

SPECIFICATION - HEAT EXCHANGER

GENERAL

ITEM NO.:	E-504	SERVICE:	BEER PREHEATER #1
TYPE:	SHELL & TUBE TYPE NEN		
CODE:	TEMA B - ASME SECTION VIII		
DESIGN PRESS.:	PSIG (kPa)	SHELL:	155 (1069) / FULL VAC. TUBES: 200 (1379) / FULL VAC.
DESIGN TEMP.:	°F (°C)	SHELL:	300 (149) TUBES: 300 (149)
TUBES:	No., IN (mm), BWG (mm)	No:	252 SIZE: 1.25 (32) 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

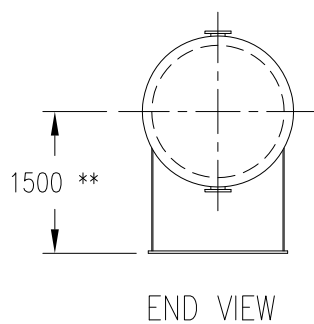
	SHELL SIDE	TUBE SIDE
FLUID CIRCULATED	ETHANOL/WATER VAPOR	BEER
ENTERING VAPOR	LB/HR (kg/HR)	
ENTERING LIQUID	LB/HR (kg/HR)	161,622 (73,311)
ENTERING STEAM	LB/HR (kg/HR)	
ENTER. NON-CONDEN.	LB/HR (kg/HR)	
FLUID VAPOR. OR CONDEN.	LB/HR (kg/HR)	8,289 (3,760)
STEAM CONDENSED	LB/HR (kg/HR)	
DENSITY	LB/FT ³ (kg/m ³)	63.10 (1,011)
VISCOSITY-LIQUID/VAPOR	cp (Pa x SEC)	10.00 (0.01000)
MOL. WT.-VAPORS		
SPECIFIC HEAT	Btu / (LB x °F) [kJ / (kg x K)]	0.89 (4)
LATENT HEAT-VAPOR	Btu/LB (kJ/kg)	914 (2,127)
TEMP. IN	°F (°C)	163 (73)
TEMP. OUT	°F (°C)	154 (68)
OPERATING PRESSURE	PSIA (kPa)	6.5 (-57)
NO. OF PASSES		12
VELOCITY	FT/SEC (m/SEC)	33 (10.2)
PRESS. DROP	PSI (kPa)	0.1 (0.3)

SURFACE:	SQ. FT. (SQ. m)	2,706 (251)	SHELLS / UNIT:	1
HEAT EXCHANGED:	Btu/HR (kJ/HR)	7,578,000 (7,995,000)	MTD, °F (°C):	29.55 (16.41)
TRANSFER RATES:	Btu/(HR x FT ² x °F)	DESIGN: 87 (1775)	CORRECTED	
	[kJ/(HR x M ² x K)]	SERVICE: 93 (1899)	CLEAN:	136 (2764)

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 (8 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

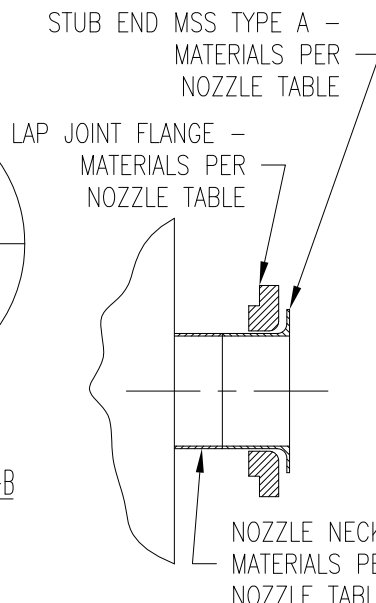
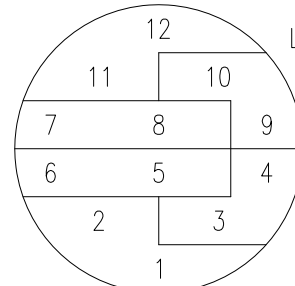
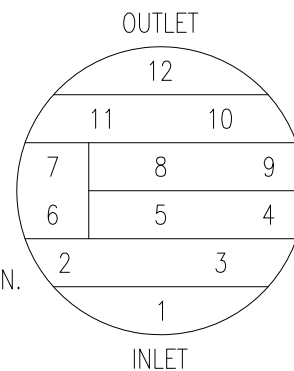
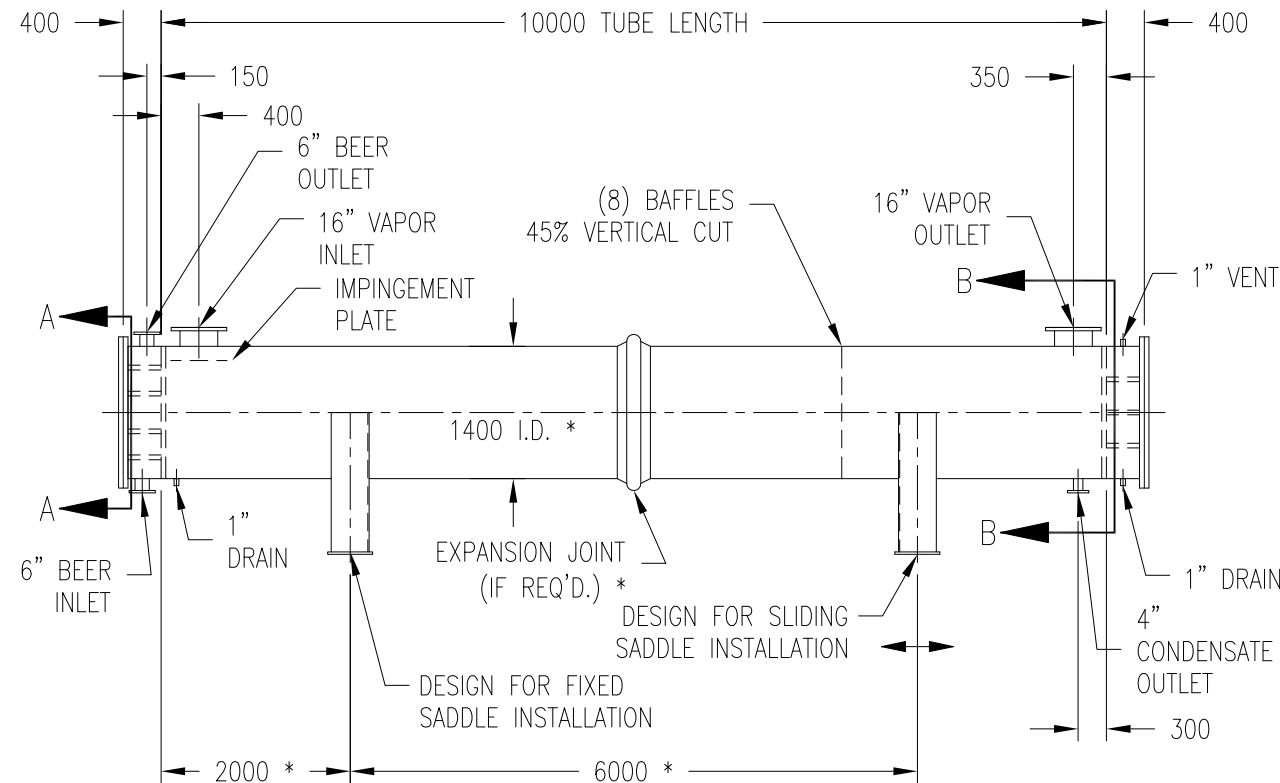


NOZZLE SIZE	NOZZLE ** EXTENSION
1 1/4" - 6"	150
8" - 24"	200

** - UNLESS OTHERWISE SPECIFIED

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 32° F (0° 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 - TWELVE PASSES.
- 4. PASS PARTITION TO WITHSTAND 200 PSI (1379 kPa) ΔP.
- 5. DAVITS REQUIRED ON EACH END.
- 6. 304L SS MAY BE SUBSTITUTED WITH DUAL GRADE 304/304L SS.



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	-		Nº Plano:
						NONE	211,200 LITERS/DAY MOTOR FUEL GRADE ETHANOL PLANT EQUIPMENT SPECIFICATION		0003-PLN-KAT-05-62-0202
0	3/1/13	REV. 0 ISSUE	WLB	JDC	JDC			Sheets: 1	Sheet Nº: 1
Rev.	Date	Description	Dwn By	Ckd By	Appd By	Origin: JDC	ITEM: E-504	Client Nº: 1132-01	Dwg Nº: 05-202