

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

1. Manufactured by Joseph Oat & Sons, Inc. Camden, New Jersey
(Name and address of Manufacturer)
2. Manufactured for Hercules, Inc. Wilmington, North Carolina 104107
(Name and address of Purchaser)
3. Type Vert. Kind Heat Exch. Vessel No. (2127-1) (NC190227) Natl. Bd. No. 614 Yr. Built 1973
(Horiz. or Vert.) (Tank, Jacketed, Heat Exch.) (Mfrs. Serial) (State & State No.)

Items 4-9 incl. to be completed for single wall vessels (such as air tanks), jackets of jacketed vessels, or shells of heat exchangers.

4. SHELL: Material SA515GR70 T.S. 70000 Nominal 3/8 Corrosion 1/16
(Kind and Spec. No.) (Fig. or F.B. & Spec. Min. T.S.) Thickness In. Allowance In. Diam. 2 Ft. 6 In. Length 12 Ft. 0 In.
5. SEAMS: Long DBW H.T. No R.T. Spot Sectioned No Efficiency 85 %
(Welded, Dbl., Single, Lap, Butt) (Yes or No) (Spot or Complete) (Yes or No)
Girth DBW H.T. No R.T. Spot Sectioned No No. of Courses 2
(Welded, Dbl., Single, Lap, Butt) (Yes or No) (Spot or Complete) (Yes or No)

If riveted de-
scribe seams
fully on re-
verse side of
form.

6. HEADS (a) Material SA515GR70 T.S. 70000 (b) Material SA515GR70 T.S. 70000
(Kind and Spec. No.) (Fig. or F.B. & Spec. Min. T.S.) (Kind and Spec. No.) (Fig. or F.B. & Spec. Min. T.S.)
(a) Location Thickness Crown Knuckle Elliptical Conical Hemispherical Flat Side to Pressure
(Top, bottom, ends) Radius Radius Ratio Apex Angle Radius Diameter (Convex or Concave)
(b) Location Thickness Crown Knuckle Elliptical Conical Hemispherical Flat Side to Pressure
(Top, bottom, ends) Radius Radius Ratio Apex Angle Radius Diameter (Convex or Concave)

If removable, bolts used SA193 B7 32 3/4" 10UNC Other fastening SA193 B7 32 3/4" 10UNC
(Material, Spec. No., T.S., Size, Number) (Describe or Attach Sketch)

7. STAYBOLTS: (Material) SA193 B7 32 3/4" 10UNC If hollow SA193 B7 32 3/4" 10UNC Attachment SA193 B7 32 3/4" 10UNC Pitch SA193 B7 32 3/4" 10UNC X SA193 B7 32 3/4" 10UNC Diam. SA193 B7 32 3/4" 10UNC
(Size of Hole) (Threaded, Welded) (Horiz.) (Vert.) (Nominal)

8. JACKET CLOSURE: SA193 B7 32 3/4" 10UNC
(Describe as ogee & weld, bar, etc. If bar, give dimensions, if bolted, describe or sketch)

9. Constructed for max. allowable working press. 300 psi at max. temp. 650° F. less than -20° Min. temp. (when SA193 B7 32 3/4" 10UNC Hydrostatic SA193 B7 32 3/4" 10UNC Test SA193 B7 32 3/4" 10UNC Press 450 psi.
(Material, Spec. No., T.S., Size, Number) (Describe or Attach Sketch) (Material, Spec. No., T.S., Size, Number) (Describe or Attach Sketch) (Material, Spec. No., T.S., Size, Number) (Describe or Attach Sketch)

Items 10 and 11 to be completed for tube sections.

10. TUBE SHEETS: Stationary. Material SA240T316 Diam. 30 In. Thickness 1-1/2 In. Attachment Welded
(Kind & Spec. No.) (Subject to Pressure) (Welded, Bolted)

Floating. Material SA249 Diam. 30 In. Thickness 1-1/2 In. Attachment Welded
(Kind & Spec. No.) (Subject to Pressure) (Welded, Bolted)

11. TUBES: Material T316 O.D. 1 In. Thickness 16 In. Gauge Number 433 Type Straight
(Kind & Spec. No.) (Straight or U)

Items 12-15 incl. to be completed for inner chambers of jacketed vessels, or channels of heat exchangers.

12. SHELL Material SA240T316 T.S. 75000 Nominal 1/4 Corrosion 0
(Kind and Spec. No.) (Fig. or F.B. & Spec. Min. T.S.) Thickness In. Allowance In. Diam. 2 Ft. 6 In. Length 2 Ft. 5 In.

13. SEAMS: Long DBW H.T. No R.T. Spot Sectioned No Efficiency 85 %
(Welded, Dbl., Single, Lap, Butt) (Yes or No) (Spot or Complete) (Yes or No)
Girth Single H.T. No R.T. None Sectioned No No. of courses 2

If riveted de-
scribe seams
fully on re-
verse side of
form.

14. HEADS (a) Material SA285GRC T.S. 55000 (b) Material SA285GRC T.S. 55000 (c) Material SA285GRC T.S. 55000
(Kind and Spec. No.) (Fig. or F.B. & Spec. Min. T.S.) (Kind and Spec. No.) (Fig. or F.B. & Spec. Min. T.S.) (Kind and Spec. No.) (Fig. or F.B. & Spec. Min. T.S.)

(a) Location Thickness Crown Knuckle Elliptical Conical Hemispherical Flat Side to Pressure
(Top, bottom, ends) Radius Radius Ratio Apex Angle Radius Diameter (Convex or Concave)
(b) Channel SA240T316 Thickness 1-7/16 In. Gauge Number 433 Type Straight
(Kind & Spec. No.) (Straight or U)

(c) Floating SA240T316 Thickness 1-7/16 In. Gauge Number 433 Type Straight
(Kind & Spec. No.) (Straight or U)

If removable, bolts used (a) SA193 B7 32 3/4" 10UNC (b) SA193 B7 32 3/4" 10UNC
(Material, Spec. No., T.S., Size, Number) (Material, Spec. No., T.S., Size, Number)

(c) SA193 B7 32 3/4" 10UNC Other fastening SA193 B7 32 3/4" 10UNC
(Material, Spec. No., T.S., Size, Number) (Describe or Attach Sketch)

15. Constructed for max. allowable working press. 75 psi at max. temp. 450° F. less than -20° Min. temp. (when SA193 B7 32 3/4" 10UNC Hydrostatic SA193 B7 32 3/4" 10UNC Test SA193 B7 32 3/4" 10UNC Press 119 psi.
(Material, Spec. No., T.S., Size, Number) (Describe or Attach Sketch) (Material, Spec. No., T.S., Size, Number) (Describe or Attach Sketch) (Material, Spec. No., T.S., Size, Number) (Describe or Attach Sketch)

Items below to be completed for all vessels where applicable.

16. SAFETY VALVE OUTLETS: Number SA193 B7 32 3/4" 10UNC Size SA193 B7 32 3/4" 10UNC Location In Piping

17. NOZZLES

Purpose (Inlet, Outlet, Drain)	Number	Diam. or Size	Type	Material	Thickness	Reinforcement Material	How Attached
A	1	18"	Plt.	SA240T316	3/16"	None	Welded
B-C	2	8"	Pipe	SA53GRB	SCH 80	SA515GR70	"
E	1	6"	"	SA312T316	SCH 40	None	"
F	1	12"	Plt.	SA240T316	3/16"	"	"

P.O. 026-57020-FCD

EQU. No. 6-6207-06

PRAT-026057

¹ If postweld heat-treated.

² List under remarks other internal or external pressures with coincident temperature when applicable.

FORM U-1 (back)

18. INSPECTION Manholes, No. _____ Size _____ Location _____
OPENINGS: Handholes, No. _____ Size _____ Location _____
Threaded, No. 2-2-2 Size 1/2"-3/4"-1" Location Nozzles B&C & Stm. Jkt. Shell
19. SUPPORTS: Skirt No Lugs 4 Legs _____ Other _____ Attached Welded
(Yes or No) (Number) (Describe) (Where & How)
20. REMARKS: Vessel is an Oxidate Stripper Reboiler constructed to Oat Dwg. 5238, 5208
and the 1971 ASME Code Section VIII. Bottom channel cover is equipped with a
Steam Jacket hydrotested to 248 psig.
Item No. E-6201-05

(Brief description of purpose of the vessel, as Air Tank, After Cooler, Jacketed Cooker, etc. State contents of each part.)

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 I.

Date 2/19 19 73 Signed Joseph Oat & Sons, Inc. By Joseph Oat
(Manufacturer)

Certificate of Authorization Expires #184 12/31/73

CERTIFICATE OF SHOP INSPECTION

VESSEL MADE BY Joseph Oat & Sons, Inc. at Camden, New Jersey
I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province N. J. and employed by Royal Indemnity Company of New York, New York have inspected the pressure vessel described in this manufacturer's data report on 1973, and state that to the best of my knowledge and belief, the manufacturer has constructed this pressure vessel in accordance with the applicable sections of the ASME Boiler and Pressure Vessel Code.

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 2/21 19 73

Inspector's Signature Commissions N.B.C. 900
Nat'l Board, State, or Province and No.

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 _____ 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 that to the best of my knowledge and belief the manufacturer has constructed and assembled this pressure vessel in accordance with the applicable sections of the ASME Boiler and Pressure vessel Code. 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 _____ 19 _____

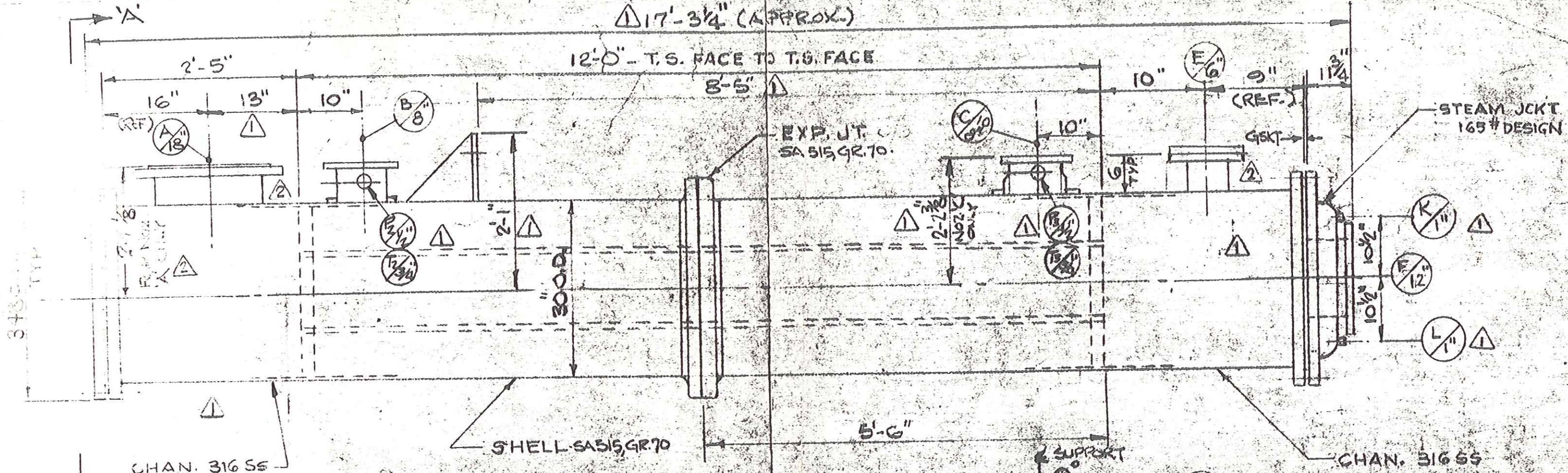
Inspector's Signature Commissions _____
Nat'l Board, State, or Province and No.



JOB NO.	NO.	DESCRIPTION	REV. BY	CHK'D	APPR'D
1/1	2	No. of tubes	LOF		
		Nozzle sizes			
		Baff space change			

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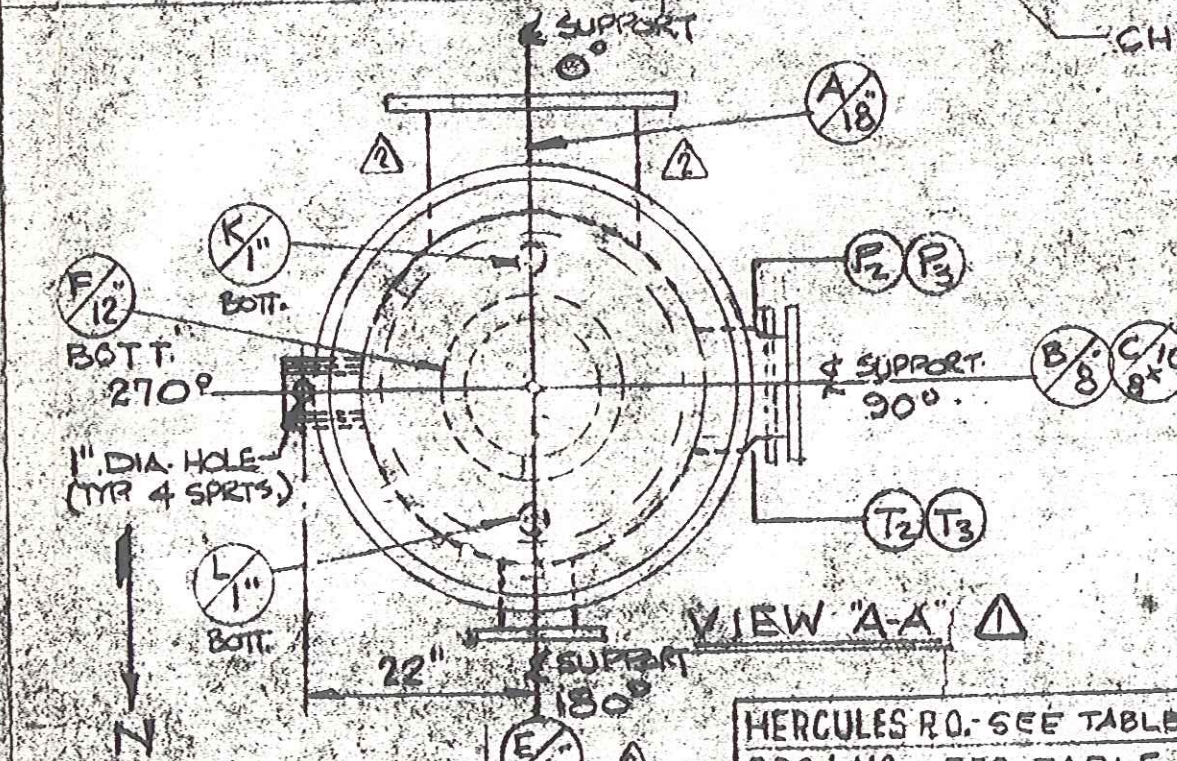
HERCULES INCORPORATED		HEAT EXCHANGER SPECIFICATIONS											
104107		Rev. 2/11/72											
Rev. 3/3/72													
REFERENCE	1	PLANT Hanover	JOB NO. 026057	EQUIP. NAME Oxidate Stripper Reboiler									
	2	AREA Est. & Dist.	NO. 2044	EQUIP. NO. E-6201-5									
	3	BLDG.	NO.	NO. UNITS 1									
	4	ORDER 02657020	VENDOR Joseph Oat & Sons	B.P.F. NO. 43553									
	5	MADE BY Obermann Frescoln	CHKD. BY	APPR. BY	DATE 2/2/71								
PROCESS AND GENERAL	6	SURFACE AREA: EACH UNIT	1,402	SQ. FT.	EACH SHELL	1,402	SQ. FT.						
	7	NO. SHELLS											
	8	WEIGHTS —	EACH SHELL	LB.	BUNDLE	LB.	FULL OF WATER	LB.					
	9			SHELL SIDE		TUBE SIDE							
	10	FLUID CIRCULATED	P-Cymene		Oxidate								
	11	TOTAL FLUID ENTERING	60,000		LB./HR.	500,000		LB./HR.					
	12	TOTAL VAPOR ENTERING			LB./HR.	STM 9,200		LB./HR.					
	13	TOTAL LIQUID ENTERING			LB./HR.			LB./HR.					
	14	TOTAL STEAM ENTERING			LB./HR.			LB./HR.					
	15	TOTAL NON-CONDENSABLES ENTERING			LB./HR.			LB./HR.					
	16	FLUIDS VAPORIZED OR VAPORS CONDENSED			36,000								
	17	STEAM CONDENSED											
	18	SPECIFIC GRAVITY @ TEMPERATURE	39 lb/cu ft.		°F.	@	°F.						
	19	VISCOSITY IN	< 0.1		CP.			CP.					
	20	VISCOSITY OUT	< 0.1		CP.			CP.					
	21	THERMAL CONDUCTIVITY	0.08		BTU/HR.-FT./°F.	.04	BTU/HR.-FT./°F.						
	22	MOLECULAR WEIGHT OF VAPORS			76								
	23	SPECIFIC HEAT OF LIQUIDS	0.7		BTU/LB./°F.	0.5	BTU/LB./°F.						
	24	LATENT HEAT OF VAPORS			BTU/LB.	182	BTU/LB.						
	25	TEMPERATURE IN	570		°F.	433	°F.						
	26	TEMPERATURE OUT	520		°F.	433	°F.						
	27	OPERATING PRESSURE			PSIG	2.1	PSIG						
	28	DESIGN PRESSURE — TEMPERATURE	300 PSIG @ 650 °F.		75 PSIG @ 650 °F.								
	29	TEST PRESSURE — HYDROSTATIC	450		PSIG			PSIG					
	30	PRESSURE DROP — ALLOWABLE	10 max.		PSIG	6.5	PSIG						
	31	PRESSURE DROP — CALCULATED	7		PSIG	6.2	PSIG						
	32	PASSES PER SHELL	1		1								
	33	VELOCITY			FT./SEC.			FT./SEC.					
	34	FOULING RESISTANCE	.002		.003								
	35	CODE REQUIREMENTS	ASME Sect. VIII TEMA CLASS B		TEMA TYPE DESIGNATION		CEN						
	36	HEAT EXCHANGED	7,150,500 BTU/HR.		MTD. (CORRECTED)		103						
	37	TRANSFER RATE — SERVICE	49		CLEAN		67						
	CONSTRUCTION AND MATERIALS	38	TUBES: MATERIAL	316 St.St1	QUAN.	446	O.D.	1 IN.	16 GA.	LENGTH	144 IN.	PITCH	(Δ) □ 0
		39	TUBE ATTACHMENT	☒ ROLLED ☒ WELDED ☐ GROOVED AND ROLLED		PITCH		1.25	INCHES				
		40	TUBE SUPPORTS	PITCH		THICKNESS		IN.	NO. TIE RODS				
		41	TUBE SHEETS	316 SS xx		☐ STATIONARY ☐ FLOATING							
		42	SHELL: C/S	I.D.	29 IN.	O.D.	IN.	THICKNESS	IN.	☒ VERT.	☐ HORIZ.		
43		SHELL COVER	THICKNESS		INCHES	O.D.	INCHES	☐ REMOV.	☐ INTEG.				
44		FLOATING HEAD COVER	THICKNESS		INCHES	O.D.	INCHES						
45		EXPANSION JOINTS	☒ YES ☐ NO		TYPE								
46		EXPANSION JOINT DESIGN CRITERIA	SHELL TEMP		575 °F.	TUBE TEMP	400 °F.						
47		CHANNEL OR BONNET	THICKNESS		INCHES	CHANNEL COVER	THICKNESS	INCHES					
48		BAFFLES — CROSS	16	PITCH	6.63 in	TYPE	25% NFA	THICKNESS	INCHES				
49		BAFFLES — LONG	No	TYPE			THICKNESS	INCHES					
50		GASKETS	Flexitallic CG		TEST GASKETS		Flexitallic "CG"						
51		CONNECTIONS: SHELL IN	10 in.		OUT	10 in.	SERIES	300 # ASA					
52		CONNECTIONS: CHANNEL IN	STM 12" LIQ-12"		OUT	18 in.	SERIES	150 # ASA					
53		IMPINGEMENT PLATES	☐ YES ☐ NO		THICKNESS		INCHES						
54		CORROSION ALLOWANCE: SHELL SIDE	Standard		TUBE SIDE	none							
55		PAINTING Shop Coat Red Lead — C/S Parts											
REMARKS	56	Bottom channel length to be 30" with 12" side nozzle, no											
	57	bottom channel cover but with companion flange.											
	58												
	59												
	60												
	61												



OAT JOB NO.	PPOJ. NO.	ITEM NO.	P.O. NO.
J-2079-1	026035	E-4201-5	026-35066
J-2127-1	026057	E-6201-05	026-57020

NOTE: ALL COUPLINGS ARE HALF-COUPPLINGS - 3000# THD.

ITEM	SIZE	SCH.	FLANGE	PURPOSE	REMARKS	DATE
2, T ₃	(2) 3/4"	3000#	CPLG	THERMOMETER	NPT W/PLUG	1/2
2, P ₃	(2) 1/2"	3000#	CPLG	PRESS. GAUGE	NPT W/PLUG	1/2
L	1"	3000#	CPLG	STEAM JKT. OUT	NPT	1
K	1"	3000#	CPLG	STEAM JKT. IN	NPT	1
F	12"	3/16"	L.J.	TUBE IN	150#	1
E	6"	3/16"	L.J.	SPARE	150# W/BLD FLG.	1
C	10"x8"	80	SORF	SHELL IN	300#	1
B	8"	80	SORF	SHELL OUT	300#	1
A	18"	3/16"	L.J.	TUBE OUT	150#	1
GRK	SIZE	SCH.	FLANGE	PURPOSE	REMARKS	DATE



VENDOR PRINT FILE	43553	DATE	10-27-72
SHEET	1	EQUIPMENT NOS.	E-6201-5
PROJECT & ACCOUNT NOS.	026057	PURCHASE ORDER NO.	336-026-57020
PLANT	HANOVER	REVIEWED - DRAFTING DESIGN	APPROVED - H. G. Scholer

NO.	DATE	DESCRIPTION	BY
1	5/29/72	ADDED PROJ. J-2127-1 & TABULATION TABLE	RO
2	6/1/72	NOZZLES 'A' & 'F' - SCH. 40 WAS 3/8"	RO
3	6/1/72	REVISED PER HERCULES MARKED PRINT DATED 5-25-72. DELETED NOZZLES P, Q, T, & SHELL	RO
4	5/29/72	REVISED PER HERCULES MARKED PRINT DATED 3/6/72 & TO SUIT FAB. DWG.	RO
		ISSUED FOR APPROVAL	RO
		REVISIONS	BY

HERCULES RO. - SEE TABLE	OAT JOB NO. - (SEE TABLE)
PROJ. NO. - SEE TABLE	
OUTLINE DRAWING OXIDATE STRIPPER REBOILER	
HERCULES INCORPORATED HANOVER PLANT WILMINGTON, N. C.	
JOS. OAT & SONS, INC., CAMDEN, N. J.	
DRAWN - RO	DATE - 2-22-72
SCALE - NONE	DWG. 5208
	REV. 4