SHALL BE MADE OF WELDS DEPOSITED BY EACH WELD PROCEDURE.
19. STENCIL "DO NOT WELD OR BURN" (IN TWO PLACES 180 DEG APART, AS A MINIMUM) ON EQUIPMENT THAT HAS BEEN POST WELD HEAT TREATED.
- △ 20. EXPORT SKIDS REQUIRED.

				CUSTOMER: PETROSIN	
				OHMSTEDE JOB NO.: 658312 (2) UNITS REQ'D	
				P.O. NO.: P181/0002	
				ITEM NO.: 10-E-100 & 20-E-100	
				SERVICE: INLET GAS COOLER / HEATER	
GENERAL NOTES					
1	RELEASE FOR FABRICATION	MS	DC	3-5-97	
0	FOR CUSTOMER APPROVAL	JSS	DC	2-5-97	
NO	REVISIONS	BY	CHK.	DATE	OK
OHMSTEDE				DRAWING NO.	SHEET NO.
				658312	15
				REV	1