

**HEAT EXCHANGER SPECIFICATION SHEET**

Customer	KP Engineering		P.O. No.	J144-B-007	
Address	Tyler, TX		Job No.	1203-04	
Plant Location	Holly Frontier- Tulsa, OK		Date	2/24/16	
Service of Unit	Debutanizer Steam Reboiler		Item No.	374-E-C221	
Size	40-240	Type	AEU Horizontal	Connected In	1 Parallel 1 Series
Surf/Unit (Eff), Sq Ft	3189	Shell/Unit	1	Surf/Shell (Eff)	3189 Sq Ft

**PERFORMANCE OF ONE UNIT**

Fluid Allocation		Shell Side		Tube Side	
Fluid Name		Steam		Debutanizer Bottoms	
Fluid Quantity, Total lb/hr		32,535		615,692	
Vapor (In/Out)					206,934
Liquid				615,692	408,758
Steam		32,535			
Water			32,535		
Noncondensable					
Temperature (In/Out)	F	552.70	420.79	334.40	354.6
Density			52.71	32.27	31.67
Viscosity	cP	0.0196	0.1239	0.1000	0.011 V/L 0.095
Molecular Weight, Vapor		18.02			83.87
Molecular Weight, Noncondensable					
Specific Heat	Btu/lb-F	0.511	1.200	0.733	0.598 V/L 0.758
Thermal Conductivity	Btu/hr-ft-F	0.026	0.377	0.038	0.017 V/L 0.036
Latent Heat Btu/lb					
Inlet Pressure psia		314.70		206.70	
Velocity ft/sec				11.21	
Pressure Drop, Allow/Calc psi		10.000	0.765	15.000	5.551
Fouling Resistance (min) ft <sup>2</sup> -hr-F/Btu		0.00050		0.0040	
Heat Exchanged	Btu/hr	28,750,000	MTD (Corrected)	72.7 F	
Transfer Rate, Service		124.0 Btu/ft <sup>2</sup> -hr-F			

**CONSTRUCTION OF ONE SHELL**

		Shell Side		Tube Side	
Design Pressure		PSI 675 / F.V.		525 / F.V.	
Test Pressure		CODE		CODE	
Design Temperature / MDMT		F 725 / 300 / -20		425 / 300 / -20	
No Passes per Shell		1		2	
Corrosion Allowance		inch 0.1250		0.1250	
Connections	In	inch 1 @ 12	600 # RFWN	inch 1 @ 10	300 # RFWN
	Out	inch 1 @ 6	600 # RFWN	inch 1 @ 14	300 # RFWN
Tube No	313U OD	1.0000	Thk(Min)	0.109	inch Length 20.0 feet Pitch 1.250 inch Layout 45
Tube Type	BARE		Material SA-214		
Shell	SA-516-70	ID	40.00	inch	Shell Cover SA-516-70
Channel or Bonnet	SA-516-70	Channel Cover SA-516-70			
Tubesheet-Stationary	SA-350-LF2	Tubesheet-Floating			
Floating Head Cover	Impingement Plate Circular plate				
Baffles-Cross	SA-36	Type	Sing Seg - Vert	%Cut (Diam)	30.10 Spacing(c/c) 9
Baffles-Long					
Supports-Tube	SA-36	U-Bend	SA-36	Type	Full
Bypass Seal Arrangement			Tube-Tubesheet Joint	Rolled & Double Grooved	
Gaskets - Shell		GMGC	Tube	GMGC	
-Floating Head					
Code Requirements			ASME Section VIII, Div. I	TEMA Class	R, API 660

Remarks: Unit is thermally, vibrationally and mechanically guaranteed by Taylor Forge Engineered Systems. Two grounding lugs. Counter current flow. National Board registration included. 1" minimum bolting. Two sets of spare gaskets included. Lath Stud type fireproofing supports. PMI bolting. Full X-ray.