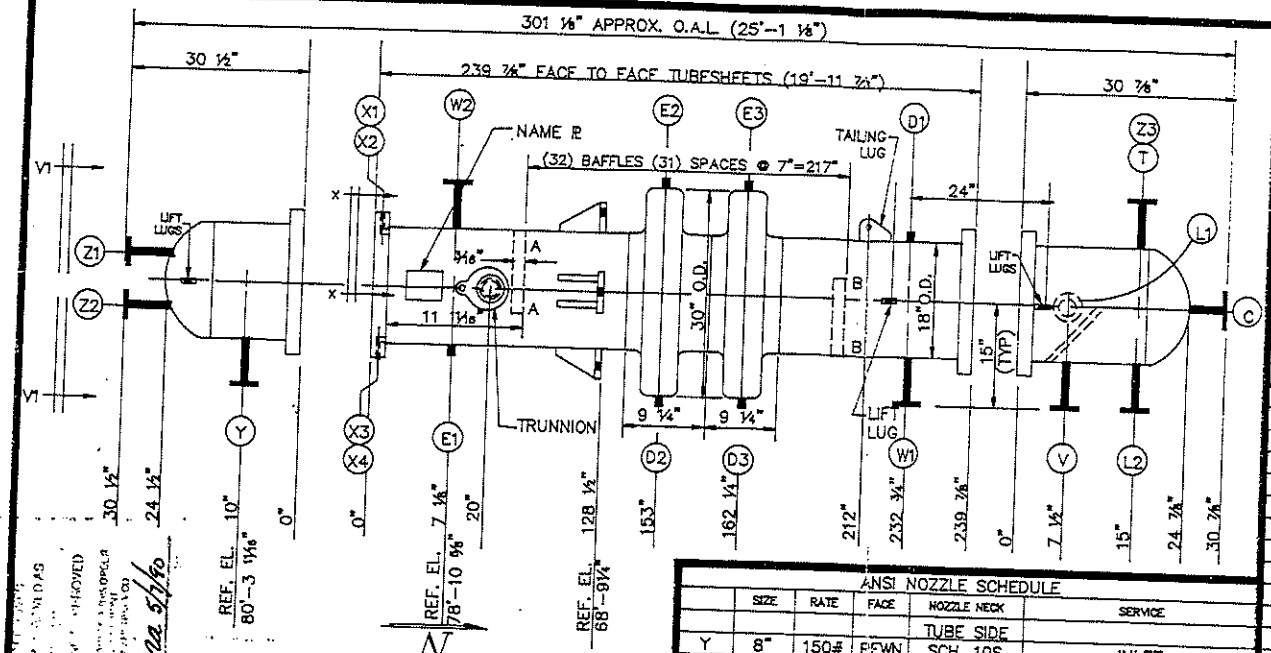
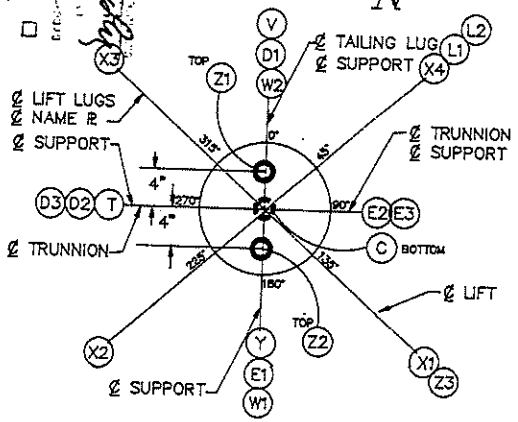




ORIENTATION
VIEW V1-V1

ANSI NOZZLE SCHEDULE

	SIZE	RATE	FACE	NOZZLE NECK	SERVICE
				TUBE SIDE	
Y	8"	150#	RFWN	SCH. 10S	INLET
C	3"	150#	RFWN	SCH. 40	LIQUID OUTLET
V	4"	150#	RFWN	SCH. 40	VAPOR OUTLET
T	1 1/2"	150#	RFWN	SCH. 40	INSTRUMENT
Z1	2"	150#	RFWN	SCH. 40	LIQUID INLET
Z2	2"	150#	RFWN	SCH. 40	LIQUID INLET
Z3	2"	150#	RFWN	SCH. 40	LIQUID INLET
L1	2"	150#	RFWN	SCH. 40	SITE GLASS
L2	2"	150#	RFWN	SCH. 40	SITE GLASS
				SHELL SIDE	
W1	4"	150#	RFWN	SCH 80	INLET
W2	4"	150#	RFWN	SCH 80	OUTLET
D1	3/4"	6000#	THD.	VENT, CPLT. PLUGGED	DRAIN
E1	3/4"	6000#	THD.	VENT, CPLT. PLUGGED	VENT
E2	3/4"	6000#	THD.	VENT, CPLT. PLUGGED	VENT
D2	3/4"	6000#	THD.	VENT, CPLT. PLUGGED	DRAIN
X1-4	1/4"	—	N.P.T.	—	TUBESHEET VENT

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 PSIG	75	75/F.V
DESIGN TEMPERATURE (MAX/MIN) °F	250/15	250/15
HYDRO. TEST PRESSURE PSIG	115	115
CORROSION ALLOWANCE	1/8"	NONE
POSTWELD HEAT TREATMENT	NONE	NONE
RADIOGRAPHIC EXAMINATION	SPOT	
METAL TEMP. (TEMA 8th ED.) °F	250/87/175/70	250/117/175/274

ASME CODE STAMP / NAT'L BD. REG IS REQUIRED.
CUSTOMER INSPECTION IS REQUIRED
SPECIFICATIONS: 1968 ASME CODE SECT. VIII DIV. 1 ADDENDA-A87
SPECIAL SERVICE: NONE CODE CASE: NONE PARTIAL DATA REPORTS: NONE
TEMA (8) G1C; G5C; G4B; SG1E; SG1S; SG2S; SG2T; SU2A; SW300M; C111SI
TUBES: SA-249 TP 316L PER SW300M TYPE 1 CATEGORY III WALL: AVG.
NO. 237 O.D. 3/4" BWG. 16 LENGTH: 240"(20'-0")
TUBESHEETS: SA-240 TP 316L

PART	SHELL SIDE	TUBE SIDE
VESSEL	SA-53 GR. B (SMLS)	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-182 F 316L
NOZZLE PIPE	SA-53 GR. B (SMLS)	SA-312 TP 316L
STUDS/NUTS	SA-193-B7/SA-194-2H	SA-193-B7/SA-194-2H
GASKETS SU2A GR1		1/8" THK. KEVLAR

MAY 11 1990

REVISIONS

285561

2	1/26/90	REV. SUPPORTS
1		GEN. REV.

CERTIFIED ENG.

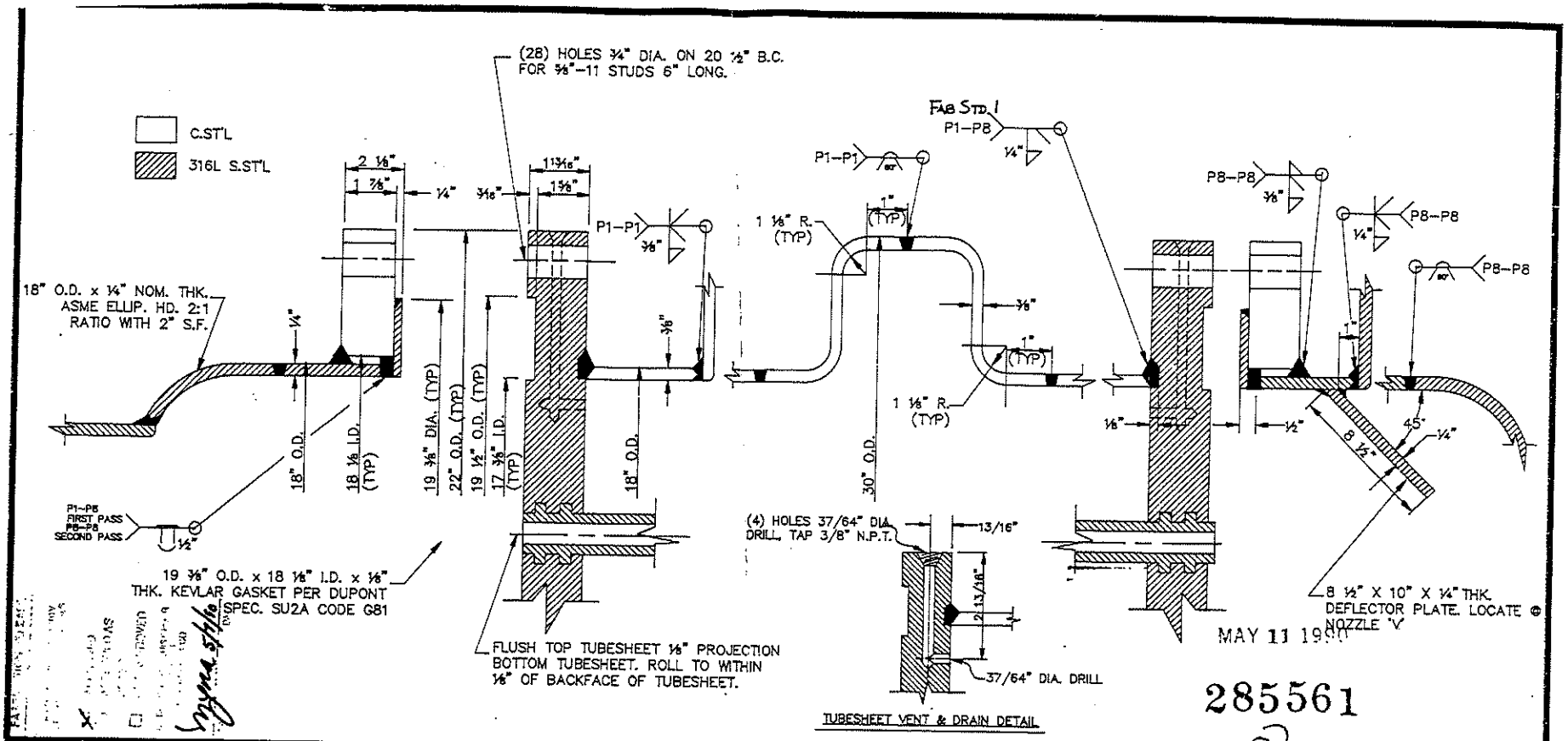
CUSTOMER E.I.DUPONT DE NEMOURS & COMPANY, INC.
CUSTOMER P.O. NO. LPBC-96110W
ITEM NO. PROJ. NO. 6432
PLANT BEAUMONT, TEXAS
EN NO. 5116-7302-15-2

TEMA SIZE AND TYPE
(1) 17-240 BEM LOW BOILER COLUMN SECONDARY CONDENSER

SOUTHERN HEAT EXCHANGER CORP.
P.O. BOX 030008 TUSCALOOSA, AL. 35403

DATE 03/22/89	ORDER NO.	DWG. NO. SP-2093-1
BY B. HUFF	89-031	SHEET 1 OF 4

5116-7302-15-2



MAY 11 19

285561

NOTES		
1. EST. WT. EMPTY: 6300#	FULL: 8800#	BOL:
2. ALL BOLT HOLES STRADDLE NORMAL CENTERLINES.		
3. WOODEN COVERS ON ALL OPEN NOZZLES. (SEE NOTE 6)		
4. MAIN GASKET SURFACES.		
5. PAINT: SANDBLAST EXPOSED C.ST'L NEAR WHITE PER SSPC–SP–10. PRIME WITH (1) COAT DUPONT 347–Y–912 GANICIN 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 C111SL.		
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.		
7. ALL TUBES MUST BE TESTED AND INSPECTED PER DUPONT SPECIFICATION SW300M TYPE 1 CAT. III		
8. ALL S.ST'L SHALL BE TESTED FOR THE PRESENCE OF MOLYBDENUM PER DUPONT SPEC. SG2T.		

NON–PRESSURE PARTS	
SUPPORTS	SA–36
BAFFLES / SUPPORTS	SA–36
TIE RODS / SPACERS	C.ST'L
PASS PARTITIONS	NONE
LIFT LUGS	316L S.ST'L
DEFLECTOR PLATE	316L S.ST'L

9. EST. WT. EMPTY TOP BONNET 350# / BOTTOM BONNET 430#

CERTIFIED ENG.

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

CUSTOMER P.O. NO. LPBC–96110W

ITEM NO. PROJ. NO. 6432

PLANT BEAUMONT, TEXAS

EN NO. 5116–7302–15–2

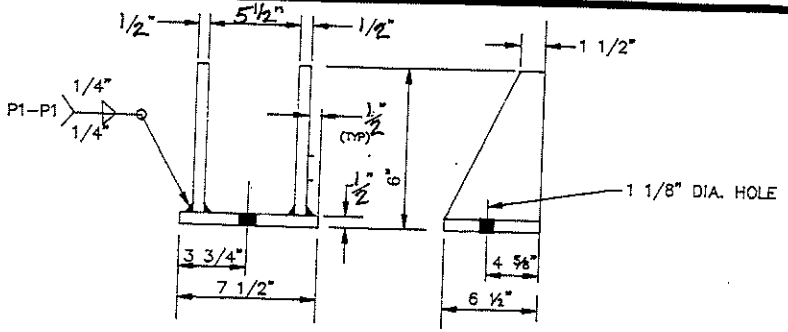
TEMA SIZE AND TYPE

(1) 17–240 BEM LOW BOILER COLUMN SECONDARY CONDENSER

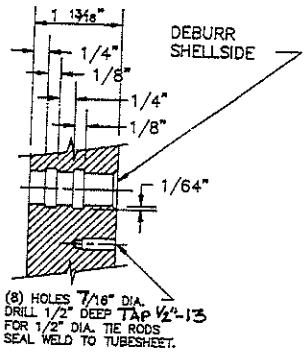
SOUTHERN HEAT EXCHANGER CORP.

P.O. BOX 030008 TUSCALOOSA, AL. 35403

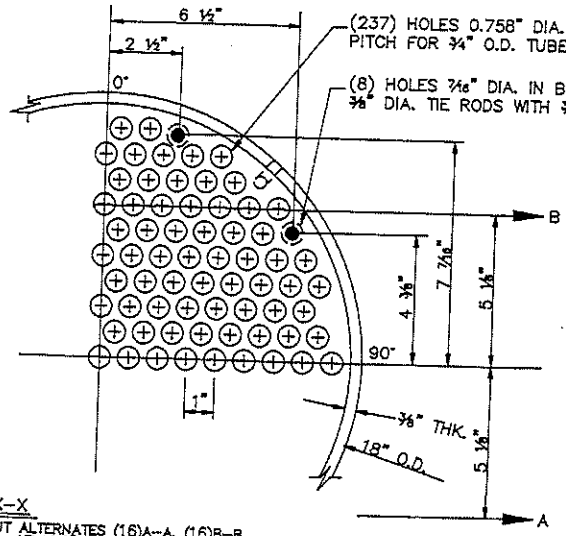
DATE 03/22/89	ORDER NO.	DWG. NO. SP–2093–1
BY B. HUFF	89–031	SHEET 2 OF 4



SUPPORT DETAIL
(4) REQUIRED



(8) HOLES 7/16" DIA.
DRILL 1/2" DEEP TAP ½"-13
FOR 1/2" DIA. TIE RODS
SEAL WELD TO TUBESHEET.



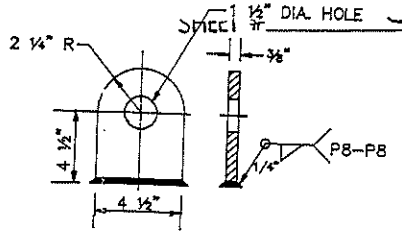
VIEW X–X
BAFFLE CUT ALTERNATES (16)A–A, (16)B–B
BAFFLE DIA.:17.125"
O.T.L.:16.750"
TUBEHOLE DIA.IN BAFFLES: 25/32"

C.ST'L

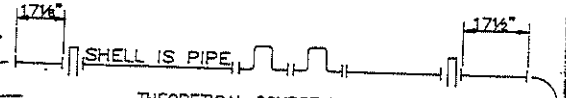
316L S.ST'L

MAY 11 1990

285561
3



LIFT LUG DETAIL
(6) REQ'D



THEORETICAL COURSE LENGTH

NATIONAL BOARD NO. LATER
CERTIFIED BY
W
RT3

SOUTHERN HEAT EXCHANGER CORP.

TUSCALOOSA, ALABAMA

SHELL SIDE				
MADP	75	PSI AT	250	°F.
MADT	15	°F. AT	75	PSI
TUBE SIDE	Acetic			
MADP	75/F.V.	PSI AT	250	°F.
MADT	15	°F. AT	75/F.V.	PSI

SHECO SER. NO. 89–031 YEAR 1989
CUST. ORDER LPBC–96110W
CUST. ITEM
EN NO. 5116–7302–15–2 DUPONT INSP. INT'L
BEAUMONT, TX PROJ. NO. 6432

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.

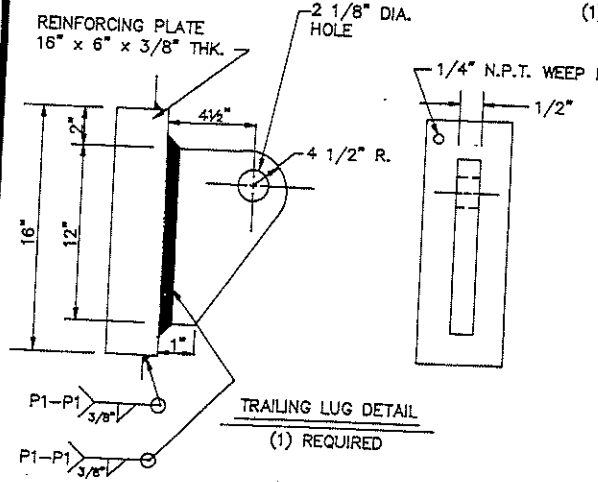
CERTIFIED	ENG.
CUSTOMER E.I.DUPONT DE NEMOURS & COMPANY, INC.	
CUSTOMER P.O. NO. LPBC–96110W	
ITEM NO.	PROJ. NO. 6432
PLANT BEAUMONT, TEXAS	
EN NO. 5116–7302–15–2	

TEMA SIZE AND TYPE

(1) 17–240 BEM LOW BOILER COLUMN SECONDARY CONDENSER

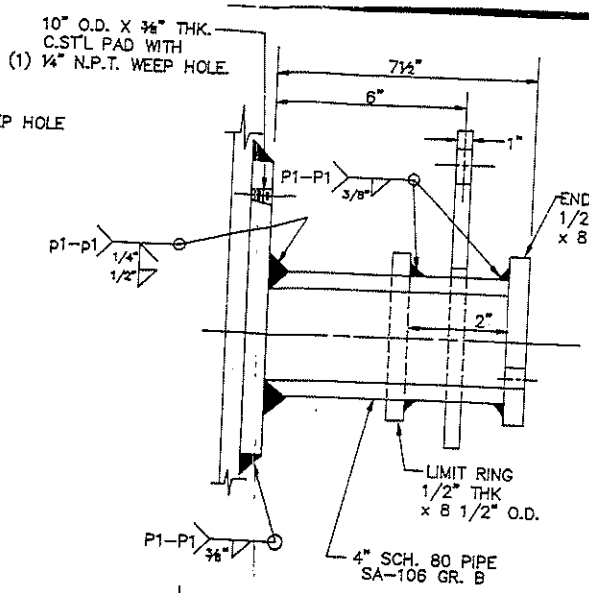
SOUTHERN HEAT EXCHANGER CORP.
P.O. BOX 030008 TUSCALOOSA, AL. 35403

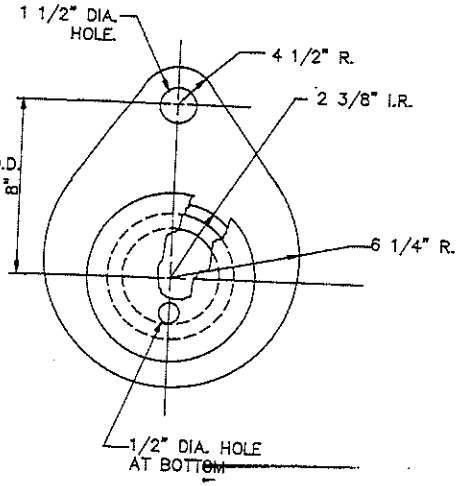
DATE 03/22/89	ORDER NO.	DWG. NO. SP–2093–2
BY B. HUFF	89–031	SHEET 3 OF 4

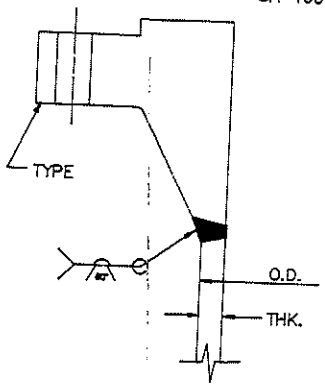


TRAILING LUG DETAIL

(1) REQUIRED





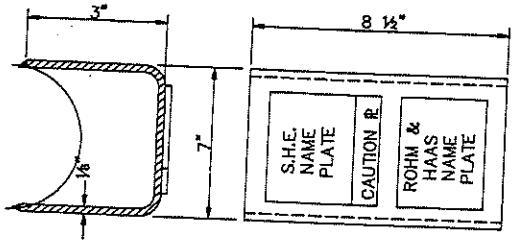


TRUNNION DETAIL

(2) REQUIRED

C.ST'L

304 S.ST'L



NAME PLATE BRACKET DETAIL

NOTE: NAME PLATE MUST BE ATTACHED USING 304 S. ST'L DRIVE SCREWS.

RFWN NOZZLE DETAIL

S.H.E. MARK	TYPE	O.D.	THK.	MAT'L
Y	8"-150#	8 5/8"	.148"	S.ST'L
V	4"-150#	4½"	.237	S.ST'L
W1, W2	4"-150#	4½"	.337	C.ST'L
C.Z1, Z2, Z3, L1, L2	2"-150#	2⅜"	.154"	S.ST'L

MAY 11 1990

285561

Sheet # 4

5/7/90

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. 5116-7302-15-2	
TEMA SIZE AND TYPE	
(1) 17-240 BEM LOW BOILER COLUMN SECONDARY CONDENSER	
SOUTHERN HEAT EXCHANGER CORP.	
P.O. BOX 030008 TUSCALOOSA, AL. 35403	
DATE 02/08/89	ORDER NO. 89-031 / DWG. NO. SP-2093-2
BY W. Mclain	SHEET 4 OF 4

FORM U-1 MANUFACTURERS' DATA REPORT FOR PRESSURE VESSELS
as required by the provisions of the ASME Code rules, Section VIII, Division 1

89-031

ITEM NO. 5116-7302-15-2

1. Manufactured and certified by Southern Heat Exchanger Corp. 400 65th St. E., Tuscaloosa, AL
(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. Beaumont, Tx.
(name and address)

4. Type: HT. EXCH. (horiz. or vert., tank) | 89-031 (mfr's. serial no.) | — (CRN) | SP-2093-2 (drawing no.) | 5774 (Nat'l. Bd. no.) | 1990 (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)

A87 (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. Dtd 4/13/90 BMS

6. Shell: SA-106B (mat'l. (spec. no., grade)) | .375" (nom. thickness (in.)) | .125" (corr. allow. (in.)) | 1'-5.250" (dia. ID (ft. & in.)) | 19'-11.875" (length (overall) (ft. & in.))

7. Seams: SMLS. (long. (dbl., sngl.)) | — (RT (spot or full)) | 85% (eff. (%)) | — (HT temp. (°F)) | — (time) | SNGL. BUTT (girth (dbl., sngl.)) | — (RT(spot, partial, or full)) | 2 (no. of courses)

8. Heads: (a) SA-516-70 (mat'l. (spec. no., grade)) (b) — (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)	CENTER	.3125"	.125"	(2) SETS 30" O.D. FLANGED & FLUED HEADS						FLAT
(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 (describe as ogee & weld, bar, etc.) If bar, give dimensions: — If bolted, describe or sketch.

11. MAWP: 75 (psi) at max. temp. 250 (°F). Min design metal temp.: 15 (°F) at 75 (psi). Hydro., ~~pneu. or comb.~~ test pressure 115 (psi).

Items 12 and 13 to be completed for tube sections.

12. Tubesheets: SA-240-316L (stationary mat'l. (spec. no., gr.)) | 22" (dia. (in.) (subject to pressure)) | 1.8125" (nom. thickness (in.)) | 0 (corr. allow. (in.)) | WELDED (attachment (welded, bolted))

— (floating mat'l. (spec. no., gr.)) | — (dia. (in.)) | — (nom. thickness (in.)) | — (corr. allow. (in.)) | — (attachment)

13. Tubes: SA-249-316L (mat'l. (spec. no., gr.)) | .750" (OD (in.)) | 16 (nom. thickness ~~(in. or gauge)~~) | 237 (no.) | STRAIGHT (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 (mat'l. (spec. no., gr.)) | .250" (nom. thickness (in.)) | 0 (corr. allow. (in.)) | 1'-5.50" (dia. ID (ft. & in.)) | 2'-0.500" / 2'-0.875" (length (overall) (ft. & in.))

15. Seams: SNGL. BUTT (long (dbl., sngl.)) | SPOT (RT (spot or full)) | 85% (eff. (%)) | — (HT temp. (°F)) | — (time) | SNGL. BUTT (girth (dbl., sngl.)) | — (RT (spot, partial, or full)) | 2 (no. of courses)

16. Heads: (a) SA-240-316L (mat'l. (spec. no., grade)) (b) — (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)	TOP/BOTTOM	.1875"	0			2:1				CONCAVE
(b)										

If removable, bolts used (describe other fastenings): SA-193-B7 (28) EA. 5/8"-11. (mat'l., spec. no., gr., size, no.)

17. MAWP: 75/FV (psi) at max. temp. 250 (°F). Min design metal temp.: 15 (°F) at 75/FV (psi). Hydro., ~~pneu. or comb.~~ test pressure 115 (psi).

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Ave., Columbus, OH 43229.

FORM U-1 (back)

18. Nozzles, Inspection and safety valve openings:

Purpose (inlet, outlet, drain, etc.)	Number	Dia. or Size	Type	Mat'l.	Nom. Thickness	Reinforcement Material	How Attached	Location
IN-OUT	1-1	4"-150#	RFWN	SA-106 B	.337"	INHERENT	WELDED	SHELL

19. Supports: Skirt NO (yes or no) Lugs 4 (no.) Legs _____ (no.) Other _____ (describe) Attached SHELL, WELDED. (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-46(d)" "UG-20(f)"

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, 19 91.

Date 04-03-90 Name Southern Heat Exchanger Corp. (manufacturer) Signed Daniel J. Noland (representative)

CERTIFICATE OF SHOP INSPECTION

Vessel constructed by Southern Heat Exchanger Corporation at Tuscaloosa, AL.

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 Co. of Boston, MA have inspected the pressure vessel described in this Manufacturers' Data Report on 04-03, 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 04-03-90 Signed B M Brooks (Authorized Inspector) B. M. Brooks Commissions NB5446 NY 2182 (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 _____ (assembler that certified and constructed field assembly) Signed _____ (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 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 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 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.)

THERM. RATING - SHELL AND TUBE HEAT EXCHANGERS Checked JRB

T.M.A. No. 7302-15-2 (7302-15'8) Quantity 1 Cooler (Condenser) Vaporizer Heater

Project No. 6432 Plant BEAUMONT Rated by H.F. Hublein Date 8/8/88

This is not a complete specification. See Standard Engineering Specification SG7E, "Shell and Tube Heat Exchanger Procurement Work Sheet" for additional information which must be furnished vendor.

Low Boiler Column Secondary Condenser

MATERIALS
Tubes: 316 L S/S

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

Type Figure: (SG1E 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 (fixed) head: (Bonnet) Channel Cone Elbow
Bottom (rear) head: (Bonnet) Channel (Baffle) Funnel separator Cone
Elbow Cover plate

Shell expansion joint: (Required) Not required

	Tube Side	Shell Side
Design temperature	°C	°C
Design pressure	psig	psig
Fluid	Boiling liquid	Boiling (liquid Nonpulsating)
	Gas (Condensing vapor)	Gas Condensing vapor

SIZE

No. shells per unit	1	Finned tube	— in.
No. tube passes per shell	1	Tube OD	0.75 in.
Outside area per shell	930 sq ft	Tube wall thick.	.065 in.
Outside area per unit	930 sq ft	Tube pitch	1. in.
Nominal shell ID	17 in.	Tube pattern	(Triangular) Rotated square
No. tubes per shell	237		Square
Tube length	20 ft	Baffle pitch	7 in.
		Baffle cut	20 % of dia.
Shell Type (E) F J		Baffle type	(Segmental) Double Segmental
		No. pairs of sealing devices	NONE

CONNECTIONS (Per SG1E Par. 20)

~~Front~~ or top head	12 " inlet	" outlet	"
~~Rear~~ or bottom head	" inlet	6" VAP " outlet	3" LIQ OUTLET
Shell	6 " inlet	6 " outlet	"

PERFORMANCE PER UNIT

	Tube Side	Shell Side
Load	1.26mm Pcu/hr	—
Fluid	PROCESS	WATER
Total fluid in	7690 ~~gpm~~ lb/hr	266 ~~gpm~~
Condensate out	5950 lb/hr	— lb/hr
Vapor out	1740 lb/hr	— lb/hr
Inlet temperature	57.2 °C	30.6 °C
Outlet temperature	36.2 °C	40 °C
Normal operating pressure	4.4 psig-~~mmHg abs~~	— psig-mmHg abs
Pressure drop	0.2 psi-~~mHg~~	9 psi-~~mHg~~

Rev. 1/72