







OWNER:  شرکت سست و سویی توهمه ایراندین (سهامی عامه)	BUSHEHR PETROCHEMICAL COMPANY MEG PLANT						EPC CONTRACTOR:  Chagalesh-Enerchimi-Steam Joint Venture BUPC-MEG PLANT PROJECT		
	AFTER COOLER MECHANICAL DATA SHEET FOR NITROGEN GAS								
MC :  شرکت سست و سویی توهمه ایراندین (سهامی عامه)							Project	Area	Phase
Owner Document Number: 17811-11B	BU	20	VD	303	ME	DSH	0017	Rev.:	Page
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AFTER COOLER MECHANICAL DATA SHEET FOR NITROGEN GAS

 شرکت سست و سویی توهمه ایراندین (سهامی عامه)	 Chagalesh-Enerchimi-Steam Joint Venture BUPC-MEG PLANT PROJECT	BUSHEHR PETROCHEMICAL COMPANY MEG PLANT
Document Review		
Issue Purpose:	FA	
Result Code: AP,AN,CM,RE,NC	AN	
Next Status : IFC,IFA,IFI,AFC,AB	AFC	
Responsible Department	MECHANICAL	
Commented Date	Feb/16/2022	
Approval or review hereunder shall not be construed to relieve Vendor / Subcontractor of his responsibilities and liability under the contract.		

02	07/02/2022	For approval	KP	LdM	JR	
01	14/09/2021	For approval	KP	PW	JR	
00	11/12/2020	For approval	KP	PW	JL	
Rev.	Date	Purpose of Issue	Prepared	Checked	Approved	AC Code
					Class: 1	Phase: P

Customer	Airpack Nederland B.V.	Job No.	17811-CC-0000
Address		Reference No.	17811-CC-0000
Plant Location		Proposal No.	202204
Service of Unit	Intercooler	Date	04/02/2022
Size	133,3 x 1256 mm	Type	AES Horizontal
Surf/Unit (Gross/Eff)	23,618 / 23,517 m ²	Shell/Unit	1
		Connected In	1 Parallel 1 Series
		Surf/Shell (Gross/Eff)	23,618 / 23,517 m ²

PERFORMANCE OF ONE UNIT

Fluid Allocation	Shell Side	Tube Side
Fluid Name	Wet Air	Water
Fluid Quantity, Total	766,20 kg/hr	4477,1
Vapor (In/Out)	766,20	
Liquid		4477,1
Steam		4477,1
Water		4477,1
Noncondensables		
Temperature (In/Out)	134,00 C	35,00 / 45,00
Specific Gravity		0,9947 / 0,9909
Viscosity	0,0219 mPa-s	0,7193 / 0,5962
Molecular Weight	19,75	18,02
Molecular Weight, Noncondensables		
Specific Heat	1,1026 kJ/kg-C	4,1778 / 4,1777
Thermal Conductivity	0,0318 W/m-C	0,6223 / 0,6350
Latent Heat	2221,5 kJ/kg	
Inlet Pressure		5,513 bar
Velocity		0,90 m/s
Pressure Drop, Allow/Calc		0,073 bar
Fouling Resistance (min)		0,000340 m ² -K/W

It is supposed to be Nitrogen

Heat Exchanged	51985, Watts	MTD (Corrected)	18,5 C
Transfer Rate, Service	119,70 W/m ² -K	Clean	287,03 W/m ² -K
		Actual	124,50 W/m ² -K

CONSTRUCTION OF ONE SHELL

	Shell Side	Tube Side	Sketch (Bundle/Nozzle Orientation)
Design/Test Pressure	25,000 barG	10,000 barG	
Design Temperature	210,00 C	95,00 C	
No Passes per Shell	1	2	
Corrosion Allowance	0,000 mm	0,000 mm	
Connections	1 @ Flange 2"	1 @ SAE 1 1/2"	
Size & Rating	1 @ Flange 2" Intermediate	1 @ SAE 1 1/2" @	

Tube No.	72	OD	8,000 mm	Thk(Avg)	0,500 mm	Length	1256, mm	Pitch	11,500 mm	
Tube Type	Continuous Fin		Material			Copper/nickel 90/10	Tube pattern 30			
Shell	316 Stainless steel (17 Cr, 12 Ni)		ID	133,30	OD	139,70 mm	Shell Cover	Carbon steel (Remove.)		
Channel or Bonnet	Carbon steel					Channel Cover	Carbon steel			
Tubesheet-Stationary	Red brass (85 Cu, 15 Zn)					Tubesheet-Floating	Red brass (85 Cu, 15 Zn)			
Floating Head Cover	Carbon steel					Impingement Plate	None			
Baffles-Cross	316 Stainless steel (17 Cr, Type NTIW-Seg.		%Cut (Diam)			17,33	Spacing(c/c)	0,000		
Baffles-Long			Seal Type			None				
Supports-Tube			U-Bend			Type None				
Bypass Seal Arrangement	pairs seal strips		Tube-Tubesheet Joint			Expanded (No groove)				
Expansion Joint			Type			None				
Rho-V2-Inlet Nozzle	679,25 kg/m-s ²		Bundle Entrance			0,00	Bundle Exit	0,00 kg/m-s ²		
Gaskets-Shell Side	O-Ring (Viton)		Tube Side			O-Ring (Viton)				
- Floating Head	O-Ring (Viton)									
Code Requirements	ASME		TEMA Class			TEMA-C				
Weight/Shell	121,42 kg	Filled with Water	143,06 kg	Bundle	31,27 kg					

Continuous Fin Density=1200 fin/meter; Root Diameter=8 mm; Thickness=0,2 mm

Air Humidity: 0.06718 kg Water / kg dry air @50 °C; 1,01325 bar (a); 80%

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Customer	Airpack Nederland B.V.	Job No.	17811-CC-0000
Address		Reference No.	17811-CC-0000
Plant Location		Proposal No.	202204
Service of Unit	Aftercooler (8 kW)	Date	04/02/2022
Size	133,3 x 856 mm	Type	AES Horizontal
Surf/Unit (Gross/Eff)	15,779 / 15,678 m ²	Shell/Unit	1
		Connected In	1 Parallel 1 Series
		Surf/Shell (Gross/Eff)	15,779 / 15,678 m ²

PERFORMANCE OF ONE UNIT

Fluid Allocation	Shell Side	Tube Side
Fluid Name	Wet Air	Water
Fluid Quantity, Total	kg/hr 720,30	1347,4
Vapor (In/Out)	720,30 / 717,21	
Liquid		1347,4 / 1347,4
Steam		
Water	52 oC	1347,4 / 1347,4
Noncondensables		
Temperature (In/Out)	C 64,00 / 40,00	35,00 / 39,50
Specific Gravity	0,9918	0,9947 / 0,9931
Viscosity	mPa-s 0,0197	0,7193 / 0,6592
Molecular Weight	21,64	18,02 / 18,02
Molecular Weight, Noncondensables		
Specific Heat	kJ/kg-C 1,0501	4,1778 / 4,1774
Thermal Conductivity	W/m-C 0,0275	0,6223 / 0,6282
Latent Heat	kJ/kg 2281,5	
Inlet Pressure	bar 23.5 bara	5,513
Velocity	m/s 1,24	0,27
Pressure Drop, Allow/Calc	bar 0,015	5,96e-3
Fouling Resistance (min)	m ² -K/W 0,000340	0,000340
Heat Exchanged	7041, Watts	MTD (Corrected) 9,9 C
Transfer Rate, Service	45,22 W/m ² -K	Clean 65,89 W/m ² -K Actual 50,69 W/m ² -K

CONSTRUCTION OF ONE SHELL

	Shell Side	Tube Side	Sketch (Bundle/Nozzle Orientation)
Design/Test Pressure	barG 25,000 /	10,000 /	
Design Temperature	C 210,00	95,00	
No Passes per Shell	1	2	
Corrosion Allowance	mm 0,000	0,000	
Connections	In mm 1 @ Flange 2"	1 @ SAE 1 1/2"	
Size & Rating	Out mm 1 @ Flange 2"	1 @ SAE 1 1/2"	
	Intermediate @	@	

Tube No.	72	OD	8,000 mm	Thk(Avg)	0,500 mm	Length	856, mm	Pitch	11,500 mm
Tube Type	Continuous Fin	Material	Copper/nickel 90/10	Tube pattern	30				
Shell	316 Stainless steel (17 Cr, 12 Ni)	ID	133,30	OD	139,70 mm	Shell Cover	Carbon steel (Remove.)		
Channel or Bonnet	Carbon steel	Channel Cover	Carbon steel						
Tubesheet-Stationary	Red brass (85 Cu, 15 Zn)	Tubesheet-Floating	Red brass (85 Cu, 15 Zn)						
Floating Head Cover	Carbon steel	Impingement Plate	None						
Baffles-Cross	316 Stainless steel (17 Cr, Type NTIW-Seg.	%Cut (Diam)	17,33	Spacing(c/c)	0,000	Inlet	400,00 mm		
Baffles-Long		Seal Type	None						
Supports-Tube		U-Bend		Type	None				
Bypass Seal Arrangement	pairs seal strips	Tube-Tubesheet Joint	Expanded (No groove)						
Expansion Joint		Type	None						
Rho-V2-Inlet Nozzle	324,13 kg/m-s ²	Bundle Entrance	0,00	Bundle Exit	0,00	kg/m-s ²			
Gaskets-Shell Side	O-Ring (Viton)	Tube Side	O-Ring (Viton)						
- Floating Head	O-Ring (Viton)								
Code Requirements	ASME	TEMA Class	TEMA-C						
Weight/Shell	114,01 kg	Filled with Water	130,41 kg	Bundle	28,25 kg				

Remarks: Continuous Fin Density=1200 fin/meter; Root Diameter=8 mm; Thickness=0,2 mm

Air Humidity: 0.003182 kg Water / kg dry air @40 °C; 21,5 bar (a); 100%

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