

HEAT EXCHANGER SPECIFICATION SHEET

1	Project	Marafiq STG Units 5 & 6 Project	Job No.	7200 011 314
2	Client	Marafiq / Saudi Arabia	Doc. No.	11314-M12-DST-80001
3	Contractor	Hanwha E&C	Load : Design Mode	Date
4	Code/Standard	ASME / TEMA / HEI	ASME Stamp	Yes
5	Service of Unit	HFO Suction Heater	No. of Units	2 set(s)
6	Size	Shell 700 ID x 5000 SETL	Type	C E U
7	Surface/Unit, Eff.	105.4	m ² Shells/Unit	1

PERFORMANCE OF ONE UNIT

Fluid Allocation	Shell Side		Tube Side	
Fluid Name	HFO 380		Secondary Steam / Condensate	
Fluid Quantity, Total	77,832		1,760	
Vapor (In/Out)	0	0	0	0
Liquid	77,832	77,832	0	0
Steam	0	0	1,760	0
Water	0	0	0	1,760
Temperature (In/Out)	55.0	80.0	151.4	151.4
Density	964.94	949.06	2.64	915.74
Viscosity	273.056	83.469	0.014	0.181
Molecular Weight	***		18.0152	
Specific Heat	0.443	0.466	0.575	1.030
Thermal Conductivity	0.099	0.097	0.027	0.588
Latent Heat	***		503.8	
Inlet Pressure	0		4	
Velocity, i / m / o	0.13		6.32	- N/A -
Pressure Drop, Allow./Calc.	0.17	0.17	0.5	0.05
Fouling Resistance (Min.)	0.0035		0.0001	
Heat Duty	884,922	kcal/h	MTD	83.23 °C
H. T. Rate, Cal'd	111.5	kcal/m ² h °C	H. T. Area, Req.	95.4 m ²
H. T. Rate, Service	100.9	kcal/m ² h °C	H. T. Area, Act.	105.4 m ²
			H. T. Area Margin	10.5 %

CONSTRUCTION OF ONE SHELL

Sketch (Bundle/Nozzle Orientation)

Design / Test Pressure	Shell Side		Tube Side		Please refer to " General Assembly "
kg/cm ² .g	9	13.5	15	22.5	
Design Temperature	85		350		
No. Passes per Shell	1		2		
Corrosion Allowance	3.2		3.2		
Connections	10"	Flanged	4"	Flanged	
Size & Rating	8"	Flanged	2"	Flanged	

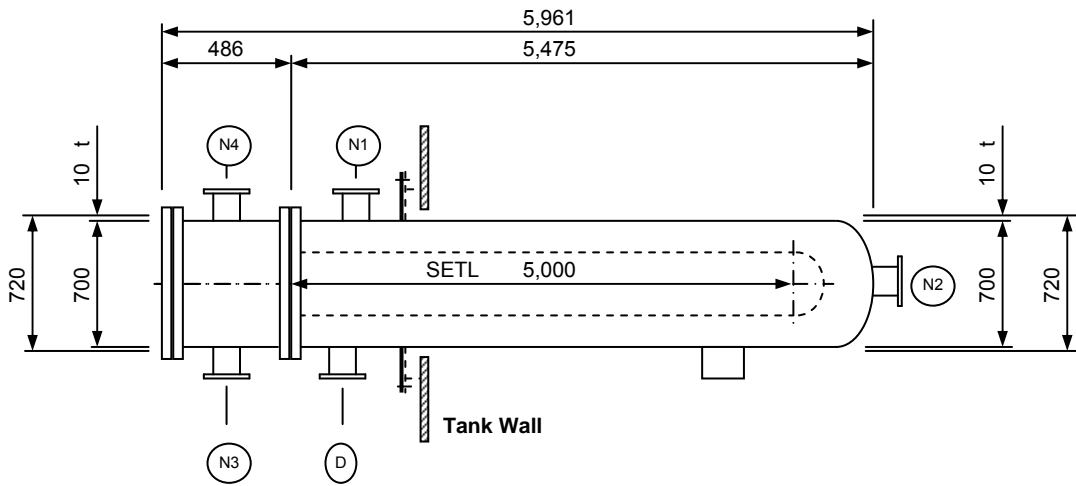
Tube No.	170	U's	OD	19.05	mm	Thk, Avg.	2.11	mm	SETL	5,000	mm	Pitch	23.8	mm
Tube Type	Plain			Material		SA 179								
Shell	SA 516-70	ID	700	Thk	10	mm	Shell Cover	SA 516-70	Thk	10	mm	Integ.		
Channel	SA 516-70	ID	700	Thk	10	mm	Channel Cover	SA 266 4	Thk	66	mm			
Tubesheet	- Stationary SA 266 4			Tubesheet		- Floating ***								
Floating Head Cover	***			Impingement Protection		Yes								
Baffles-Cross	SA 285-C	Type	Segmental		% Cut, Diam	20	Spacing : c/c	700	Inlet	800	mm			
Baffles-Long	***			Seal Type		***								
Supports-Tube	***			U-bend	***		Type		***					
Bypass Seal Arrangement	Yes			Tube-Tubesheet Joint		Expanded+Seal W.								
Expansion Joint	***			Type		***								
pv ² -Inlet Nozzle	***			Bundle Entrance		Bundle Exit								
Gaskets-Shell Side	Non-asbestos			Tube Side		Non-asbestos								
-Floating Head	***													
Code Requirements	ASME			TEMA Class		R								
Weight/Shell	4,117	Filled with Water		6,143	Bundle		1,974	kg						

Notes

56	*1)	
57	*2)	
58	*3)	
59	*4)	
60	*5)	

SCHEMATIC DIMENSIONAL OUTLINE

1	Project	Marafiq STG Units 5 & 6 Project			Job No.	7200 011 314	
2	Client	Marafiq / Saudi Arabia			Doc. No.	SDO - ST - 200	
3	Contractor	Hanwha E&C			Date	2010. 10. 3.	
4	Code/Standard	ASME / TEMA / HEI		ASME Stamp	Yes	Revision	A B
5	Service Of Unit	HFO Suction Heater			Item No.	5NP / 6NP - HF - HX -01	
6	Size	Shell 700 ID x 5000 SETL		Type	C E U		
7	Surface/Shell, Eff.	105.4 m ²		Class	R		
8		Shell Side	Tube Side		Shell Side	Tube Side	
9	Fluid Name	HFO 380		Secondary Steam / Conde			
10	Press., In	kg/cm ² .g	0	4	Design Press.	kg/cm ² .g	9 15
11	Temp., In / Out	°C	55 / 80	151.3 / 151.3	Design Temp.	°C	85 350
12	No. of Passes	1		2	Corrosion Allow.	mm	3.2 3.2



MATERIALS

NOZZLE LIST

Description	Specification			Mk	Service	Q'ty	Size	Type	Rating	Face
	Qty	U's	t							
Shell	SA 516-70	170	10 t	N1	Shell Side Inlet	1	10"	150 lb	Flanged	
Shell Girth Flange	SA 266 4	1	55 t	N2	Shell Side Outlet	1	8"	150 lb	Flanged	
Shell Cover	SA 516-70	1	10 t	N3	Tube Side Inlet	1	4"	300 lb	Flanged	
Channel	SA 516-70	1	10 t	N4	Tube Side Outlet	1	2"	300 lb	Flanged	
Channel Girth Flange	***	***	*** t		Shell Side PSV	1	2"	150 lb	Flanged	
Bonnet Cover	***	***	*** t		Tube Side PSV	1	1"	300 lb	Flanged	
Channel Cover	SA 266 4	1	66 t	D	Drain	1	1"	150 lb	Flanged	
Channel Cover Flange	SA 266 4	1	55 t							
Tube	Plain	170	U's							
	SA 179	OD	19.1	2.11 t						
Tubesheet	SA 266 4	1	55 t							
Baffle	SA 285-C	6	10 t							
Baffle, Long.	***	***	*** t							
Pass Partition	SA 516-70	1	13 t							
Support Saddle	SA 283-C			Empty	4,117	kg				
				Oper.	5,628	kg				
				Full Water	6,143	kg				

LOADING DATA

Notes

- *1) Data shown above may be changed in acc. with detail design.
- *2) Parts not shown above will be duly provided as far as required.
- *3)
- *4)
- *5)