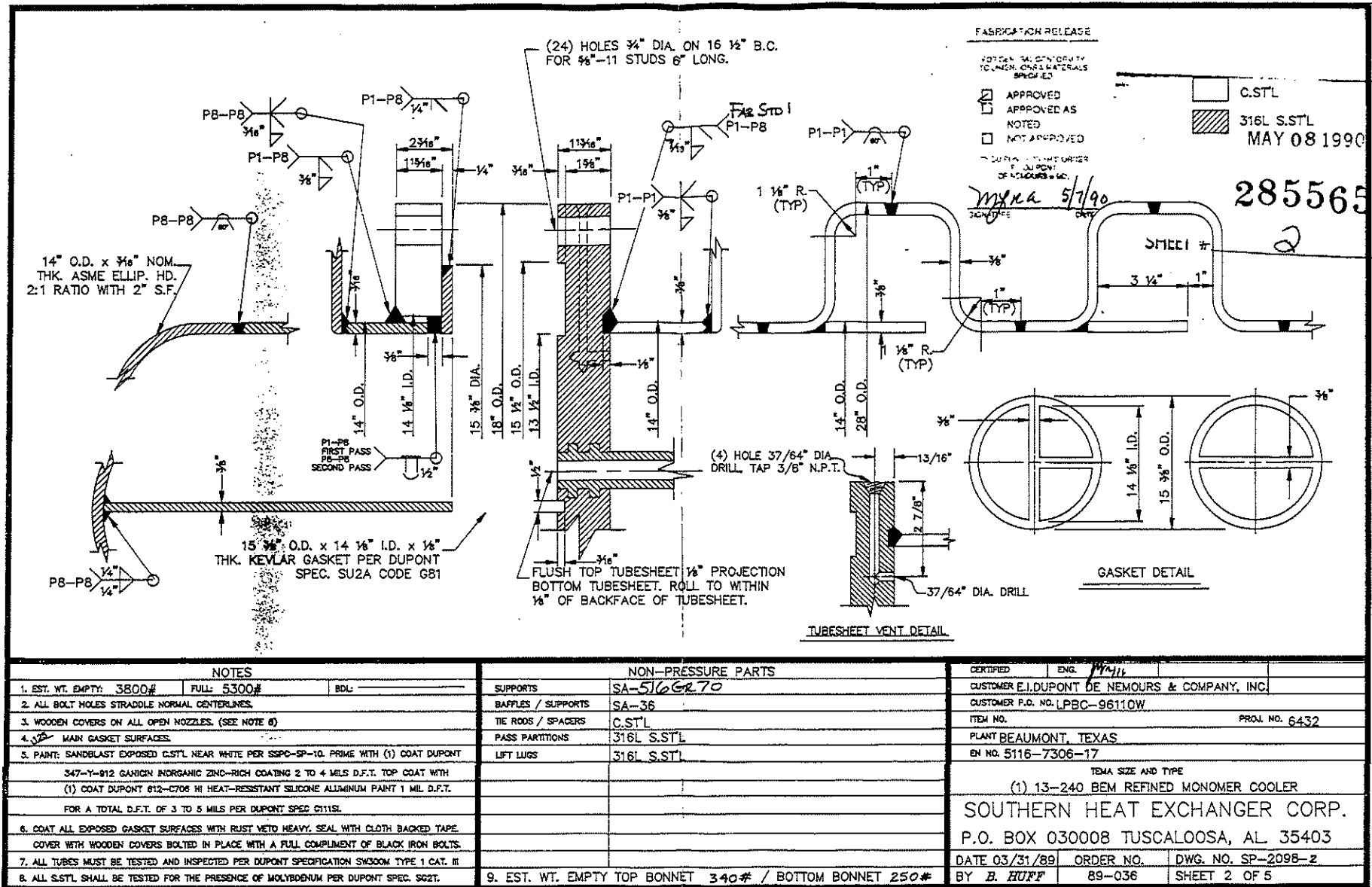


5116-7306-17

***** EQUIPMENT SPECIFICATIONS *****

ID #:	5116-7306-17	ISO?	N	ISO TEST EQ?	N	RECORD #	3154
DESC:	COOLER; REFINED MONOMER					LOC ?	N
	: W-999026					CRIT LEV:	SPECS : 9
AREA:	MMA	SUB AREA:	REFCOL	SYS:		RM:	N
MANUF:	SOUTHERN-HEAT EXCHANGER CORP.			LOC ID:		HISTORY:	9
FAA :	22035116	ORG PRICE:				WRT WO ?	Y
MODEL NO:		INST COST:				SPR PTS:	9
SER NO:		PROJ/WO :	6432			ADL COM:	9
HIST RET:	NONE? N 5 YR? Y 10 YR? N	INFIN?	N	P.O.:			
TYPE :	VERTICAL			NAT'L BRD NO :		BLDG:	MMA
OPERATION TYPE :				WEIGHT :	3800;LBS		
DESIGN CODE :	ASME			DESIGN:			
SECTION:	8	DIV:	1	YR:	1987		
STAMPED? Y		STRESS RELIEVED?		PRESS :	75/100;PSIG		
DIMENSIONS :	274 3/4" X 14;INCH			TEMP :	250/300;DEGF		
INSULATION CODE:	118.1			TEST PRESS :	115;PSIG		
PAINT CODE :				WORKING:			
LOUVERS ?				PRESS :			
LOUVER CONTROLS:				TEMP :			
NO OF PASSES :	1			NO OF PASSES:	2		
CORR ALLOW :	1/16;INCH			CORR ALLOW :	0;INCH		
SURFACE AREA :				SURFACE AREA:			
SERVICE :	CHILLH2O			SERVICE :	PRODMONO		
GSK CODE :	G-81			GSK CODE :	G-81		
CONN: TYPE :	FLANGE			CONN: TYPE :	FLANGE		
INLET: RTG :	150;LBS			INLET: RTG:	150;LBS		
SIZE :	3;INCH			SIZE :	3;INCH		
OUTLET:RTG :	150;LBS			OUTLET:RTG:	150;LBS		
SIZE :	3;INCH			SIZE :	3;INCH		
FLG FACE FIN :	RFWN			FLG FACE FIN:	RFWN		
BAFFLE: NO OF :				BAFFLE:NO OF:	82		
WALL THK :				TUBESHEET TYPE:			
SHELL ID :				TUB/TUBSHT CON:	ROLLED		
HEADER TYPE :				ROWS PER HOR :			
IMPING BAF TYPE:				EXP JOINTS:			
EQUIP POSITION :				NO :	2		
FIN TYPE :				SIZE :	9 1/4;INCH		
MATL OF CONST:				TUBES:			
TUBES :	316L SS			NO OF :	58		
TUBESHEETS :	316L SS			ID :			
HEADER :				OD :	1;INCH		
SHELL :	CARBON STEEL			LENGTH :	240;INCH		
PLUGS :				THICK :	.065		
TIE RODS :	CARBON STEEL			CORR ALLOW:	0;INCH		
SPACERS :	CARBON STEEL			TYPE :			
EXP JOINTS :	CARBON STEEL			PLUGS:			
IMPING BAFFLE:				TYPE :			
				SIZE :			
MATL OF CONST:							
SHELL CONN :	CARBON STEEL			HEAD WEIGHTS:			
TUBE CONN :	316L SS			TOP :	304;LBS		
INT BOLTS :	CARBON STEEL			FRONT :			
EXT BOLTS :	CARBON STEEL						
TRANS BAF :							



NOTES

- EST. WT. EMPTY: 3800# FULL: 5300# BDL: _____
- ALL BOLT HOLES STRADDLE NORMAL CENTERLINES.
- WOODEN COVERS ON ALL OPEN NOZZLES. (SEE NOTE 8)
- MAIN GASKET SURFACES.
- PAINT: SANDBLAST EXPOSED C.S.T.L. NEAR WHITE PER SSPC-SP-10. PRIME WITH (1) COAT DUPONT 347-Y-612 GARNISH 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 6111SL.
- 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.
- ALL TUBES MUST BE TESTED AND INSPECTED PER DUPONT SPECIFICATION SW300M TYPE 1 CAT. III
- ALL S.S.T.L. SHALL BE TESTED FOR THE PRESENCE OF MOLYBDENUM PER DUPONT SPEC. 562T.

NON-PRESSURE PARTS

- SUPPORTS SA-516Gr70
- BAFFLES / SUPPORTS SA-36
- TIE ROOS / SPACERS C.S.T.L.
- PASS PARTITIONS 316L S.S.T.L.
- LIFT LUGS 316L S.S.T.L.
9. EST. WT. EMPTY TOP BONNET 340# / BOTTOM BONNET 250#

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. 5116-7306-17

TEMA SIZE AND TYPE

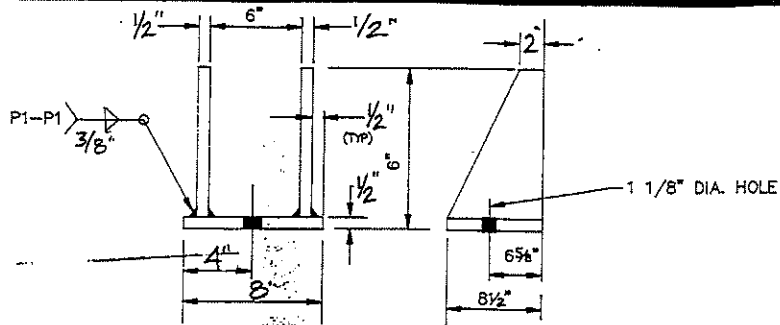
(1) 13-240 BEM REFINED MONOMER COOLER

SOUTHERN HEAT EXCHANGER CORP.

P.O. BOX 030008 TUSCALOOSA, AL. 35403

DATE 03/31/89 ORDER NO. DWG. NO. SP-2098-2

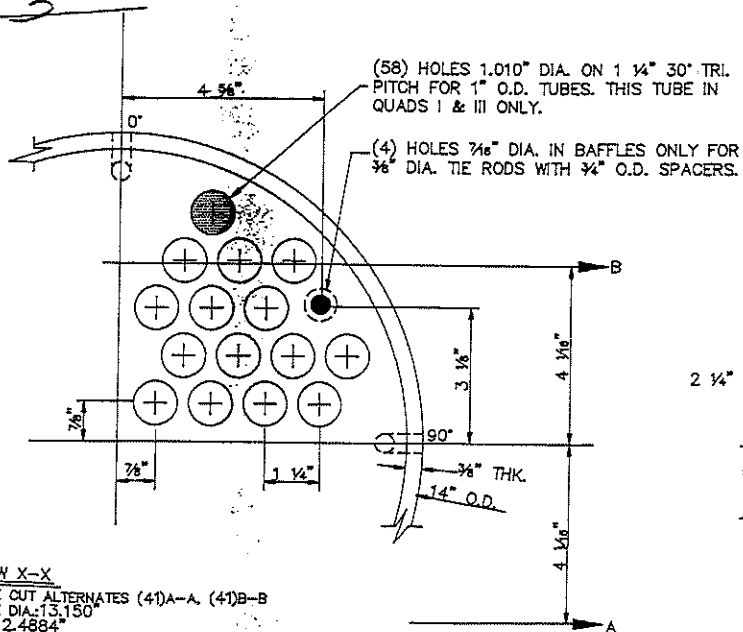
BY B. HUFF 89-036 SHEET 2 OF 5



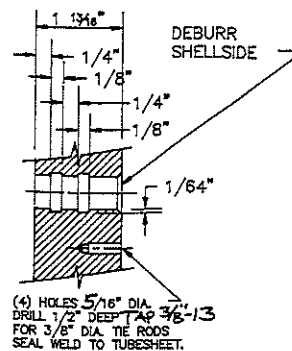
MAY 08 1990

285565

SHEET 3



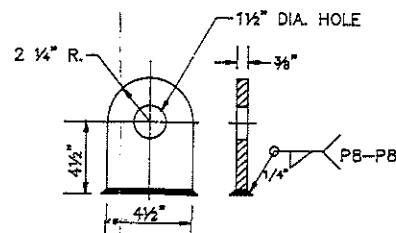
VIEW X-X
BAFFLE CUT ALTERNATES (41)A-A, (41)B-B
BAFFLE DIA: 13.150
O.T.L.: 12.4884
TUBEHOLE DIA IN BAFFLES: 1 1/32"



C.STL
316L S.STL

FABRICATION RELEASE

BY DU PONT DE NEMOURS & COMPANY, INC.
DATE 5/1/90



LIFT LUG DETAIL
(6) REQ'D



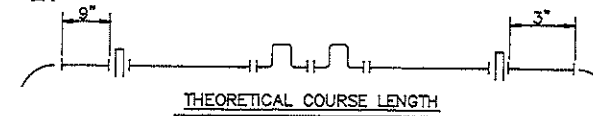
NATIONAL BOARD NO. LATER
CERTIFIED BY
SOUTHERN HEAT EXCHANGER CORP.
TUSCALOOSA, ALABAMA

SHELL SIDE
MADP 75 PSI AT 250 F.
MADT 15 F. AT 75 PSI
TUBE SIDE
MADP 100 PSI AT 300 F.
MADT 15 F. AT 100 PSI

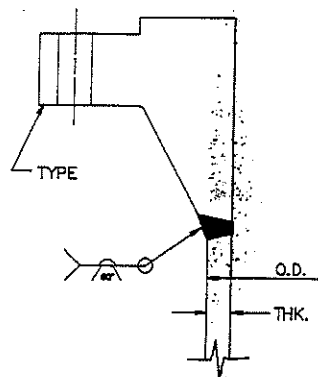
SHECO SER. NO. 89-036 YEAR 1989
CUST. ORDER LPBC-96110W
CUST. ITEM
EN NO. 5116-7306-17 DUPONT INSP. INT'L
BEAUMONT, TX PROJ. NO. 6432

CAUTION

THE PRESSURE AND TEMPERATURES SHOWN ON THE S&L 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.



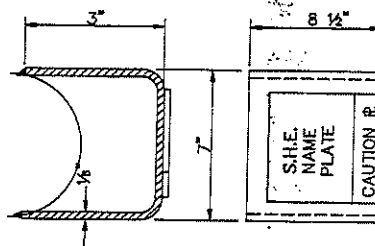
CERTIFIED ENG. 11/1/86
CUSTOMER E.I. DUPONT DE NEMOURS & COMPANY, INC.
CUSTOMER P.O. NO. PLBC-96110W
ITEM NO. PROJ. NO. 6432
PLANT BEAUMONT, TEXAS
EN NO. 5116-7306-17
ITEM SIZE AND TYPE
(1) 13-240 BEM REFINED MONOMER COOLER
SOUTHERN HEAT EXCHANGER CORP.
P.O. BOX 030008 TUSCALOOSA, AL. 35403
DATE 03/31/89 ORDER NO. DWG. NO. SP-2098-2
BY B. HUFF 89-036 SHEET 3 OF 5



RFWN NOZZLE DETAIL

S.H.E. MARK	TYPE	O.D.	THK.	MAT'L
Z.U.	3"-150#	3 1/2"	.216"	S.S.T'L
W1, W2	3"-150#	3 1/2"	.300"	C.S.T'L
D1, D2, F1-3	1"-150#	1.315"	.133"	S.S.T'L

☐ C.S.T'L
☒ 304 S.S.T'L



NAME PLATE BRACKET DETAIL

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

MAY 08 1990

285565

SHEET # 4

FABRICATION RELEASE

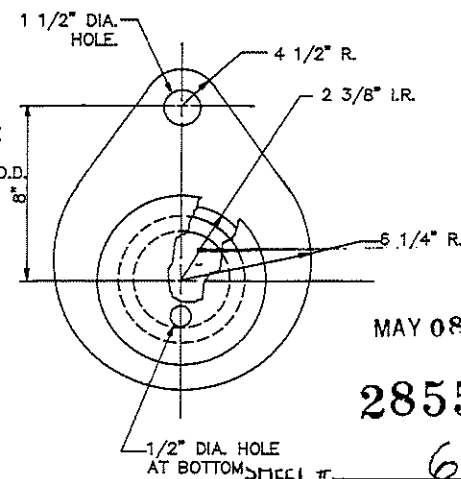
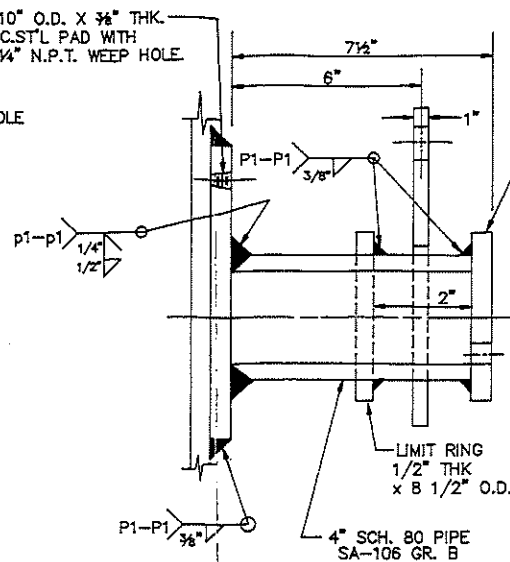
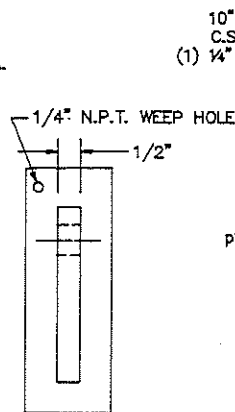
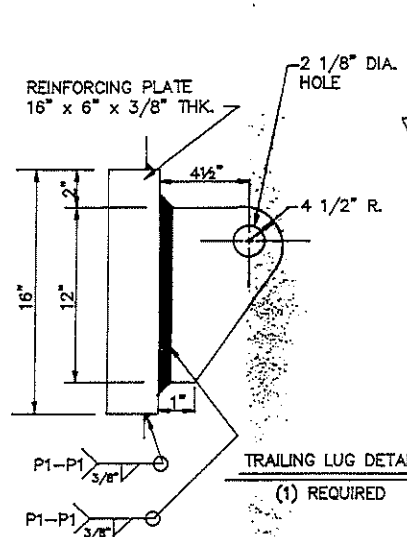
FOR GENERAL CONFORMITY TO DIMENSIONS & MATERIALS SPECIFIED

- ☒ APPROVED
- ☐ APPROVED AS NOTED
- ☐ NOT APPROVED

BY DUPONT FOR THIS ORDER
E.I. DUPONT
DE NEMOURS & CO.

myra 5/7/90
DATE

CERTIFIED	ENG. <i>Wm. J.</i>	
CUSTOMER E.I. DUPONT NEMOURS & COMPANY, INC.		
CUSTOMER P.O. NO. LPBC-96110W		
ITEM NO.	PROJ. NO. 6432	
PLANT BEAUMONT, TEXAS		
EN. NO. 5116-7306-17		
TEMA SIZE AND TYPE (1) 13-240 BEM REFINED MONOMER COOLER		
SOUTHERN HEAT EXCHANGER CORP.		
P.O. BOX 030008 TUSCALOOSA, AL. 35403		
DATE 02/08/89	ORDER NO.	DWG. NO. SP-2098-2
BY <i>W. McLain</i>	89-036	SHEET 4 OF 5



TRUNNION DETAIL
(2) REQUIRED

FABRICATION RELEASE

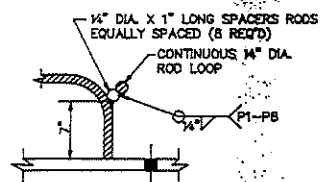
FOR GENERAL CONFORMITY
TO DIMENSIONS & MATERIALS
SPECIFIED

- ☒ APPROVED
☐ APPROVED AS
NOTED
☐ NOT APPROVED

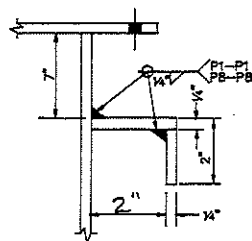
BY DUPONT OR THIS ORDER
E.I. DUPONT
DE MOULDER & CO.

Signature: *myra 5/1/90*
DATE

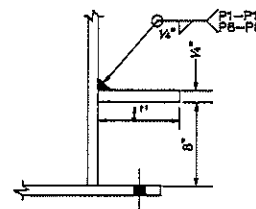
☐ C.S.T'L



INSULATION SUPPORT
TYPE A



INSULATION SUPPORT
TYPE B



INSULATION SUPPORT
TYPE C

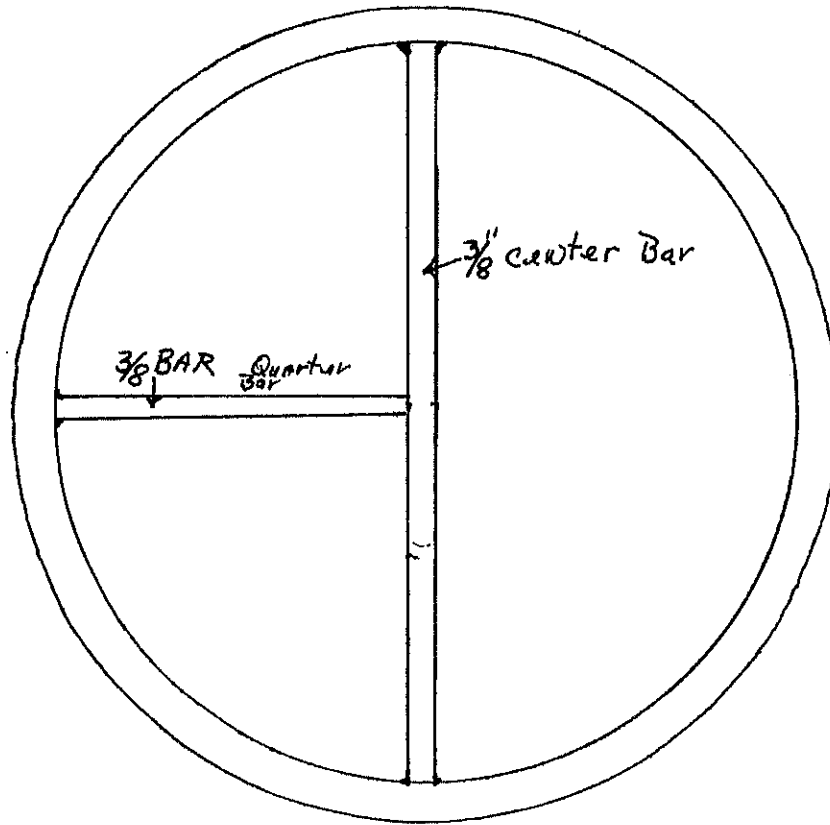
INSULATION SUPPORTS ARE MADE OF
THE SAME MATERIAL AS TO WHICH THEY
ARE ATTACHED

CERTIFIED	ENG. <i>myra</i>	
CUSTOMER E.I. DUPONT DENEMOURS & CO., INC.		
CUSTOMER P.O. NO. LPBC-96110W		
ITEM NO. EN. NO. 5116-7306-17	PROJ. NO. 6432	
PLANT BEAUMONT, TEXAS		
TEMA SIZE AND TYPE (1) 13-240 BEM REFINED MONOMER COOLER		
SOUTHERN HEAT EXCHANGER CORP.		
P.O. BOX 030008 TUSCALOOSA, AL. 35403		
DATE 11-13-89	ORDER NO.	DWG. NO. SP-2098-2
BY N.B.Y.	89-036	SHEET 5 OF 5

Refine Monomer Cooler

5116-7306-17

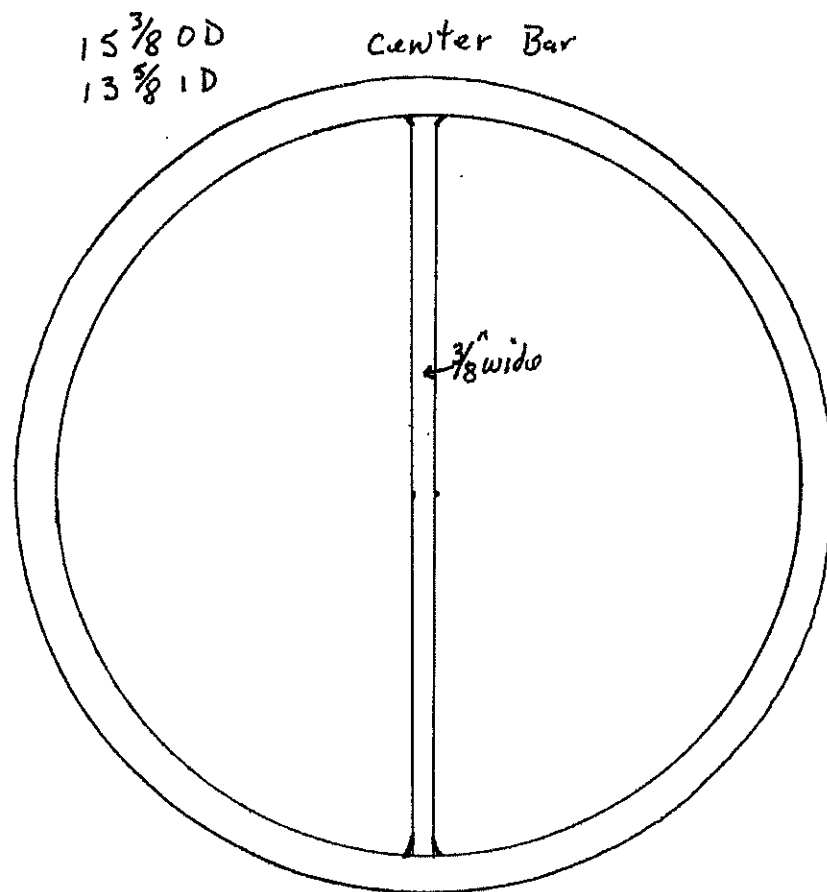
$15\frac{3}{8}"$ OD
 $13\frac{5}{8}"$ ID



Refine Monomer Cooler

5116-7306-17

Bottom head



FORM U-1 MANUFACTURERS' DATA REPORT FOR PRESSURE VESSELS

as required by the provisions of the ASME Code rules, Section VIII, Division 1

ITEM NO.

89-036

5116-7306-17

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. 89-036 — SP-2098-2 5789 1990
(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)
- A-87 — —
(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-106B .375" .0625" 1'-1.250" 19'-11.875"
(mat'l. (spec. no., grade)) (nom. thickness (in.)) (corr. allow. (in.)) (dia. ID (ft. & in.)) (length (overall) (ft. & in.))
7. Seams: SMWS. — 85% — — SINGL. BUTT SPOT 2
(long. (dbl., singl.)) (RT (spot or full)) (eff. (%)) (HT temp. (°F)) (time) (girth (dbl., singl.)) (RT (spot, partial, or full)) (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	.375"	.0625"	2 SETS 28" 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 If bar, give dimensions: — If bolted, describe or sketch.
(describe as ogee & weld, bar, etc.)
11. MAWP: 75 at max. temp. 250 Min design metal temp.: 15 at 75 Hydro., ~~xxxxxxx~~ test pressure 115
(psi) (°F) (°F) (psi)

Items 12 and 13 to be completed for tube sections.

12. Tubesheets: SA-240-316L 18" 1.8125" 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-249-316L 1" 16 SB STRAIGHT
(mat'l. (spec. no., gr.)) (OD (in.)) (nom. thickness ~~wt.~~ 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 .1875" 0 1'-1.625" 1'-3.250"
(mat'l. (spec. no., gr.)) (nom. thickness (in.)) (corr. allow. (in.)) (dia. ID (ft. & in.)) (length (overall) (ft. & in.))
15. Seams: SINGL. BUTT SPOT 85% — — SINGL. BUTT — 2
(long. (dbl., singl.)) (RT (spot or full)) (eff. (%)) (HT temp. (°F)) (time) (girth (dbl., singl.)) (RT (spot, partial, or full)) (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 (24) EA. 5/8"-11.
(mat'l., spec. no., gr., size, no.)

17. MAWP: 100 at max. temp. 300 Min design metal temp.: 15 at 100 Hydro., ~~xxxxxxx~~ test pressure 150
(psi) (°F) (°F) (psi)

18. Nozzles, inspection and safety valve openings:

19. Supports: Skirt No Lugs 4 Legs _____ Other _____ Attached SHELL WELDED.
(yes or no) (no.) (no.) (describe) (where and how)

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

Signed James H. N.
(representative)

(Authorized Inspector) **B. M. Brooks** (Nat'l. Bd. (incl. endorsements) state, prov. and no.)

Date _____ Name _____ Signed _____
(assembler that certified and constructed field assembly) (representative)

Date _____ Signed _____ Commissions _____
(Authorized Inspector) (Nat'l Bd. (incl. endorsements) state, prov. and no.)

THEIR RATING - SHELL AND TUBE HEAT EXCHANGERS

F.A.A. No. 7306-17 Quantity 1 Cooler Condenser Vaporizer Heater
 Project No. 6432 Plant BEAUMONT Rated by H. F. Hubbs Date 7/25/88
 CHECKED BY BAVFP

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

REFINED MONOMER COOLER

MATERIALS

Tubes: 316 L S/S

CONSTRUCTION

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

Type Figure: SGLE 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 Funnel separator Cone
Elbow Cover plate

Shell expansion joint: Required Not required

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

SIZE

No. shells per unit	<u>1</u>	Finned tube	_____ in.
No. tube passes per shell	<u>4</u>	Tube OD	<u>1.</u> in.
Outside area per shell	<u>305</u> sq ft	Tube wall thick.	<u>.065</u> in.
Outside area per unit	<u>305</u> sq ft	Tube pitch	<u>1.25</u> in.
Nominal shell ID	<u>13</u> in.	Tube pattern	<u>Triangular</u> Rotated square
No. tubes per shell	<u>58</u>		Square
Tube length	<u>20</u> ft	Baffle pitch	<u>2 3/4</u> in.
		Baffle cut	<u>20</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 SGLE Par. 20)

Front on-top head	<u>3</u> " inlet	<u>3</u> " outlet	_____ "
Rear on-bottom head	_____ " inlet	_____ " outlet	_____ "
Shell	<u>3</u> " inlet	<u>3</u> " outlet	_____ "

PERFORMANCE PER UNIT

	Tube Side	Shell Side
Load	<u>306000</u> Pcu/hr	_____
Fluid	<u>MONOMER</u>	<u>CHILLED WATER</u>
Total fluid in	<u>40000</u> lb/hr	<u>60</u> gpm - <u>200</u> lb/hr
Condensate out	_____ lb/hr	_____ lb/hr
Vapor out	_____ lb/hr	_____ lb/hr
Inlet temperature	<u>41.1</u> °C	<u>15</u> °C
Outlet temperature	<u>25</u> °C	<u>25</u> °C
Normal operating pressure	_____ psig-mmHg abs	_____ psig-mmHg abs
Pressure drop	<u>5</u> psi-mmHg	<u>10</u> psi-mmHg