

14-9-Ex-4

APPROXIMATE WEIGHT IN LBS.

Shipping _____	Erection _____
Operating _____	Hydrotest _____

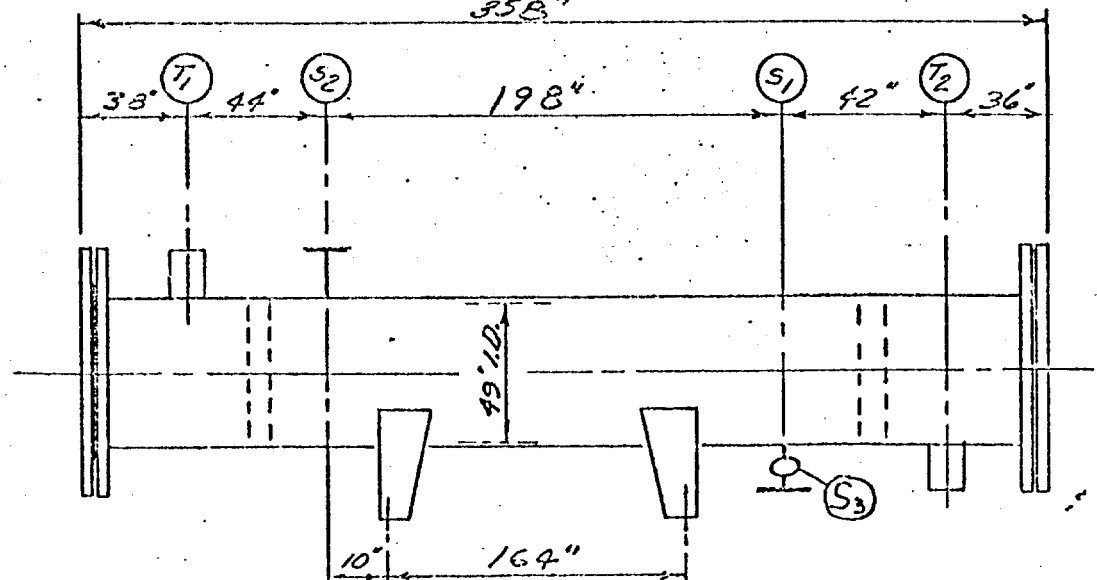
S1	1	12"	600#RF	LWN	SHELL INLET
S2	1	12"	600#RF	LWN	SHELL OUTLET
T1	1	26"	O.D.	BFW	TUBE INLET
T2	1	24"	O.D.	BFW	TUBE OUTLET
S3	1	2'	600#RF	LWN	DRAIN & FILL W/BLD FLGE

ALL GAGE GLASSES, LEVEL CONTROLS, ALARMS, ETC.
HAVING TWO CONNECTIONS ARE TO BE SET WITH JIG.

NOTES:

90749

1. SANDVIK 3 REGO S.S. TUBES FURN. BY CELANESE. Δ
2. ALL C-1/2 MO PLATE TO BE SA-204-C. Δ
3. ALL STEEL PLATE SUBJECT TO PRESSURE STRESS TO BE SA-516-70.
4. TUBE SHEETS TO BE 1/8" TYPE 304 CLAD OR OVERLAY TUBE Δ SIDE.
5. CHAN. & CHAN. COVER TO BE 1/8" TYPE 304 S.S. CLAD OR OVERLAY. (OUTLET CHANNEL ONLY) Δ
6. CHAN. NOZZLES TO BE BEVELED FOR WELDING.
7. SURFACE SHOWN IS GROSS TOTAL EXTERNAL TUBE SURFACE. Δ
8. ALL THICKNESSES SPECIFIED ARE MINIMUM UNLESS SHOWN OTHERWISE.
9. TUBES ROLLED FULL DEPTH - 1/8" Δ
10. GROUNDING LUGS REQUIRED. Δ
11. TUBE SHEET DESIGN METAL TEMP.: SHELL-304°F, TUBES-325°F. Δ



ITEM NO. AE-253

BY _____
CHKD. _____
DATE _____

BROWN & ROOT Inc. HOUSTON, TEXAS

CONT. NO.
ER-0995

#96749

EXCHANGER DATA SHEET

Dwg. No.
149-EX-1

BY T.C.S.

REVIEWED

APPROVED

RES 9/5/74

DATE 8/1/74

SHT

1

OF 2

1 Client CELANESE CORP. OF AMERICA Size 4'-240 Surface/Shell 9200
 2 Destination BISHOP, TEXAS Surface/Unit 9200 Shell/Unit ONE
 3 Unit METHANOL Connected In: Series _____ Parallel _____
 4 Item No. HE-2532 No. Req'd ONE Job No. ER-0995 Mounted: Vertical _____ Horizontal ☒ Stacked _____
 5 Service BOILER FEED WATER PREHEATER Manufacturer _____ Serial No. _____
 6 Type: Shell & Tube CEN Quote No. _____ Date _____
 7 Floating Head ☒ No Removable Bundle ☒ No P.O. No. _____ Date _____

PERFORMANCE EXCLUDING STANDBY CAPACITY

9 NO % OF FLOW SHT. COND.

	Shell In	Shell Out	Tube In	Tube Out
10 Fluid Circulated <u>BOILER FEED WATER</u>				<u>REFORMED GAS</u>
11 Vapor (Lb/Hr)				
12 <u>(LB/HR) NON COND.</u>				
13 Liquid (Lb/Hr)	<u>437885</u>	<u>437885</u>		<u>137945</u>
14 (GPM)				
15 Steam (Lb/Hr)			<u>121370</u>	<u>100220</u>
16 Total (Lb/Hr)	<u>437885</u>	<u>437885</u>	<u>259315</u>	<u>259315</u>
17 Fluid Vaporized & Condensed (Lb/Hr)				<u>21150</u>
18 Steam Condensed (Lb/Hr)				
19 <u>DENSITY (LB/CU. FT.) - GAS</u>			<u>.248</u>	<u>.356</u>
20 <u>DENSITY (LB/CU. FT.) - LIQUID</u>	<u>56.5 AV.</u>			
21 Molecular Weight - Vapors	<u>18.02 AV.</u>		<u>12.834</u>	<u>12.133</u>
22 Specific Heat Vapors (BTU/Lb-°F)			<u>.649</u>	<u>.630</u>
23 Specific Heat Liquids (BTU/Lb-°F)	<u>1.007</u>	<u>1.078</u>		
24 Latent Heat - Vapors (BTU/Lb)				
25 Temperature (°F)	<u>228°</u>	<u>400°</u>	<u>660°</u>	<u>800°</u>
26 Vaporization Or Condensation Range (°F)				
27 Operating Pressure (PSIG)	<u>760</u>		<u>226.4</u>	
28 No. Of Passes: Shell <u>1</u> Tube <u>1</u> Velocity, (Ft/Sec): Shell <u>3.51</u> Tube <u>59.2/58.1</u>				
29 Allow. Press. Drop (PSI): Shell _____ Tube _____ Fouling Resistance: <u>0'ALL</u> <u>.00171</u>				
30 Design Press. Drop (PSI): Shell <u>2.0</u> Tube <u>1.11</u> Heat Exchanged (BTU/Hr) <u>78.315 MM</u>				
31 Transfer Rate: Service <u>113.2</u> Clean <u>140.4</u> MTD Corrected (°F) <u>86.65 (WTD)</u>				

MATERIAL AND CONSTRUCTION

33 Design Press. (PSIG): Shell 880 Tube 270 Design Temp. (°F): Shell 650 Tube 710
 34 Test Press. (PSIG): Shell Side CODE Tube Side CODE Pneu Test (PSIG): Shell Side _____ Tube Side _____
 35 Corr. Allow. (In.) Shell Side 1/16 Tube Side (Ex. Tubes) 1/16 Code Req. ASME Yes ☒ TEMA Yes ☒ Class _____
 36 Tubes: No. 2343 O.D. 3/4" B.W.G. 16 AV Length 20'-0" Pitch 15/16" Δ Mat'l. SANDWICH
 37 Fins: No. _____ Height _____ Thickness _____ Attached By _____ Mat'l. _____
 38 Shell: I.D. 49" O.D. (R.T.) Thickness _____ Vapor Belt _____ Mat'l. C.S.
 39 INLET CHAN. Thickness _____ Mat'l. C-1/2 MC (HT) Fltg. Hd Cover: Thickness _____ Mat'l. C-1/2 MC
 40 OUTLET CHAN. THK. _____ Mat'l. 304 S.S. CLAD HT Channel Cover: Thickness _____ Mat'l. 304 S.S. C
 41 Stat. Tube Sheet: Thickness _____ Mat'l. 304 S.S. CLAD Fltg. Tube Sheet: Thickness _____ Mat'l. _____
 42 Baffles - Cross: Pitch 9" Type SGT. 20% Thickness 1/4" Mat'l. C.S.
 43 Baffles - Long: Type _____ Seal _____ Thickness _____ Mat'l. _____
 44 Tube Supports: Pitch _____ Type _____ Thickness _____ Mat'l. _____
 45 Tie Rods: O.D. 1/2" Mat'l. C.S. Spacer Mat'l. C.S. Gasket Mat'l. 177L-887A
 46 Tube To T.S. Joint: ROLLED 1/8" SW Vapor Lanes: 1/8" No. _____ Tube Free Area: Top - Bott. _____
 47 Shell Exp. Joint: Type _____ Mat'l. _____ Imp. Baffle: Thickness _____ Mat'l. _____
 48 Size Conn. Shell In: 12" Out: 12" Type: LWN Rating: 600 T.W. 33 No. _____ Press. Conn. 3-1/2"
 49 Chan. In: 26" Out: 24" Type BFW Rating: _____ T.W. 33 No. _____ Press. Conn. 3-1/2"
 50 Vent: 12" No. _____ Type _____ Rating _____ Drain: Yes ☒ 2" Type LWN Rating 600 T.W. 33
 51 Weight (Lbs): Shell _____ Bundle _____ Total _____ Full of Water _____
 52 Painting: Cleaning _____ Primer _____ Paint _____

53 Note: Indicate after each part whether stress relieved (H.T.) or radiographed (R.T.)

54 SEE PAGE 2 FOR ADDITIONAL INFORMATION.

ITEM NO. 85-4

1-10 94-16 5F-48 61-1

14-2/86 20/10

* 1/8" TP 304 CLAD OR WELD OVERLAY.

A

A

A

A

A

A

A

A

A

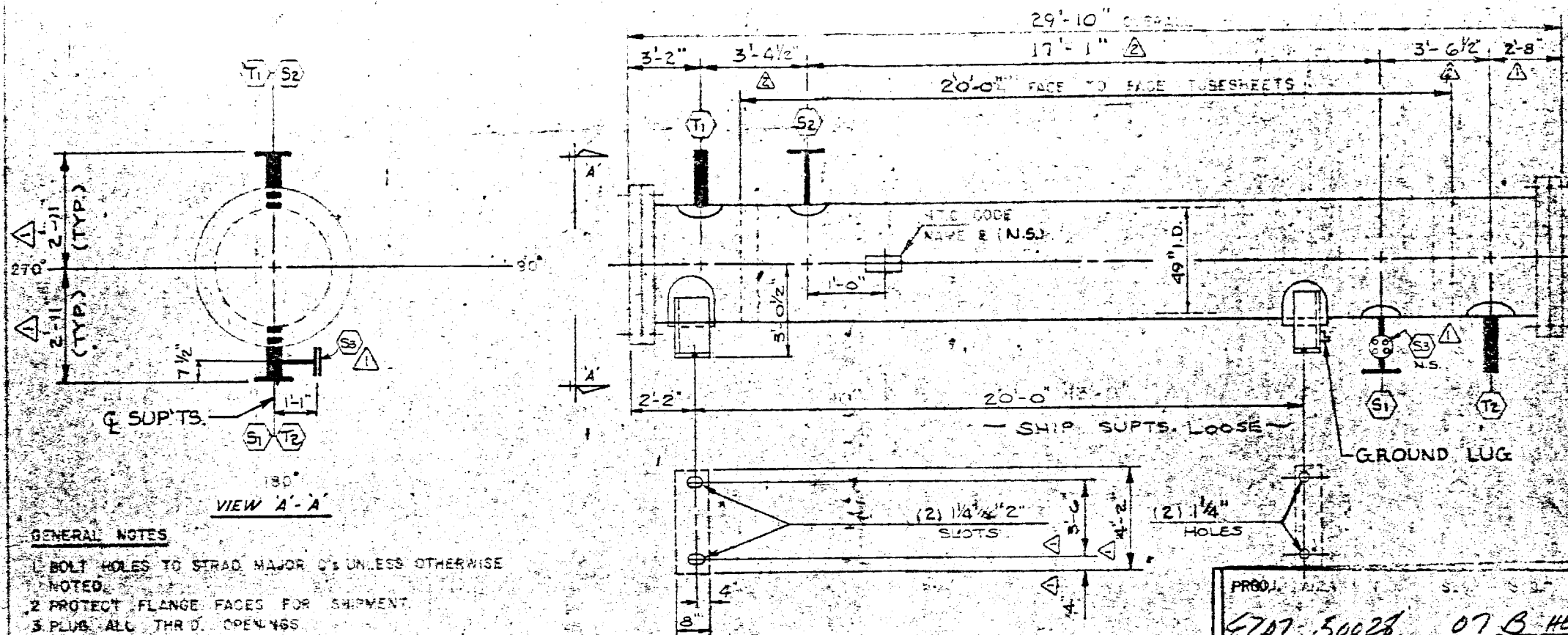
REV NO

BY

CHKD.

DATE

B-13



GENERAL NOTES

1. BOLT HOLES TO STRAD MAJOR Q'S UNLESS OTHERWISE NOTED.
2. PROTECT FLANGE FACES FOR SHIPMENT.
3. PLUS ALL THRU OPENINGS.
4. INSPECTION: (H.T.C.) (COMMERCIAL UNION COMPANIES) (CUSTOMER)
5. SURFACE PREP: HAND TOOL CLEAN PER (SSPC - SP 2-63)
6. SEAL WELD TUBES TO TUBESHEETS.

- (1) APPROVED - MFG. MAY PROCEED.
- (2) APPROVED - SUBMIT FINAL DWG. - MFG. MAY PROCEED.
- (3) APPROVED EXCEPT AS NOTED - MAKE CHANGES AND SUBMIT FINAL DWG. - MFG. MAY PROCEED AS APPROVED.
- (4) NOT APPROVED - CORRECT AND RESUBMIT.
- (5) REVIEW NOT REQUIRED - MFG. MAY PROCEED.

APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE SUPPLIER OF RESPONSIBILITY FOR ACCURACY OF DIMENSIONS, PERFORMANCE, DESIGN, DESIGN DETAILS OR COMPLETION OF SPECIFICATION AND PURCHASE ORDER REQUIREMENTS.

DAVE POWERGAS INC.

S3	1	2"	600#	RF-LWN	DRAIN & FILL
S2	1	12"	600#	RF-LWN	OUTLET
S1	1	12"	600#	RF-LWN	INLET
T2	1	24"	O.D.	BFW	OUTLET
T1	1	26"	O.D.	BFW	INLET

PART NO	SIZE	RATING	TYPE	SERVICE	REMARKS
SCHEDULE OF OVERHAUL					

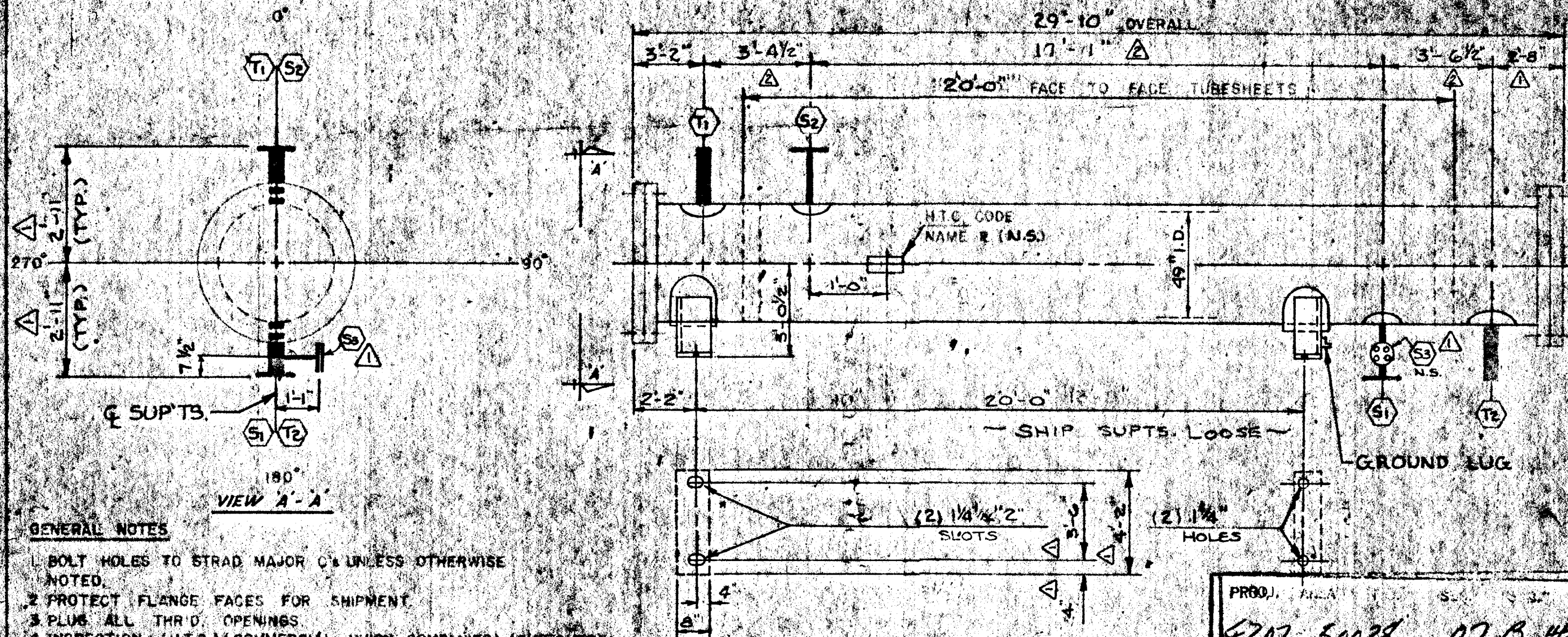
CERTIFIED FOR CONSTRUCTION
SHELL 100%
CHAM: (SPOT)
SHELL (NO)
CHAM: *

EXT. TUBE SURFACE PER EXCH.	9200	50 FT.
W. EX. EXCH. LBS. WT.	53,300	WET: 77,790 BDL: +
DESIGN PRESSURE, PSI	880	270
DESIGN TEMPERATURE, °F	650	710
PROPO. TEST PRESSURE, PSI	1320	405
CORROSION ALLOW.	1/16	1/16 (C.S.)
NUMBER OF PASSES	ONE (1)	ONE (1)

REVISION:
1. GEN. REV./CUST. 10-29-74 RM
2. RELOCATE S1, S2 & SUPTS./CUST. 4-17-75
HUNT TOOL COMPANY
HEAT EXCHANGER DIVISION
CITY OF CHICAGO, ILL.
R.S. 10-4-79
90749

PROJ. 50028 07 B HE-2538

CODES AND SPECIFICATIONS
ASME SECT. VIII PRESS. VESSELS
DIV. 1, STAMP (YES) TEMA (R)
CELANESE VENDOR REQUIREMENTS
OUTLINE SIZE 49-240
SERVICE BOILER FEED WATER PREHEATER
CUST. CELANESE CHEM. CO.
CUST. P.O. NO. 040041-50028
CUST. ITEM NO. HE-2538
RE INCHES ADD ONE (1) IN. CEN.
Dwg. No. 5-5435 SHEET 2 OF 17



GENERAL NOTES

1. BOLT HOLES TO STRAD MAJOR C'S UNLESS OTHERWISE NOTED.
2. PROTECT FLANGE FACES FOR SHIPMENT.
3. PLUG ALL THRD. OPENINGS.
4. INSPECTION (H.T.C. (COMMERCIAL UNION COMPANIES), (CUSTOMER).
5. SURFACE PREP. HAND TOOL CLEAN PER (SSPC - SP 2 - G3).
6. PAINT (ONE (1) COAT RED SHOP PRIMER.
7. SEAL WELD TUBES TO TUBESHEETS.

- (1) APPROVED - MFG. MAY PROCEED.
 - (2) APPROVED - SUBMIT FINAL DWG. - MFG. MAY PROCEED.
 - (3) APPROVED EXCEPT AS NOTED - MAKE CHANGES AND SUBMIT FINAL DWG. - MFG. MAY PROCEED AS APPROVED.
 - (4) NOT APPROVED - CORRECT AND RESUBMIT.
 - (5) REVIEW NOT REQUIRED - MFG. MAY PROCEED.
- APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE SUPPLIER OF RESPONSIBILITY FOR ACCURACY OF DIMENSIONS, PERFORMANCE, DESIGN, DESIGN DETAILS OR HONOR, MANUFACTURE SPECIFICATION AND PURCHASE ORDER REQUIREMENTS.

DAVY POWERGEN INC.

CERTIFIED FOR CONSTRUCTION BY *[Signature]*

SHELL (100%)
CHAN. (SPOT)
PWHT
SHELL (NO)
CHAN. (X)

EXT. TUBE SURFACE PER EXCH.		9200	50. FT
WT. EA. EXCH. LBS.	DRY: 53,300	WET: 77,790	BDL: ~
DESIGN CONDITIONS		SHELL SIDE	TUBESIDE
DESIGN PRESSURE	P.S.I.	880	270
DESIGN TEMPERATURE	°F	650	710
HYDRO-TEST PRESSURE	P.S.I.	1320	405
CORROSION ALLOW.	IN	1/16	1/16 (C.B.)
NUMBER OF PASSES		ONE (1)	ONE (1)

REVISION
1. GEN. REV./CUST. 10-29-74
2. RELOCATE S1, S2 & SUPTS. CUST. 4-17-75

HUNT
TOOL COMPANY
HEAT EXCHANGER DIVISION
CANTON, OHIO 44705
DRN. R.S. 10-4-74
CHKD. R.A. 10-4-74
APP'D.

ASME SECT. VIII PRESS. VESSELS
DIV. 1, STAMP (YES), TEMA (R)
CELANESE VENDOR REQUIREMENTS
REQUIREMENTS

#90749

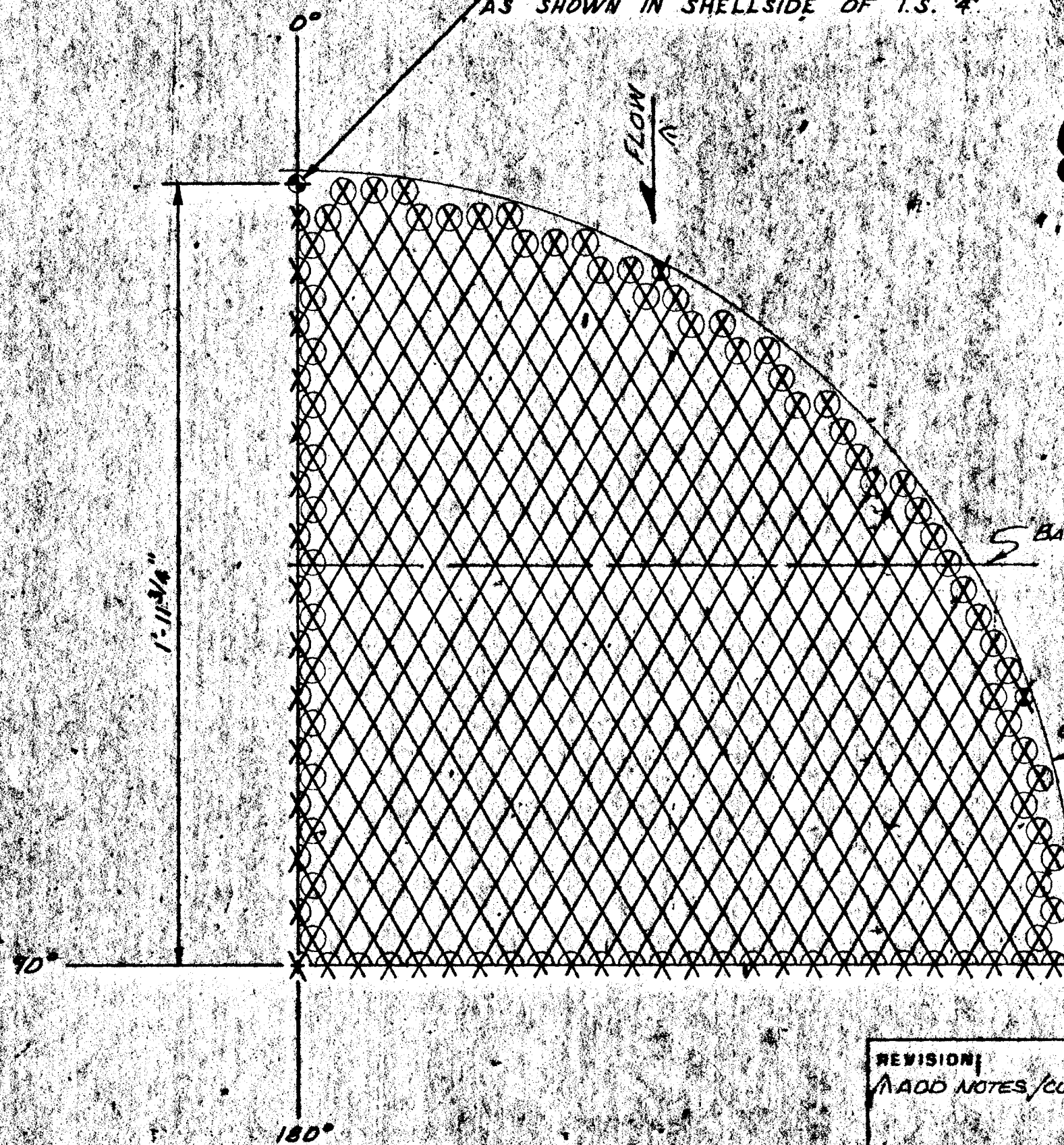
OUTLINE SIZE 49-240
SERVICE BOILER FEED WATER PREHEATER
CUST. CELANESE CHEM.
CUST. P.O. # 040041-50028
CUST. ITEM # HE-2538
RESEARCH'S HEAD ONE (1) TYPE CEN
DWG. NO. HE-3435 SHEET 2 OF 2

MARK	Nº	SIZE	RATING	FLG. DESCR.	SERVICE	REMARKS
S3	1	2"	600#	RF-LWN	DRAIN & FILL	
S2	1	12"	600#	RF-LWN	OUTLET	
S1	1	12"	600#	RF-LWN	INLET	
T2	1	24"	O.D.	BFW	OUTLET	
T1	1	26"	O.D.	BFW	INLET	

SCHEDULE OF OPENINGS

*INLET CHAN. YES
OUTLET CHAN. NO

ONE (1) OF (10) $\frac{1}{2}$ " ϕ TIE RODS, LOCATED
AS SHOWN IN SHELLSIDE OF T.S. "4"



NOTE:
LAYOUT IS SYMMETRICAL
ABOUT BOTH C/S.

☒	1) APPROVED - MFG MAY PROCEED
☒	2) APPROVED - SUPPLY FILLING DWG - MFG MAY PROCEED
☒	3) APPROVED EXCEPT AS NOTED - MAKE CHANGES AND SUBMIT FINAL DWG - MFG MAY PROCEED
☐	4) NOT APPROVED - CORRECT AND RE-DRAW
☐	5) REVIEW NOTICE - MFG MAY PROCEED

APPROVAL OF THIS DRAWING TO S.D. REVEALS THE SUPPLIER OF RESPONSIBILITY FOR THE DESIGN, DIMENSIONS, MATERIAL, AND FINISH OF THE DRAWING. THE SUPPLIER SHALL BE RESPONSIBLE FOR THE DESIGN, DIMENSIONS, MATERIAL, AND FINISH OF THE DRAWING.

DAVY POWERGAS INC.

[Signature] DATE 4/28/75

PROJ.	AREA	P.	S.	ITEM
9207	50028	11	B	HE-2538

\$ 90749.

TOTAL NO OF TUBES 2343
TUBE O.D. $\frac{3}{4}$ "
TUBE PITCH $\frac{15}{16}$ " Δ
NO OF PASSES ONE (1)
C OF OUTERMOST TUBE 47.545" ϕ

LAYOUT VIEW FROM SHELLSIDE OF TUBESHEET "4"

REVISION:
ADD NOTES/CUST. 4-17-75

HUNT TOOL COMPANY HEAT EXCHANGER DIVISION CORPUS CHRISTI, TEXAS		
DR'N.	V.M.	11-18-74
CHK'D.	RM	1-15-75
APP'D.		

TUBE HOLE LAYOUT	
CUST. ITEM NO HE-2538	
NO EXCHG. REQD ONE (1) TYPE CEN	
DWG NO HE-3435	SHEET 6 OF 7