

SPECIFICATION - HEAT EXCHANGER

GENERAL

ITEM NO.:	E-534	SERVICE:	BEER STRIPPER #2 REBOILER
TYPE:	SHELL & TUBE TYPE NEN		
CODE:	TEMA B - ASME SECTION VIII		
DESIGN PRESS.:	PSIG (kPa)	SHELL: 150 (1035) / FULL VAC.	TUBES: 120 (828) / FULL VAC.
DESIGN TEMP.:	°F (°C)	SHELL: 366 (186)	TUBES: 350 (177)
TUBES:	No., IN (mm), BWG (mm)	No: 504	SIZE: 1.5 (38) O.D. GAUGE: # 16 BWG (1.65)
	FT-IN (mm), IN (mm)	LENGTH: 32' - 10" (10,000)	PITCH: 2.25 (57.2) Triangular

PROCESS DATA

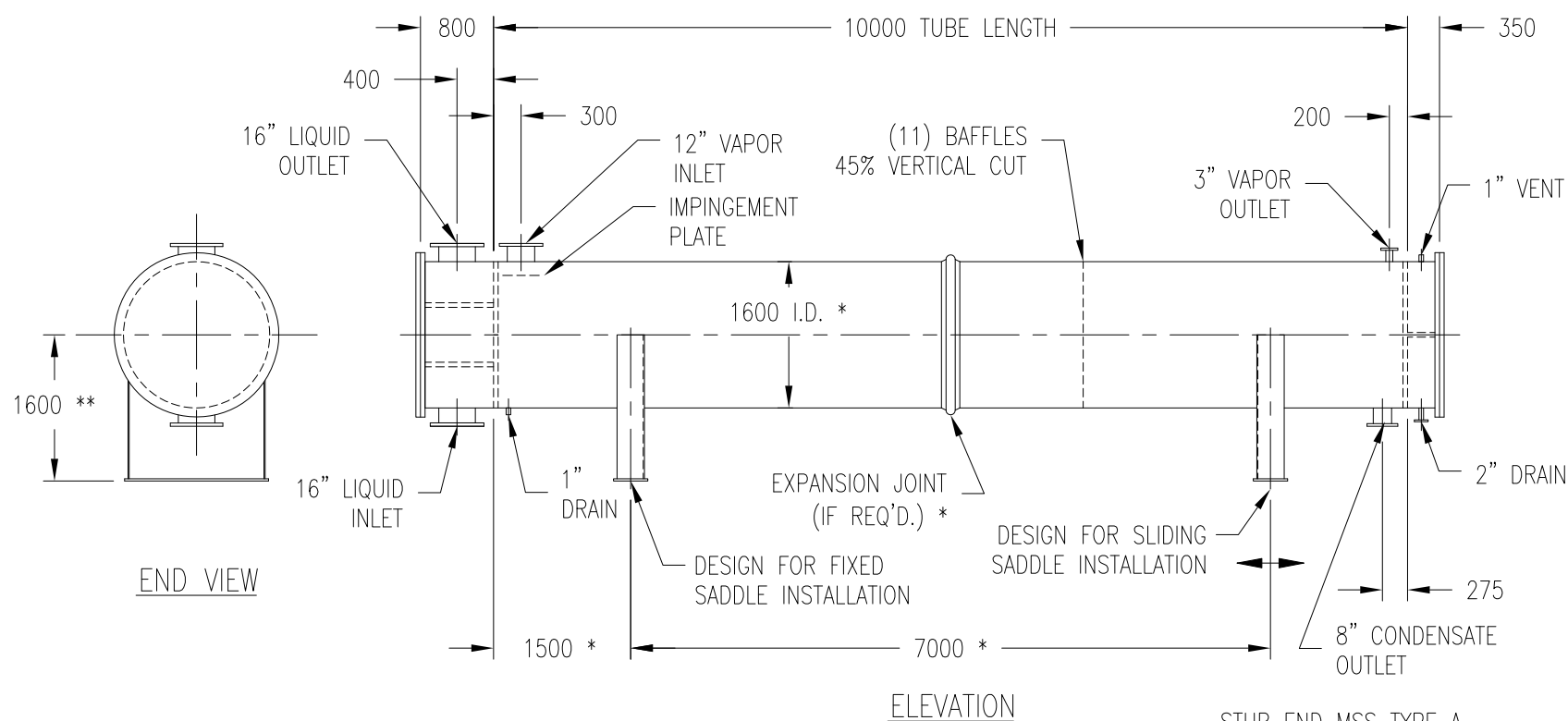
	SHELL SIDE	TUBE SIDE
FLUID CIRCULATED	ETHANOL VAPOR	STILLAGE
ENTERING VAPOR	LB/HR (kg/HR)	
ENTERING LIQUID	LB/HR (kg/HR)	2,325,796 (1,054,963)
ENTERING STEAM	LB/HR (kg/HR)	
ENTER. NON-CONDEN.	LB/HR (kg/HR)	
FLUID VAPOR. OR CONDEN.	LB/HR (kg/HR)	52,198 (23,677)
STEAM CONDENSED	LB/HR (kg/HR)	
DENSITY	LB/FT ³ (kg/m ³)	0.6 (9) / 63.0 (1,009)
VISCOSITY-LIQUID/VAPOR	cp (Pa x SEC)	0.01 (0.00001) / 2.00 (0.00200)
MOL. WT.-VAPORS		
SPECIFIC HEAT	Btu / (LB x °F) [kJ / (kg x K)]	0.93 (4)
LATENT HEAT-VAPOR	Btu/LB (kJ/kg)	350 (814)
TEMP. IN	°F (°C)	279 (137) / 240 (115)
TEMP. OUT	°F (°C)	278 (137) / 248 (120)
OPERATING PRESSURE	PSIA (kPa)	95 (554) / 75 (416)
NO. OF PASSES		1 / 4
VELOCITY	FT/SEC (m/SEC)	5.4 (1.6) / 8.0 (2.4)
PRESS. DROP	PSI (kPa)	0.1 (0.9) / 20.4 (140.5)

SURFACE:	SQ. FT. (SQ. m)	6,493 (603)	SHELLS / UNIT:	1
HEAT EXCHANGED:	Btu/HR (kJ/HR)	18,264,000 (19,268,000)	MTD, °F (°C):	34.28 (19.04)
TRANSFER RATES:	Btu/(HR x FT ² x °F)	DESIGN: 83 (1678)		
	[kJ/(HR x M ² x K)]	SERVICE: 101 (2053)	CLEAN:	198 (4029)

MATERIALS

SHELL:	A240 TP-304L STAINLESS STEEL		
TUBES:	A249 TP-304L STAINLESS STEEL - AVERAGE WALL		
CHANNEL:	A240 TP-304L STAINLESS STEEL		
CHANNEL COVER:	A516 GR. 70 CARBON STEEL	LINER:	A240 TP-304L STAINLESS STEEL
TUBE SHEETS - STAT.:	A240 TP-304L STAINLESS STEEL		
TUBE SHEETS - FLOATING:	---		
FLOATING HEAD COVER:	---		
TUBE SUPPORTS:	---		
BAFFLES:	STAINLESS STEEL (11 REQUIRED) - 45 % VERTICAL CUT		
TIE RODS & SPACERS:	STAINLESS STEEL		
SUPPORTS:	CARBON STEEL W/ STAINLESS STEEL ISOLATION PADS		
EXPANSION JOINT:	IF REQUIRED		
GASKETS, IN (mm):	1/16" (2mm) NON-ASBESTOS		
BOLTING:	A193 B7 WITH A194 2H HEX NUTS		

	SHELL SIDE	TUBE SIDE
NOZZLES:		
NECK:	A312 TP-304L S. STL. PIPE	A312 TP-304L S. STL. PIPE
FLANGE:	A105 FORGED STEEL 150# LAP JOINT	A105 FORGED STEEL 150# LAP JOINT
COUPLING:	A182 F-304L S. STL. 3000# THR'D FULL	A182 F-304L S. STL. 3000# THR'D FULL
CORROSION ALLOWANCE:	IN (mm)	NONE

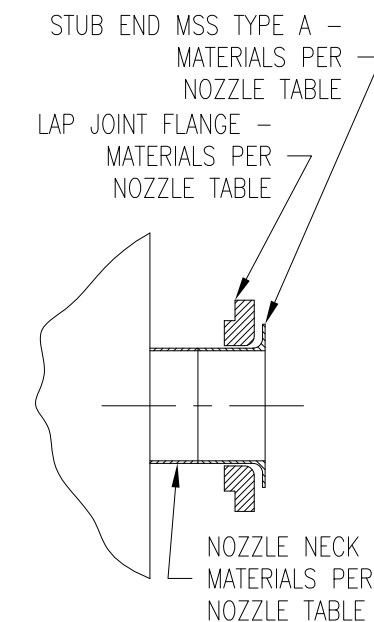


NOTES:

- * - VENDOR TO SPECIFY/VERIFY.
- ** - FINAL ELEVATION TO BE DETERMINED PER PIPING DESIGN.
- 1. MAXIMUM TEMPERATURE ΔT FOR EXPANSION IS 300° F (149° C) SHELLSIDE AND 60° F (16° C) TUBESIDE.
- 2. ALL EXTERNAL CARBON STEEL SURFACES TO BE CLEANED AND OTHERWISE PROPERLY PREPARED PRIOR TO APPLICATION OF ONE COAT OF CORROSION PROTECTION PRIMER PER SHOP STANDARD. FINAL PAINTING PER OWNER'S REQUIREMENTS.
- 3. TUBESIDE - FOUR PASSES.
- 4. PASS PARTITION TO WITHSTAND 75 PSI (517 kPa) ΔP.
- 5. DAVITS REQUIRED ON EACH END.
- 6. 304L SS MAY BE SUBSTITUTED WITH DUAL GRADE 304/304L SS.

NOZZLE SIZE	NOZZLE ** EXTENSION
1 1/4"-6"	150
8"-24"	200

** - UNLESS OTHERWISE SPECIFIED



TYPICAL NOZZLE DETAIL
WHERE LAP JOINT FLANGES ARE CALLED FOR IN NOZZLE TABLE

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								BIOETANOL PAYSANDÚ	
						UTE ABENER TEYMA PAYSANDÚ		KATZEN INTERNATIONAL, INC. TECHNOLOGY • ENGINEERING CINCINNATI, OHIO, U.S.A.	
						Scale: NONE		Nº Plano: 0003-PLN-KAT-05-62-0217	
						211,200 LITERS/DAY MOTOR FUEL GRADE ETHANOL PLANT EQUIPMENT SPECIFICATION		Sheets: 1 Sheet Nº: 1	
						Origin: JDC		Client Nº: 1132-01 Dwg Nº: 05-217	
0	3/1/13	REV. 0 ISSUE	WLB	JDC	JDC	ITEM: E-534			
Rev.	Date	Description	Dwn By	Ckd By	Appd By				