

100492

FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1. Manufactured and certified by REDMAN-EQUIPMENT & MANUFACTURING CO., 19800 NORMANDIE AVENUE, TORRANCE, CA 90502
(Name and address of Manufacturer)
2. Manufactured for UNOCAL AGRICULTURAL PRODUCTS, 231610 EAST GAME FARM ROAD, KENNEWICK, WA 99337
(Name and address of Purchaser)
3. Location of Installation UNOCAL AGRICULTURAL PRODUCTS, 231610 EAST GAME FARM ROAD, KENNEWICK, WA 99337
(Name and address)
4. Type: Horizontal Heat Exchanger 9937 N/A N99-37-A 594 1999
(Horiz., vert., or sphere) (Tank separator, jkt. vessel, heat exch., etc.) (Mfg's serial No.) (CRN) (Drawing No.) (Nat'l. Bd. No.) (Year built)
5. ASME Code, Section VIII, Div. 1 Edition 1998, Addenda 1998 N/A N/A
Edition and Addenda (date) Code Case No. Special Service per UG-120(d)

Items 6 - 11 Incl. to be completed for single wall vessels, jackets of jacketed vessels, shell of heat exchangers, or chamber of multi-chamber vessels.

6. Shell (a) No. of course(s): 3 (b) Overall length (ft & in.): 21'-11 5/8"

Course(s)			Material		Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B & C)			Heat Treatment	
No.	Diameter, in.	Length (ft & in.)	Spec./Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
2	33" ID	8'-0"	SA-516 Gr 70		3/4"	1/8"	1	Spot	.85	1	Spot	.85	N/A	N/A
1	33" ID	5'-11 5/8"	SA-516 Gr 70		3/4"	1/8"	1	Spot	.85	1	Spot	.85	N/A	N/A

7. Heads: (a) SA-516 Gr 70 (No H.T.) (b) See Line 12
(Mat'l Spec. No., Grade or Type) H.T. - Time & Temp. (Mat'l Spec. No., Grade or Type) H.T. - Time & Temp.

	Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a)	End	11/16"	1/8"			2:1				No	Yes			
(b)														

If removable, bolts used (describe other fastening)

N/A

8. Type of jacket N/A Jacket closure N/A
(Mat'l Spec. No., Grade, Size, No.)

If bar, give dimensions N/A

(Describe as ogee & weld, bar, etc.)

If bolted, describe or sketch.

9. MAWP 525 --- psi at max. temp. 250 --- ° F Min. design metal temp. -20 ° F at 525 psi.
(internal) (external) (internal) (external)

10. Impact test Exempt per UG-20(f)

(Indicate yes or no and the component(s) impact tested)

11. Hydro., ~~Hydro.~~, or ~~Hydro.~~ test press 788 Proof test N/A

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: SA-516 Gr 70 34 7/16" 4 1/8" 5/16" Bolted
Stationary (Mat'l Spec. No.) Dia., in. (subject to press.) Nom. thk., in. Corr. Allow., in. Attachment (welded or bolted)
- N/A
Floating (Mat'l Spec. No.) Dia., in. Nom. thk., in. Corr. Allow., in. Attachment

13. Tubes: SA-249 Ty 304L Welded 3/4" .049"(aw) 471 U-Tubes
Mat'l Spec. No., Grade or Type O. D., in. Nom. thk., in. or gauge Number Type (Straight or U)

Items 14 - 18 incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers.

14. Shell (a) No. of course(s): 1 (b) Overall length (ft & in.): 1'-7 13/16"

Course(s)			Material		Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B & C)			Heat Treatment	
No.	Diameter, in.	Length (ft. & in.)	Spec./Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	33" ID	1'-7 13/16"	SA-516 Gr 70		1/2"	1/8"	1	Spot	.85	1	Spot	.85	1150	1.0

15. Heads: (a) SA-516 Gr 70 (1.0 hrs. at 1150 F) (b)
(Mat'l Spec. No., Grade or Type) H.T. - Time & Temp. (Mat'l Spec. No., Grade or Type) H.T. - Time & Temp.

	Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a)	End	7/16"	1/8"			2:1				No	Yes			
(b)														

If removable, bolts used (describe other fastening)

N/A

(Mat'l Spec. No., Grade, Size, No.)

16. MAWP 75 psi at max. temp. 190 ° F Min. design metal temp. -20 ° F at
(internal) (external) (internal) (external)

17. Impact test Exempt per UG-20(f)

(Indicate yes or no and the component(s) impact tested)

18. Hydro., ~~Hydro.~~, or ~~Hydro.~~ test pressure 113 Proof test N/A

19. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc.)	No.	Diameter or Size	Flange Type	Material		Nozzle Thickness		Reinforcement Material	How Attached		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
Shell Inlet	1	8"-300#	RFWN	SA-106 Gr B SMLS	SA-105	0.500"	1/8"	SA-516 Gr 70 (1)	Welded	Welded	
Shell Outlet	1	8"-300#	RFWN	SA-106 Gr B SMLS	SA-105	0.500"	1/8"	SA-516 Gr 70 (1)	Welded	Welded	
Chan. Inlet	1	10"-150#	RFWN	SA-106 Gr B SMLS	SA-105	0.500"	1/8"	None	Welded	Welded	
Chan. Outlet	1	10"-150#	RFWN	SA-106 Gr B SMLS	SA-105	0.500"	1/8"	None	Welded	Welded	
Auxiliaries	8	3/4"-6000#	CPLG	SA-105			1/8"	None	Welded		

20. Supports: Skirt No Lugs 0 Legs 0 Others (2) Saddles Attached Welded to shell
(Yes or No.) (No.) (No.) (Describe) (Where and How)

21. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report:
(List the name of part, item number, mfg's. name and identifying number)

22. Remarks: Safety valves to be provided by owner. (1) 13 1/2" OD x 1/2" thick plate.
MDEA COOLER
33 X 258 X 4079 BEU-2H
P.O. NO. : 74984

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1.

U Certificate of Authorization No. 6047 Expires January 31 2000
Date 6/17/99 Name REDMAN EQUIPMENT & MANUFACTURING CO. Signed A. Erickson
(Manufacturer) (Representative)

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of CA and employed by Hartford Steam Boiler Inspection & Insurance Co. of Connecticut have inspected the pressure vessel described in this Manufacturer's Data Report on 6.17.1999, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.
Date 6.17.99 Signed Cirilo Reyes NB 9435A / CA 1526
(Authorized Inspector) (Natl Board incl. endorsement, State, Province and No.)

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms with the requirements of ASME Code, Section VIII, Division 1.

U Certificate of Authorization No. Expires
Date Name Signed
(Assembler) (Representative)

CERTIFICATE OF FIELD ASSEMBLY INSPECTION

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of and employed by of have compared the statements in this Manufacturer's Data Report with the described pressure vessel and state that parts referred to as data items, not included in the certificate of shop inspection, have been inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel in accordance with ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of psi. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.
Date Signed Commissions
(Authorized Inspector) (Natl Board incl. endorsement, State, Province and No.)

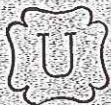
REDMAN EQUIPMENT & MANUFACTURING CO.

19800 NORMANDIE AVENUE TORRANCE, CALIFORNIA

#100492

HEAT EXCHANGER SPECIFICATIONS

1	Customer	Unocal Petroleum Products		Job No.	99-37	Rev.	0
2	Address	P.O. Box 5797		Cust. P.O.	74984		
3		Kennewick WA, 99336		Date	4/8/99	Rev.	0
4	Service	MDEA Cooler		TEMA Type	BEU		
5	Size	33 x 258		Item No.	E-228		
6	Orientation (Horiz./Vert.)	Horizontal		No. in Series	1		
7	Effective Surface/Shell	ft. ²	4079	No. in Parallel	1		
8	PERFORMANCE OF ONE UNIT						
9	Fluid Allocation	SHELL SIDE			TUBE SIDE		
10		Inlet		Outlet	Inlet		Outlet
11	Fluid	MDEA			Water		
12	Flow Rate, Total	lbm./hr.	365,000		1,262,170		
13	Vapor	lbm./hr.	0	0	0	0	
14	Liquid	lbm./hr.	365,000	365,000	1,262,170	1,262,170	
15	Steam	lbm./hr.	0	0	0	0	
16	Noncondensables	lbm./hr.	0	0	0	0	
17	Temperature, Operating	°F	205	110	75	100	
18	Density	lbm./ft. ³	64.65	64.65	64.65	64.65	
19	Viscosity	cP.	1	3.1	0.913	0.68	
20	Molecular Weight, Vapor		0	0	0	0	
21	Molecular Weight, Noncond.		0	0	0	0	
22	Specific Heat	BTU/lbm.-°F	0.91	0.91	1.00	1.00	
23	Conductivity	BTU/hr.-ft.-°F	0.261	0.261	0.358	0.358	
24	Latent Heat	BTU/lbm.	0	0	0	0	
25	Pressure, Operating	psig	450	441.2	30	25.1	
26	Velocity	ft./sec.	-		4.99		
27	Pressure Drop, Allow./Act.	psig	10 / 8.81		10 / 4.92		
28	Fouling Resist.	hr.-ft. ² -°F/BTU	0.002		0.002		
29	Heat Exchanged	BTU/hr.	31,554,300	MTD, Corrected	°F	56.42	Fouling Available
30	Rate, Service	BTU/hr.-ft. ² -°F	137.22	Rate, Clean	BTU/hr.-ft. ² -°F	316.17	hr.-ft.-°F/BTU
31	CONSTRUCTION OF ONE SHELL				SKETCH		
32		Shell side		Tube side			
33	Design Pressure	psig	525	75			
34	Test Pressure	psig	788	113			
35	Design Temperature	°F	250	190			
36	MDMT	°F	-20	-20			
37	Corrosion Allowance	in.	1/8"	1/8"			
38	No. Passes		1	2			
39	Connections:	Inlet	8"-300# RF WN	10"-150# RF WN			
40		Outlet	8"-300# RF WN	10"-150# RF WN			
41		Auxiliary	3/4"-6000# CPLG.	3/4"-6000# CPLG.			
42	Tubes		Materials		Baffles		
43	Type (Straight/U-Tube)	U-Tubes	Shell	SA-516-70	Spacing in.	14 1/8"	
44	No.	471	Shell Cover / Head	SA-516-70	Pct. Cut(NFA)	15%	
45	OD	in. 3/4	Channel	SA-516-70	Type Sgmts.	Single	
46	Material	SA-249 Tp 304L	Channel Cover / Head	SA-516-70	Type Cuts	Vertical	
47	Wall Thickness	in. 0.049	Tubesheets	SA-516-70	Material	SA-36	
48	Min. Wall/Avg. Wall	AVG.	Floating Head Cover	-	Long. Baffle	No	
49	Straight Length	in. 258	Body Flanges	SA-105	Estimated Weight Data (lbs.)		
50	Pitch	in. 15/16	Mean Metal Temperatures (°F)		Dry	14,750	
51	Pitch Type	° 60-Rot.Triangle	Shell	141.2	Full of water	22,150	
52	Welded/Seamless	Welded	Tubes	96.4	Bundle	8,250	
53	Plain/Finned	Plain	Expansion Joint	No	Miscellaneous		
54	Tube-to-Tubesheet Joint	Rolled	Gaskets		Seal Strips	No	
55	Construction Codes		Shell-side	DJSC	Skid Bars	No	
56	ASME Code	Section VIII, Div. I	Tube-side	DJSC	Imp. Plate	Yes	
57	Stamp	Yes	Floating Head	-	Inlet pv ²	1,581	
58	TEMA Class	R	Remarks				
59	Customer Specifications	Yes	1.	Sandblast & paint w/ inorganic zinc			
60	National Board Registration	Yes	2.	Stress relieve shell and U-bends			
61	Prepared By	R. Erickson	3.	Spot RT shell & channel			



W
RT3
PHT

NAT'L. BD. NO. 594

CERTIFIED BY
REDMAN EQUIPMENT and MANUFACTURING CO.
TORRANCE, CALIFORNIA

	MAWP (PSI)	SHELL	TUBES
	at °F	525	75
		250	190
YEAR BUILT	MDMT (°F)	-20	-20
	at PSI	525	75
1999	TEST PRESSURE	788	113

HEAT EXCHANGER

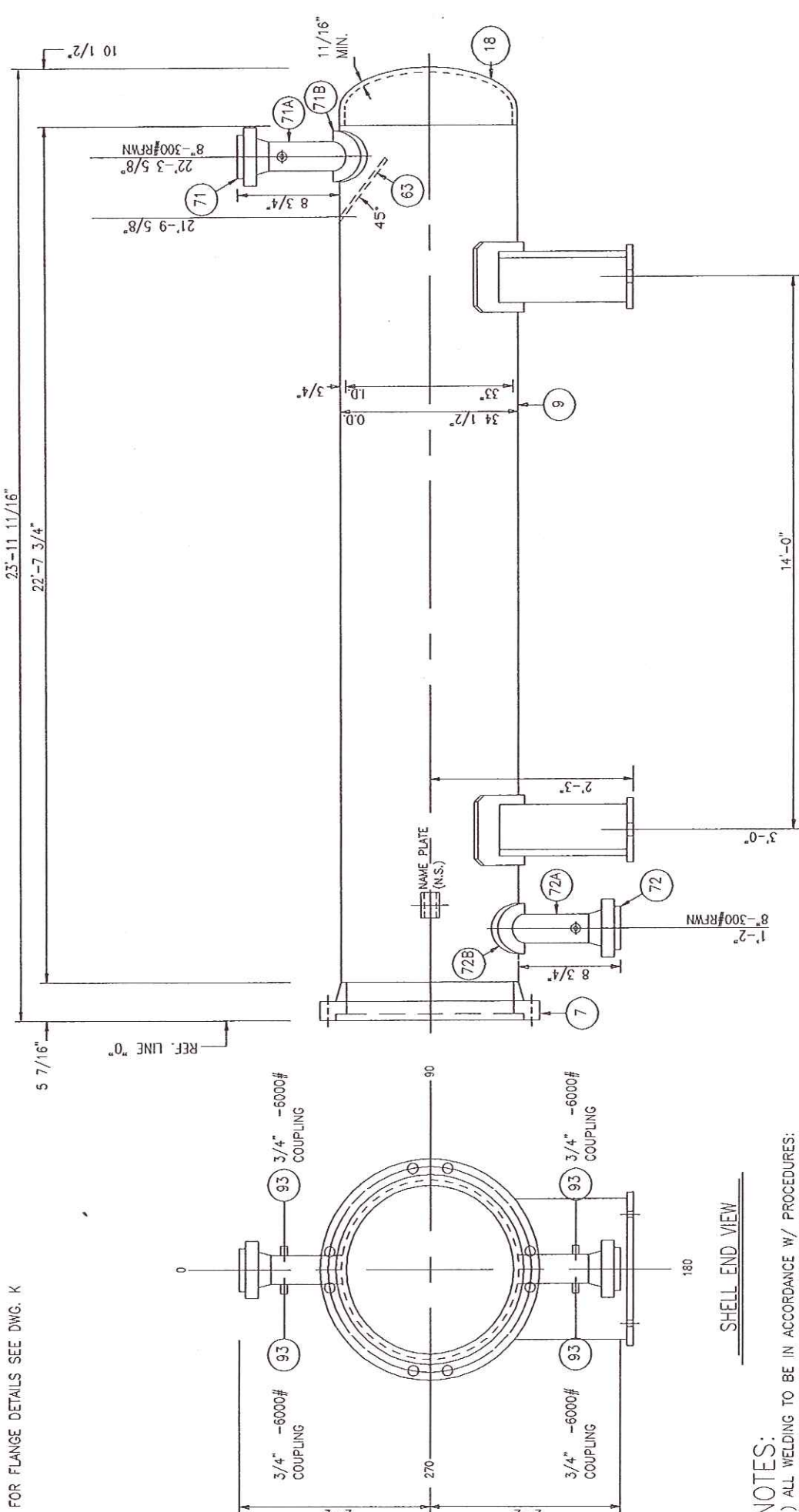
MFG. S/N 9937

MDEA COOLER

SIZE 33 X 258 X 4079 **TYPE** BEU-2H

ITEM NO. E-228 **P.O.** 74984

FOR FLANGE DETAILS SEE DWG. K



NOTES:

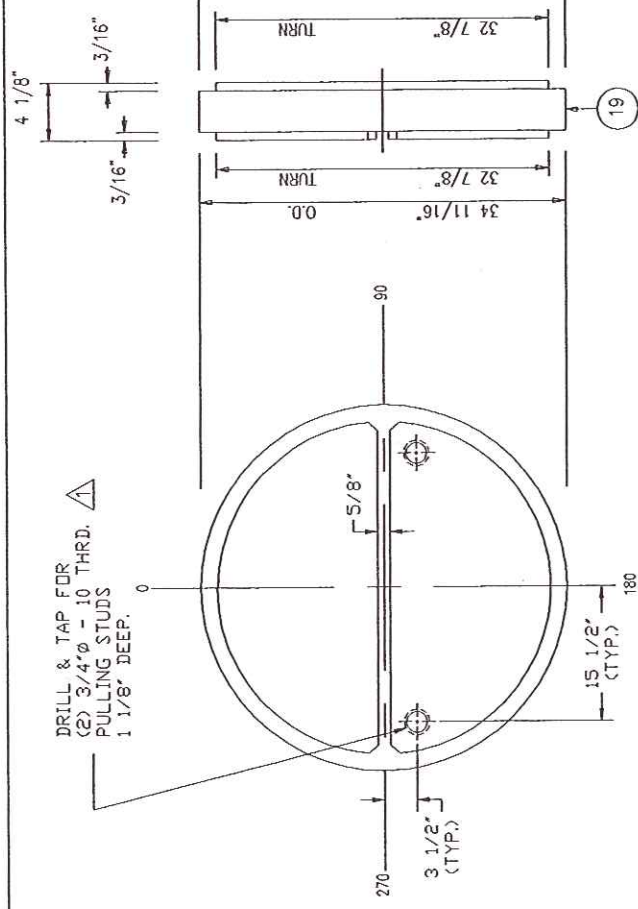
- 1) ALL WELDING TO BE IN ACCORDANCE W/ PROCEDURES:
- 2) ALL BOLT HOLES TO STRADDLE CENTER LINES.
- 3) FOR WELD AND BEVEL DETAILS SEE DWG. Z
- 4) GRIND ALL INSIDE WELDS FLUSH.
- 5) SPOT RADIOGRAPHY.
- 6) POST-WELD HEAT TREAT SHELL:
 - A) HEAT FROM 800 °F TO 1150 °F AT 400 °F PER HOUR.
 - B) HOLD AT 1150°F FOR (1.00) HOURS (MIN).
 - C) COOL FROM 1150°F TO 800 °F AT 500 °F PER HOUR.
 - D) FURTHER COOLING MAY BE IN STILL AIR.

NO.		DATE	REVISIONS
1	4/28	4/28	ADDED HEAT TREAT NOTES
DWG. NO. N99-37-B			
REV. 1			

E-228
SHELL DETAILS
Redman Equipment
& Manufacturing Co.
Torrance, CA

DWN. BY R.V.E.
DATE 4-7-99
CHK. BY [Signature]

DRILL & TAP 3/4" DEEP FOR 8.- 1/2" DIA.
TIE RODS ON SHELL SIDE OF
19 TUBESHEET. DO NOT DRILL THRU!!
(SEE TUBE LAYOUT FOR LOCATIONS.)

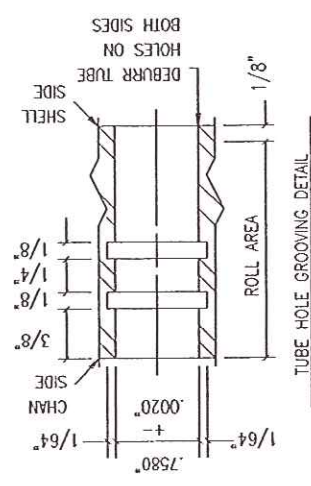


CHANNEL SIDE

SHELL SIDE

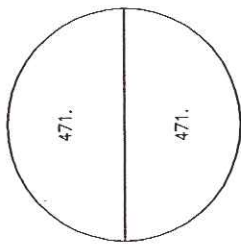
NOTES:

- 1) MACHINE ALL SURFACES TO 250 RMS EXCEPT GASKET FACES TO BE 125 RMS.
- 2) ALL PASS PLATE GROOVE WIDTHS TO BE 5/8" WIDE.
- 3) ALL PASS PLATE GROOVE JOINTS TO BE NOTCHED 3/8" AT 45 Deg.



TUBE HOLE GROOVING DETAIL

E-228		TUBESHEET DETAILS	
DWN. BY	R.W.E.	Redman Equipment & Manufacturing Co.	
DATE	4-7-99	Torrance, CA	
CKD. BY		DWG. NO.	N99-37-F
NO.	5/7	CHANGED THREADS TO NC	REV. 1
DATE		REVISIONS	



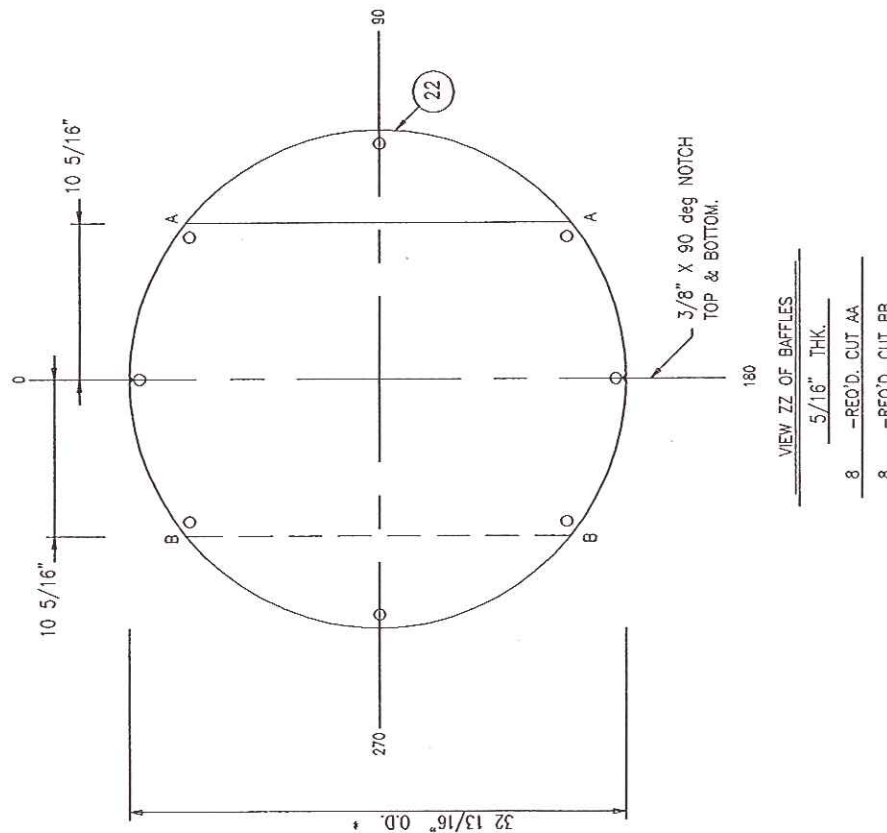
TUBE DISTRIBUTION

NOTES:

- 1) DRILL AND REAM TUBE HOLES IN TUBESHEETS TO .7580" $\pm$.0020" DIA.
FOR 471 - 3/4" O.D. U-TUBES.
TOTAL HOLES = 942
- 2) TUBE PITCH = 15/16" 60° TRIANGLE.
- 3) NUMBER OF PASSES = 2
- 4) SEE DRAWING F
FOR TUBE GROOVING DETAILS.
- 5) BAFFLE O.D. = 32 13/16"
- 6) O.T.L. = 32"

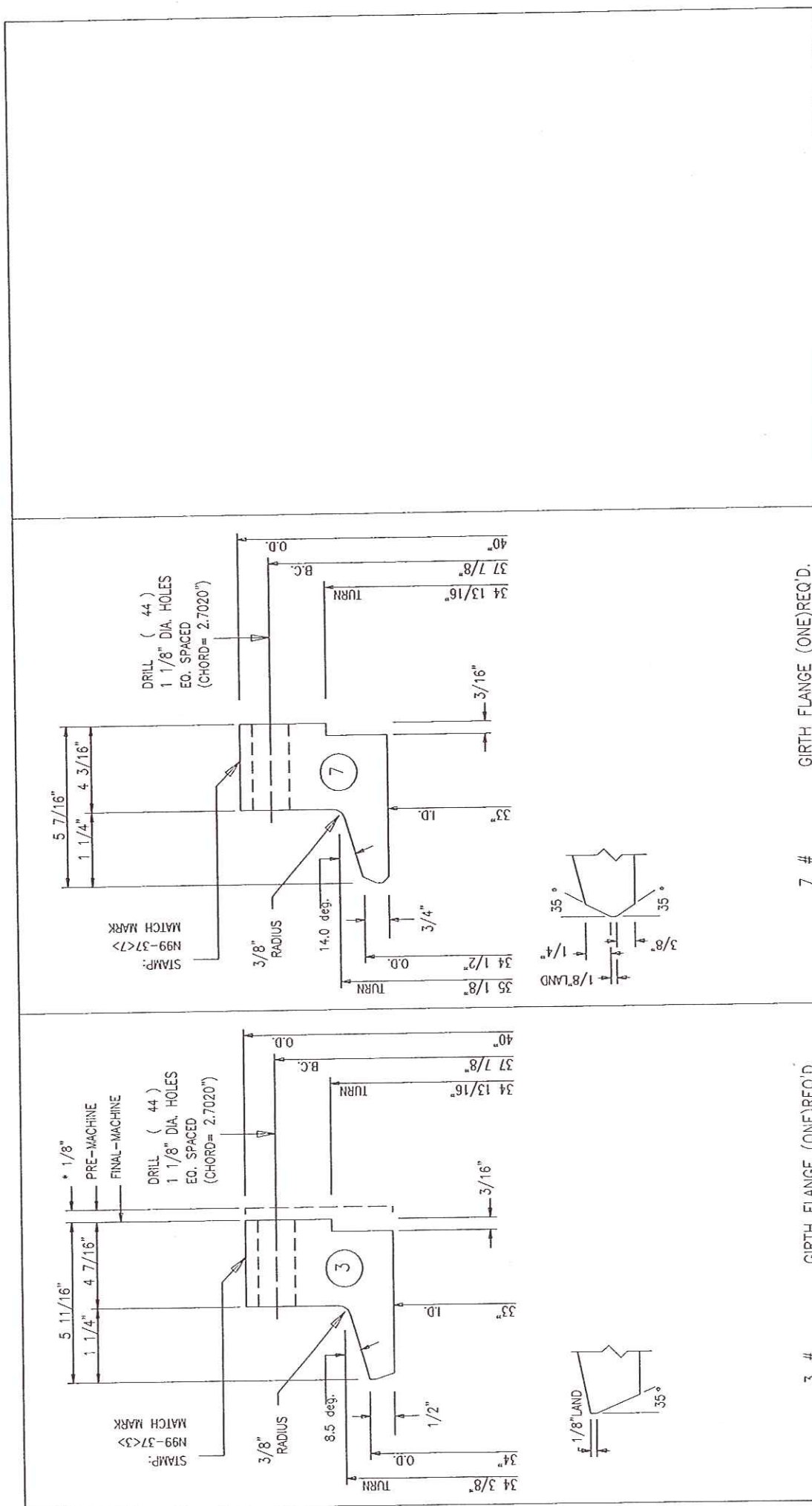
		E-228		TUBE LAYOUT	
		DWN. BY	R.V.E.	Redman Equipment & Manufacturing Co. Torrence, CA	
		DATE	4- 7-99		
		Ckd. by			
		REVISIONS	DWG. NO.		REV.
	NO.	DATE	N99-37-H		0

VIEW LOOKING AT SHELL SIDE OF NO. 19 TUBESHEET



5) MACHINE O.D. OF BAFFLES TO 250 RMS.

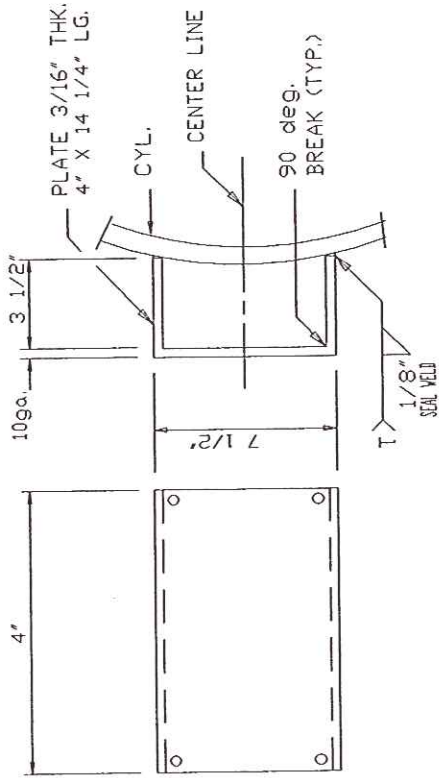
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E-228		GIRTH FLANGES	
OWN. BY	R.W.E.	Redman Equipment & Manufacturing Co.	
DATE	4-7-99	Torrance, CA	
CHKD BY	[Signature]	DWG. NO.	N99-37-K
REV.	0		

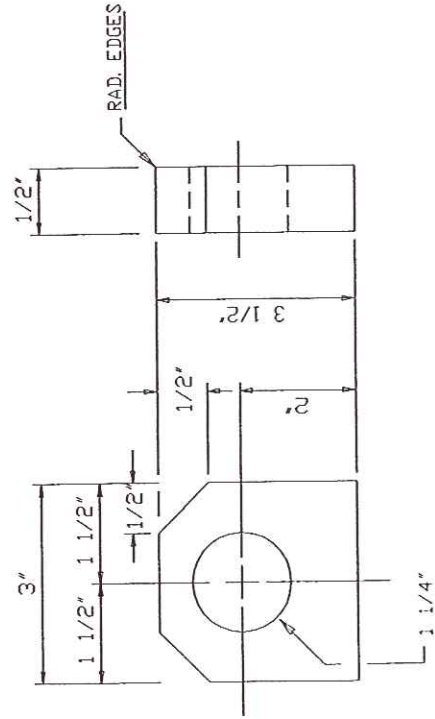
NOTES:

- 1) MACHINE ALL SURFACES TO 250 RMS EXCEPT GASKET SURFACES MACHINE TO 125 RMS.
- 2) ALL BOLT HOLES TO STRADDLE NATURAL CENTER LINES.
- 3) * FINAL MACHINE FACING AFTER FINAL WELDING AND POST WELD HEAT TREATMENT.



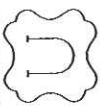
(ONE) REQ'D.

NAME PLATE BRACKET DETAIL

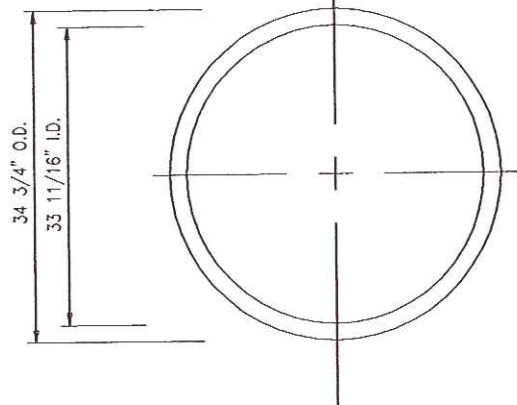


NUMBER REQUIRED (2)

LIFTING LUG DETAIL

		NAT'L. BD. NO. 594 CERTIFIED BY REDMAN EQUIPMENT and MANUFACTURING CO. TORRANCE, CALIFORNIA	
RT3 PHT	W	SHELL	TUBES
		525	75
		250	190
		-20	-20
		525	75
		788	113
YEAR BUILT		TEST PRESSURE	
1999		MFG. S/N 9937	
HEAT EXCHANGER		MDEA COOLER	
SIZE 33 X 258 X 4079		TYPE BEU-2H	
ITEM NO. E-228		P.O. 74984	

NAME PLATE & BRACKET DETAILS	
DWN. BY	R.W.E.
DATE	4-7-99
CND. BY	OWC. NO. N99-37-N
REV.	1

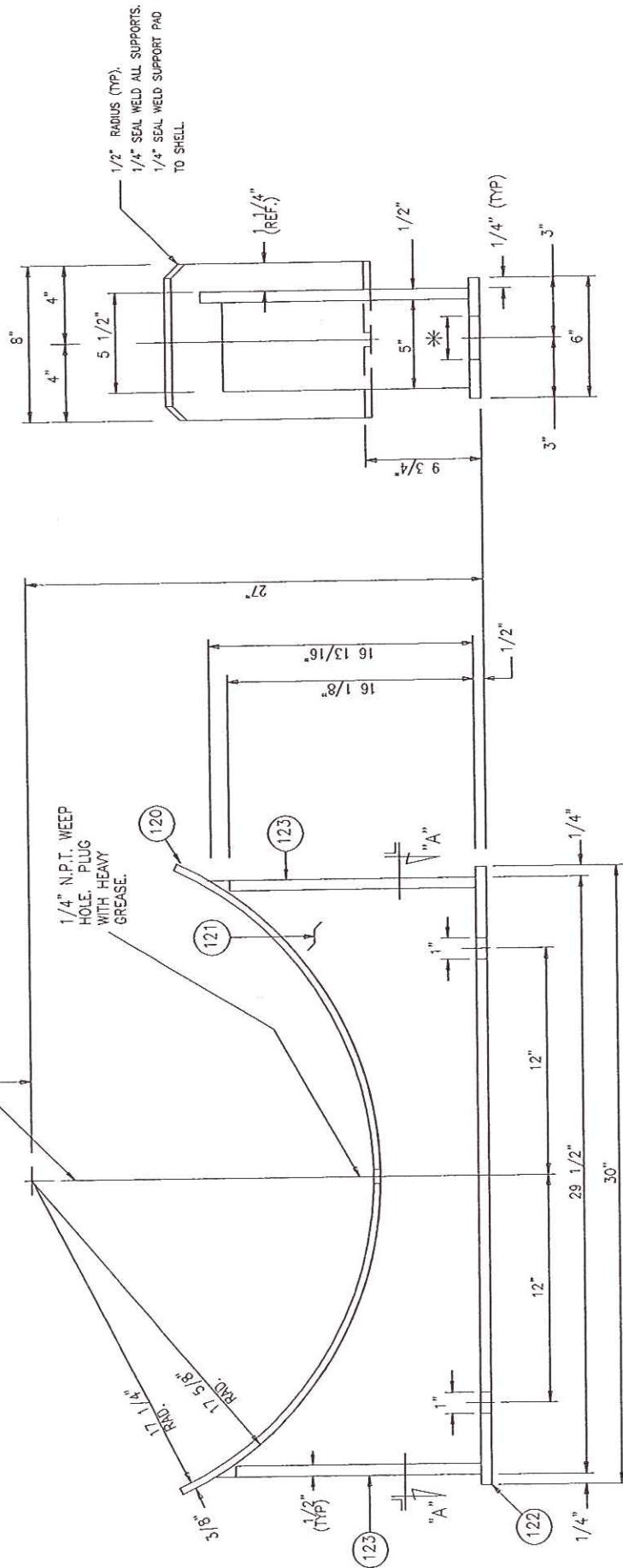


(1)-REQUIRED.
SHELL GASKET.
1/8" AIDJNAF

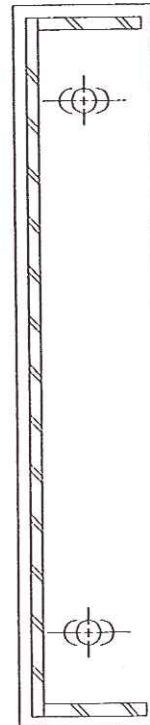
- 1) QUANTITIES SHOWN FOR ONE SET (1)-SET REQUIRED TOTAL.
- 2) ALL RADII TO BE 1/4"

[illegible]

SHELL CENTER LINES



* ONE REQUIRED MARKED 'X' W/ (2.) 1" ROUND HOLES.
 ONE REQUIRED MARKED 'Y' W/ (2.) 1" X 2" LG. SLOTS.



SECTION "A-A"

E-228
 SUPPORT DETAILS

Redman Equipment
 & Manufacturing Co.
 Torrance, CA

DWN. BY
 R.V.E.
 DATE
 4-7-99

CHKD BY
 [Signature]

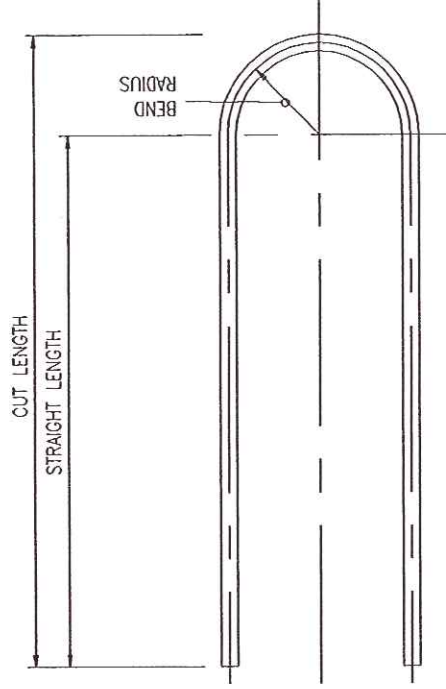
REVISIONS

NO. DATE

DWG. NO.
 N99-37-P

REV.
 0

ROW	NO. OF TUBES	BEND RADIUS	BEND DIAMETER	BEND LENGTH	STRAIGHT LENGTH	CUT LENGTH	DEVELOPED LENGTH
A	33.	1 1/8"	2 1/4"	0'-3 9/16"	21'-6"	21'-7 1/2"	43'-3 9/16"
B	34.	1 15/16"	3 7/8"	0'-6 1/8"	21'-6"	21'-8 5/16"	43'-6 1/8"
C	33.	2 3/4"	5 1/2"	0'-8 11/16"	21'-6"	21'-9 1/8"	43'-8 11/16"
D	32.	3 9/16"	7 1/8"	0'-11 1/4"	21'-6"	21'-9 15/16"	43'-11 1/4"
E	33.	4 3/8"	8 3/4"	1'-1 3/4"	21'-6"	21'-10 3/4"	44'-1 3/4"
F	32.	5 3/16"	10 3/8"	1'-4 5/16"	21'-6"	21'-11 9/16"	44'-4 5/16"
G	31.	6"	12"	1'-6 7/8"	21'-6"	22'-0 3/8"	44'-6 7/8"
H	30.	6 13/16"	13 5/8"	1'-9 7/16"	21'-6"	22'-1 3/16"	44'-9 7/16"
J	29.	7 5/8"	15 1/4"	2'-0"	21'-6"	22'-2"	45'-0"
K	28.	8 7/16"	16 7/8"	2'-2 9/16"	21'-6"	22'-2 13/16"	45'-2 9/16"
L	27.	9 1/4"	18 1/2"	2'-5 1/16"	21'-6"	22'-3 5/8"	45'-5 1/16"
M	26.	10 1/16"	20 1/8"	2'-7 5/8"	21'-6"	22'-4 7/16"	45'-7 5/8"
N	23.	10 7/8"	21 3/4"	2'-10 3/16"	21'-6"	22'-5 1/4"	45'-10 3/16"
O	22.	11 11/16"	23 3/8"	3'-0 3/4"	21'-6"	22'-6 1/16"	46'-0 3/4"
P	19.	12 1/2"	25"	3'-3 5/16"	21'-6"	22'-6 7/8"	46'-3 5/16"
Q	18.	13 5/16"	26 5/8"	3'-5 7/8"	21'-6"	22'-7 11/16"	46'-5 7/8"
R	13.	14 1/8"	28 1/4"	3'-8 3/8"	21'-6"	22'-8 1/2"	46'-8 3/8"
S	8.	14 15/16"	29 7/8"	3'-10 15/16"	21'-6"	22'-9 5/16"	46'-10 15/16"



TOTAL NO. REQUIRED: 471.
 SIZE: 3/4" X 0.049"(ow)
 MATERIAL: SA-249TP304L

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

QUANTITIES SHOWN ARE FOR
 ONE SET OF U-TUBES,
 1 -SET REQ'D. TOTAL.

ELECTRIC RESISTANCE
 STRESS RELIEVE U-BENDS PLUS
 1'-0" BEYOND BEND TANGENT AT 1800°F. Δ

E-228		TUBE BENDING SCHEDULE	
DWN. BY	R. V. E.	Redman Equipment & Manufacturing Co.	
DATE	4-7-99	Torrance, CA	
CKO. BY	<i>[Signature]</i>	DWG. NO.	N99-37-S
REV.	1		

SHELL LONG. & GIRTH SEAMS	SHELL LONG. & GIRTH SEAMS	SHELL LONG. & GIRTH SEAMS	SHELL LONG. & GIRTH SEAMS	SHELL LONG. & GIRTH SEAMS
FRONT CHAN LONG. & GIRTH SEAMS	FRONT CHAN LONG. & GIRTH SEAMS	FRONT CHAN LONG. & GIRTH SEAMS	FRONT CHAN LONG. & GIRTH SEAMS	FRONT CHAN LONG. & GIRTH SEAMS
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GENERAL NOTES 1) ALL WELDING TO BE IN ACCORDANCE W/ ASME CODE (SECTION IX) *2) ALL FILLET WELDS TO BE 3/8" UNLESS NOTED OTHERWISE.	NO. DATE REVISIONS	NO. DATE REVISIONS	NO. DATE REVISIONS	NO. DATE REVISIONS
WELD & BEVEL DETAILS	WELD & BEVEL DETAILS	WELD & BEVEL DETAILS	WELD & BEVEL DETAILS	WELD & BEVEL DETAILS
Redman Equipment & Manufacturing Co. Torrance, CA	Redman Equipment & Manufacturing Co. Torrance, CA	Redman Equipment & Manufacturing Co. Torrance, CA	Redman Equipment & Manufacturing Co. Torrance, CA	Redman Equipment & Manufacturing Co. Torrance, CA
Rev. 0	Rev. 0	Rev. 0	Rev. 0	Rev. 0

MK.NO.	QUAN.	DESCRIPTION	REV	MATERIAL	DUE	P.O. NO.	RCV'D	PRICE
21	471	TUBES 3/4" O.D.X .0490"(aw) THK PER BEND SCHEDULE		SA-249TP304L		9552		
		FORGED RING MATERIAL						
3	1	FLG 40" O.D.X 33" I.D.X 5 11/16" THK (f)		SA-105N		9551		
7	1	FLG 40" O.D.X 33" I.D.X 5 7/16" THK (f)		SA-105N		9551		
		TUBESHEETS & COVERS						
19	1	TUBESHEET 34 11/16" O.D.X 4 1/8" THK (f)		SA-516-70		9549		
		BAFFLES						
22	16	BAFFLES 33 3/16" O.D.X 5/16" THK		SA-36		STOCK		
22A	1	SUPT. PL. 33 3/16" O.D.X 5/8" THK		SA-36		STOCK		
		HEADS						
1	1	ELLIP HD. 33" I.D.X 7/16" THK(min) W/1 1/2" SF		SA-516-70		9550		
18	1	ELLIP HD. 33" I.D.X 11/16" THK(min) W/1 1/2" SF		SA-516-70		9550		
		CYLINDERS						
9	1	R&W CYL 33" I.D.X 3/4" THK X 22'-8 1/4" LG. (106 1/16" WRAP) 2-CYL 8'-0" 1-CYL 6'-8 1/4"		SA-516-70		9556		
4	1	R&W CYL 33" I.D.X 1/2" THK X 1'-8 1/16" LG. (105 1/4" WRAP) X 1/2" THK X 20 1/16" LG.		SA-516-70		9556 9557		
		FORMING						
		ANSI FLANGES						
71	1	ANSI 8" - 300 # RF WN W/ (X-HVY BORE)		SA-105		9553		
72	1	ANSI 8" - 300 # RF WN W/ (X-HVY BORE)		SA-105		9553		
81	1	ANSI 10" - 150 # RF WN W/ (X-HVY BORE)		SA-105		9553		
82	1	ANSI 10" - 150 # RF WN W/ (X-HVY BORE)		SA-105		9553		
71A	1	SMLS.PIPE 8 5/8" ODX(.5000" X-HVY)X 6 1/4" LG.		SA-106B		STOCK		
72A	1	SMLS.PIPE 8 5/8" ODX(.5000" X-HVY)X 6 1/4" LG.		SA-106B		✓		
81A	1	SMLS.PIPE 10 3/4" ODX(.5000" X-HVY)X 7" LG.		SA-106B		✓		
82A	1	SMLS.PIPE 10 3/4" ODX(.5000" X-HVY)X 7" LG.		SA-106B		✓		
71B	1	WELD PAD 13 1/2" O.D.X 9 1/8" I.D.X 1/2" THK				9556		
		PL 13 1/2" X 14" X 1/2" ROLL TO 17 1/4" RAD		SA-516-70		9557		
72B	1	WELD PAD 13 1/2" O.D.X 9 1/8" I.D.X 1/2" THK				9556		
		PL 13 1/2" X 14" X 1/2" ROLL TO 17 1/4" RAD		SA-516-70		9557		
		COUPLINGS						
93	8	3/4" -6000# WELD IN COUPLINGS W/ PLUGS		SA-105		STOCK		
		BOLTING & GASKETS						
40	1	LOT OF GASKETS PER DWG. N99-37-0				9554		
41	44	1" ROUND X 8 THREAD STUDS X 14 3/4" LG. 3&7		SA-193B7		9555		
42	88	1" HEAVY HEX NUTS		SA-194-2H		9555		

(*) DENOTES PRELIMINARY ORDER.

CUSTOMER: UNOCAL PETROLEUM PRODUCTS & CHEMICALS
P.O. NO.: 74984
ITEM NO.: E-228

PRE-BILL ISSUE
DATE: _____

FINAL-BILL ISSUE
DATE: _____

BILL OF MATERIAL

DWN. BY
R.W.E.

DATE
4/ 8/99

CKD. BY

Redman Equipment
& Manufacturing Co.
Torrance, CA

DWG. NO.
N99-37-Y

REV.
0

NO. DATE REVISIONS

