

SCHEDULE OF OPENINGS & WELD MAP

MARK	SIZE	QTY	RATING	TYPE	DESCRIPTION	OS PROJ	INT PROJ	WD	A	B	C
A	10"	1	600#	RFLWN	RIGHT CHANNEL	N/A	N/A	12	0.5"		
B	10"	1	600#	RFLWN	LEFT CHANNEL	N/A	N/A	12	0.5"		
C	3"	1	600#	RFLWN	TUBE SIDE INLET	9"	0"	6	0.5"		
D	3"	1	600#	RFLWN	TUBE SIDE OUTLET	9"	0"	6	0.5"		
E	3"	1	600#	RFLWN	SHELL SIDE INLET	9"	0"	6	0.5"		
F	3"	1	600#	RFLWN	SHELL SIDE OUTLET	9"	0"	6	0.5"		
G	1"	1	600#	RFLWN	SHELL SIDE VENT	9"	0"	6	0.5"		
H	1"	1	600#	RFLWN	SHELL SIDE DRAIN	9"	0"	6	0.5"		
I	1.5"	1	600#	RFLWN	PSV	9"	0"	6	0.5"		
J											
K											
L											
M											
N											

DESIGN DATA

REGISTRATION	NATIONAL BOARD	YEAR BUILT	2009
CONSTRUCTION	ASME SEC. VIII, DIV 1, 07 A	SERIAL NO.	CV-0887
DESIGN PRESSURE	SHELL 800 PSI TUBE 800 PSI	CAPACITY (VOL)	110 GAL
DESIGN TEMP	SHELL 250F TUBE 250F	SHIPPING WT (EMPTY)	3237 LB.
EXTERNAL PRESSURE	FV @ 350F	WT. FULL OF WATER	4119 LB.
OPERATING PRESSURE	SHELL 675/670 TUBE 690/685	VESSEL SHELL MAT'L	SA-106 GR. B
OPERATING TEMP	SHELL 21/100 TUBE 110/64	TOP/LEFT HEAD	
MIN. DES. METAL TEMP	20F	BOTTOM/ RIGHT HEAD	
WIND CRITERIA	IBC 2006, 100 MPH	NOZZLES	SA-106 GR B SA-182 304L
SEISMIC CRITERIA	IBC 2006, SDS=0.181, SDI=0.093	GASKETS	SS SPIRAL WOUND
HYDRO TEST PRESS	SHELL 1040 PSI TUBE 1040 PSI	STUDS & NUTS	A-193 GR B7, SA-194 GR 2H HWY
CORROSION ALLOW.	0.0625" SHELL SIDE, 0.125 TUBE SIDE	SURFACE PREP	CLEAN PER RF 15690
RADIOGRAPHY	RT-1	PRIMER	NONE PER RF 15690
POST WELD HEAT TREAT	N/A	FINISH PAINT	N/A
CORROSION ALLOW. FOR CLAD	N/A	INSULATION	CALCIUM SILICATE
MATERIAL HARDNESS	N/A	AUTHORIZED QUALITY CONTROL PROGRAM	

BILL OF MATERIAL

32					
31					
30					
29					
28					
27					
26					
25					
24					
23					
22					
21					
20					
19	80'		5/8" TUBE 16# - BAFFLE SPACERS		SA-179
18	2		SS SPIRAL WOUND GASKET		
17			SADDLE FOOT - SEE SHEET 2 OF 2		
16	4		3/8" - 16 UNC NUTS		SA-194 2H
15	80'		3/8" ROD - TIE RODS		SA-36
14	32		1 1/4" - 16 UNC STUDS		SA-193 GR. B7
13	32		1 1/4" - 16 UNC NUTS		SA-194 2H HEAVY
12	1	1	1.5" 600# RFLWN CS FLANGE		SA-105
11	2		10 X 20# CHANNEL (30'L) - SADDLE		SA-36
10			BAFFLES - SEE SHEET 2 OF 2		
9	2		10.75"OD X 3.75" SS PLATE - TUBESHEET		SA-240 304L
8	2		10" 600# BLIND FLANGE		SA-182 304L
7	2	G,H	1" 600# RFLWN CS FLANGE		SA-105
6	2	E,F	3" 600# RFLWN CS FLANGE		SA-105
5	2	C,D	3" 600# RFLWN SS FLANGE		SA-182 304L
4	2	A,B	10" 600# RFLWN SS FLANGE, SCH 80 BORE		SA-182 304L
3	72		3/4" 16 GA SS TUBE (20.25'L)		SA-213 TP304L
2	2	A,B	10" S80 SS PIPE (12'L) - CHANNEL		SA-312 304L
1	1		10" XH CS SMLS PIPE (19' 4.375'L) - SHELL		SA-106 GR. B
ITEM	QTY	PART	DESCRIPTION	MATERIAL	WT

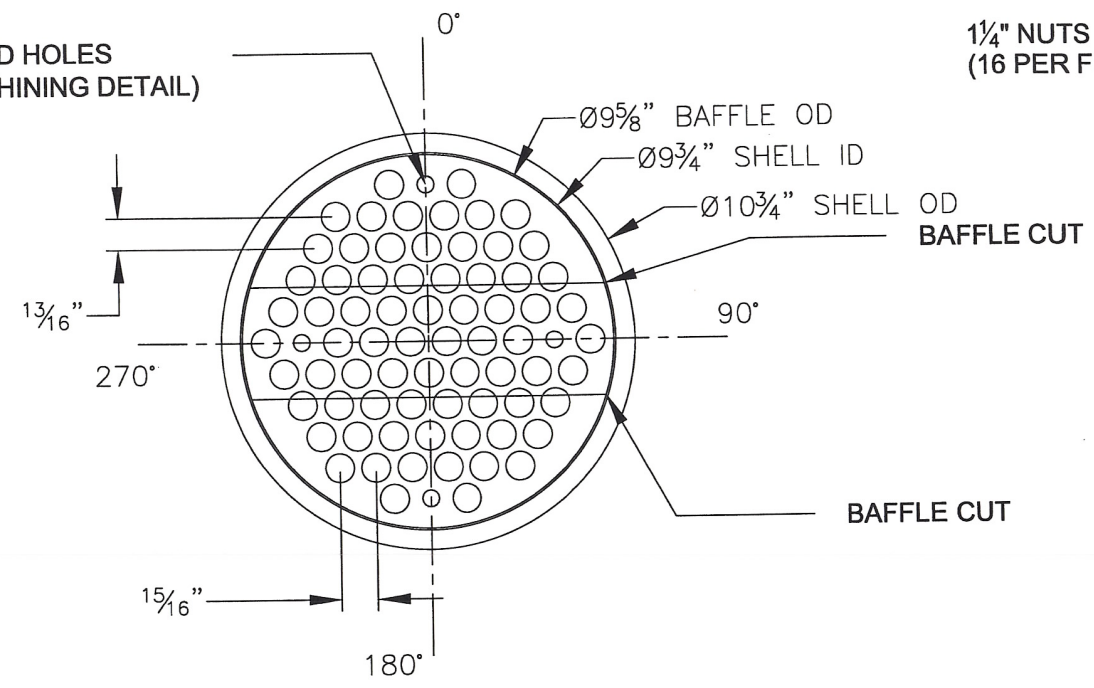
2	UPDATED STUD INFORMATION IN BOM	MDH	DRR	NDH	7/30/09
1	UPDATED TUBE AND SHELL INFORMATION	MDH	DRR	6/13/09	
0	CERTIFIED - ISSUED FOR FABRICATION	MDH	DRR	5/1/09	
B	CORRECTED GENERAL COMMENTS	MDH	DRR	4/6/09	
A	UPDATED SADDLES AND MISC. CLEANUP	MDH	DRR	3/23/09	
REV	DESCRIPTION	BY	APPD	DATE	

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6535 WASHINGTON AVE.
DENVER, CO 80229

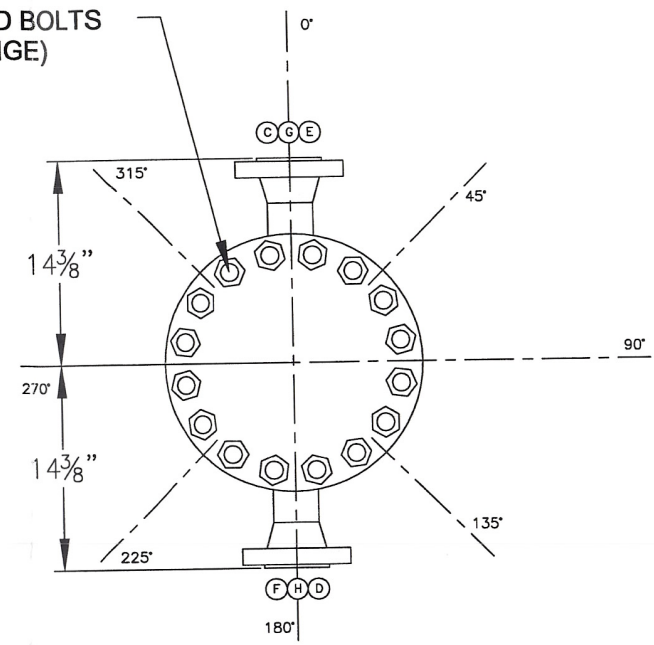
CUSTOMER	RANGE FUELS SOPERTON PLANT	JOB NO:	4358 SOP 10525
TITLE / PROJECT:	FEED EFFLUENT EXCHANGER 31-E-234	PAGE NUMBER:	1 OF 2
DRAWN BY:	MDH	CHECKED BY:	DRR
APPROVED:	DRR	DATE:	5/1/09
SCALE:	NTS	DRAWING NO:	D-1498
REV:	2		



(4) TIE ROD HOLES
(SEE MACHINING DETAIL)



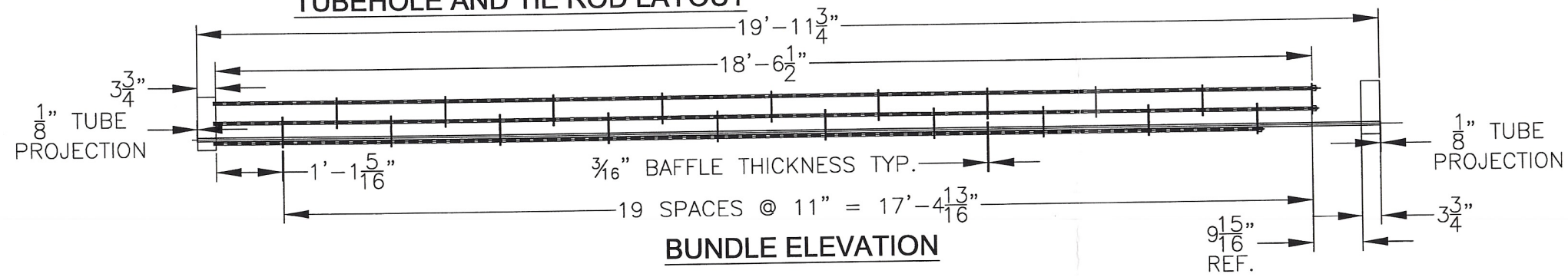
1/4" NUTS AND BOLTS
(16 PER FLANGE)



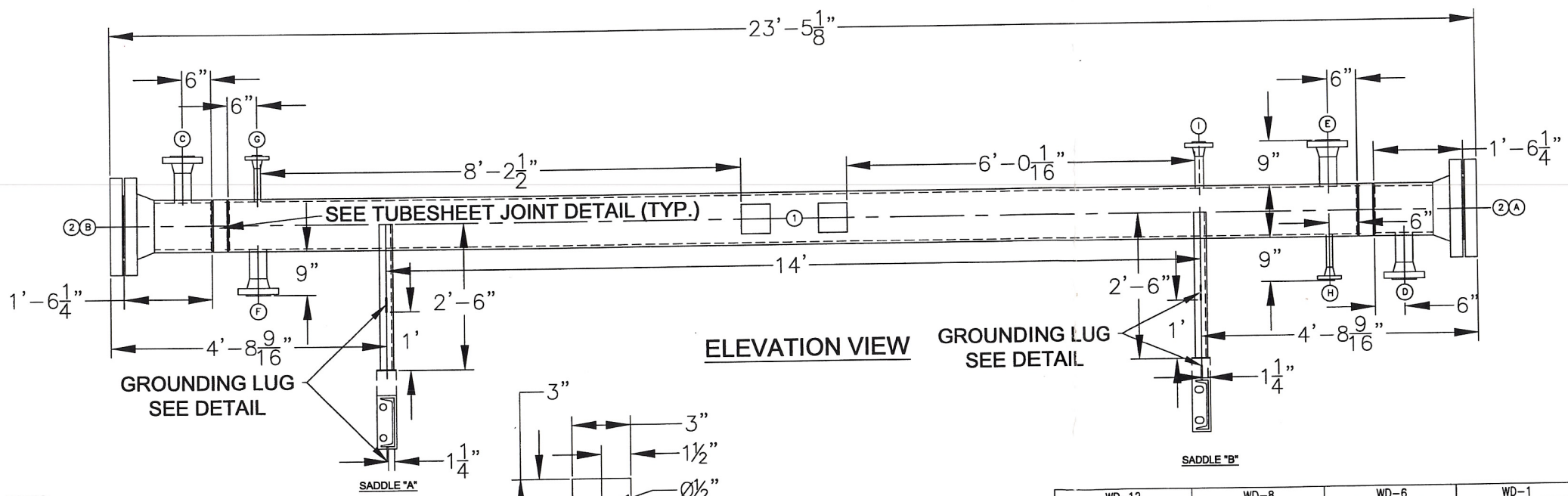
CERTIFIED

TUBEHOLE AND TIE ROD LAYOUT

PLAN VIEW



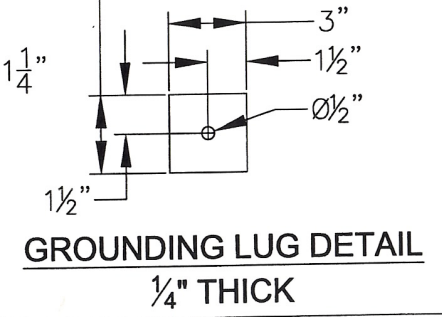
BUNDLE ELEVATION



ELEVATION VIEW

GROUNDING LUG
SEE DETAIL

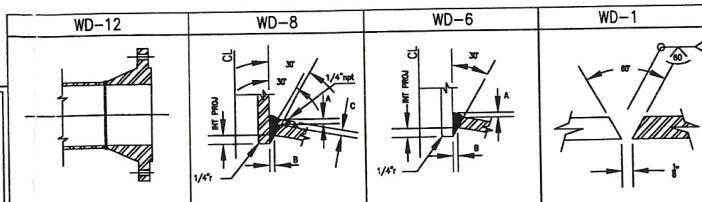
GROUNDING LUG
SEE DETAIL

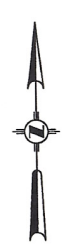


GROUNDING LUG DETAIL
1/4" THICK

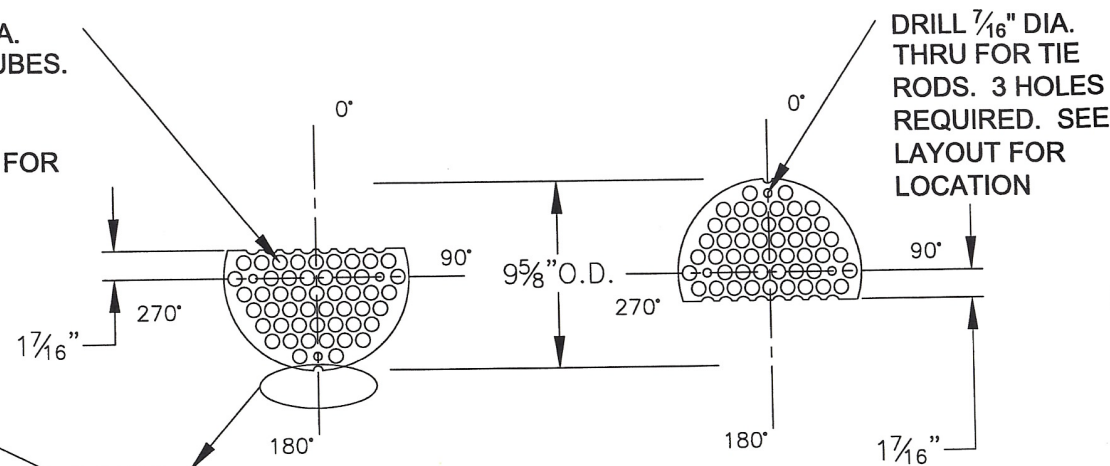
- NOTES:
1. ALL BOLT HOLES TO STRADDLE NATURAL CENTERLINES OF VESSEL
 2. ANTISIEZE TO BE APPLIED TO ALL BOLTING PRIOR TO TIGHTENING
 3. ALL WELD JOINTS AND 1" ON EITHER SIDE OF JOINT TO BE CLEANED PRIOR TO WELDING.
 4. ALL WELDED CONSTRUCTION.
 5. REVISION DESIGNATION CHANGED FROM USING NUMERIC TO USING ALPHABETIC PRIOR TO FABRICATION. PREVIOUS REVISIONS 1 AND 2 ARE NOW REVISIONS A AND B. DRAWING IS REVISION 0 WHEN RELEASED FOR FABRICATION.
 6. FOR PAINTING, USE THE ENGINEERING SPEC 5141-42.1443.02-5 SPECIFICATION FOR K2 SOPERTON PLANT PAINTING.

NOTICE
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DRILL $\frac{25}{32}$ " DIA. THRU FOR TUBES. 72 HOLES REQUIRED. SEE LAYOUT FOR LOCATION.



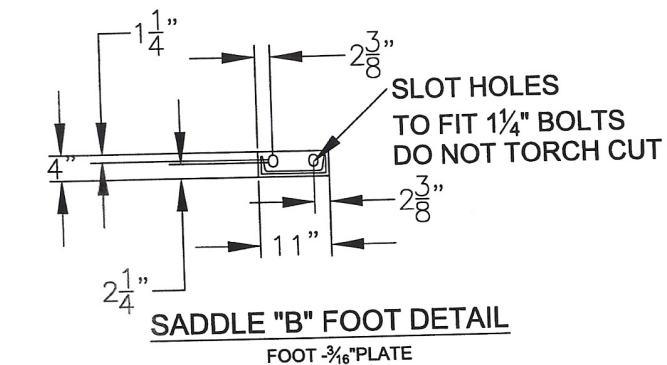
DRILL 1/2" DIA. HOLE THRU AS SHOWN.

NOTCH DETAIL
(TYP. ALL BAFFLES TOP AND BOTTOM)

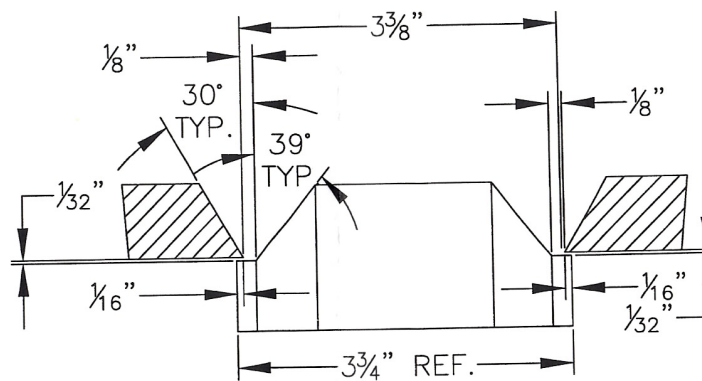
BAFFLE DETAILS

DRILL HOLES TO FIT 1 1/4" BOLTS DO NOT TORCH CUT

SADDLE "A" FOOT DETAIL
FOOT 3/16" PLATE

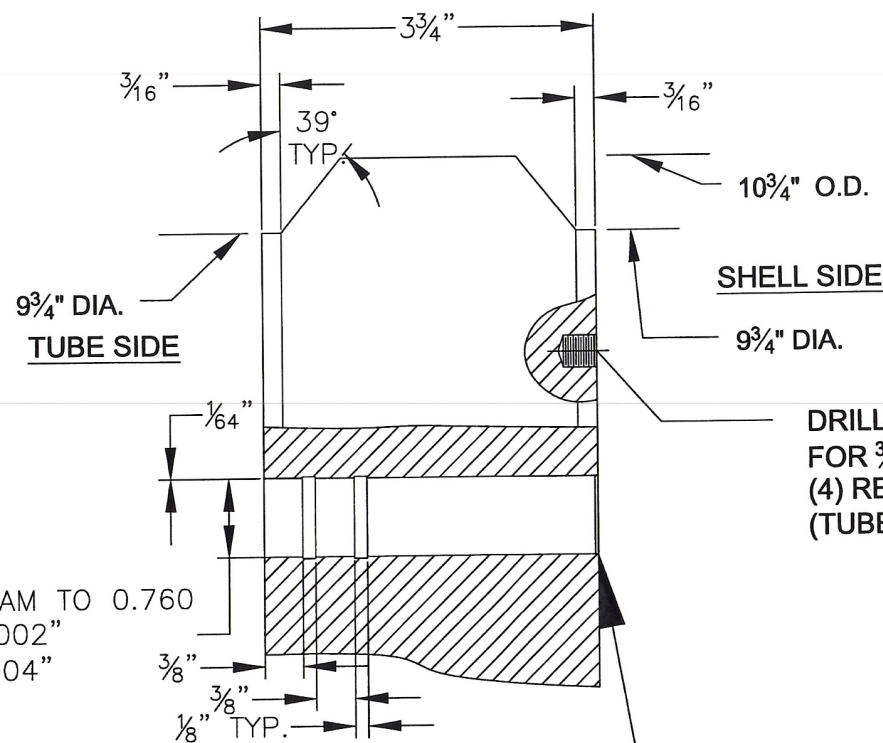


CERTIFIED



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

TUBESHEET JOINT DETAIL



DRILL AND REAM TO 0.760 + 0.002" - 0.004"

TUBESHEET MACHINING DETAIL

DRILL 5/16" DIA. AND 5/8" DEEP AND TAP FOR 3/8"-16 UNC TIE RODS. (4) REQ'D. SEE LAYOUT FOR LOCATION. (TUBESHEET "A" ONLY)

1/32" X 45 DEG. CHMFR.

NB

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6535 NORTH WASHINGTON STREET
DENVER, COLORADO

TUBE SIDE
MAWP 800/FV PSI AT 250/350 °F
MDMT 20 °F AT 800 PSI
SERIAL NO. CV-0887
YEAR BUILT 2009

PART NO. 31-E-234
D-1498

NB

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4	2		11" X 4" X 3/16" CS PLATE - SADDLE FOOT	SA-36																										
3	2		NAMEPLATE AND NAMEPLATE BKR	SS/CS																										
2	20		9.625"OD X 0.1825" CS PLATE - BAFFLES	SA-36																										
1	2		TUBESHEET - SEE SHEET 1 OF 2																											
<table border="1"> <thead> <tr> <th>REV</th> <th>DESCRIPTION</th> <th>BY</th> <th>APPD</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>UPDATED TUBE AND SHELL INFORMATION</td> <td>MDH</td> <td>DRR</td> <td>6/13/09</td> </tr> <tr> <td>0</td> <td>CERTIFIED - ISSUED FOR FABRICATION</td> <td>MDH</td> <td>DRR</td> <td>5/1/09</td> </tr> <tr> <td>B</td> <td>CORRECTED GENERAL COMMENTS</td> <td>MDH</td> <td>DRR</td> <td>4/6/09</td> </tr> <tr> <td>A</td> <td>UPDATED SADDLES AND MISC. CLEANUP</td> <td>MDH</td> <td>DRR</td> <td>3/23/09</td> </tr> </tbody> </table>						REV	DESCRIPTION	BY	APPD	DATE	1	UPDATED TUBE AND SHELL INFORMATION	MDH	DRR	6/13/09	0	CERTIFIED - ISSUED FOR FABRICATION	MDH	DRR	5/1/09	B	CORRECTED GENERAL COMMENTS	MDH	DRR	4/6/09	A	UPDATED SADDLES AND MISC. CLEANUP	MDH	DRR	3/23/09
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DRAWN BY: MDH	CHECKED BY: DRR	APPROVED DRR	DATE: 5/1/09	SCALE: NTS
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