

FORM U-1 MANUFACTURERS' DATA REPORT FOR PRESSURE VESSELS
As required by the Provisions of the ASME Code Rules, Section VIII, Division I

106768
19E72A-R

1. Manufactured by Tri-Ex Thermal Division, Zurn Industries, Inc. Tulsa, Oklahoma
(Name and address of Manufacturer)

2. Manufactured for Clark Oil & Refining Company
(Name and address of Purchaser)

3. Type Horiz Kind Haat Exch Vessel No. 72-945-1 (Mfrs. Serial) (State & State No.) Natl. Bd. No. Yr. Built 1972
(Horiz. or Vert.) (Tank, Jacketed, Heat Exch.)

Items 4-9 incl. to be completed for single wall vessels (such as air tanks), jackets of jacketed vessels, or shells of heat exchangers.

4. SHELL: Material SA-240-304 T.S. 75000 Nominal Thickness 1/4 In. Corrosion Allowance 0 In. Diam. 2 Ft. 9 1/2 Length 9 Ft. 8 3/8 In.
(Kind and Spec. No.) (Fig. or F.B. & Spec. Min. T.S.)

5. SEAMS: Long DBL. Butt H.T. No R.T. None Sectioned No Efficiency 70 %
(Welded, Dbl., Single, Lap, Butt) (Yes or No) (Spot or Complete) (Yes or No)
DBL. Butt and Single
Girth Wld w/back up H.T. No R.T. None Sectioned No No. of Courses 2

If riveted describe seams fully on reverse side of form.

6. HEADS (a) Material T.S. (b) Material T.S.
Location Thickness Crown Radius Knuckle Radius Elliptical Ratio Conical Apex Angle Hemispherical Radius Flat Diameter Side to Pressure
(Top, bottom, ends) (Convex or Concave)

(a)

(b)

If removable, bolts used (Material, Spec. No., T.S., Size, Number) Other fastening (Describe or Attach Sketch)

7. STAYBOLTS: If hollow Attachment Pitch X (Horiz.) (Vert.) Diam. (Nominal)
(Material) (Size of Hole) (Threaded, Welded)

8. JACKET CLOSURE:
(Describe as ogee & weld, bar, etc. If bar, give dimensions, if bolted, describe or sketch)

9. Constructed for max. allowable working press 75 & FV psi at max. temp. 450 °F. Min. temp. (when less than -20°) °F. Hydrostatic or Pneumatic or Combination Test Press 144 psi.

Items 10 and 11 to be completed for tube sections.

10. TUBE SHEETS: Stationary. Material SA-240-304L Diam. 35 1/4 In. Thickness 1 13/16 In. Attachment Welded
(Kind & Spec. No.) (Subject to Pressure) (Welded, Bolted)

(2)
Floating. Material (Kind & Spec. No.) Diam. In. Thickness In. Attachment

11. TUBES: Material SA-249-304 O.D. 3/4 In. Thickness 16 (m) Laches or Gage Number 665 Type
(Kind & Spec. No.) (Straight or U)

Items 12-15 incl. to be completed for inner chambers of jacketed vessels, or channels of heat exchangers.

(2) 12. SHELL Material SA-515-70 T.S. PV-70000 Nominal Thickness 3/8 In. Corrosion Allowance 1/16 In. Diam. 2 Ft. 9 3/4 Length 1 Ft. 0 1 1/2 In.
(Kind and Spec. No.) (Fig. or F.B. & Spec. Min. T.S.)

13. SEAMS: Long DBL. Butt H.T. No R.T. None Sectioned No Efficiency 70 %
(Welded, Dbl., Single, Lap, Butt) (Yes or No) (Spot or Complete) (Yes or No)
DBL. Butt and
Girth Lap Joint H.T. No R.T. None Sectioned No No. of courses 1/1

If riveted describe seams fully on reverse side of form.

14. HEADS (a) Material T.S. (b) Material SA-515-70 T.S. SPV70000 (c) Material T.S.
Location Thickness Crown Radius Knuckle Radius Elliptical Ratio Conical Apex Angle Hemispherical Radius Flat Diameter Side to Pressure
(Top, bottom, ends) (Convex or Concave)

(a) Top, bottom, ends

(2) (b) Channel 3/8" (nom) 2:1 Concave

(c) Floating

If removable, bolts used (a) (Material, Spec. No., T.S., Size, Number) (b) SA-193-B7;125000;5/8" Ø 64

(c) Other fastening Heads weld to cyls
(Describe or Attach Sketch)

15. Constructed for max. allowable working press 75 psi at max. temp. 200 °F. Min. temp. (when less than -20°) °F. Hydrostatic or Pneumatic or Combination Test Press 115 psi.

Items below to be completed for all vessels where applicable.

16. SAFETY VALVE OUTLETS: Number Size Location

Purpose (Inlet, Outlet, Drain)	Number	Diam. or Size	Type	Material	Thickness	Reinforcement Material	How Attached
Chan In	1	6"-150#	Pipe	SA-106-B	.432"	Weld	Welded
Chan Out	1	6"-150#	Pipe	SA-106-B	.432"	Weld	Welded
Shell In	1	30" O.D.	R&W eye	SA-240-304	1/4"	SA-240-304	Welded
Shell Out	1	2 1/2" 300#	Pipe	SA-312-304	.203"	Weld	Welded
Aux Noz	1	2 1/2" 300#	Pipe	SA-312-304	.203"	Weld	Welded
Aux Nozs	2	3" 300#	Pipe	SA-312-304	.216	Weld	Welded

¹ If postweld heat-treated.

² List under remarks other internal or external pressures with coincident temperature when applicable.

18. INSPECTION Manholes, No. _____ Size _____ Location _____
OPENINGS: Handholes, No. _____ Size _____ Location _____
Threaded, No. _____ Size _____ Location _____
19. SUPPORTS: Skirt No _____ Lugs _____ Legs 2 _____ Other _____ Attached S/W
(Yes or No) (Number) (Describe) (Where & How)

20. REMARKS: 33-120 BEM Flash Co. Condenser
Item No. 19E72A-R
P.O. No. 31564

(Brief description of purpose of the vessel, as Air Tank, After Cooler, Jacketed Cooker, etc. State contents of each part.)

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 I.

Date June 19, 1972 Signed Tri-Ex Thermal Division
(Manufacturer)

By Jim Thompson
Jim Thompson

Certificate of Authorization Expires December 31, 1972

CERTIFICATE OF SHOP INSPECTION

VESSEL MADE BY Tri-Ex Thermal Division at Tulsa, Oklahoma

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province Arkansas and employed by Employers Commercial Union Ins. Company of _____ have inspected the pressure vessel described in this manufacturer's data report on 6-20 1972, and state that to the best of my knowledge and belief, the manufacturer has constructed this pressure vessel in accordance with the applicable sections of the ASME Boiler and Pressure Vessel Code.

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 6-20 1972

D. F. Vinyard
Inspectors Signature

Commissions Arkansas 346
Nat'l Board, State, or Province and No.

CERTIFICATE OF FIELD ASSEMBLY INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province _____ and employed by _____ of _____

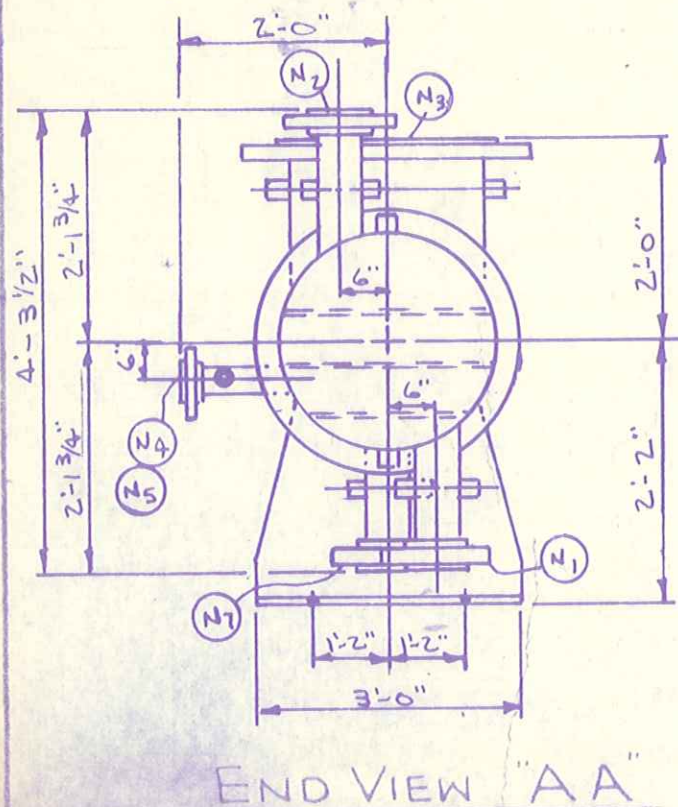
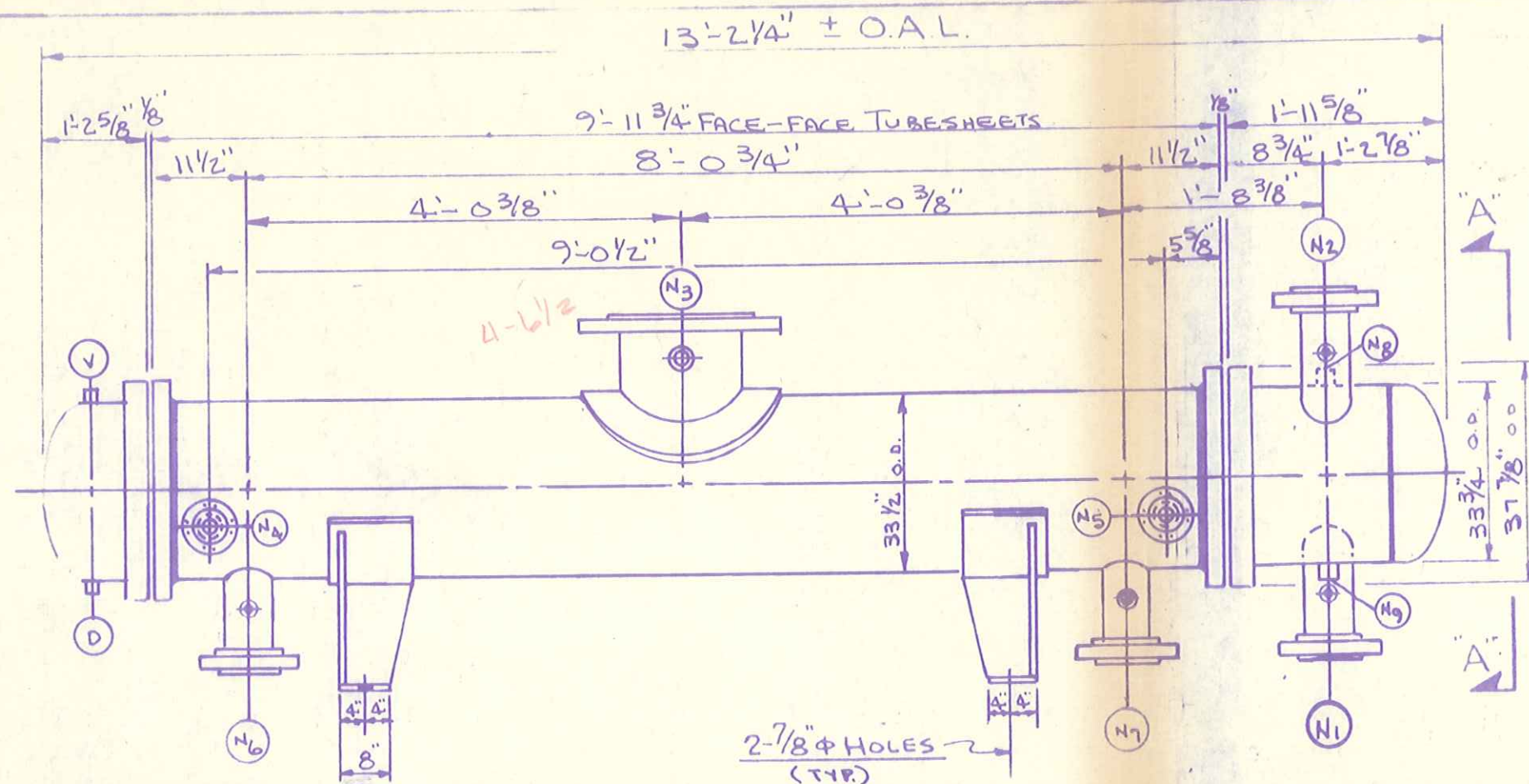
_____ have compared the statements in this manufacturer's data report with the described pressure vessel and state that parts referred to as data items _____, not included in the certificate of shop inspection have been inspected by me and that to the best of my knowledge and belief the manufacturer has constructed and assembled this pressure vessel in accordance with the applicable sections of the ASME Boiler and Pressure vessel Code. 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 _____ 19 _____

Inspector's Signature

Commissions _____
Nat'l Board, State, or Province and No.



NOTE: SHIP SUPPORTS LOOSE

	SHELL	CHAN	MATERIALS
DESIGN PRESS. P.S.I.	75 ± F.V.	75	TUBES: SA-249 TP304
TEST PRESS. P.S.I.	144	115	TUBESHTS: SA-240 TP304
DESIGN TEMP °F	450	200	CHAN. FLGS: SA-105-II
CORR. ALLOW	0	1/16	CHAN. CYL: SA-515-70
NO. PASSES	ONE	6	CHAN. HD: SA-515-70
X-RAY	No	No	SHELL CYL: SA-240 TP304
HEAT TREAT	No	No	BAFFLE: 304 S.S.

TUBES 665 - 3/4" O.D. x 16 BWG x 10'-0" LG
 TUBE PITCH: 1 5/16" Δ
 ALL BOLT HOLES TO STRADDLE E'S
 2 - 3/4" - 3000# CPLG'S IN EACH NOZZLE
 PAINT ONE COAT RED ZINC CHROMATE PRIMER (C-STL. PARTS ONLY)
 GASKETS: 1/8" THK. J.-M. #60

106768

TEMA "C", ASME CODE (SECTION VIII, DIVISION 1) & SO STAMPED.

CUSTOMER: CLARK OIL & REFINING Co.

P.O. No.: 31564

ITEM NO.: 19E72A R

EXCHANGER FILE
19-E-72A R

REV	DATE	DESCRIPTION	BY	EST. WEIGHTS
				DRY: 8,800
				WET: 12,500

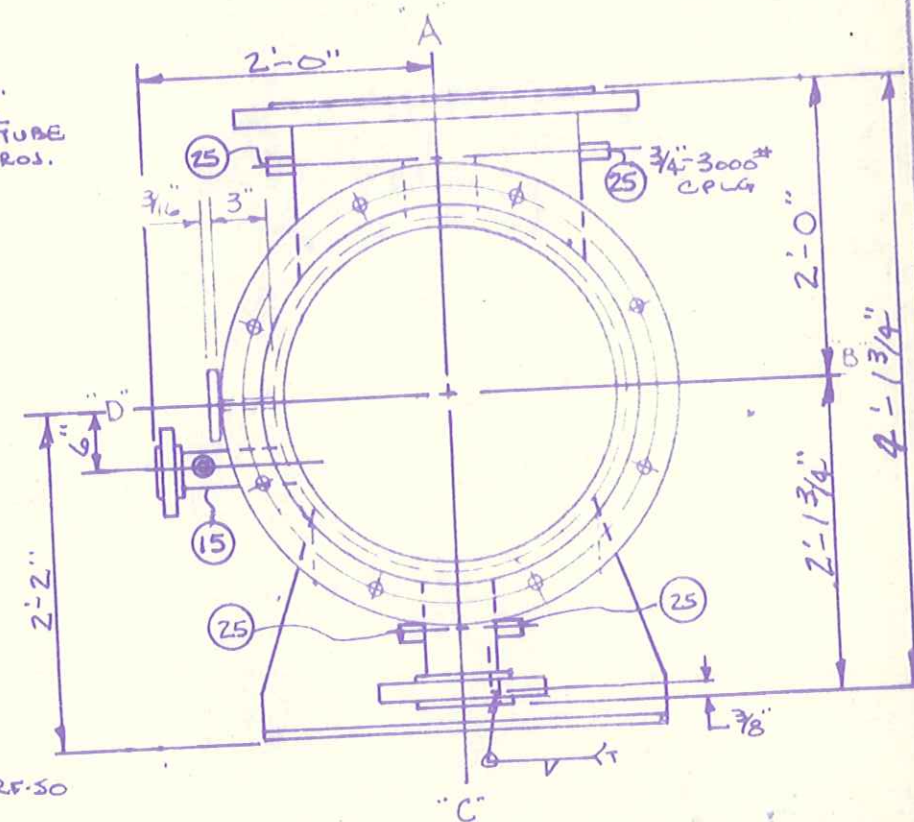
NOZZLES	
N1	6"-150# RF-SO
N2	6"-150# RF-SO
N3	30" NOZZLE
N4	2 1/2"-300# RF-SO
N5	2 1/2"-300# RF-SO
N6	3"-300# RF-SO
N7	3"-300# RF-SO
N8	1"-6000# CPLG W/PLUG
N9	1"-6000# CPLG W/PLUG
V&D	1"-6000# WELD. BONS W/PLUG

TRI-EX THERMAL DIV.
 ZURN INDUSTRIES INC.
 TULSA OKLAHOMA

ASSEMBLY & SPECIFICATIONS FOR
 ONE - BEM-33-120

SERVICE: FLASH COL. CONDENSER

DATE	5-25-72	REV	0
72-945	1-1		



-
- Hand-drawn technical drawing of a mechanical assembly, likely a bracket or support structure, showing dimensions and features:
- Top Horizontal Dimensions:**
 - Overall width: $35\frac{3}{4}"$ O.D.
 - Inner width: $34\frac{1}{8}"$ B.C.
 - Radius: $33\frac{1}{4}"$ R.F. TURN
 - Inner width: $30\frac{1}{8}"$ I.D.
 - Vertical Dimensions:**
 - Left side height: $\frac{3}{8}"$
 - Right side height: $\frac{1}{8}"$
 - Right side height: $2\frac{1}{6}"$
 - Right side height: $3\frac{1}{6}"$
 - Other Features:**
 - 36- $\frac{7}{8}"$ ϕ HOLES
 - Angle: $\frac{1}{4}" @ 60^\circ$

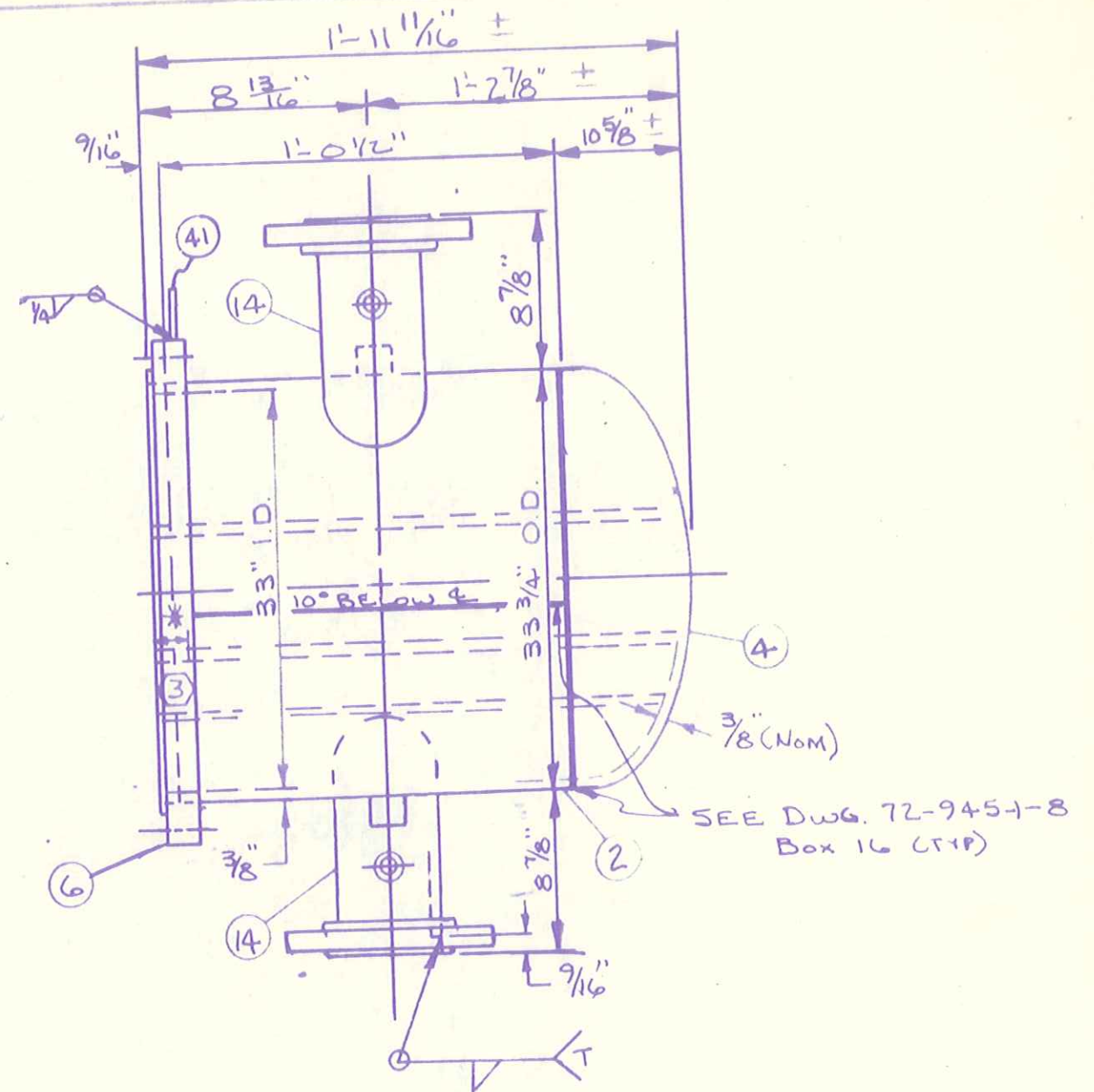
NOTES:

SHELL

SIZE 33-120		ONE-REQ'D	
DWN 4	DATE 5-25-72	CK ☒	REV 0
		72-945-1-2	

Hand-drawn technical drawing of a circular vessel head with a flange. The drawing includes the following details:

- Dimensions:**
 - Overall diameter: $2' - 1\frac{3}{4}"$
 - Flange thickness: $6"$
 - Internal horizontal spacing: $3\frac{7}{16}"$, $3\frac{7}{16}"$, $3\frac{7}{16}"$, and $3\frac{7}{8}"$
 - Internal vertical spacing: $3\frac{7}{16}"$, $3\frac{7}{16}"$, and $3\frac{7}{8}"$
 - Flange outer diameter: $37\frac{1}{4}"$
 - Flange inner diameter: $37"$
- Labels and Components:**
 - 9** 6"-150# RF-50 (Flange)
 - 24** 1"-6000# CPLG. (Gaskets)
 - 24** 3/4"-3000# CPLG. (Gaskets)
 - 18** (Internal structural components)
 - 19** (Internal structural components)
 - 26** (Internal structural components)
- Orientation:**
 - "A"** (Top)
 - "B"** (Left)
 - "C"** (Bottom)
 - "D"** (Right)
- Other Notes:**
 - 1/4" (Dimension)
 - 1/2" (Dimension)
 - 3/8" (Dimension)



TRI-EX THERMAL DIV.
ZURN INDUSTRIES, INC.
TULSA, OKLAHOMA

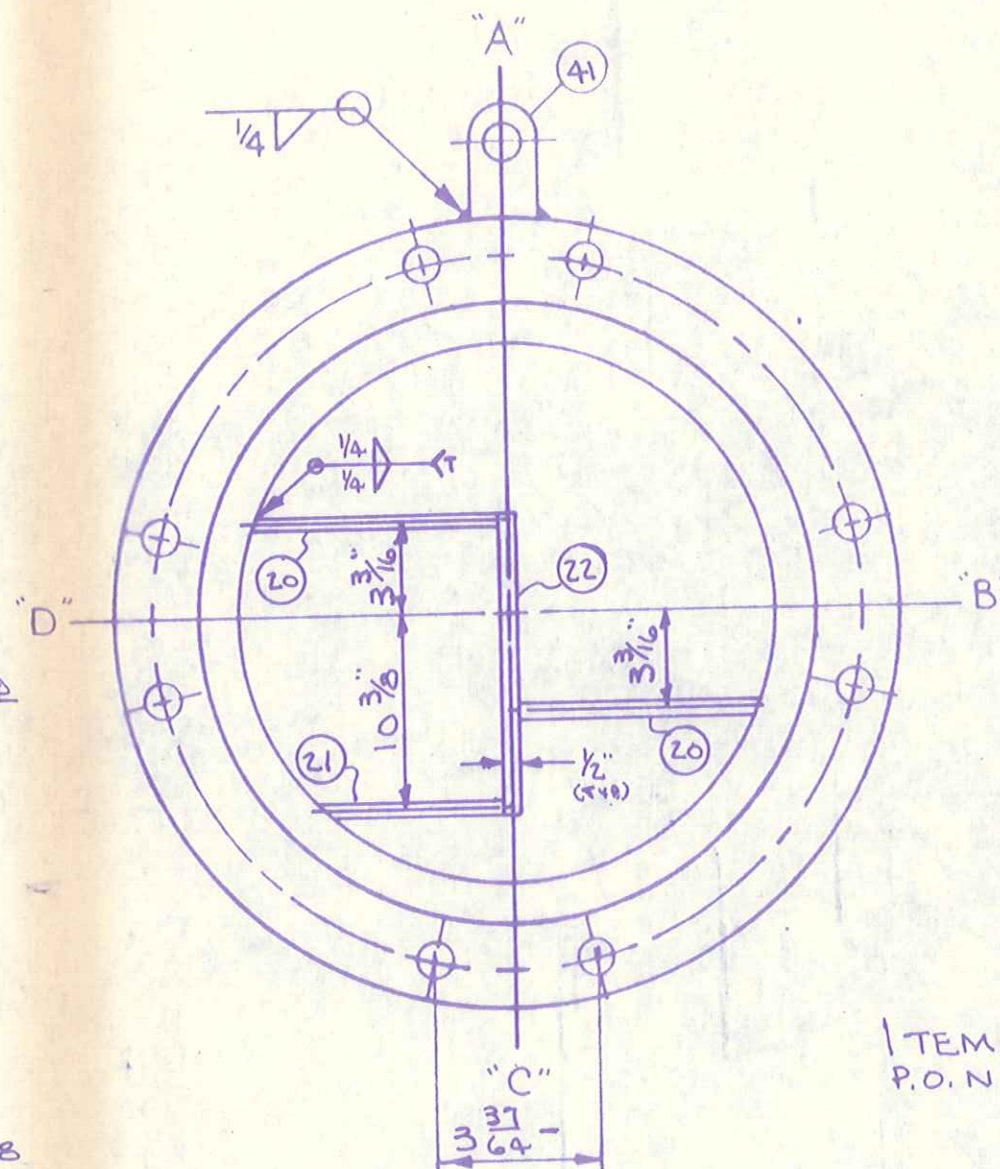
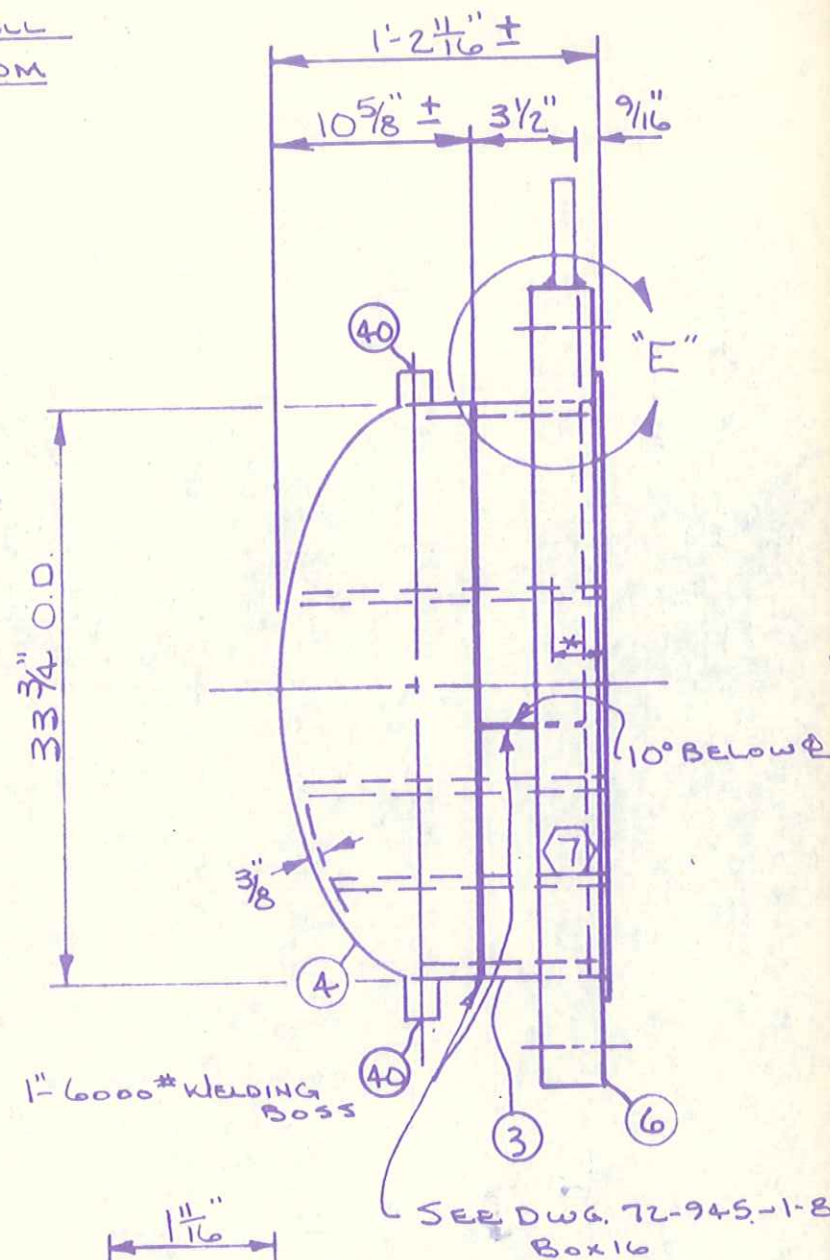
NOTES:
1. ALL BOLT HOLES TO STR. Q'S.
2. SEE DWG. 72-745-1-4 FOR #3 FLG. DETAIL.

ONE - REQ'D.

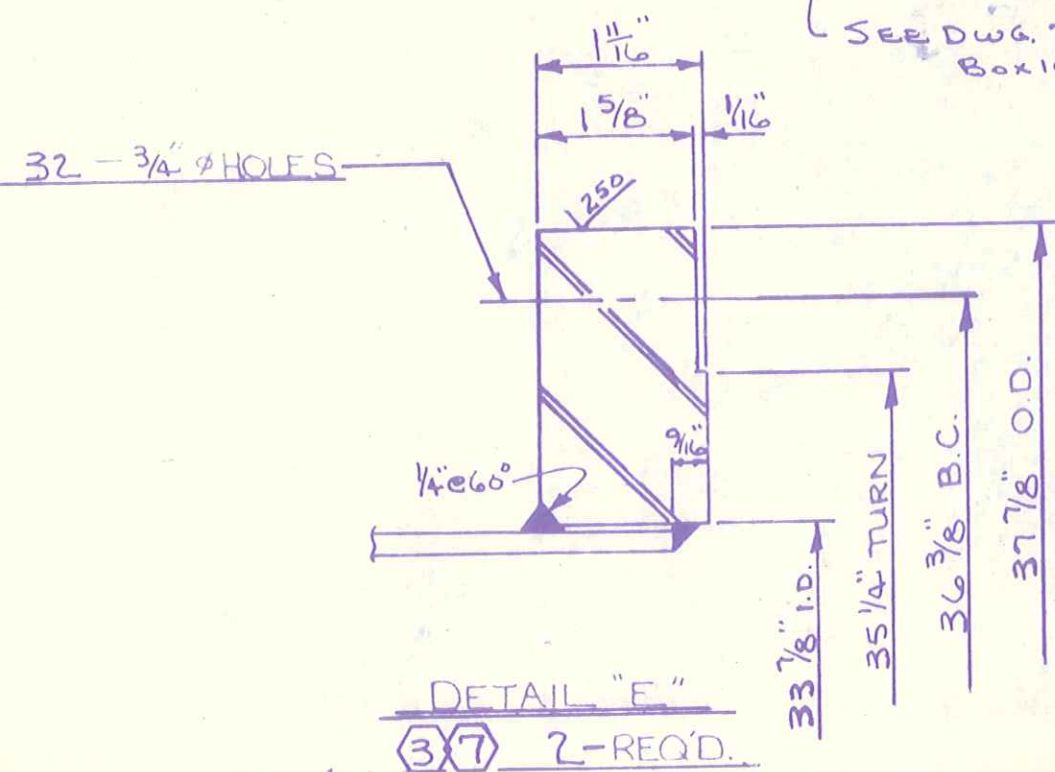
72-945-1-3

REV

* PASS R WELDS TO BE FULL
PENETRATION FOR 2" FROM
FACE OF FLG.



ITEM NO: 19E72A-R
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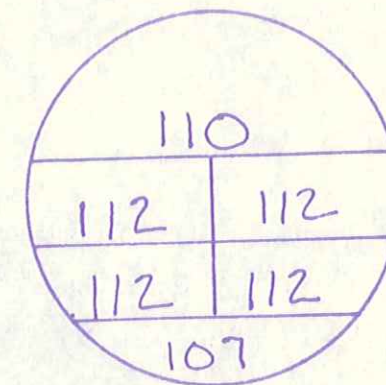
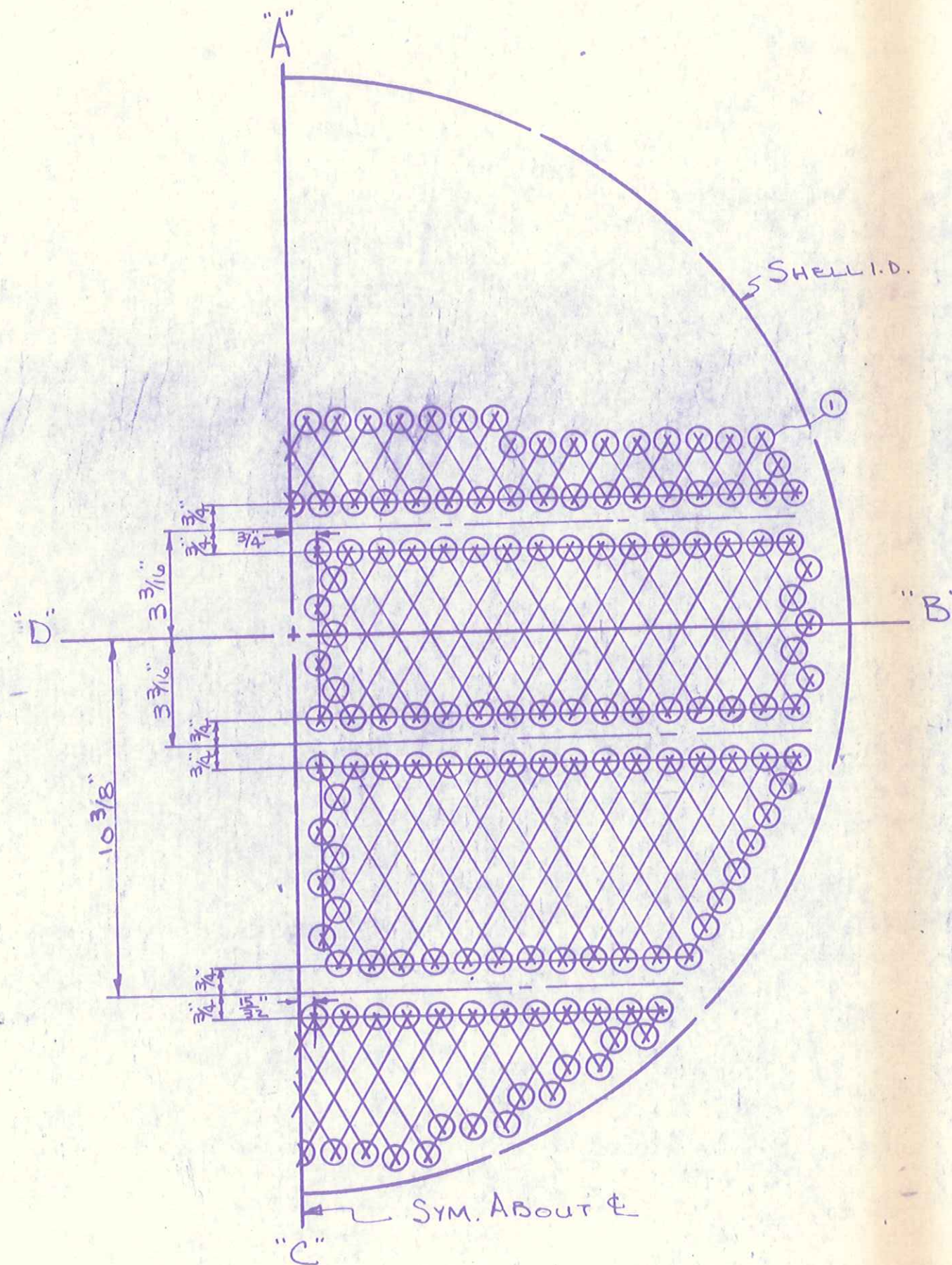


ALL BOLT HOLES TO STRADDLE Ø'S.
NOTES:

TRI-EX THERMAL DIV.
ZURN INDUSTRIES, INC.
TULSA, OKLAHOMA

RETURN CHANNEL

SIZE	33-120	ONE	REQ'D.
DWN	CP	DATE	5-25-72
		CK	W
			72-945-1-4



TUBE HOLE ARRANGEMENT

NOTES:

1. 665-3/4" O.D. TUBES.
2. 31 7/16" OUTER TUBE LINE.
3. 15/16" Δ PITCH.
4. 6 PASS.
5. SEE DWG. 72-945-1-6 FOR DRILLING DETAIL.

VIEWED FROM TUBE SIDE
OF #4 TUBESHEET

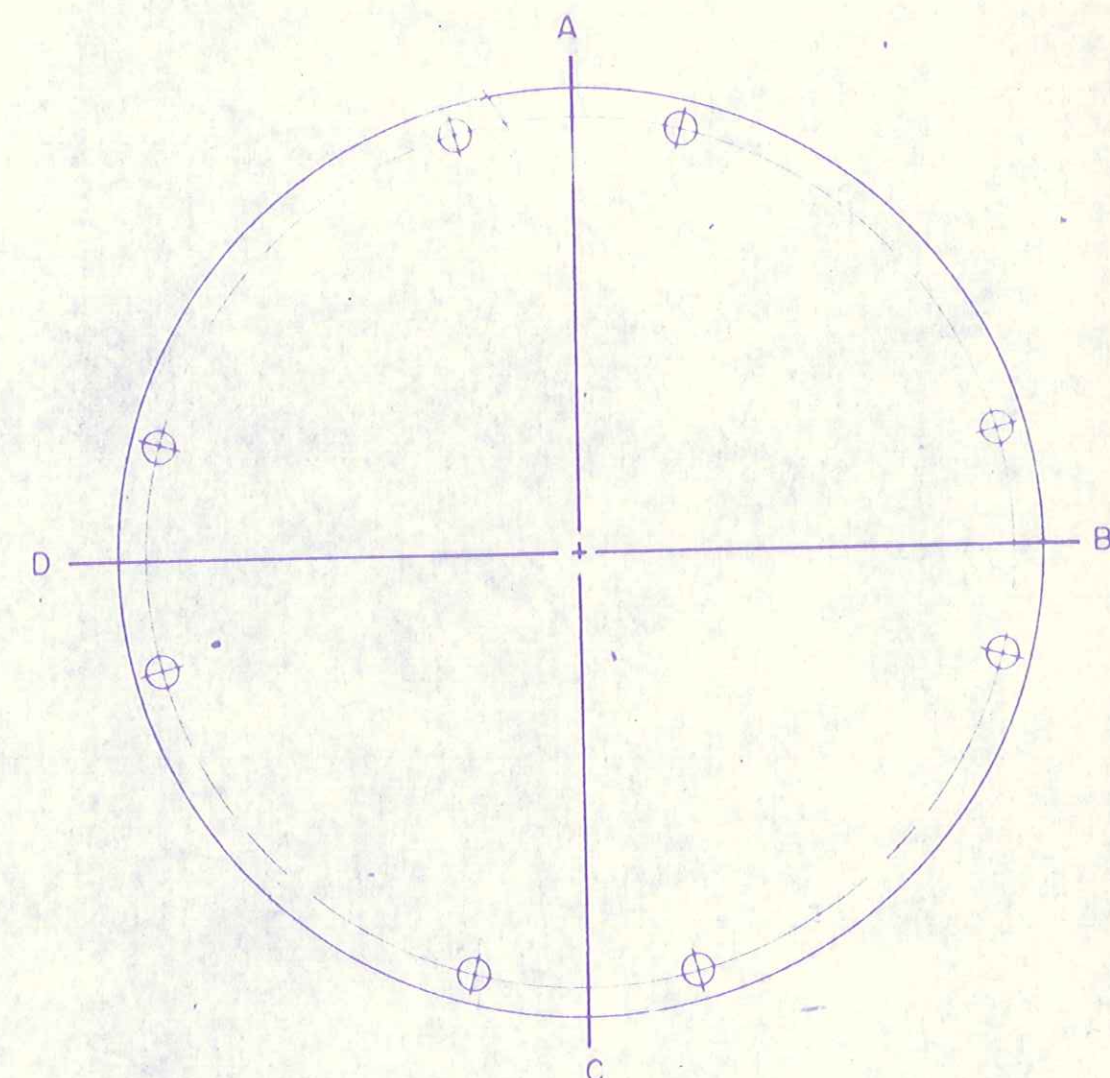
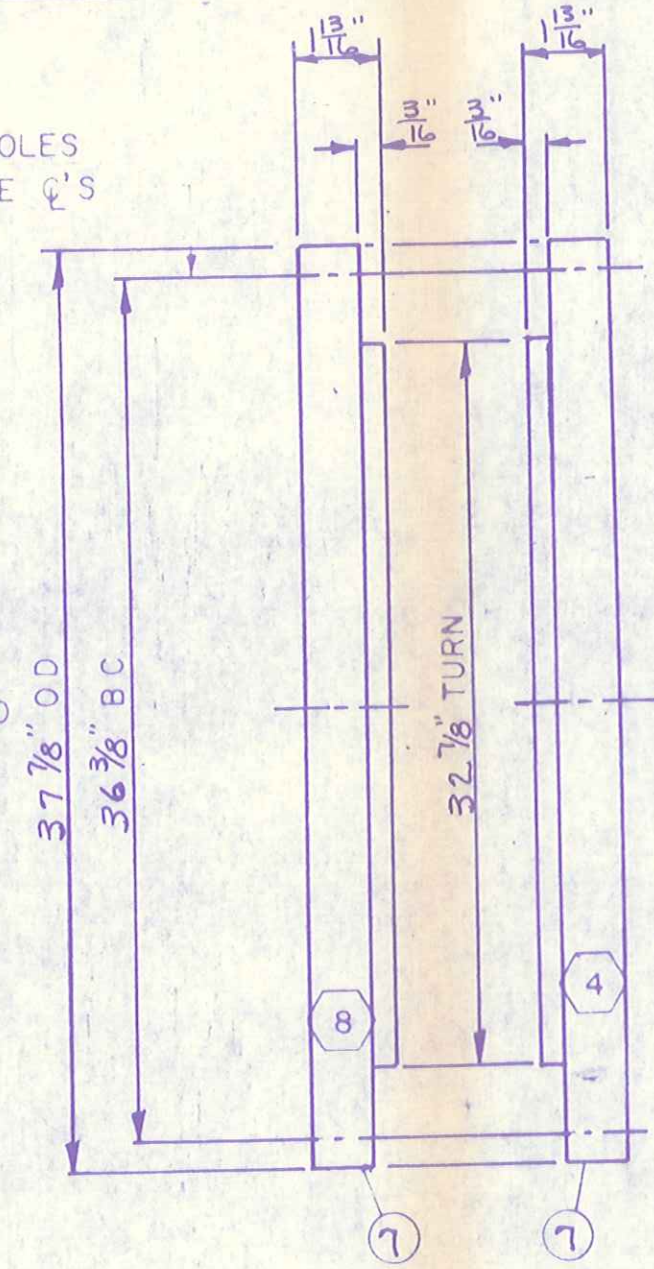
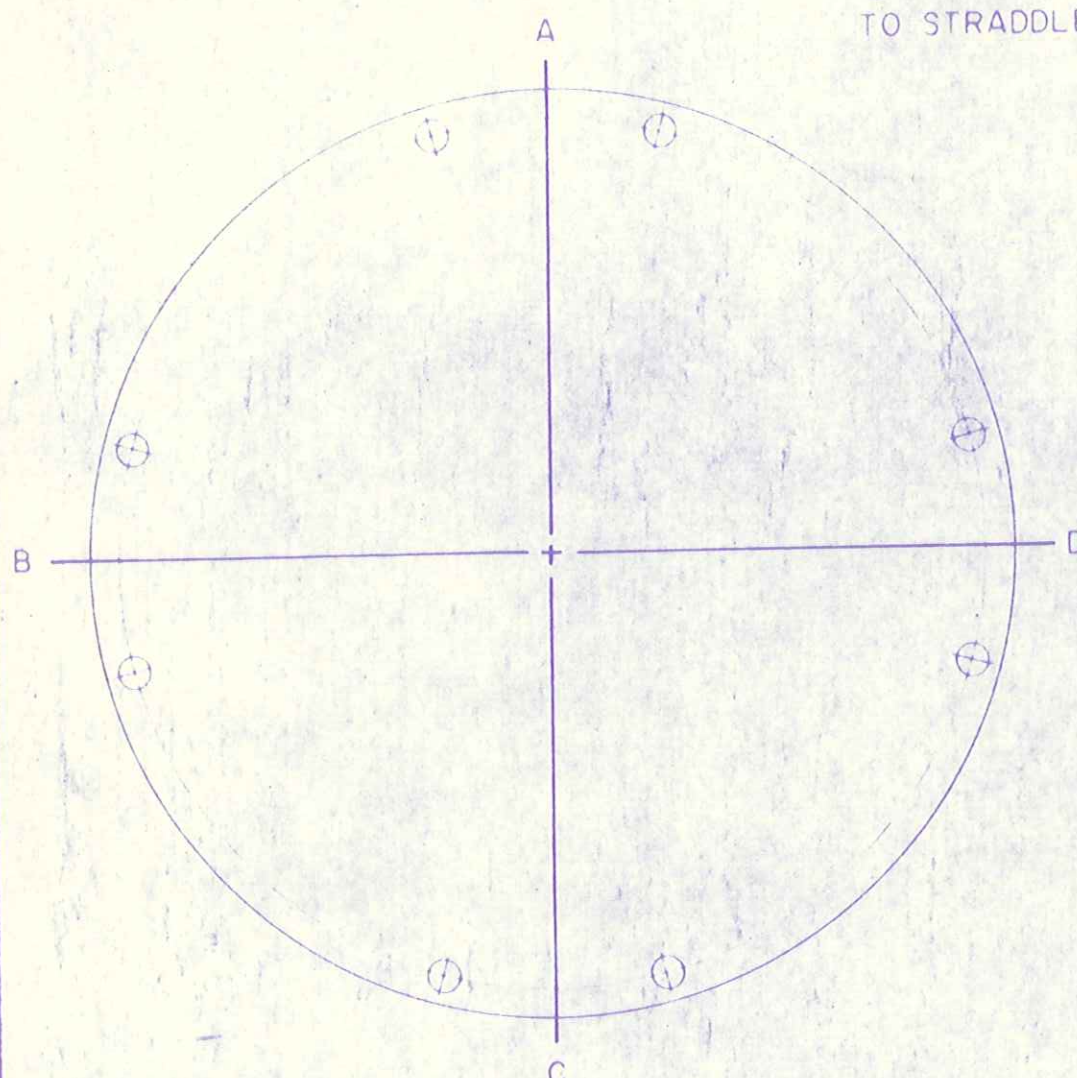
ITEM NO: 19E 72A-R
P.O. NO: 31564

TRI-EX THERMAL DIV.
ZURN INDUSTRIES, INC.
TULSA, OKLAHOMA

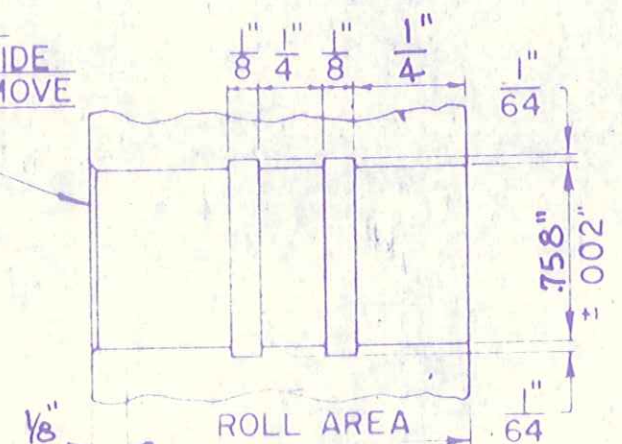
TUBE LAYOUT

SIZE	33-120	ONE	REQ'D.
DWN	4	DATE	5-25-77
		CK	1/10
			72-945-1-5

32 - 3/4" Ø HOLES
TO STRADDLE C'S



CHAMFER 1/32
45° SHELL SIDE
ONLY TO REMOVE
BURRS

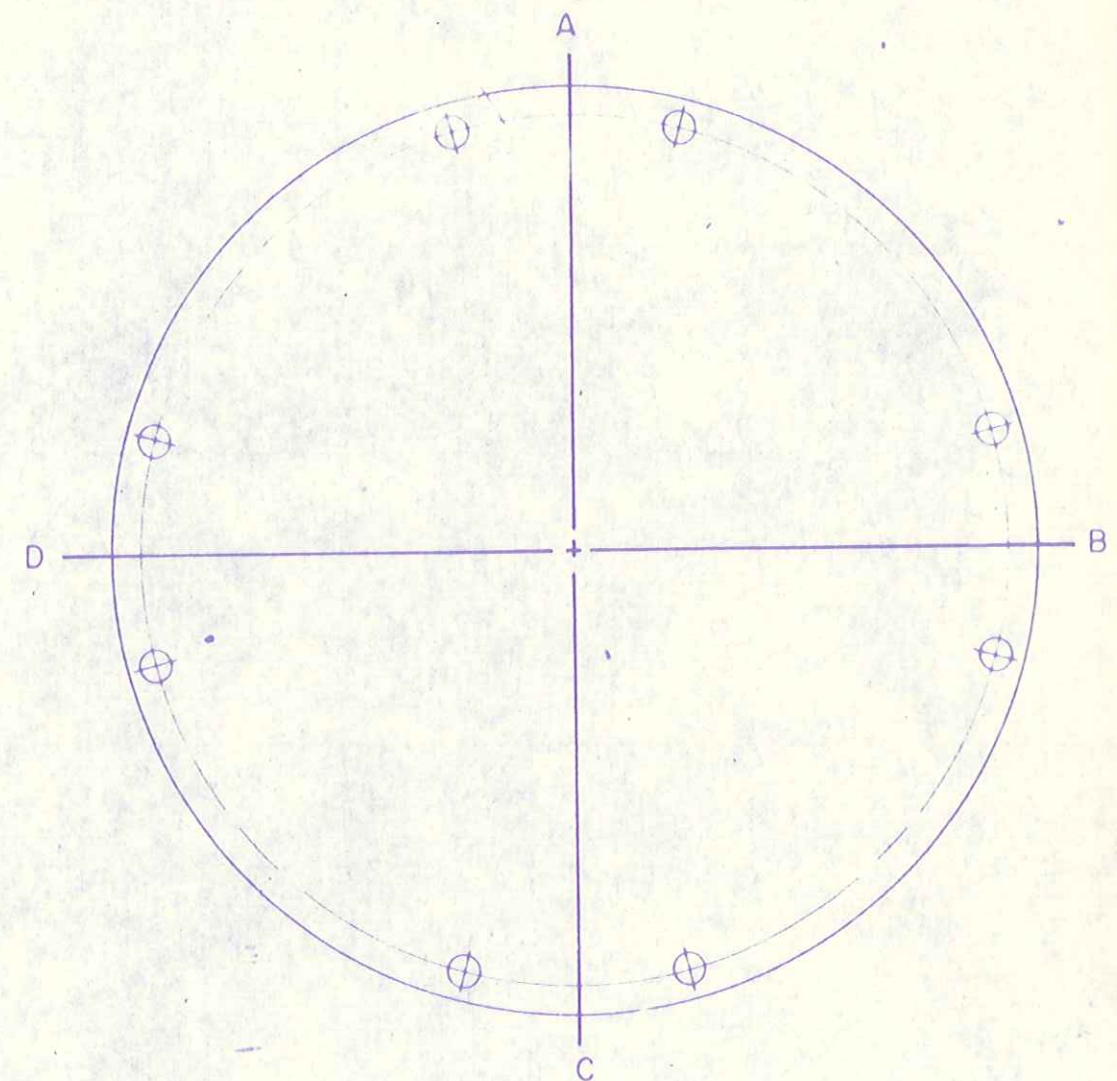
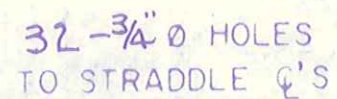


TUBE HOLE RING GROOVE DETAIL

NOTES 1. DRILL REAM & RING GROOVE PER DETAIL

ITEM NO: 19E72-A-R
P.O. NO: 31564

REV	DATE	DESCRIPTION
TRI-EX THERMAL DIV.		
ZURN INDUSTRIES INC		
TULSA		OKLAHOMA
SIZE 33-120	DATE 5-25-72	REQD ONE EACH
DWG CK	TITLE	DWG NO
7	TUBESHEET	72-945-1-6
		REV
		0



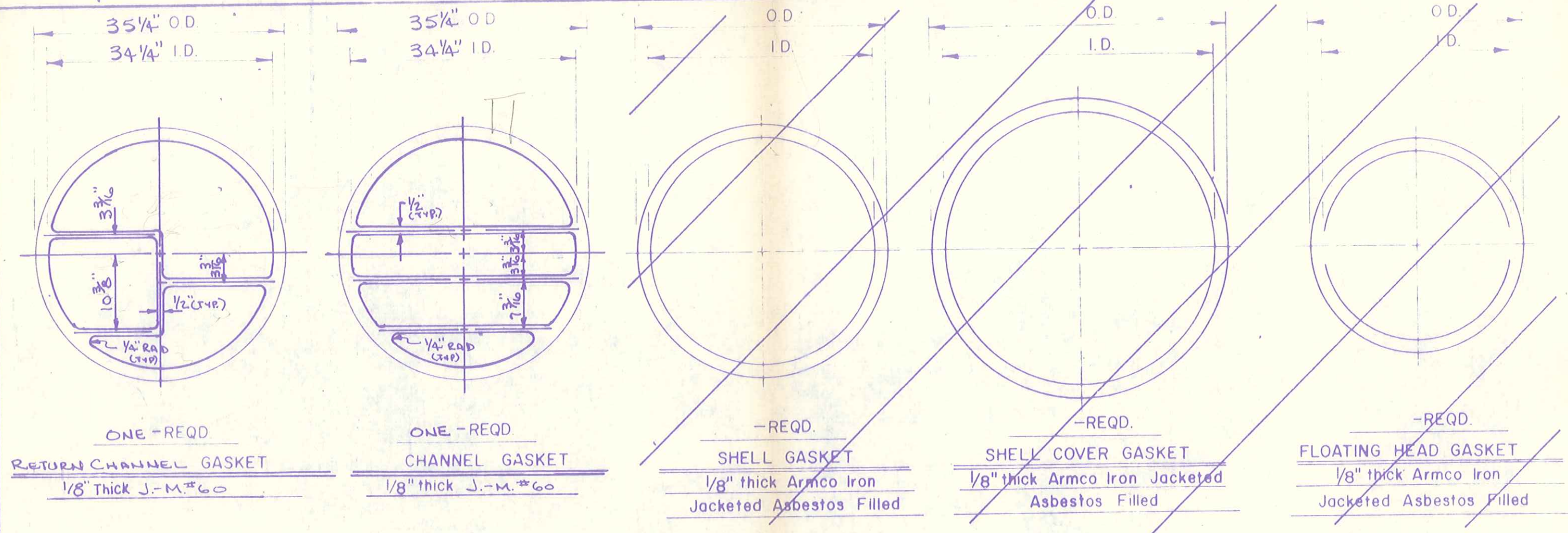
Technical drawing of a mechanical part, likely a shaft or rod, showing dimensions in inches. The drawing includes a cross-section view and a side view. The cross-section view shows a central hole with a diameter of $\frac{1}{8}$ " and a total outer diameter of $\frac{1}{4}$ ". The side view shows a length of 7.58 " and a total width of $\frac{1}{4}$ ". The drawing is labeled "SIDE VIEW" and "ROLL AREA".

TUBE HOLE RING GROOVE DETAIL

NOTES 1. DRILL REAM & RING GROOVE PER DETAIL

P.O. No: 31564

REV	DATE	DESCRIPTION	
TRI-EX THERMAL DIV. <u>ZURN INDUSTRIES INC</u>			
TULSA		OKLAHOMA	
SIZE	33-120	DATE	5-25-72
REQD		ONE EACH	
DWG	CK	TITLE	DWG NO
8	1	TUBESHEET	72-945-1-6
			REV
			0



TRI EX THERMAL DIV ZURN INDUSTRIES INC.

TULSA, OKLAHOMA

TEST CHAN 75 PSI AT 200 °F

TEST SHELL 75 PSI AT 450 °F

TEST CHAN 115 PSI SHELL 144 PSI

SERVICE FLASH COL. CONDENSER

ITEM 19E72A-R MFRS. NO. 72-945-1

PURCHASE ORDER 31564

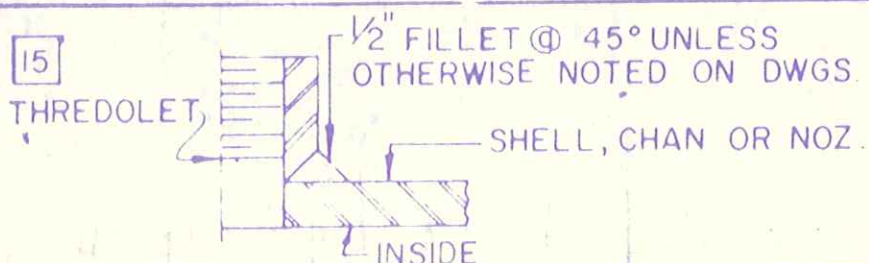
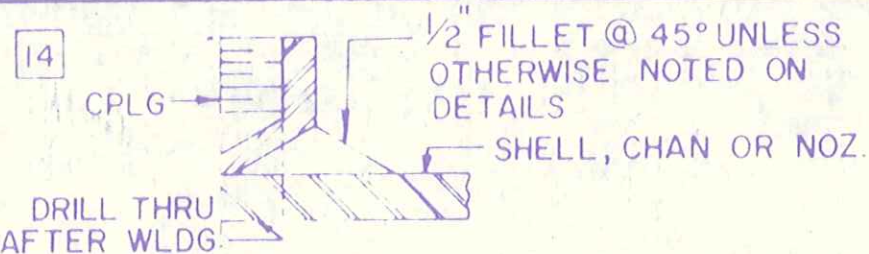
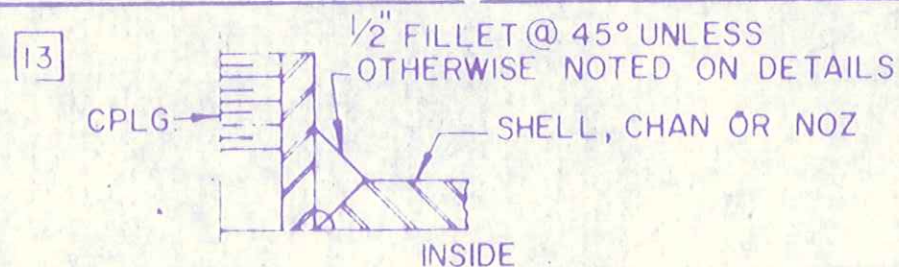
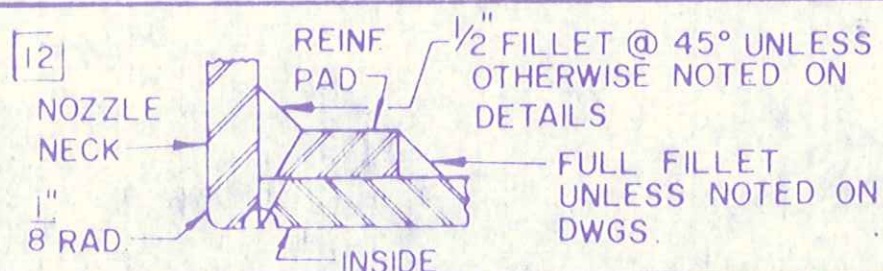
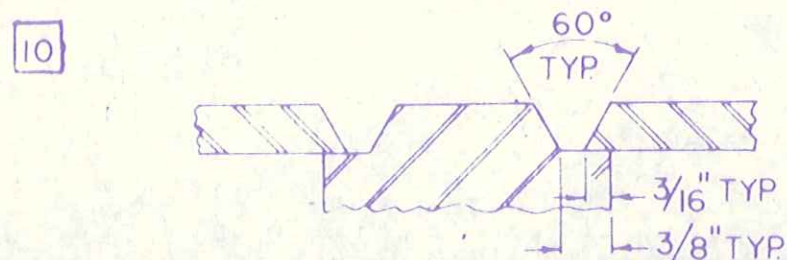
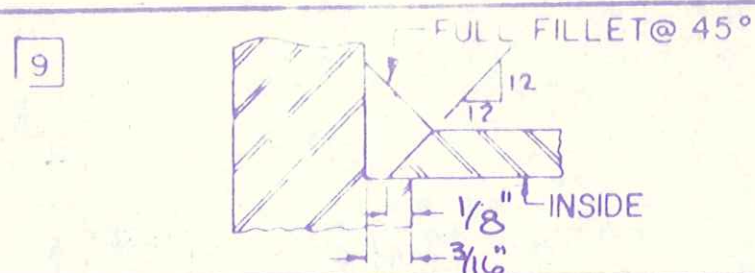
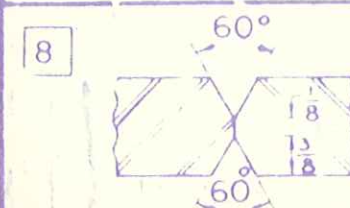
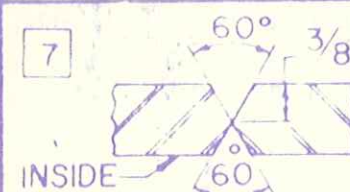
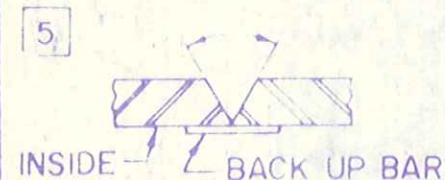
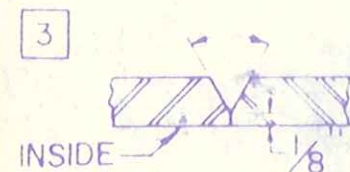
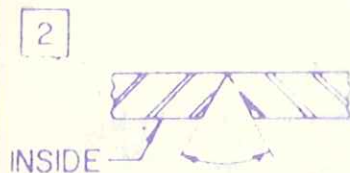
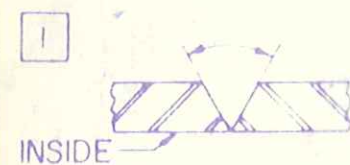
SIZE 33-120 TYPE BEM

YEAR 1972

NAME PLATE ONE - REQD.

ITEM No: 19E 72A-R
P.O. No: 31564

REV	DATE	DESCRIPTION
TRI-EX THERMAL DIV. ZURN INDUSTRIES INC.		
TULSA OKLAHOMA		
SIZE 33-120	DATE 5-24-72	REQD As Noted
DWG CK	TITLE NAME PLATE & GASKETS	DWG NO 72-945-1-7
CP		REV 0



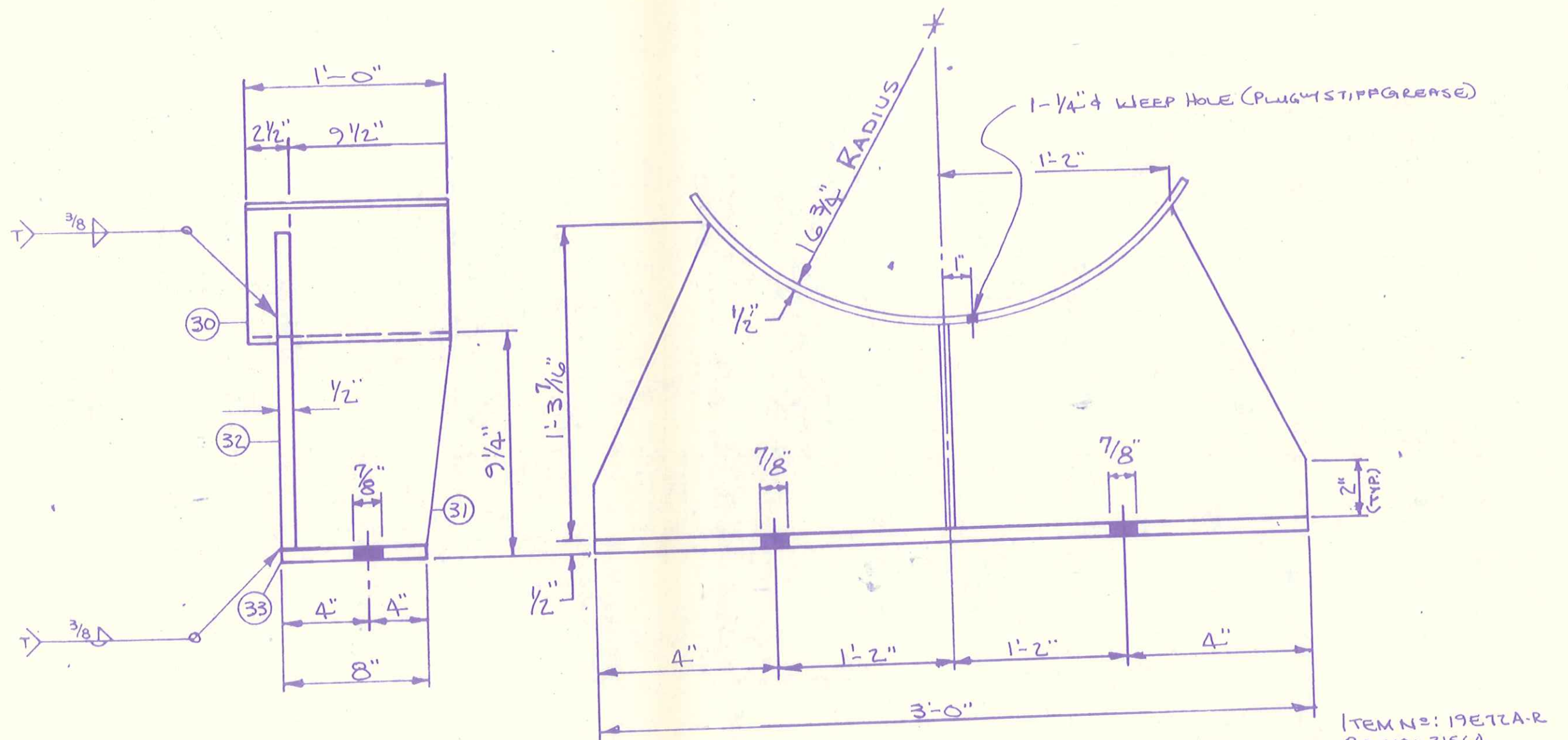
GENERAL NOTES

WELD PROCEDURES TO BE FOLLOWED
IN WELDING ARE:

MANUAL ROD
AUTO WIRE
FLUX

ITEM N^o: 19E72A-R
P.O.N^o: 31564

REV	DATE	DESCRIPTION	
TRI-EX THERMAL DIV. ZURN INDUSTRIES INC			
TULSA		OKLAHOMA	
SIZE	33-120	DATE	5-25-72
REQD			
DWG	CK	TITLE	DWG NO
CP	HY	WELD. DETAIL	72-945-1-8
			REV
			0

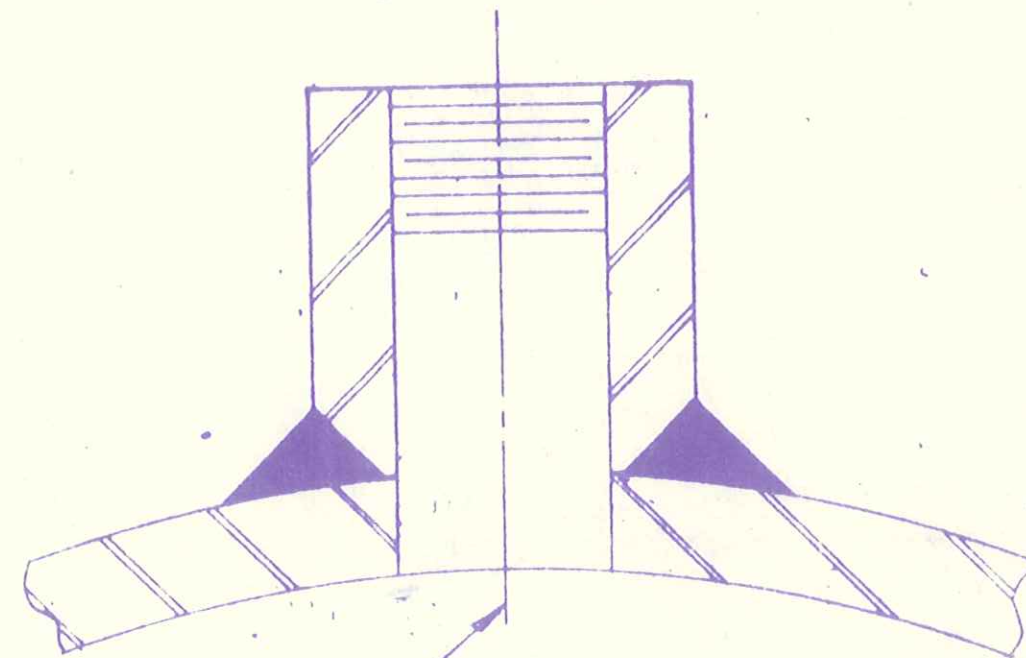
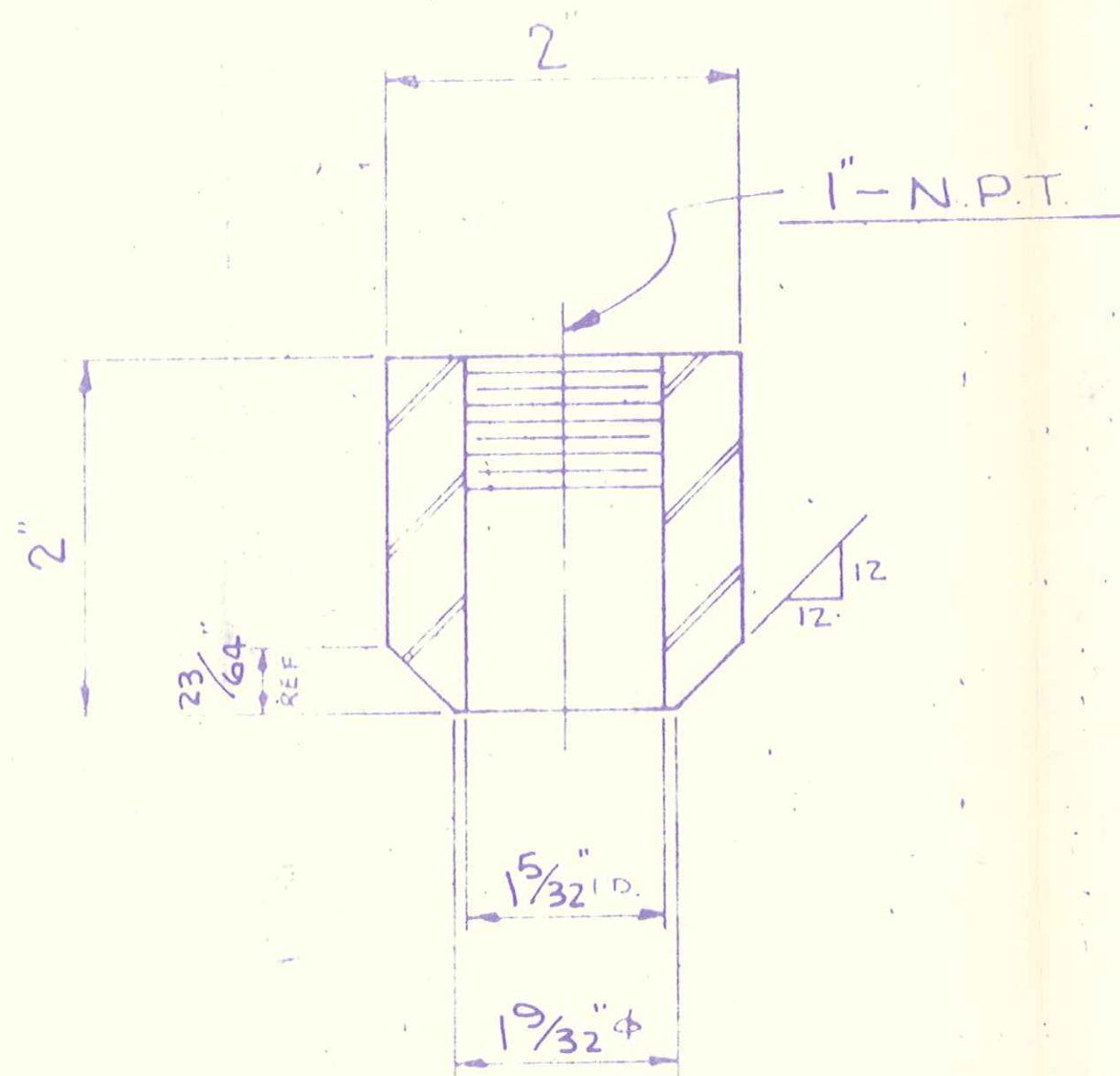


2 W/ 2-7/8" ϕ HOLES

TRI-EX THERMAL DIV.
ZURN INDUSTRIES, INC.
TULSA, OKLAHOMA

SUPPORT DETAIL

SIZE : 33-120			TWO-REQ'D.	
DWN	DATE	CK	72-945-1-9	0
CP	5-24-72	JK		



AFTER WELDING, DRILL $\frac{1}{32}$ " ϕ
HOLE IN PIPE OR CYLINDER

TRI-EX THERMAL DIV.
 ZURN INDUSTRIES, INC.
 TULSA, OKLAHOMA

TYP 1" WELDING BOSS
INSTALLATION DETAIL

REV	0	EX-A-7	6.0	2-13-71	MS
-----	---	--------	-----	---------	----

TRI-EX THERMAL DIV.
ZURN INDUSTRIES INC.

CUSTOMER CLARK OIL & REFINING CO.

ITEM 19E72A-R		BILL OF MATERIAL		SHEET 1 OF 1		
SIZE: 33-120		TYPE: BEM		JOB: 72-945-1		
MK.	QTY.	DESCRIPTION	MATERIAL	DATE	P.O. NO.	COST
1	665	3/4" O.D. X 16 BWG TUBES X 10'-0" LG (STOCK)	SA-249 TP304			
2	1	PC 33" I.D. X 3/8" THK. R. & W. CYL. X 1'-0 1/2" LG. (8'-9 1/16") (SQ. CUT)	SA-515-70			
3	1	PC 33" I.D. X 3/8" THK. R. & W. CYL. X 3 1/2" LG (8'-9 1/16") (SQ. CUT)	✓			
4	2	33" I.D. X 3/8" THK. (NOM) 2:1 ELLIP. HDS. W/ 2" S.F. (SQ. CUT) (B.O.S. EACH END; SA. CUT ALL OTHER)	✓			
5	1	PC 33" I.D. X 1/4" THK. R. & W. CYL. X 9'-8 3/8" (8'-8 1/16")	SA-240 TP304			
6	2	37 7/8" O.D. X 33 7/8" I.D. X 1 1/16" THK (FIN. DIM)	SA-105-II			
7	2	37 7/8" O.D. X 1 13/16" THK (TUBESHEETS) (-)	SA-240-TP304			
8	1	R 32 7/8" O.D. X 1/2" THK. (BAFFLE) (-)	304 S.S.			
9	2	6"-150# RF-50 FLG'S	SA-181-1			
10	2	2 1/2"-300# RF-50 FLG'S	SA-182F304			
11	2	3"-300# RF-50 FLG'S	✓			
12	1	35 3/4" O.D. X 30 1/8" I.D. X 2 3/16" THK. (30" NOZZLE FLG (FIN. DIM) (SQ. CUT)	SA-105-II			
13	1	R 29 1/2" I.D. X 1/4" THK. R. & W. CYL. X 1'-5 1/2" LG (7'-9 1/16")	SA-240 TP304			
14	2	PCS 6"-SCH 80 SMLS PIPE X 1'-0 1/2" LG	SA-106-B			
15	2	PCS 2 1/2"-SCH 40 ✓ ✓ X 9 1/2" LG	SA-312 TP304			
16	2	PCS 3"-SCH 40 ✓ ✓ X 9 1/2" LG.	✓			
17	1	SET GASKETS PER DWG. 72-945-1-7				
18	2	R'S 24 5/8" X 1/2" X 32 1/4" LG (PASS R'S)	STL.			
19	1	R. 24 5/8" X ✓ X 25 1/4" LG (-)	✓			
20	2	R'S 15 5/8" X ✓ X 15 7/8" LG (-)	✓			
21	1	R 12 3/8" X ✓ X 15 5/8" LG (-)	✓			
22	1	R 14 1/16" X ✓ X 15 5/8" LG. (-)	✓			
23	1	R 44" X 1/4" X 51 1/2" LG (ROLL TO 16 3/4" I.D.R.) (WELD PAD)	SA-240 TP504			
24	4	3/4"-3000# CPLG'S	SA-105-II			
25	10	3/4"- ✓ ✓	SA-182F304			
26	2	1"-6000# CPLG'S	SA-105-II			
27	4	3/4" N.P.T. PLUGS X 3" LG	STL.			
28	10	3/4" ✓ - ✓ X ✓	304 S.S.			
29	4	1"- ✓ - ✓ X ✓	STL.			
30	2	R'S 12" X 1/2" X 36" LG. (SUPPORTS)	✓			
31	2	R'S 8 1/4" X ✓ X 9 1/2" LG (-)	✓			
32	2	R'S 15 7/16" X ✓ X 36" LG (-)	✓			
33	2	R'S 8" X ✓ X 36" LG (-)	✓			
34	64	5/8" & ALL THRD STUDS X 5 1/8" LG	SA-193-B7			
35	128	5/8" HEX NUTS	SA-194-ZH			
36	1/2	GAL RED ZINC CHROMATE PRIMER (NO SAND BLAST)				
37	1	NAME R PEREX-A-1	STN. STL.			
38	1	R 4" X 3/16" X 6" LG (NAME R BRKT)	STL.			
39	1	R 3" X ✓ X ✓ (- - -)	✓			
40	2	1"-6000# WELDING BOSSES PER EX-A-7	SA-105-II			
41	2	LIFTING LUGS	STL.			
42						
43						
44						
45						