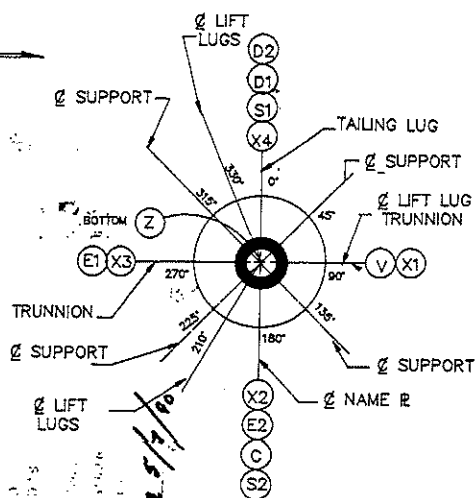
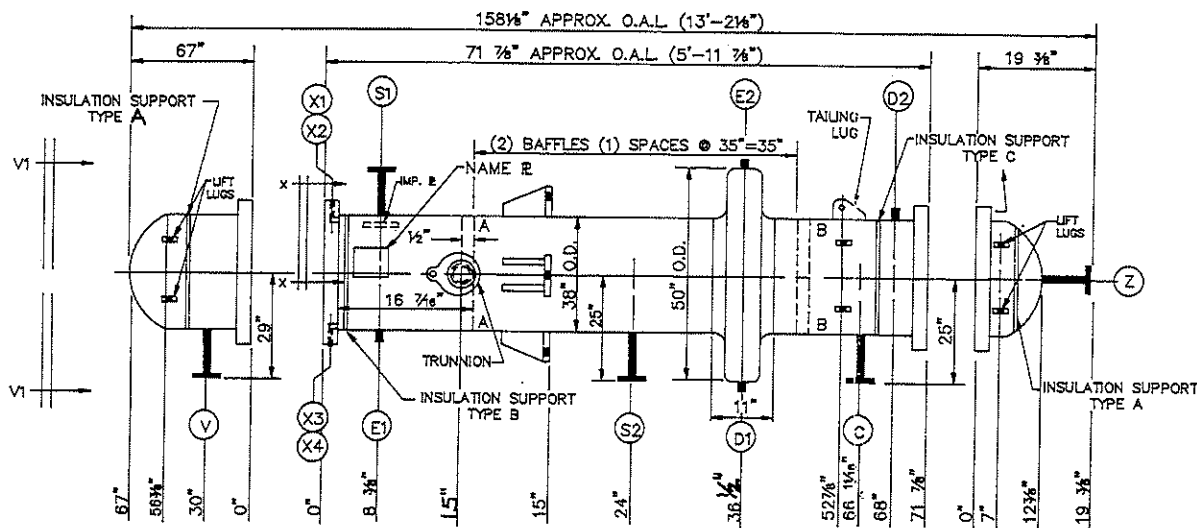


5116-7306-2



ORIENTATION
VIEW VI-VI

ANSI NOZZLE SCHEDULE					
	SIZE	RATE	FACE	NOZZLE NECK	SERVICE
				TUBE SIDE	
Z	18"	150#	L.W.	1/4" THK. P	INLET
V	24"	150#	L.W.	1/4" THK. P	OUTLET
				SHELL SIDE	
S1	6"	150#	R.F.W.N.	STD. WT.	STEAM INLET
C	2"	150#	R.F.W.N.	SCH. 160	CONDENSATE OUTLET
E1	3/4"	6000#	THD.	VOGT. CPT. PLUGGED	VENT
E2	3/4"	6000#	THD.	VOGT. CPT. PLUGGED	VENT
D1	3/4"	6000#	THD.	VOGT. CPT. PLUGGED	DRAIN
X1-4	3/4"		N.P.T.		TUBESHEET VENT
S2	2"	150#	R.F.W.N.	SCH. 160	STEAM OUTLET
D2	3/4"	6000#	THD.	VOGT. CPT. PLUGGED	DRAIN

WPS P1-P1	W-42(SMAW)	W-72(FCAW)	W-89(SAW)
WPS P1-P8	W-2(SMAW)	W-112(FCAW)	W-100(SAW)
WPS P8-P8	W-3(SMAW)	W-81(FCAW)	W-90(SAW)

ASME CODE REQUIREMENTS

	SHELL SIDE	TUBE SIDE
DESIGN PRESSURE	75/F.V.	75/F.V.
DESIGN TEMPERATURE (MAX/MIN)	350/15	350/15
HYDRO. TEST PRESSURE	115	115
CORROSION ALLOWANCE	1/8"	NONE
POSTWELD HEAT TREATMENT	NONE	NONE
RADIOGRAPHIC EXAMINATION	SPOT *	
METAL TEMP. (TEMA 6th ED.)	350/300/300/70/70/70/300	350/157/70/150/70/300/300

* FULL X-RAY EXP. JT. 50" O.D. GIRTH SEAM.

ASME CODE STAMP / NAT'L BD. REG. IS REQUIRED.

CUSTOMER INSPECTION IS REQUIRED

SPECIFICATIONS: 1986 ASME CODE SECT. VII DIV. 1 ADDENDA-A&T

SPECIAL SERVICE: NONE CODE CASE: NONE PARTIAL DATA REPORTS: NONE

TEMA (B) G1G; G2G; G4B; S01E; S01S; S02S; S02A; S02T; S0000A; 0011S; G12D

TUBES: SA-240 TP 316L PER SHW000 TYPE 1 CATEGORY II WALL: AVG.

NO. 300 O.D. 1 1/2" BWG. 16 LENGTH: 72" (6'-0")

TUBESHEETS: SA-240 TP 316L

PART	SHELL SIDE	TUBE SIDE
VESSEL	SA-516 GR. 70	SA-240 TP 316L
COVERS		
FORMED HEADS	SA-516 GR. 70	SA-240 TP 316L
BODY FLANGES		SA-516 GR. 70
NOZZLE FLANGES	SA-105	SA-105
NOZZLE PIPE	SA-106 GR.B (SMLS)	SA-240 TP 316L
STUDS/NUTS	SA-193-B7/SA-194-2H	SA-193-B7/SA-194-2H
GASKETS	SA-240	1/8" THK. KEVLAR
INSULATION	3 1/2" THK.	3 1/2" THK.

MAY 03 1990

REVISIONS

285563

11-13-89 GENERAL REVISIONS.

CERTIFIED

ENG.

CUSTOMER E.I. DUPONT DE NEMOURS & COMPANY, INC.

CUSTOMER P.O. NO. LPBC-96110W

ITEM NO. EN NO. 5116-7306-2

PROJ. NO. 6432

PLANT BEAUMONT, TEXAS

TEMA SIZE AND TYPE

(1) 37-72 BEM REFINING COLUMN CALANDRIA

SOUTHERN HEAT EXCHANGER CORP.

P.O. BOX 030008 TUSCALOOSA, AL 35403

DATE 02/14/89	ORDER NO.	DWG. NO. SP-2085-1
BY B. HUFF	89-023	SHEET 1 OF 5

FABRICATION RELEASE

APPROVED FOR FABRICATION

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BY

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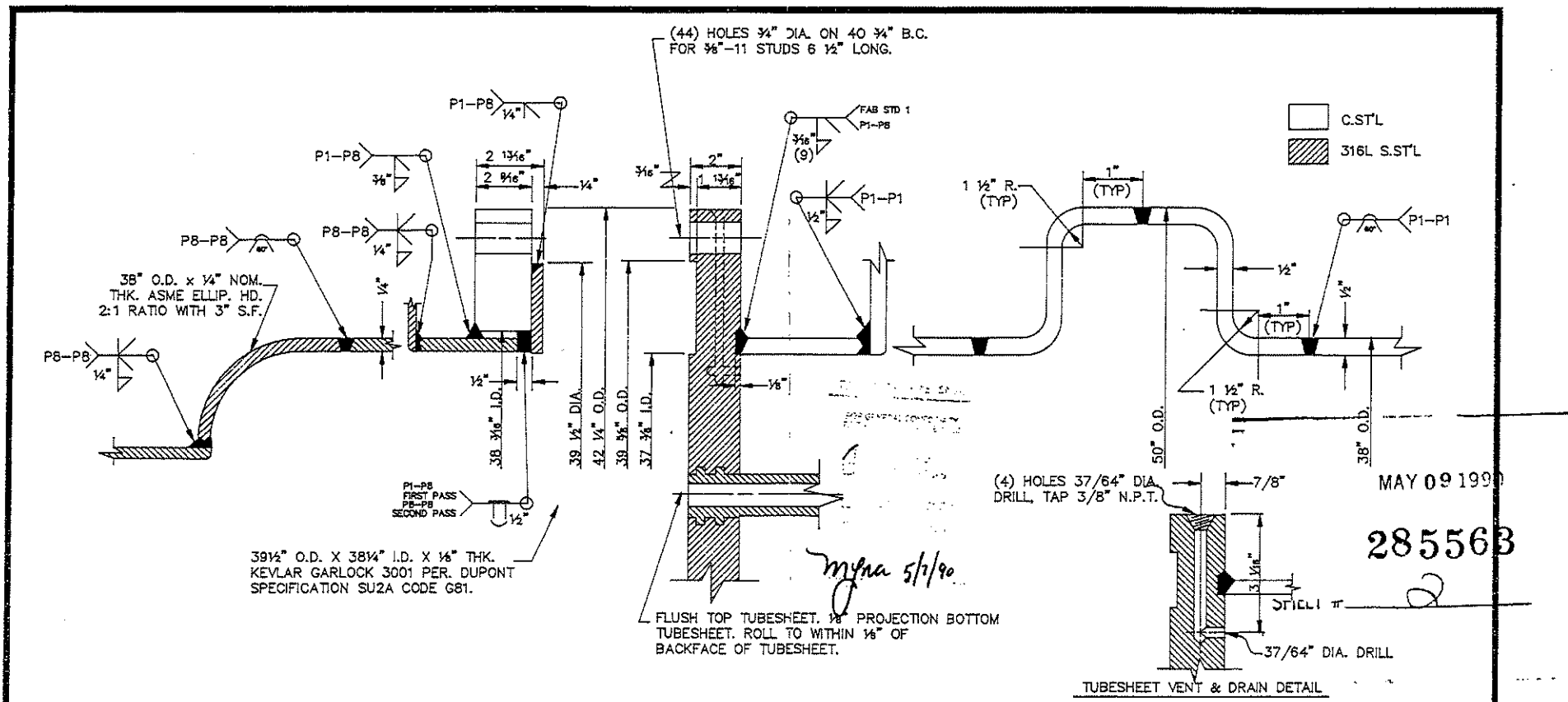
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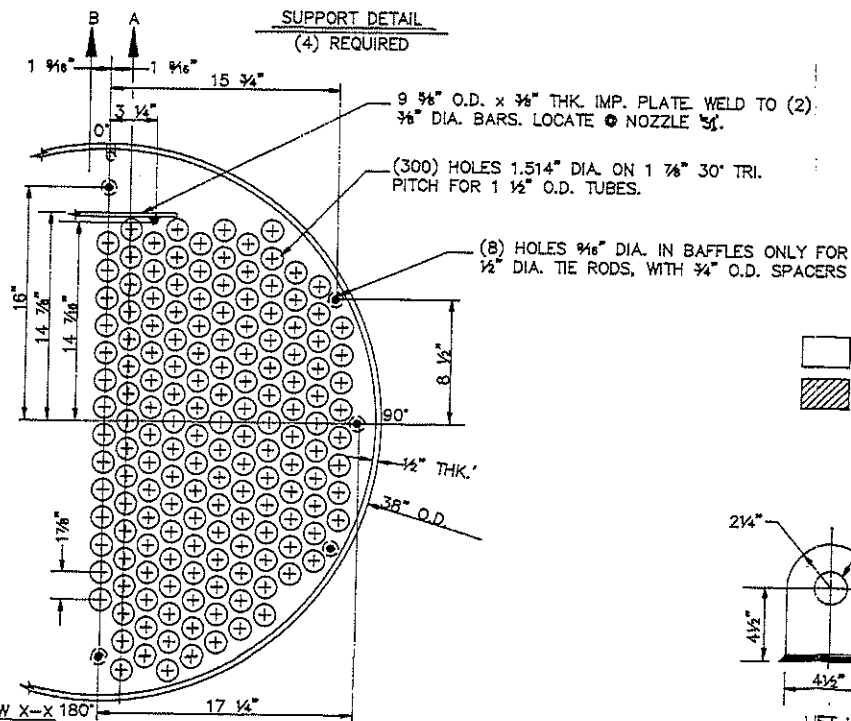
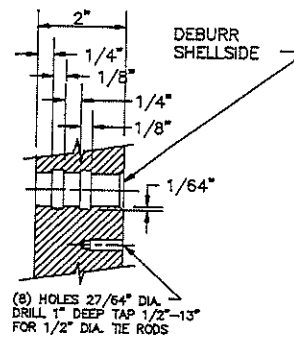
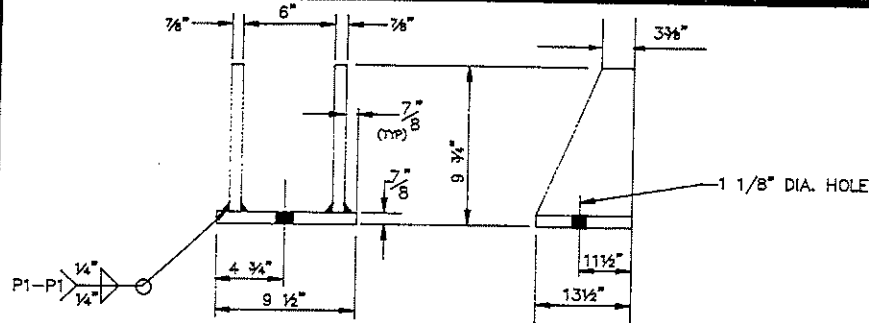
BY

DATE

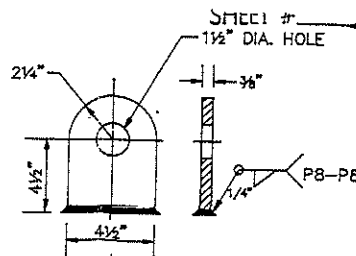
BY



NOTES			NON-PRESSURE PARTS		CERTIFIED	ENG.
1. EST. WT. EMPTY: 8600# (9)	FULL: 13800#	BOL:	SUPPORTS	SA-36	CUSTOMER E.I. DUPONT DE NEMOURS & COMPANY, INC.	
2. ALL BOLT HOLES STRADDLE NORMAL CENTERLINES.			BAFFLES / SUPPORTS	SA-36	CUSTOMER P.O. NO. LPBC-96110W	
3. WOODEN COVERS ON ALL OPEN NOZZLES. (SEE NOTE 6)			TIE RODS / SPACERS	C.S.T'L	ITEM NO. EN NO. 5116-7306-2	
4. MAIN GASKET SURFACES.			PASS PARTITIONS	NONE	PLANT BEAUMONT, TEXAS	
5. PAINT: SANDBLAST EXPOSED C.S.T'L NEAR WHITE PER SSPC-SP-10. PRIME WITH (1) COAT DUPONT 347-Y-P12 GANION INORGANIC ZINC-RICH COATING 2 TO 4 MILS D.F.T. TOP COAT WITH (1) COAT DUPONT 612-C706 HI HEAT-RESISTANT SILICONE ALUMINUM PAINT 1 MIL D.F.T. FOR A TOTAL D.F.T. OF 3 TO 5 MILS PER DUPONT SPEC C611S.			LIFT LUGS	316L S.S.T'L	TEMA SIZE AND TYPE	
6. COAT ALL EXPOSED GASKET SURFACES WITH RUST VETO HEAVY. SEAL WITH CLOTH BACKED TAPE. COVER WITH WOODEN COVERS BOLTED IN PLACE WITH A FULL COMPLIMENT OF BLACK IRON BOLTS.			TRIUNIONS/TAILING LUG	SA-36	(1) 37-72 BEM REFINING COLUMN CALANDRIA	
7. ALL TUBES MUST BE TESTED AND INSPECTED PER DUPONT SPECIFICATION SW300M TYPE 1 CAT. III			IMP. PLATE	SA-36	SOUTHERN HEAT EXCHANGER CORP.	
8. ALL S.S.T'L MUST BE TESTED FOR THE PRESENCE OF MOLYBDENUM PER DUPONT SPEC. SG2T.			9. EST. WT. FOR TOP BONNET & BOTTOM BONNET	1500# 900#	P.O. BOX 030008 TUSCALOOSA, AL. 35403	
					DATE 02/14/89	ORDER NO.
					BY B. HUFF	89-023
					DWG. NO. SP-2085-1	SHEET 2 OF 5



VIEW X-X 180°
BAFFLE CUT ALTERNATES (1)A-A, (1)B-B
BAFFLE DIA.: 36.825"
O.T.L.: 36.5279"
TUBEHOLE DIA. IN BAFFLES: 1 33/64"



LIFT LUG DETAIL
(9) REQ'D

C.S.T.L.
316L S.S.T.L.

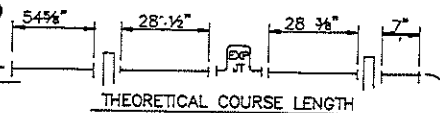
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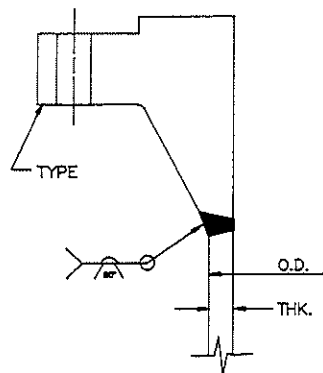
SOUTHERN

CAUTION

THE PRESSURE AND TEMPERATURES SHOWN ON THE S.H.E. NAMEPLATE RELATE ONLY TO THE PRESSURE RETENTION CAPABILITY OF THIS HEAT EXCHANGER. COMPONENTS OF THIS HEAT EXCHANGER HAVE BEEN DESIGNED FOR SPECIFIC OPERATING CONDITIONS. A CHANGE IN SERVICE OR DEVIATION FROM THE SPECIFIED OPERATING CONDITIONS REQUIRES THAT A MECHANICAL DESIGN CHECK BE MADE IN ORDER TO AVOID POSSIBLE DAMAGE TO THE HEAT EXCHANGER.

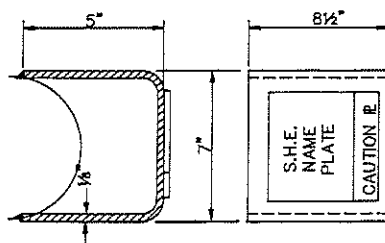


CERTIFIED	ENG.
CUSTOMER E.I. DUPONT DE NEMOURS & COMPANY, INC.	
CUSTOMER P.O. NO. 1PBC-96110W	
ITEM NO. EN NO. 5116-7306-2	PROJ. NO. 6432
PLANT BEAUMONT, TEXAS	
TENA SIZE AND TYPE (1) 37-72 BEM REFINING COLUMN CALANDRIA	
SOUTHERN HEAT EXCHANGER CORP.	
P.O. BOX 030008 TUSCALOOSA, AL. 35403	
DATE 02/14/89	ORDER NO.
BY B. HUFF	89-023
DWG. NO. SP-2085-1	SHEET 3 OF 5



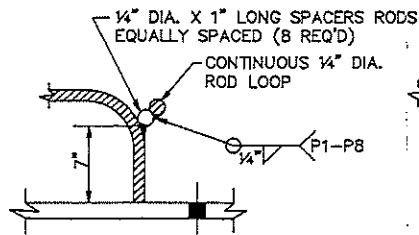
RFWN NOZZLE DETAIL

S.H.E. MARK	TYPE	O.D.	THK.	MATL
S1	16"-150#	6 3/8"	.280"	C.STL
C.S2	2"-150#	2 3/4"	.344"	C.STL

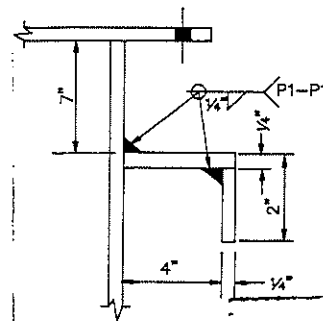


NAME PLATE BRACKET DETAIL

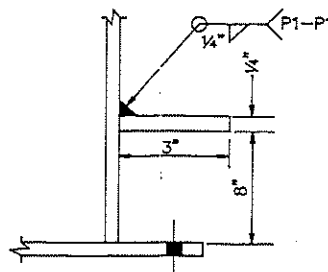
NOTE: NAME R MUST BE ATTACHED USING 304 S. STL DRIVE SCREWS.



INSULATION SUPPORT
TYPE A



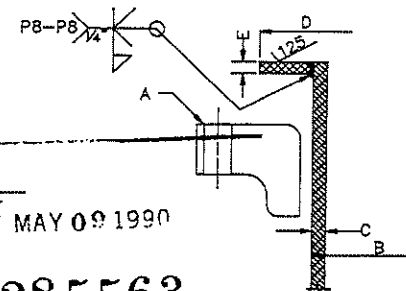
INSULATION SUPPORT TYPE B



INSULATION SUPPORT
TYPE C

NOTE:
INSULATION SUPPORTS WILL BE THE
SAME MATERIAL TO WHICH IT IS
ATTACHED.

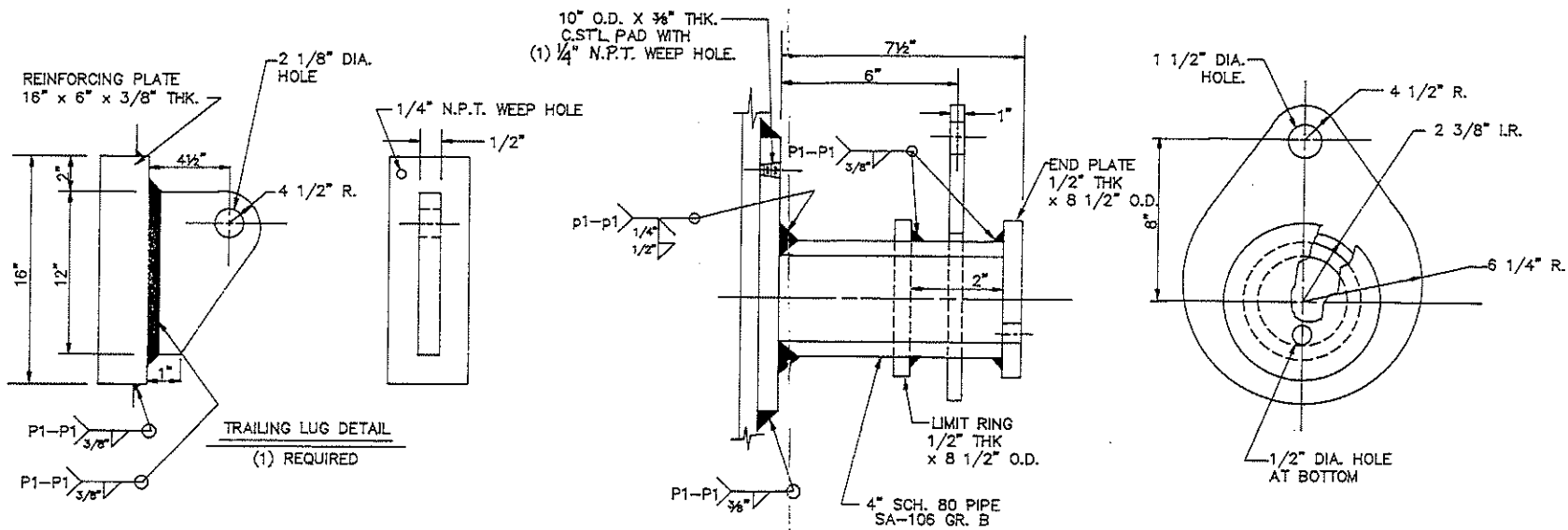
C.STL
304 S.STL
316L S.STL



LAP JOINT DETAIL

NOZZLE Z	NOZZLE V
A 18"-150# LJ	A 24"-150# LJ
B 18"	B 24"
C 1/4"	C 1/4"
D 21"	D 27 1/4"
E 1/4"	E 1/4"

CERTIFIED	ENG.
CUSTOMER E.I.DUPONT NEMOURS & COMPANY, INC	
CUSTOMER P.O. NO. LPBC-96110W	
ITEM NO.	PROJ. NO. 6432
PLANT BEAUMONT, TEXAS	
EN. NO. 5116-7302-2	
TEMA SIZE AND TYPE	
(1) 37-72 BEM REFINING COLUMN CALANDRIA	
SOUTHERN HEAT EXCHANGER CORP.	
P.O. BOX 030008 TUSCALOOSA, AL 35403	
DATE 02/08/89	ORDER NO.
BY W. McLain	89-023
DWG. NO. SP-2085-1	SHEET 4 OF 5



TRUNNION DETAIL

(2) REQUIRED

MAY 09 1990

C.S.T.L.
316L S.S.T.L.

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CERTIFIED	ENG.	
CUSTOMER E.I. DUPONT DENEMOURS & CO., INC.		
CUSTOMER P.O. NO. LPBC-96110W		
ITEM NO. EN. NO. 5116-7302-2		PROJ. NO. 6432
PLANT BEAUMONT, TEXAS		
TEMA SIZE AND TYPE		
(1) 37-72 BEM REFINING COLUMN CALANDRIA		
SOUTHERN HEAT EXCHANGER CORP.		
P.O. BOX 030008 TUSCALOOSA, AL. 35403		
DATE 11-13-89	ORDER NO.	DWG. NO. SP-2085-1
BY N.B.Y.	89-023	SHEET 5 OF 5

Specification Changes

Original Specifications

89-023

5116-7304-2

1. Manufactured and certified by SOUTHERN HEAT EXCHANGER CORPORATION 400 65TH ST E. TUSCALOOSA, ALABAMA
(name and address of manufacturer)
2. Manufactured for E. I. duPont de Nemours & Co., Inc. Wilmington, De.
(name and address of purchaser)
3. Location of installation E. I. duPont de Nemours & Co., Inc. BEAMONT, TX.
(name and address)
4. Type: Hr. Exch. 89-023 — SP-2085-1 5727 1980
(horiz. or vert., tank) (mfr's. serial no.) (CRN) (drawing no.) (Nat'l. Bd. no.) (year built)
5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction and workmanship conform to ASME Code, Section VIII, Division 1: 1986
(year)
- A27 — —
(addenda (Date)) (Code Case no.) (special service per UG-120(d))

Items 6-11 inclusive to be completed for single wall vessels, jackets of jacketed vessels, or shells of heat exchangers.

6. Shell: SA-516-70 .500" .125" 3'-1" 5'-11.275"
(mat'l. spec. no., grade) (nom. thickness (in.)) (corr. allow. (in.)) (dia. ID (ft. & in.)) (length (overall) (ft. & in.))
7. Seams: SING. BUTT SPOT 85% — — SING. BUTT 100% ON EXP. 2
(long. (dbl., angl.)) (RT (spot or full)) (eff. (%)) (HT temp. (°F)) (time) (girth (dbl., angl.)) (RT (spot, partial, or full)) (no. of courses)
8. Heads: (a) SA-516-70 (b) —
(mat'l. spec. no., grade) (mat'l. spec. no., grade)
- | | Location (top, bottom, ends) | Minimum Thickness | Corrosion Allowance | Crown Radius | Knuckle Radius | Elliptical Ratio | Conical Apex Angle | Hemispherical Radius | Flat Diameter | Side to Pressure (convex or concave) |
|-----|------------------------------|-------------------|---------------------|---|----------------|------------------|--------------------|----------------------|---------------|--------------------------------------|
| (a) | <u>CENTER</u> | <u>.4375"</u> | <u>.125"</u> | <u>(2) 50" O.D. FLANGED & FLUED HEADS</u> | | | | | | <u>FLAT</u> |
| (b) | | | | | | | | | | |
- If removable, bolts used (describe other fastenings): LINE 7.
(mat'l. spec. no., gr., size, no.)

9. Type of jacket: NONE Proof test: —
10. Jacket closure: NONE If bar, give dimensions: — If bolted, describe or sketch: —
(describe as open & weld, bar, etc.)
11. MAWP: 75/PSI at max. temp. 350 Min design metal temp.: 15 at 75/PSI Hydro. pres. or comb. test pressure 115
(psi) (°F) (°F) (psi)

Items 12 and 13 to be completed for tube sections.

12. Tubesheets: SA-240-316L .250" 2" 0 WELDED
(stationary mat'l. spec. no., gr.) (dia. (in.) (subject to pressure)) (nom. thickness (in.)) (corr. allow. (in.)) (attachment (welded, bolted))
- — — — —
(floating mat'l. spec. no., gr.) (dia. (in.)) (nom. thickness (in.)) (corr. allow. (in.)) (attachment)
13. Tubes: SA-240-316L 1.50" 16 300 STRAIGHT
(mat'l. spec. no., gr.) (OD (in.)) (nom. thickness (in. or gauge)) (no.) (type (straight or U))

Items 14-17 inclusive to be completed for inner chambers of jacketed vessels or channels of heat exchangers.

14. Shell: SA-240-316L .250" — 3'-1.50" 5'-7"
(mat'l. spec. no., gr.) (nom. thickness (in.)) (corr. allow. (in.)) (dia. ID (ft. & in.)) (length (overall) (ft. & in.))
15. Seams: SING. BUTT SPOT 85% — — SING. BUTT — 2
(long. (dbl., angl.)) (RT (spot or full)) (eff. (%)) (HT temp. (°F)) (time) (girth (dbl., angl.)) (RT (spot, partial, or full)) (no. of courses)
16. Heads: (a) SA-240-316L (b) —
(mat'l. spec. no., grade) (mat'l. spec. no., grade)
- | | Location (top, bottom, ends) | Minimum Thickness | Corrosion Allowance | Crown Radius | Knuckle Radius | Elliptical Ratio | Conical Apex Angle | Hemispherical Radius | Flat Diameter | Side to Pressure (convex or concave) |
|-----|------------------------------|-------------------|---------------------|--------------|----------------|------------------|--------------------|----------------------|---------------|--------------------------------------|
| (a) | <u>TOP/BOTTOM</u> | <u>.1875"</u> | <u>—</u> | | | <u>2:1</u> | | | | <u>CONCAVE</u> |
| (b) | | | | | | | | | | |
- If removable, bolts used (describe other fastenings): SA-193-B7 (44) EA. 5/8"-11.
(mat'l. spec. no., gr., size, no.)

17. MAWP: 75/PSI at max. temp. 350 Min design metal temp.: 15 at 75/PSI Hydro. pres. or comb. test pressure 115
(psi) (°F) (°F) (psi)

18. Nozzles, inspection and safety valve fittings;

[illegible]

19. Supports: Skit 110 Lugs 4 Legs Other Attached SEW, WELDED
(yes or no) (no.) (no.) (describe) (where and how)

20. Remarks: Manufacturers' Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report: _____

(name of part, item number, mfr's. name and identifying stamp)

UG-20(f) UG-46(d)

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. 7037 expires FEB. 28, 1991

Date 1-5-90 Name SOUTHERN HEAT EXCHANGER CORPORATION
(manufacturer)

Signed D. H. Noland
D. H. NOLAND (representative)

CERTIFICATE OF SHOP INSPECTION

Vessel constructed by SOUTHERN HEAT EXCHANGER CORPORATION at TUSCALOOSA, ALABAMA

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 COMMERCIAL UNION INSURANCE COMPANY

_____ of BOSTON, MASS., have inspected the pressure vessel described in this Manufacturers' Data Report on 1-5, 19 90, 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 the Manufacturers' 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: 5-90 Signed: B.M. Swartz Commissions: NB546 May 282
(Authorized Inspector) (Nat'l. Bd. incl. endorsements) state, prov. and no.

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the field assembly construction of all parts of this vessel conforms with the requirements of Section VIII, Division 1 of the ASME BOILER AND PRESSURE VESSEL CODE.

"U" Certificate of Authorization no. _____ expires _____, 19____

Date _____ Name _____ Signed _____
(assembler that certified and constructed field assembly) (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 Manufacturers' Data Report with the described pressure vessel and state that parts referred to as data items _____, not included in the

By signing this certificate neither the inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in the Manufacturers' 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 _____ (Authorized Inspector) _____ Commissions _____ (Nat'l. Bd. incl. endorsements state, prov. and no.)

THERMAL RATING - SHELL AND TUBE HEAT EXCHANGERS NATURAL CIRCULATION

5116 -
 F.A.A. No. 7306-2 Quantity 1 Cooler Condenser Vaporizer Heater
 Project No. 6432 Plant BEAUMONT Rated by H.F. Hublein Date 7/25/68
 CHECKED J. BAKER 1-6-89

This is not a complete specification. See Standard Engineering Specification SOTE, "Shell and Tube Heat Exchanger Procurement Work Sheet" for additional information which must be furnished vendor.

REFINING COLUMN CALANDRIA

MATERIALS
 Tubes: 316 L S/S

CONSTRUCTION

Type Name: Fixed tube sheet U-tube External floating head
Internal floating head Kettle reboiler

Type Figure: SOLE Figure 2A 2B 2C 3A 3B 3C 3D 4A 4B 5A 5B 5C 5D 6A 6B 6C
 With Weir Without Weir

TEMA Type Designation: BEM
 Position: Vertical Horizontal Inclined _____ degrees
 Top (~~front~~) head: Bonnet Channel Cone Elbow
 Bottom (~~rear~~) head: Bonnet Channel Baffle Furnel separator Cone
Elbow Cover plate
 Shell expansion joint: Required Not required

	Tube Side	Shell Side
Design temperature _____ °C		
Design pressure _____ psig		
Fluid <u>Boiling liquid</u>		<u>Boiling liquid Nonboiling</u>
<u>Gas</u> <u>Condensing vapor</u>		<u>Gas</u> <u>Condensing vapor</u>

SIZE

No. shells per unit <u>1</u>	Finned tube _____ in.
No. tube passes per shell <u>1</u>	Tube OD <u>1.5</u> in.
Outside area per shell <u>705</u> sq ft	Tube wall thick. <u>.065</u> in.
Outside area per unit <u>705</u> sq ft	Tube pitch <u>1.875</u> in.
Nominal shell ID <u>37</u> in.	Tube pattern <u>Triangular</u> Rotated square
No. tubes per shell <u>300</u>	<u>Square</u>
Tube length <u>6</u> ft	Baffle pitch <u>Provide Tube</u> in.
	Baffle cut <u>SUPPORT</u> % of dia.
Shell Type <u>E</u> F J	Baffle type <u>Segmental</u> Double Segmental
	No. pairs of sealing devices <u>NONE</u>

CONNECTIONS (Per SOTE Par. 20)

Refrigerant top head _____ " inlet	<u>24</u> " outlet	_____ "
Refrigerant bottom head <u>18 x 4</u> " inlet	_____ " outlet	_____ "
Shell <u>8 x 2</u> " inlet	<u>24</u> " outlet	_____ "

PERFORMANCE PER UNIT

	Tube Side	Shell Side
Load	<u>8.13 MM</u> Pcu/hr	<u>STEAM</u>
Fluid	<u>PROCESS</u>	<u>STEAM</u>
Total fluid in	<u>190000</u> lb/hr	<u>16020</u> lb/hr
Condensate out	<u>103500</u> lb/hr	<u>16020</u> lb/hr
Vapor out	<u>84500</u> lb/hr	_____ lb/hr
Inlet temperature	<u>22.2</u> °C	<u>145</u> °C
Outlet temperature	<u>22.2</u> °C	<u>145</u> °C
Normal operating pressure	<u>273</u> mmHg abs	<u>45</u> psig
Pressure drop	_____ psi-mmHg	_____ psi-mmHg