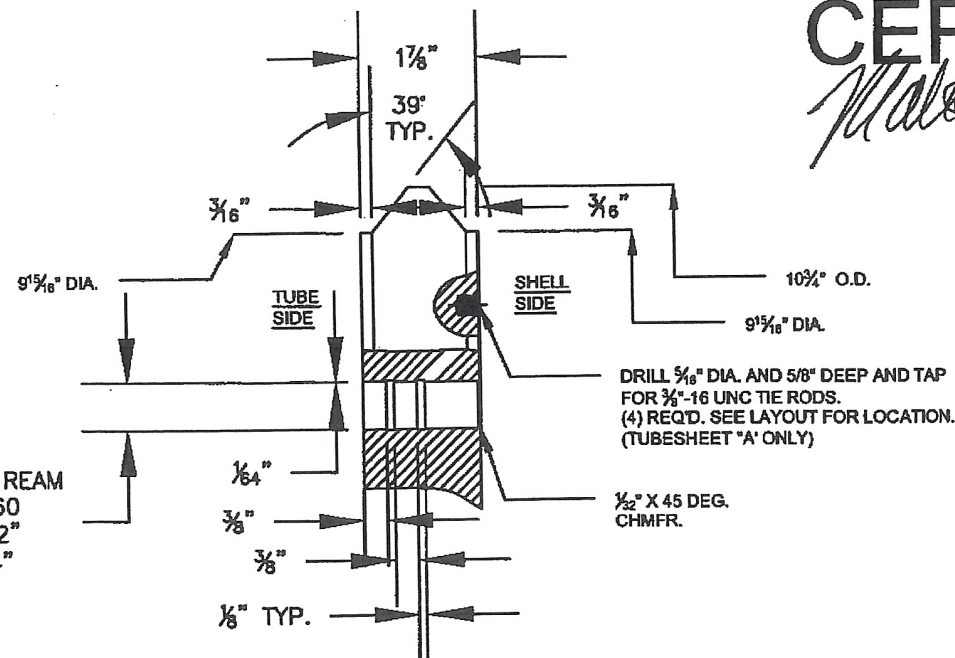


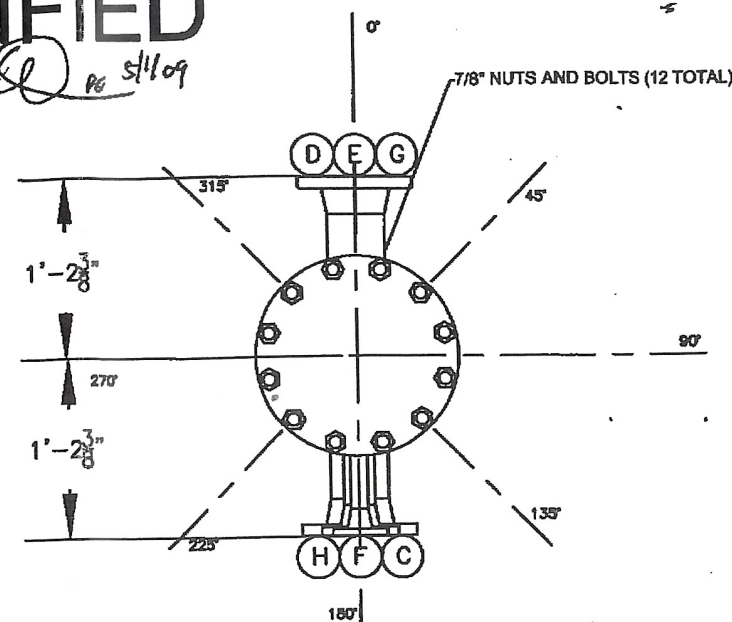


DRILL AND REAM
TO 0.760
+ 0.002"
- 0.004"

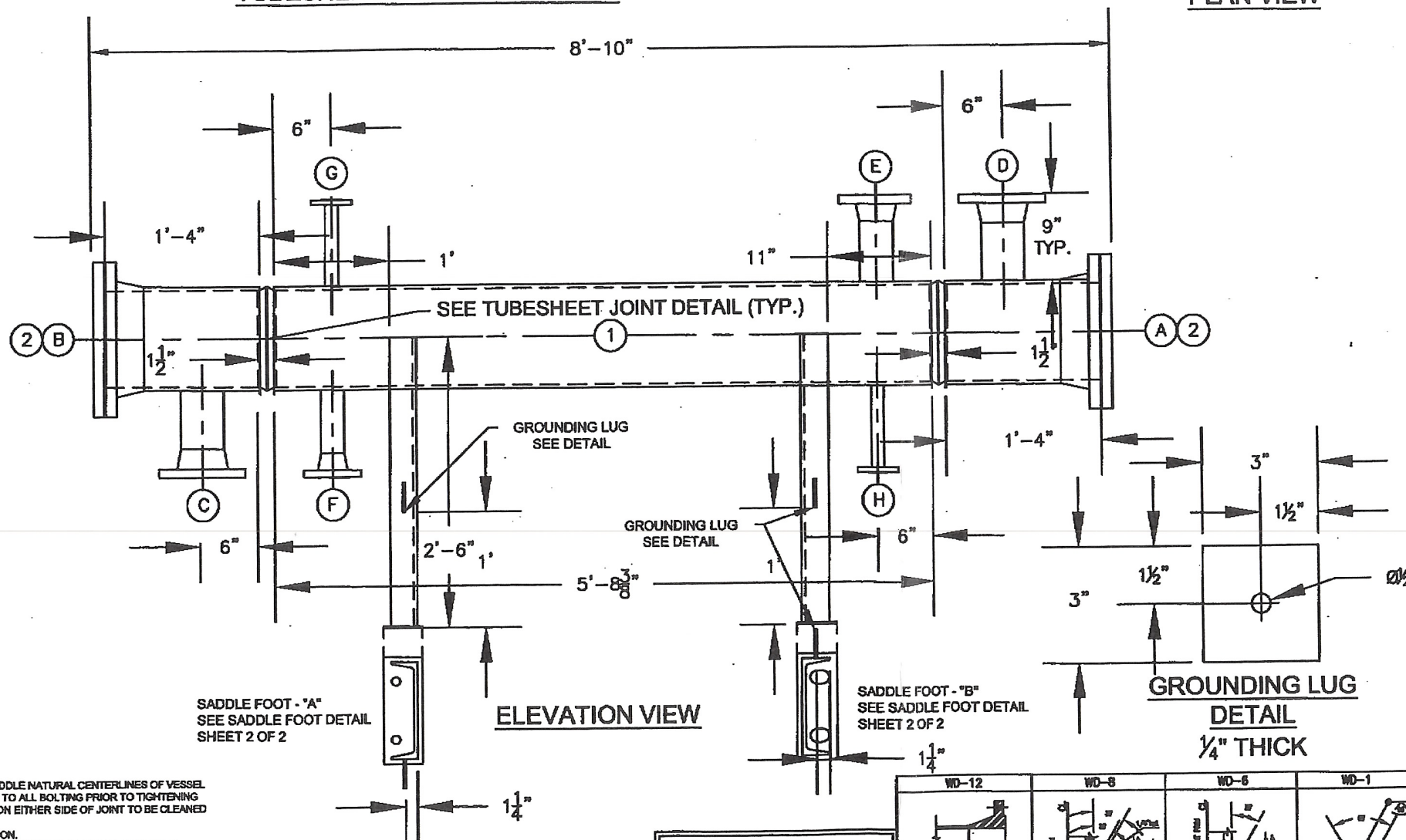


TUBESHEET MACHINING DETAIL

CERTIFIED
Walter E. Rogers
PG 5/1/09



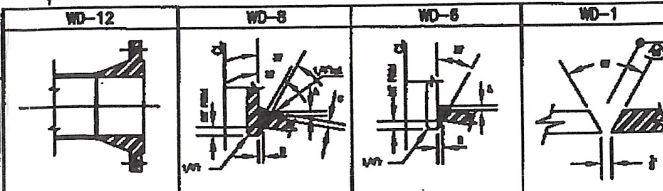
PLAN VIEW



ELEVATION VIEW

- NOTES:
1. ALL BOLT HOLES TO STRADDLE NATURAL CENTERLINES OF VESSEL.
 2. ANTISIEZE TO BE APPLIED TO ALL BOLTING PRIOR TO TIGHTENING.
 3. ALL WELD JOINTS AND 1" ON EITHER SIDE OF JOINT TO BE CLEANED PRIOR TO WELDING.
 4. ALL WELDED CONSTRUCTION.
 5. FOR PAINTING, USE THE ENGINEERING SPEC 5441-42.1443.02-5 SPECIFICATION FOR K2 SOPERTON PLANT PAINTING.
 6. ALL WETTED MATERIALS SHALL COMPLY WITH NACE MR0175.
 7. REVISION DESIGNATION CHANGED FROM USING NUMERIC TO USING ALPHABETIC PRIOR TO FABRICATION. PREVIOUS REVISIONS 1 AND 2 ARE NOW REVISIONS A AND B. DRAWING IS REVISION D WHEN RELEASED FOR FABRICATION.

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SCHEDULE OF OPENINGS & WELD TYPE											
MARK	SIZE	QTY	PAVING	TYPE	DESCRIPTION	OS PROJ	INT PROJ	WD	A	B	C
A	10"	1	150#	RFWN	RIGHT CHANNEL	N/A	N/A	12	0.5"		
B	10"	1	150#	RFWN	LEFT CHANNEL	N/A	N/A	12	0.5"		
C	4"	1	150#	RFWN	TUBE SIDE INLET	0"	0"	6	0.5"	0.5"	
D	4"	1	150#	RFWN	TUBE SIDE OUTLET	0"	0"	6	0.5"	0.5"	
E	3"	1	150#	RFWN	SHELL SIDE INLET	0"	0"	6	0.5"	0.5"	
F	2"	1	150#	RFWN	SHELL SIDE OUTLET	0"	0"	6	0.5"	0.5"	
G	1"	1	150#	RFLWN	SHELL SIDE VENT	0"	0"	6	0.5"	0.5"	
H	1"	1	150#	RFLWN	SHELL SIDE DRAIN	0"	0"	6	0.5"	0.5"	
I											
J											
K											
L											
M											
N											

DESIGN DATA

REGISTRATION	INTERNAL BOARD	YEAR BUILT	2000
CONSTRUCTION	ASME SEC. VIII, DIV. 1, GT A	SERIAL NO.	CH-0888
DESIGN PRESSURE	150 PSI SHELL, 200 PSI TUBE SIDE	CAPACITY (VOL.)	50 GALLONS
DESIGN TEMP	400F - SHELL SIDE, 250F TUBE SIDE	SHIPPING WT (EMPTY)	1913 LB.
EXTERNAL PRESSURE	PSI @ 350F	WT. FULL OF WATER	2375 LB.
OPERATING PRESSURE	60/75 PSI SHELL, 80/90 PSI TUBE	VESSEL SHELL MAT'L	SA-106 GR. B
OPERATING TEMP	324/320F SHELL, 102/120F TUBE	TOP/LEFT HEAD	SA-106 GR. B
MIN. DES. METAL TEMP	30F	BOTTOM/RIGHT HEAD	SA-106 GR. B
WIND CRITERIA	IBC 2006, 100 MPH	NORZEL'S	SA-106 GR. B / SA-106
SEISMIC CRITERIA	IBC 2006, SDS=0.181, SDI=0.003	ONNETS	SS SPINAL WOUND
HYDRO TEST PRESS	185 PSI SHELL, 260 PSI TUBE	STUDS & NUTS	SA-185 GR. B7, SA-184 GR. 2H HW
CORROSION ALLOW.	0.0025" SHELL/TUBE SIDE, N/A TUBES	SURFACE PREP	CLEAN PER NF 15680
RADIOGRAPHY	RT-1	PRIMER	NONE PER NF 15680
POST WELD HEAT TREAT	N/A	FINISH PAINT	CHLOM SLOTE
CORROSION ALLOW. FOR CLAD	N/A	INSULATION	
MATERIAL HARDNESS	N/A	AUTHORIZED QUALITY CONTROL PROGRAM	

BILL OF MATERIAL

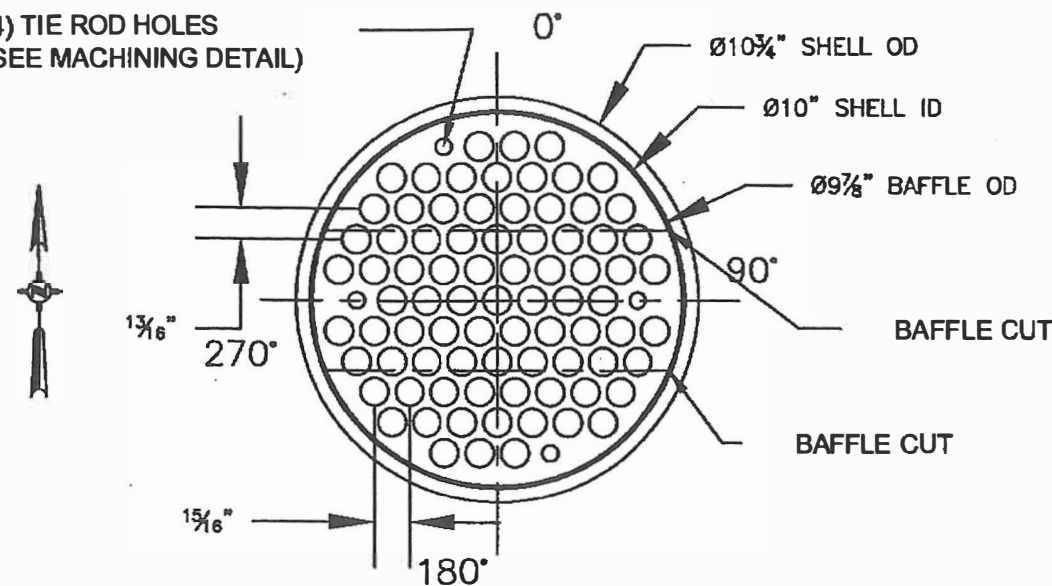
ITEM	QTY	PART	DESCRIPTION	MATERIAL	WT
32					
31					
30					
29					
28					
27					
26					
25					
24					
23					
22					
21					
20					
19					
18	24		7/8" - 16 UNC BOLTS	SA-185 GR. B7	
17	24		7/8" - 16 UNC NUTS	SA-184 2H HW	
16	2		CHANNEL FOOT - SEE SHEET 2 OF 2		
15	2		10 X 20# CHANNEL - 30L	SA-30	
14	2		SS SPINAL WOUND GASKET		
13	2		10.75" X 1 7/8" CS FLARE - TUBESHEET	SA-516 - 70	
12	2		10" 150# BLIND FLANGE	SA-105	
11	2	6H	1" 150# RFLWN CS FLANGE	SA-105	
10	1	F	2" 150# RFWN CS FLANGE, SCH 40 BORE	SA-105	
9	1	E	3" 150# RFWN CS FLANGE, SCH 40 BORE	SA-105	
8	2	CD	4" 150# RFWN CS FLANGE, SCH 40 BORE	SA-105	
7	1	F	2" 340 CS SMLS PIPE (0.0075")	SA-106 GR. B	
6	1	E	3" 340 CS SMLS PIPE (0.0075")	SA-106 GR. B	
5	2	CD	4" 340 CS SMLS PIPE (0.0075")	SA-106 GR. B	
4	2	AD	10" 150# RFWN CS FLANGE, SCH STD BORE	SA-105	
3	81		3/4" 14 GA CS TUBE (0L)	SA-170	
2	2	AD	10" STD CS SMLS PIPE (12L) - CHANNEL	SA-106 GR. B	
1	1		10" STD CS SMLS PIPE (0.0375") - SHELL	SA-106 GR. B	

REV	DESCRIPTION	BY	APPD	DATE
0	CERTIFIED - ISSUED FOR FABRICATION	MDH	DRR	5/1/09
C	CHANGED SHELL INLET FLANGE TO 3"	MDH	DRR	4/15/09
B	CORRECTED GENERAL COMMENTS	MDH	DRR	4/14/09
A	UPDATED SKIDDES AND MISC. CLEANUP	MDH	DRR	3/23/09

PRECISION PIPE AND VESSEL, LLC
6535 WASHINGTON AVE.
DENVER, CO 80229

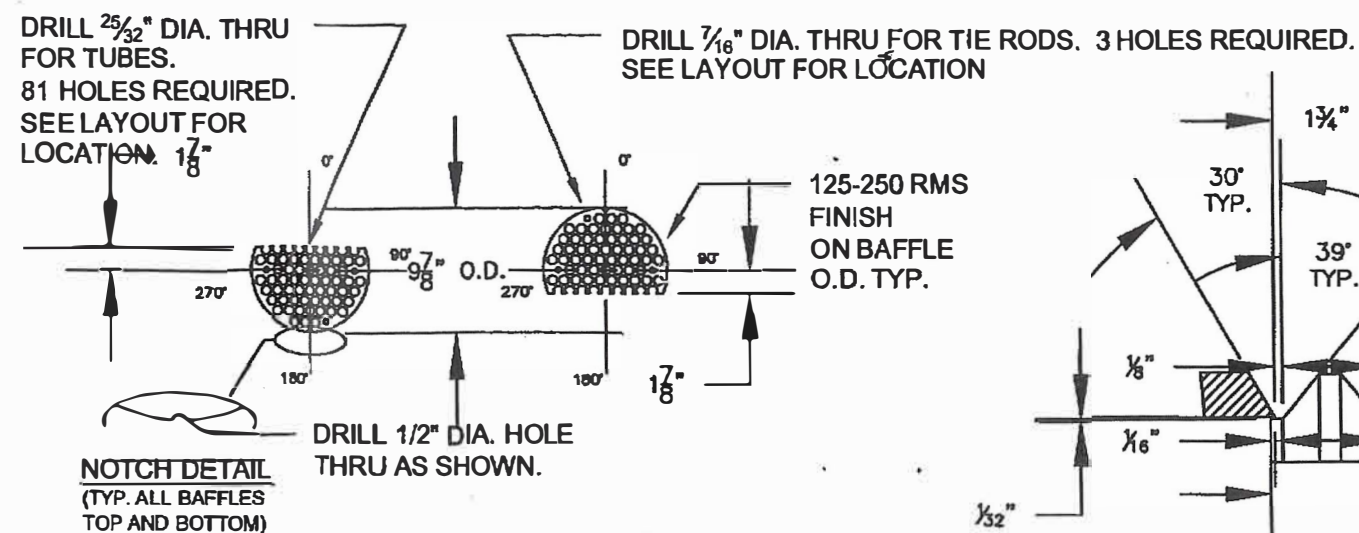
CUSTOMER RANGE FUELS SOPERTON PLANT				JOB NO: 4358 SOP 10525	
TITLE / PROJECT: HP LIQUID HEATER 31-E-236				PAGE NUMBER: 1 OF 2	
DRAWN BY: MDH	CHECKED BY: DRR	APPROVED BY: DRR	DATE: 5/1/09	SCALE: NTS	REV: 0

(4) TIE ROD HOLES
(SEE MACHINING DETAIL)

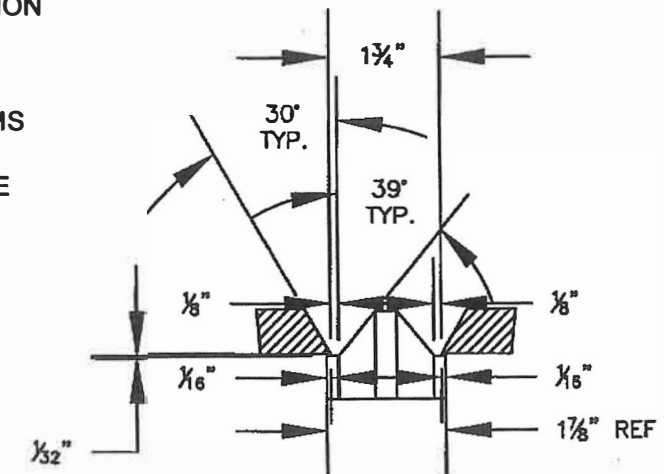


TUBEHOLE AND TIE ROD LAYOUT

DRILL $\frac{25}{32}$ " DIA. THRU
FOR TUBES.
81 HOLES REQUIRED.
SEE LAYOUT FOR
LOCATION.

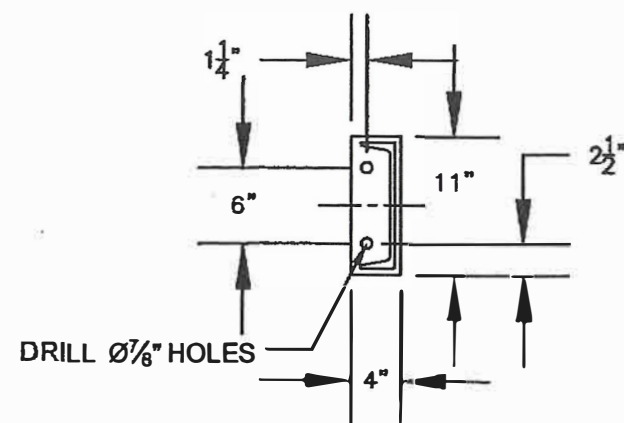


BAFFLE DETAILS

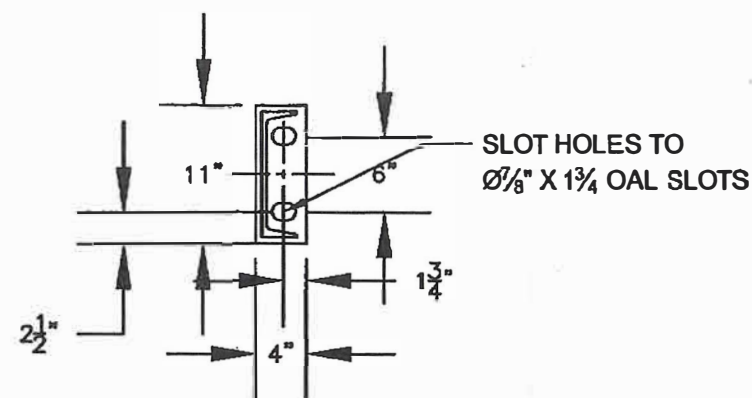


NOTE: TUBESHEET LIQUID
PENETRANT INSPECTION
PER UG-93(d)(3) IS REQUIRED.

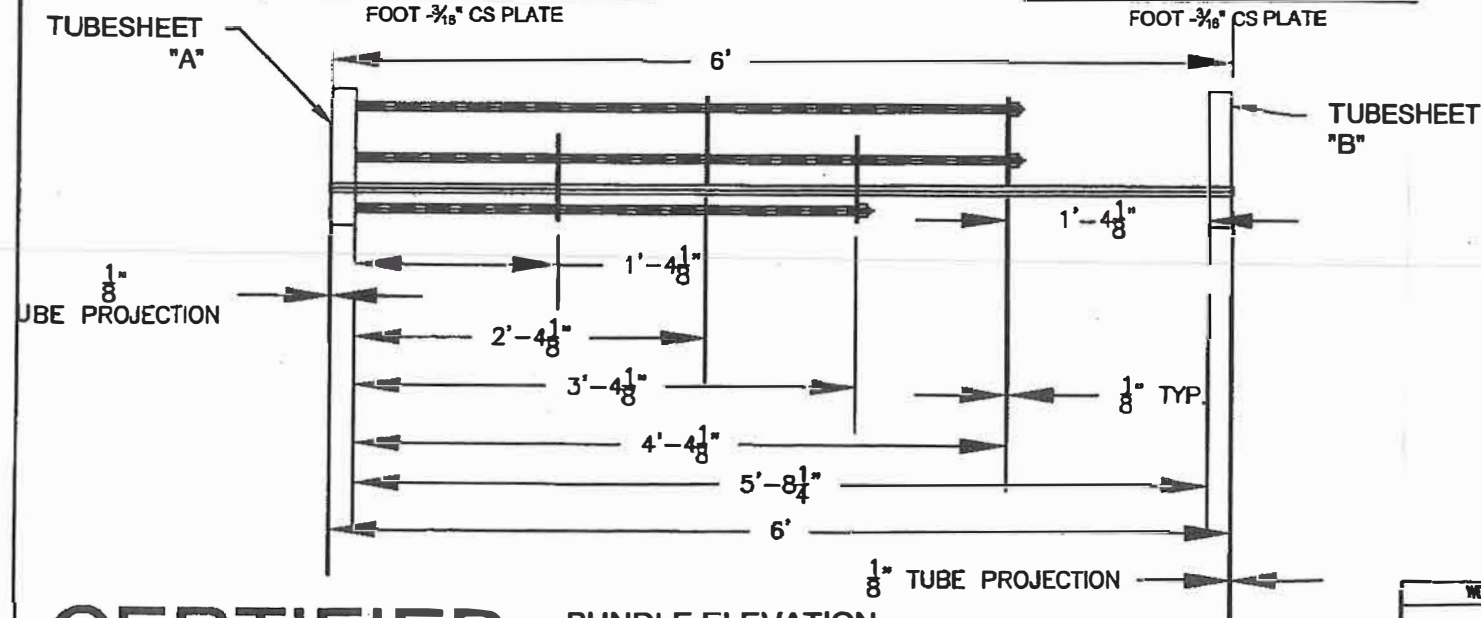
TUBESHEET JOINT DETAIL



SADDLE "A" FOOT DETAIL
FOOT $\frac{3}{16}$ " CS PLATE



SADDLE "B" FOOT DETAIL
FOOT $\frac{3}{16}$ " CS PLATE



BUNDLE ELEVATION

NB

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PRECISION PIPE & VESSEL, LLC
6335 WASHINGTON AVE.
DENVER, CO 80220

TUBE SIDE
MAWP 200/250 PSI AT 250/350 °F
MONT 20 °F AT 200 PSI
SERIAL NO. CV-0808
YEAR BUILT 2008

PART NO. 31-E-236
D-1487

NB

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PRECISION PIPE & VESSEL, LLC
6335 WASHINGTON AVE.
DENVER, CO 80220

SHELL SIDE
MAWP 150/250 PSI AT 400/350 °F
MONT 20 °F AT 150 PSI
SERIAL NO. CV-0808
YEAR BUILT 2008

PART NO. 31-E-236
D-1487

BILL OF MATERIAL				
32				
31				
30				
29				
28				
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12				
11				
10				
9				
8	20'	TUBE - SEE SHEET 1 OF 2		
7	4	5/8" 18J CS TUBE - BAFFLE SPACERS	SA-179	
6	2	3/8" - 18 UNC NUTS	SA-184 2H	
5		11" X 4" X 3/16" CS PLATE - CHANNEL FOOT	SA-38	
4	2	10 X 20J CHANNEL - SEE SHEET 1 OF 2	SA-38	
3	20'	NAMEPLATE AND NAMEPLATE BAR	CS/38	
2		3/8" ROD - TIE ROD	SA-38	
1		TUBESHEET - SEE SHEET 1 OF 2	SA-S18 - 70	
		0.875" X 0.125" CS PLATE - BAFFLES	SA-38	
ITEM	QTY	PART	DESCRIPTION	WGT
8			CERTIFIED - ISSUED FOR FABRICATION	MDH DRR 5/1/08
9			CHANGED SHELL INLET FLANGE TO 3"	MDH DRR 4/13/08
9			CORRECTED GENERAL COMMENTS	MDH DRR 4/8/08
A			UPDATED SKETCHES AND MISC. CLEANUP	MDH DRR 3/23/08
REV	DESCRIPTION			BY APPD DATE

PRECISION PIPE AND VESSEL, LLC
6335 WASHINGTON AVE.
DENVER, CO 80220

TITLE / PROJECT:
HP LIQUID HEATER 31-E-236

DRAWN BY:
MDH

CHECKED BY:
DRR

APPROVED
DRR

DATE:
5/1/08

SCALE:
NTS

DRAWING NO.:
D-1487

REV:
0

JOB NO:
4358 SOP 10525

PAGE NUMBER:
2 OF 2

CERTIFIED

Handwritten signature
PE
5/1/08

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