

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 OHMSTEDE, INC., ST. GABRIEL PLANT, 4250 HWY 30, ST. GABRIEL, LA 70776
(Name and address of Manufacturer)

2. Manufactured for AMOCO OIL CO. YORKTOWN, VA
(Name and address of Purchaser)

3. Location of installation AMOCO OIL CO. YORKTOWN, VA
(Name and address)

4. Type: HORIZONTAL HEAT EXCHANGER 438655B
(Horiz., vert., or sphere) (Tank, separator, jkt. vessel, heat exch., etc.) (Mfg's serial No.)

438655 851 1995
(CRN) (Drawing No.) (Nat'l. Bd. No.) (Year Built)

5. ASME Code, Section VIII, Division 1 1992 ED, 1993 ADD Rev.2 -- --
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): 4 (b) Overall length (ft & in.): 19' 5.062"

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	36" ID	6' 2.375"	SA 516-70	.500	.125	1	SPOT	.85	1	SPOT	.85	1150	2HR
1	36" ID	6' 2.312"	SA 516-70	.500	.125	1	SPOT	.85	1	SPOT	.85	1150	2HR
1	40 ID	0' 10"	SA 516-70	.500	.125	1	SPOT	.85	1	SPOT	.85	1150	2HR

7. Heads: (a) SA 516-70, 2HR, 1150deg 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	.516	.125	--	--	2:1	--	--	--	--	X	S	NONE	1.0
(b)														

If removable, bolts used (describe other fastening) SA 193-B7 3/4" (52)
(Mat'l Spec. No., Grade, size, No.)

8. Type of jacket -- Jacket closure --
(Describe as ogee & weld, bar, etc.)

If bar, give dimensions -- If bolted, describe or sketch.

9. MAWP 81 -- psi at max. temp. 350 -- °F. Min. design metal temp. -20 °F at 81 psi.
(internal) (external) (internal) (external)

10. Impact test NONE PER UCS-66(a)
(Indicate yes or no and the component(s) impact tested)

11. Hydro., pneu., or comb. test press. 122 PSI Proof test --

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: SA 516-70 * 36 2.250 .125 BOLTED
Stationary (Mat'l Spec. No.) Dia., in. (subject to press.) Nom. thk., in. Corr. Allow., in. Attachment (welded or bolted)

SA 516-70 * 35.625 2.250 .125 BOLTED
Floating (Mat'l Spec. No.) Dia., in. Nom. thk., in. Corr. Allow., in. Attachment

13. Tubes: SB 338-GR2 .750 .065 778 STRAIGHT
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' 9"

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	36 ID	1' 9"	SA 240-316	.500	.125	1	SPOT	.85	1	SPOT	.85	--	--

15. Heads: (a) SA 182-F316 (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	2.75	.125	--	--	--	--	--	41.250	--	X	S	NONE	.85
(b)														

If removable, bolts used (describe other fastening) SA 193-B7, 3/4" (48)
(Mat'l Spec. No., Grade, size, No.)

FORM U-1 (Back)

16. MAWP 159 — psi at max. temp. 150 — °F. Min. design metal temp. -20 °F at 159 psi.
(internal) (external) (internal) (external)

17. Impact test NONE PER UHA 51

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

18. Hydro., pneu., or comb. test press. 239 PSI Proof test —

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	
OUTLET	1	18"	RFWN	SA105	SA106B	.500	.125	INHERENT	FPW	FPW	SHELL
INTERMEDIATE	2	12"	RFWN	SA105	SA106B	.500	.125	INHERENT	FPW	FPW	SHELL
INTERM/INLET	2	10"	RFWN	**	***	.375	.125	INHERENT	FPW	FPW	CHANNEL
VENT/DRAIN	2	.750"	CPLG	SA105	—	6000#	.125	INHERENT	FPW	—	SHELL
TEMP/ PRESS	4	.750"	CPLG	***	—	6000#	.125	INHERENT	FPW	—	CHANNEL
UNKNOWN	1	4"	RFWN	****	***	.337	.125	INHERENT	FPW	FPW	CHANNEL
TEMP/ PRESS	6	1"	RFLWN	SA105	—	.500	.125	INHERENT	FPW	—	SHELL

20. Supports: Skirt NO Lugs — Legs — Others SADDLE (2) Attached SHELL WELDED
(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)

CHANNEL 438655-6, OHMSTEDE, INC. LAKE CHARLES PLANT, SULPHUR, LA; 17,397

SHELL 438655-2,4; OHMSTEDE, INC. LAKE CHARLES PLANT, SULPHUR, LA; 17,397

22. Remarks: 12CONT:*SB 265-GR2 CLAD. 19CONT: SPOT RADIOGRAPHY EFFICIENCY = .85, **SA240-316,
*** SA 182F316, ****SA 312TP316. CHANNEL END FLANGES: SA 182F316. SHELL AND SHELL COVER
END FLANGES: SA105N. FLO.HD: FLG SA 182F316, HD. SA 240-316 x 1/2"x28"IDR.
ITEM#: EA-101B P O # 9422058

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. 10562 Expires 7-14, 19 97

Date 3/31/95 Name OHMSTEDE, INC., ST. GABRIEL PLANT Signed Anthony J. Balin
(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/or the State or Province of LA and employed by H.S.B.I. & I. CO. of HARTFORD, CT have inspected the pressure vessel described in this Manufacturer's Data Report on 3-31, 19 95, 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 4-3-95 Signed Charles R. Efferson Commissions NB9849A LA922
(Authorized Inspector) (Nat'l 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.

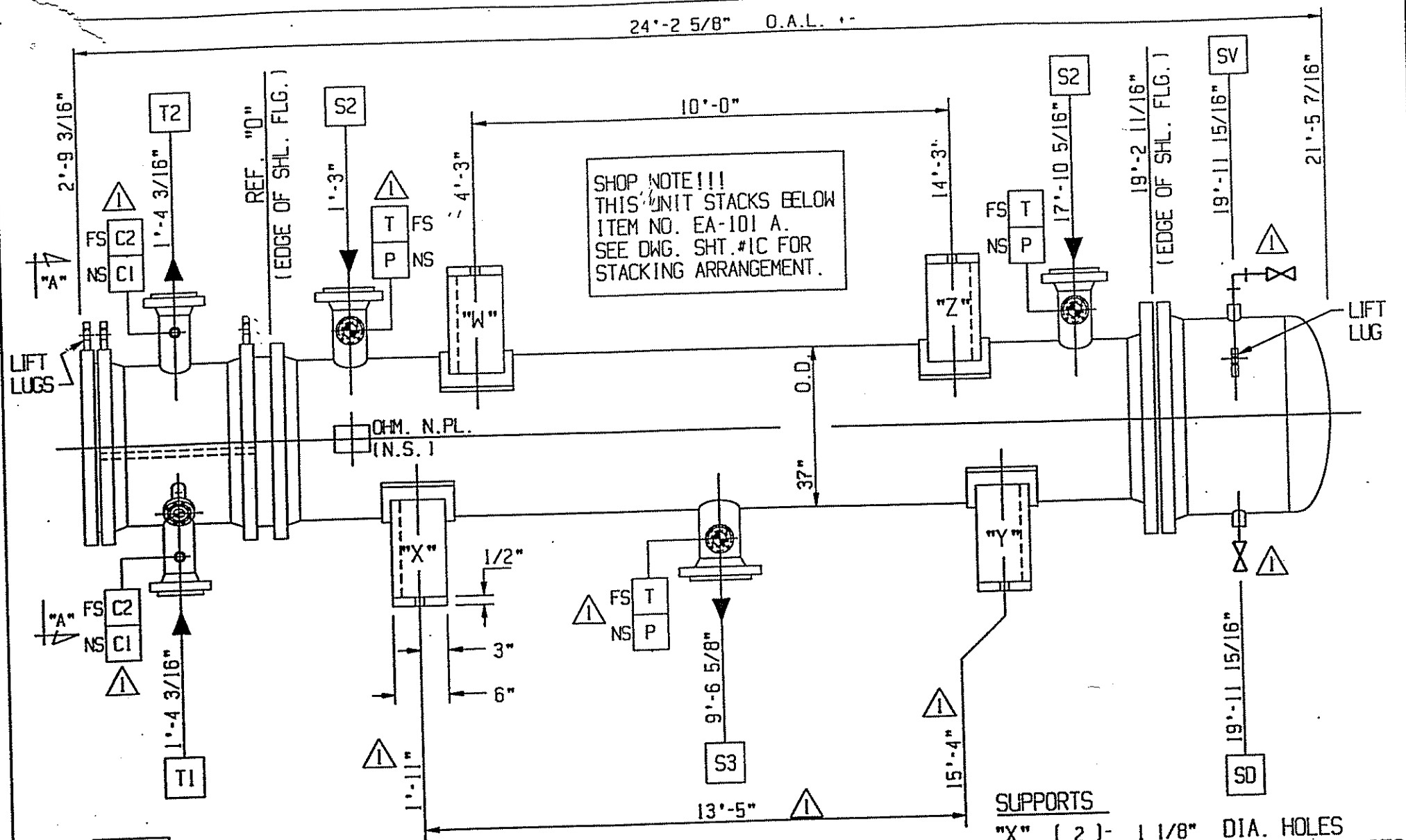
U Certificate of Authorization No. — Expires —, 19 —

Date — Name — Signed —
(Assembler) (Representative)

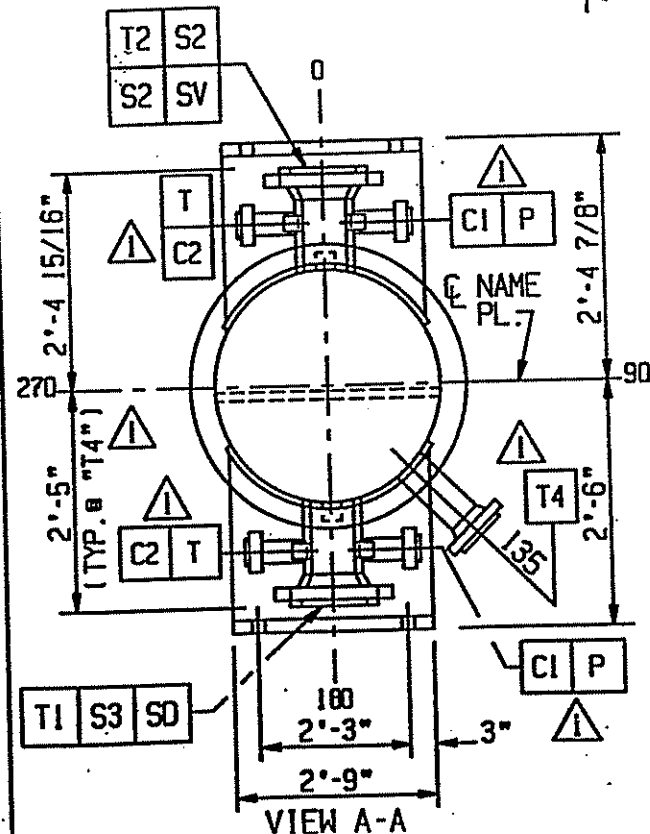
CERTIFICATE OF FIELD ASSEMBLY INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or 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) (Nat'l Board Incl. endorsement, State, Province and No.)



SHOP NOTE!!!
THIS UNIT STACKS BELOW
ITEM NO. EA-101 A.
SEE DWG. SHT. #1C FOR
STACKING ARRANGEMENT.



W/ 3/4" SCH. 160 NIPPLE
AND 3/4" 800# GATE VA.
VOGT# TSW-12111 OR EQ.

SUPPORTS		
"X"	(2) - 1 1/8"	DIA. HOLES
"Y"	(2) - 1 1/8"	X 2 1/4" SLOTS
"W"	(2) - 1 1/8"	DIA. HOLES
"Z"	(2) - 1 1/8"	DIA. HOLES

INSULATION (BY OTHERS)	
TUBESIDE:	NONE
SHELLSIDE:	NONE

T	(3) 1" - 150#RF LWN	SHELL TEMP. CONN.
P	(3) 1" - 150#RF LWN	SHELL PRESS. CONN.
T4	4" - 150#RF WN	CUST. PLEASE ADVISE!!
C2	(2) 3/4" - 6000#CPLG.	CHAN. TEMP. CONN.
C1	(2) 3/4" - 6000#CPLG.	CHAN. PRESS. CONN.
SD	3/4" - 6000#CPLG.	SHELL DRAIN
SV	3/4" - 6000#CPLG.	SHELL VENT
T1	10" - 150#RF WN	CHAN. INLET
T2	10" - 150#RF WN	CHAN. INTERMEDIATE
S2	12" - 150#RF WN	SHELL INTERMEDIATE
S2	12" - 150#RF WN	SHELL INTERMEDIATE
S3	18" - 150#RF WN	SHELL OUTLET
MK	SIZE-RATE	SERVICE

CERTIFIED _____
DATE _____

DESIGN DATA

DESIGN DATA	SHELL	TUBE
DESIGN PRESSURE, P.S.I.G.	75	150
TEST PRESSURE P.S.I.G.	122	239
DESIGN TEMPERATURE DEG. F. (MAX./MIN.)	350/ -20	150/ -20
CORROSION ALLOWANCE	.1250"	.1250"
NUMBER OF PASSES	DIVIDED FLOW	2
RADIOGRAPHIC EXAMINATION	SPOT	SPOT
HEAT TREAT REQUIRED	YES	NO

ESTIMATED WEIGHTS, LBS.

DRY: 19000	BUNDLE: 10000	WET: 29000
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SPECIFICATIONS

ASME CODE SECT. VIII DIV.1, 1993 ADD. (STAMP YES)
TEMA CLASS R and API-660 APPLIES
NATIONAL BOARD REGISTRATION REQUIRED
AMOCO STD. ENG. SPEC. 24C-1, 98C-4, 57C-17

MATERIAL

CHANNEL: SA-240-316
SHELL: SA-516-70
TUBESHEETS: SA-516-70 W/ 1/2" MIN. CLAD (SB-265-GR.2)
BAFFLES: SA-36 or EQUAL
TUBES: SB-338-GR2 WELDED
(778) 3/4" O.D.X .065" A.W. X 20'-0" LG.
TUBE PITCH 1" SURFACE 2995 SQ.FT.

GENERAL NOTES

ALL BOLT HOLES TO STRADDLE NATURAL CENTER LINES.

MAXIMUM ALLOWABLE PRESSURES

SHELLSIDE-
MAWP (HOT & CORR)= 81 PSIG LMTD BY FLOATING HEAD DISH
TUBESIDE-
MAWP (HOT & CORR)= 159 PSIG LMTD BY FLOATING HEAD RINGS

BODY FLANGE GASKETS: .1250" THK. MONEL DJ GRAPH.
1 SET OF SPARE GASKETS REQUIRED.

PAIN: NEAR WHITE SANDBLAST ALL EXT. C-STL. SURFACES PER
SSPC-SP-10 AND PRIME W/ (1) COAT OF AMERON DIMETCOTE 9
INORGANIC ZINC @ 3.0 MILS. D.F.T.
FINISH W/ (2) COATS OF AMERON AMERCOAT 891 (WHITE) @
1.5 MILS. D.F.T. (TOTAL D.F.T. TO BE MINIMUM 4.5 MILS.)

TYPE UNIT : A J S SIZE : 36" 24"

CUSTOMER: AMOCO OIL CO. - YORKTOWN
OHMSTEDE JOB NO.: 438655
P.O. NO.: 9422058
ITEM NO.: EA-101 B
SERVICE : COMBINATION CONDENSER

(1) UNIT REQUIRED

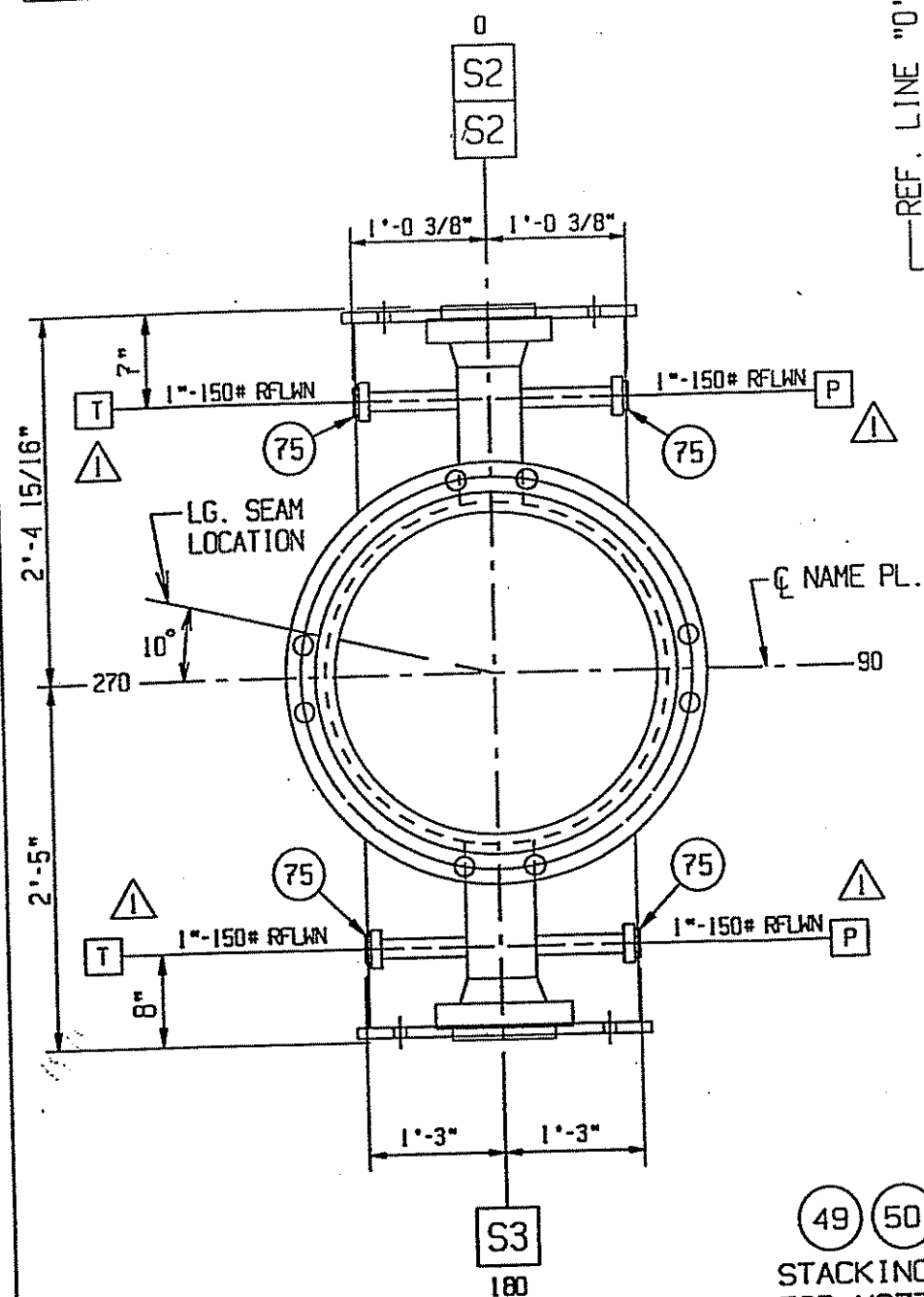
ASSEMBLY AND SPECIFICATIONS

OHMSTEDE	DRAWING NO. 438655	SHEET NO. 1B	REV. 1
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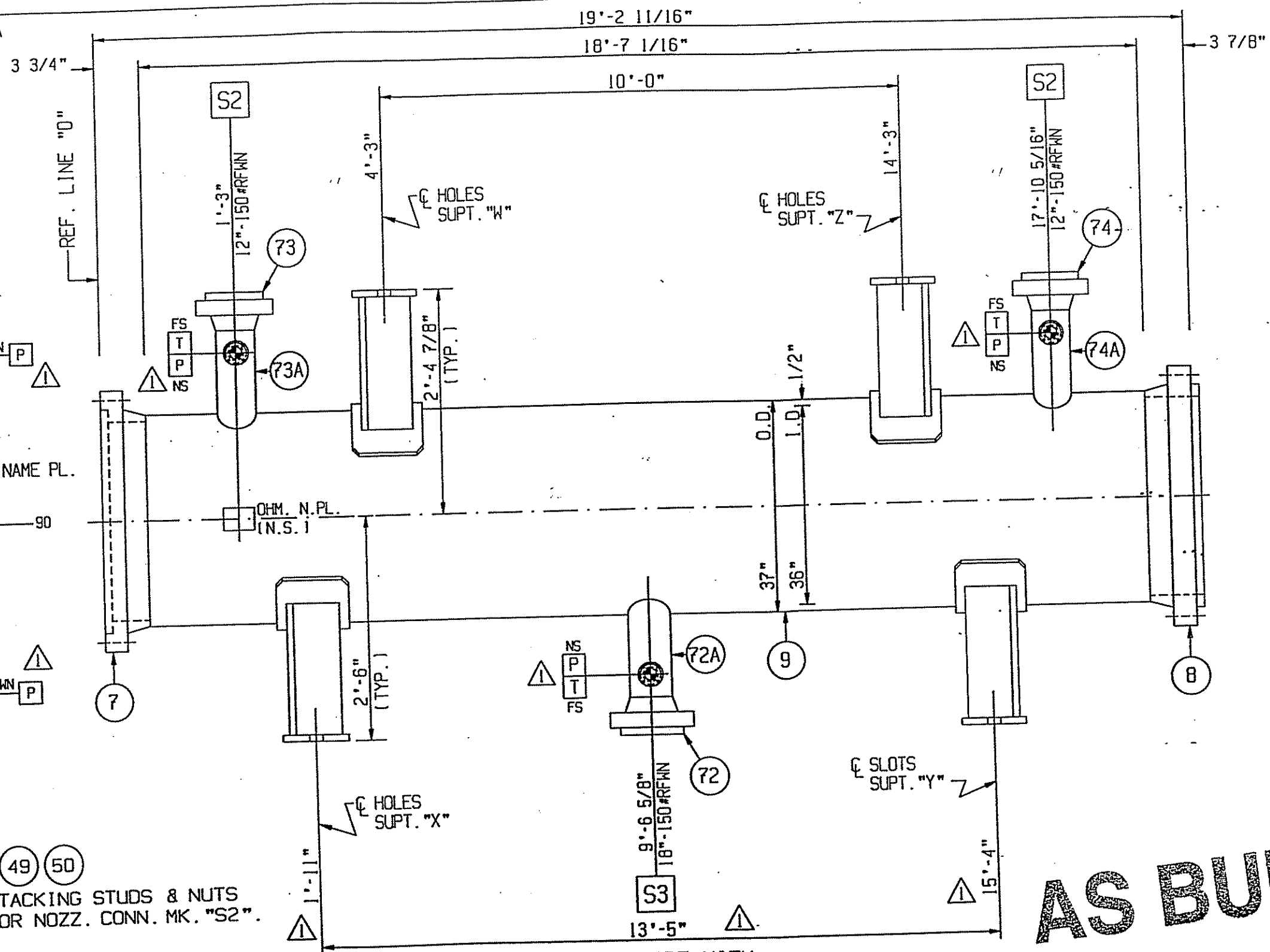
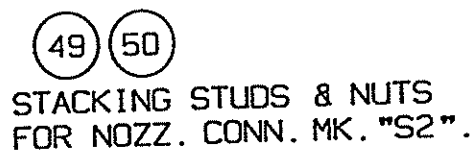
RELEASED FOR FAB.	KS	DC	1/23/95
FOR CUSTOMER APPROVAL	KS	DC	12-21-94
REVISIONS	BY	CHK.	DATE CHK.

AS BUILT

SHELL WT. = 5.750 LBS.



SHELL END VIEW



SHELL SIDE VIEW

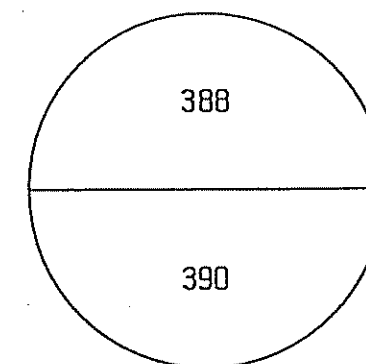
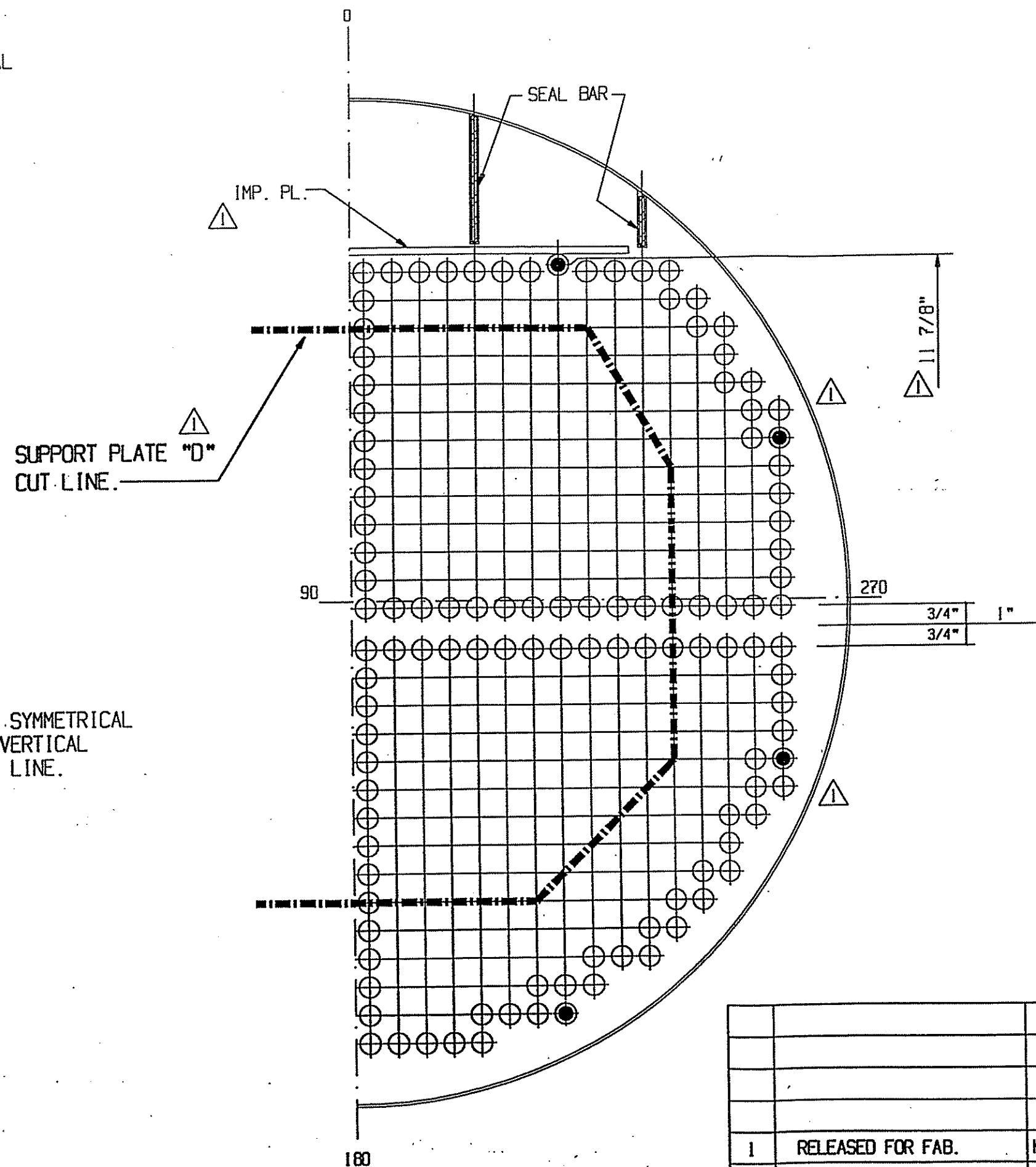
NOTES :

- NOTES:
- 1) ALL BOLT HOLES TO STRADDLE CENTER LINES.
 - 2) FOR WELD & BEVEL DETAILS SEE DWG. SHEET NO. 15
 - 3) GRIND ALL INSIDE WELDS FLUSH.
 - 4) SPOT RADIOGRAPHY.
 - 5) POST-WELD HEAT TREAT SELL: 
- A) HEAT FROM 800 deg.F TO 1150 ± 25 deg.F AT 400 deg.F PER HOUR
B) HOLD AT 1150 ± 25 deg.F FOR 1.00 HOUR (MIN).
C) COOL FROM 1150 ± 25 deg.F TO 600 deg.F AT 400 deg.F PER HOUR
D) FURTHER COOLING MAY BE IN STILL AIR.
E) AN OVEN RECORDING CHART IS REQUIRED.

					CUSTOMER: AMOCO OIL CO. - YORKTOWN
					OHMSTEDE JOB NO.: 438655
					P.O. NO.: 9422058
					ITEM NO.: EA-101 B
					(1) UNIT REQUIRED
1	RELEASED FOR FAB.	KS	DC	1/23/95	SHELL DETAILS
0	FOR CUSTOMER APPROVAL	KS	DC	12-21-94	
NO.	REVISIONS	BY	CHK.	DATE CHK.	
					OHMSTEDE
					DRAWING NO. 438655
					SHEET NO. 4B
					REV. 1

AS BUILT

 TIE RODS.
 1/2" O.D.
 8 REOD. TOTAL



TUBE DISTRIBUTION

NOTES:

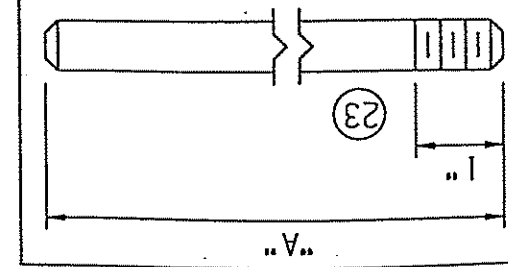
- 1) DRILL AND REAM TUBE HOLES IN TUBESHEETS TO .7600" $\pm$.002" DIA. FOR 778 - 3/4" O.D. TUBES.
- 2) TUBE PITCH = 1" SQUARE.
- 3) NUMBER OF PASSES = 2
- 4) SEE DRAWING SHEET NO. 6 FOR TUBE HOLE GROOVING DETAILS.
- 5) BAFFLE O.D. = 35 13/16"
- △ 6) O.T.L. = 34 9/16"

LAYOUT SYMMETRICAL ABOUT VERTICAL CENTER LINE.

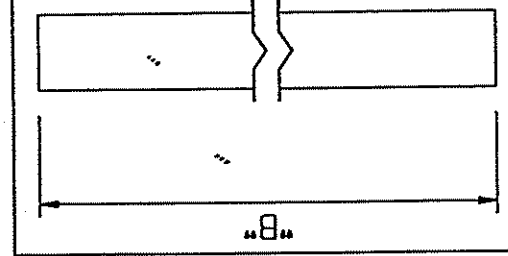
AS BUILT

VIEW LOOKING AT SHELL SIDE OF NO. 19 TUBESHEET

					CUSTOMER: AMOCO OIL CO. - YORKTOWN OHMSTEDE JOB NO.: 438655 P.O. NO.: 9422058 ITEM NO.: EA-101 A/B			
1	RELEASED FOR FAB.	KS	DC	1/23/95	(2) UNITS REQUIRED			
0	FOR CUSTOMER APPROVAL	KS	DC	12-21-94	TUBE LAYOUT			
NO.	REVISIONS	BY	CHK.	DATE CHK.	OHMSTEDE	DRAWING NO. 438655	SHEET NO. 7	REV 1



19'-2 1/2"	8
REO'D.	"A"



19'-2 1/2"	8
REO'D.	"A"

21 3/8"	4
34 5/8"	4
12 7/8"	56
26 1/8"	24
21 1/8"	4
34 3/8"	4

BACK TUBESHEET	4
1/8" TUBE PROJ.	4

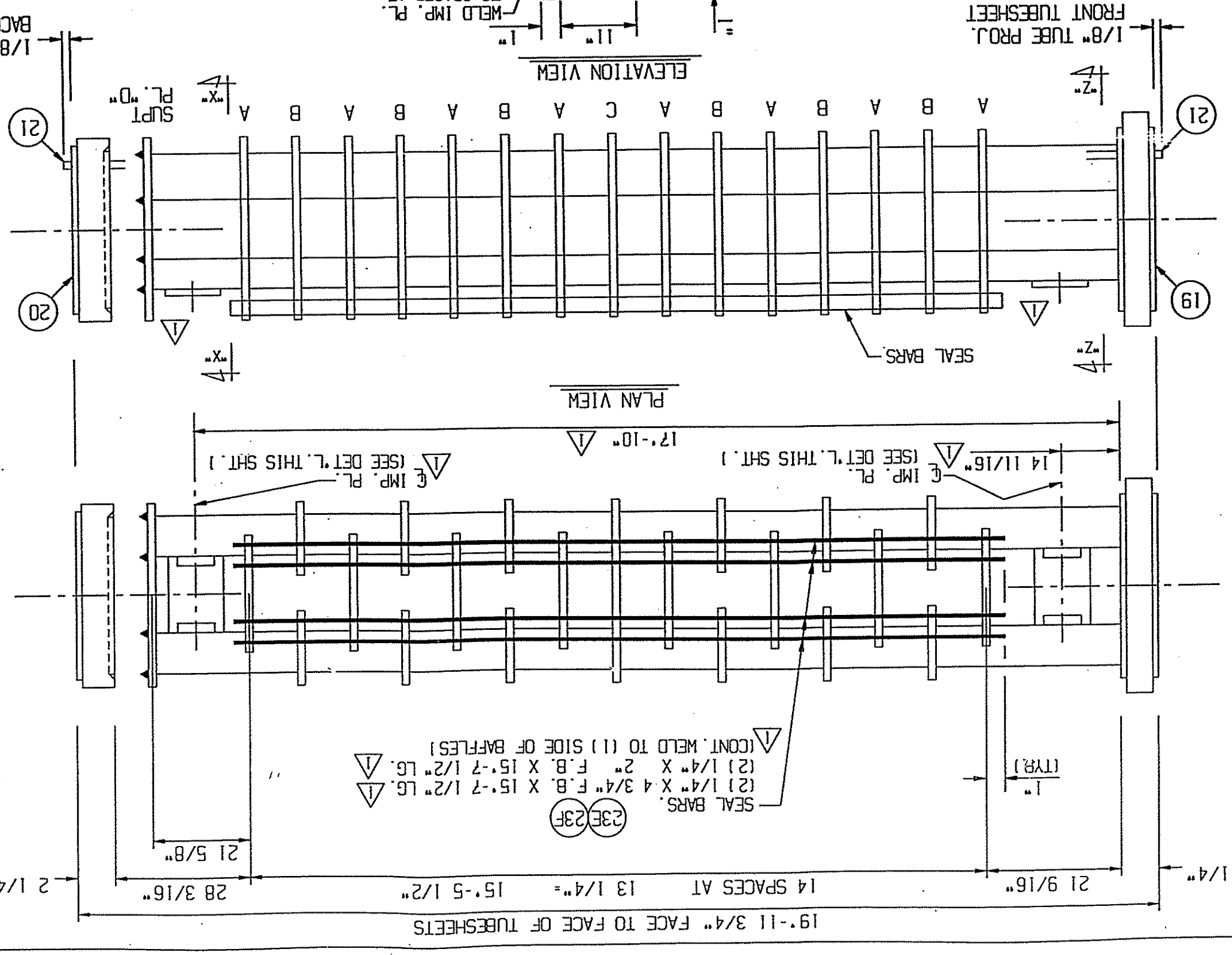
As Built

CUSTOMER: AMOCO OIL CO. - YORKTOWN
 OHMSTEDE JOB NO.: 438655
 P.O. NO.: 9422058
 ITEM NO.: EA-101

BUNDLE DETAILS

OHMSTEDE
 DRAWING NO. 438655
 SHEET NO. 8B
 REV. 1

NO.	REVISIONS	BY	CHK.	DATE CHK.
0	FOR CUSTOMER APPROVAL	KS	DC	12-21-94
1	RELEASED FOR FAB.	KS	DC	1/23/95



SHOP NOTE!!
 TIE RODS TO BE TACK WELDED
 TO ALL BAFFLES & CONT. F.W.
 TO SUPT. PL. "D"

NOTES:
 1. SEE DWG. SHEET NO. 9A FOR SECTION AND VIEW DETAILS.

