HEAT EXCHANGER SPECIFICATION SHEET

US Units

sgl carbon

		Job No.	02RT3160 / PTS:12948
Customer	Martinez Refinery	Reference No.	
Address	150 Solano Way	Proposal No.	14155199
Plant Location	Chemical Plant / 082	Date	3/13/19 Rev 01
Service of Unit	Primary Wet Gas Cooler	Item No.	E-5003
Size	56.5 x 195.6 inch Type AEP Vertical	Connected In	1 Parallel 1 Series
Surf/Unit (Gross/Eff)	3964.9 / 3620.3 ft2 Shell/Unit 1	Surf/Shell (Gross/Eff)	3964.9 / 3620.3 ft2

PERFORMANCE OF ONE UNIT

Fluid Allocation		Shell Side		Tube Side	
Fluid Name		Cooling Water		Process Gas	
Fluid Quantity, Total	lb/hr	676600		111200	
Vapor (In/Out)				111200	91779
Liquid		676600	676600		19421
Steam					
Water		676600	676600		
Noncondensables					
Temperature (In/Out)	F	85.00	115.30	167.00	130.00
Specific Gravity		0.9964	0.9902		0.9869
Viscosity	cP	0.8068	0.5829	0.0141	0.0165 V/L 0.5423
Molecular Weight, Vapor					
Molecular Weight, Noncondensables					
Specific Heat	Btu/lb-F	0.9989	0.9986	0.2772	0.2386 V/L 1.0033
Thermal Conductivity	Btu/hr-ft-F	0.3550	0.3677	0.0140	0.0137 V/L 0.3736
Latent Heat	Btu/lb			977.58	1011.0
Inlet Pressure	psia	54.696		14.200	
Velocity	ft/sec	0.90		77.86	
Pressure Drop, Allow/Calc	psi	5.000	0.921	0.289	0.262
Fouling Resistance (min)	ft2-hr-F/Btu	0.00100		0.00000	

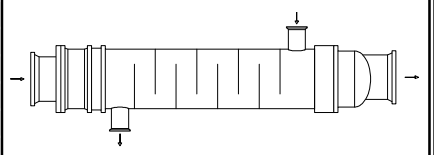
Heat Exchanged 20473120 Btu/hr MTD (Corrected) 51.3 F

Transfer Rate, Service 110.15 Btu/ft2-hr-F Clean 125.40 Btu/ft2-hr-F Actual 111.42 Btu/ft2-hr-F

CONSTRUCTION OF ONE SHELL

Sketch (Bundle/Nozzle Orientation)

			Shell Side	Tube Side
Design/Test Pressure		psig	75.000 /	10.000 /
Design Temperature		F	200.00	225.00
No Passes per Shell			1	1
Corrosion Allowance		inch	0.1250	0.0000
Connections	In	inch	1 @ 14.000	1 @ 42.000
Size &	Out	inch	1 @ 14.000	1 @ 42.000
Rating	Intermediate		@	@



Tube No. 472 OD 1.9685 inch Thk(Avg) 0.2559 inch Length 15 ft Pitch 2.2440 inch

Tube Type Plain Material Graphite Tube pattern 30

Shell Carbon steel ID 56.500 OD 57.125 inch Shell Cover

Channel or Bonnet Graphite Channel Cover Graphite

Tubesheet-Stationary Graphite Tubesheet-Floating Graphite

Floating Head Cover Impingement Plate None

Baffles-Cross Graphite Type Single-Seg. %Cut (Diam) 25 Spacing(c/c) 17.500 Inlet 28.050 inch

Baffles-Long Seal Type None

Supports-Tube U-Bend Type None

Bypass Seal Arrangement 0 pairs seal strips Tube-Tubesheet Joint Expanded (No groove)

Expansion Joint Type

Rho-V2-Inlet Nozzle 497.14 lb/ft-sec2 Bundle Entrance 1466.8 Bundle Exit 1475.9 lb/ft-sec2

Gaskets-Shell Side Ring Joint (Fiberglass\Teflon) Tube Side Ring Joint (Fiberglass\Teflon)

-Floating Head

Code Requirements ASME TEMA Class non-TEMA

Remarks:

Process T_out is 129.5 F with 0% over design. Design meets pressure drop requirement.