

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	2010. 10. 7.		
4	Code/Standard	ASME / TEMA / HEI	ASME Stamp	Yes	Revision	A B	
5	Service of Unit	Steam Transformer	No. of Units	1 set(s)	Item No.	8P - AS - TR - 01	
6	Size	Shell 1800 ID x 5600 SETL	Type	CKU	Horizontal	Connected In	***
7	Surface/Unit, Eff.	194.7	m ²	Shells/Unit	1	Surface/Shell	194.7 m ²

PERFORMANCE OF ONE UNIT

Fluid Allocation		Shell Side		Tube Side	
Fluid Name		Cond. Water / Secondary Steam		Primary Steam / Condensate	
Fluid Quantity, Total		22,000		23,497	
kg/h					
Vapor (In/Out)		0		0	
Liquid		0		0	
Steam		0		23,497	
Water		22,000		0	
Temperature (In/Out)		145.0		154.9	
°C					
Density		921.69		2.88	
kg/m ³					
Viscosity		0.189		0.014	
Cp					
Molecular Weight		18.0152		18.0152	
Specific Heat		1.026		0.583	
kcal/kg°C					
Thermal Conductivity		0.589		0.027	
kcal/mh°C					
Latent Heat		501.1		476.5	
kcal/kg					
Pressure Oper. / Inlet		4.5		10.5	
kg/cm ² .g					
Velocity, i / m / o		- N/A -		18.70	
m/sec					
Pressure Drop, Allow./Calc.		0.5		0.00	
kg/cm ²					
Fouling Resistance (Min.)		0.0001		0.0001	
m ² h°C/kcal					
Heat Duty		11,249,916		29.37	
kcal/h					
MTD					
°C					
H. T. Rate, Clean		4103.7		4103.7	
kcal/m ² h°C					
H. T. Rate, Cal'd		2,180.0		175.7	
kcal/m ² h°C					
H. T. Area, Req.		175.7		53.1	
m ²					
Cleanliness Fac.		53.1		10.8	
%					
H. T. Rate, Service		1,967.3		194.7	
kcal/m ² h°C					
H. T. Area, Act.		194.7		10.8	
m ²					
H. T. Area Margin		10.8		%	

CONSTRUCTION OF ONE SHELL

Sketch (Bundle/Nozzle Orientation)

Design / Test Pressure		Shell Side		Tube Side		Please refer to " General Assembly "
kg/cm ² .g		15		22.5		
Design Temperature		350		350		
°C						
No. Passes per Shell		1		2		
Corrosion Allowance		3.2		3.2		
Connections		3" Flanged		10" Flanged		
In						
Size & Rating		12" Flanged		6" Flanged		
Out						
In / Out		300 lb		300 lb		

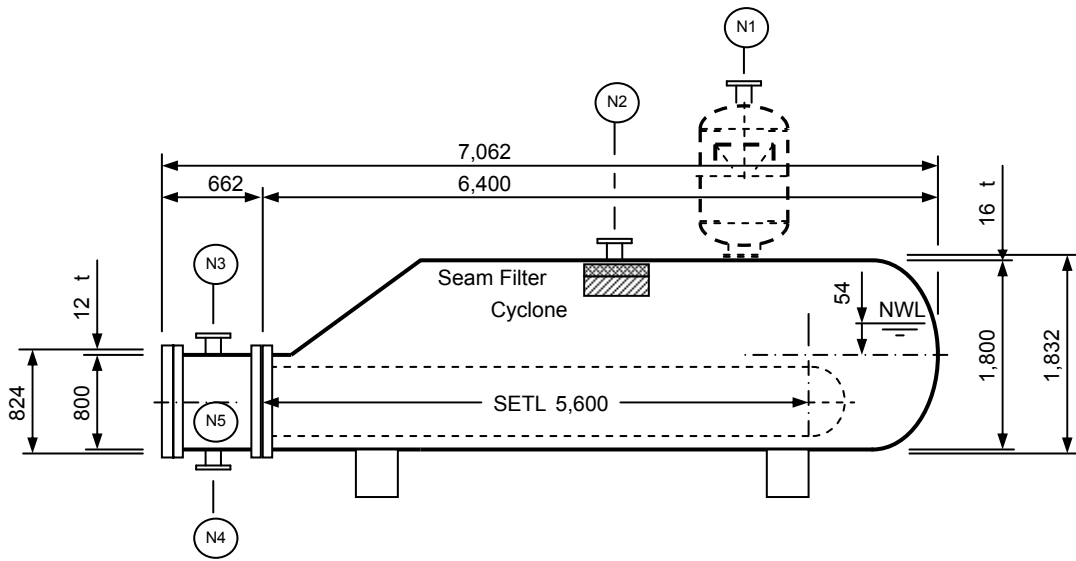
39	Tube No.	280	U's	OD	19.05	mm	Thk, Avg.	1.245	mm	SETL	5,600	mm	Pitch	25.4	mm
40	Tube Type	Plain			Material	SA 213 TP304			→ ◀ △ □ ◇						
41	Shell	SA 516-70	ID	1800	Thk	16	mm	Shell Cover	SA 516-70	Thk	16	mm	Integ.		
42	Channel	SA 516-70	ID	800	Thk	12	mm	Channel Cover	SA 266 4	Thk	72	mm			
43	Tubesheet	- Stationary SA 266 4			Tubesheet	- Floating ***									
44	Floating Head Cover	***			Impingement Protection	***									
45	Baffles-Cross	*** Type ***			% Cut, Diam	*** Spacing : c/c 750									
46	Baffles-Long	***			Seal Type	***									
47	Supports-Tube	SA 285-C	U-bend	***			Type	***							
48	Bypass Seal Arrangement	***			Tube-Tubesheet Joint	Expanded+Seal W.									
49	Expansion Joint	***			Type	***									
50	pv ² -Inlet Nozzle	1,781			Bundle Entrance	Bundle Exit			kg/m.sec ²						
51	Gaskets-Shell Side	Non-asbestos			Tube Side	Non-asbestos									
52	-Floating Head	***													
53	Code Requirements	ASME			TEMA Class	R									
54	Weight/Shell	10,014			Filled with Water	24,677			Bundle	3,055	kg				

Notes

- 56 *1) Thermal Insulation is provided.
- 57 *2)
- 58 *3)
- 59 *4)
- 60 *5)

SCHEMATIC DIMENSIONAL OUTLINE

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5	Service Of Unit	Steam Transformer			Item No.	8P - AS - TR - 01	
6	Size	Shell 1800 ID x 5600 SETL		Type	C K U		
7	Surface/Shell, Eff.	194.7 m ²		Class	R		
8		Shell Side	Tube Side		Shell Side	Tube Side	
9	Fluid Name	Water / Secondary Steam / Condensate					
10	Press., In	kg/cm ² .g	4.5	10.5	Design Press.	kg/cm ² .g	15
11	Temp., In / Out	°C	145 / 154.9	185.3 / 185.3	Design Temp.	°C	350
12	No. of Passes	1		2	Corrosion Allow.	mm	3.2



MATERIALS

NOZZLE LIST

Description	Specification	Mk	Service	Q'ty	Size	Rating	Type	Face
Shell	SA 516-70 Qty 16 t	N1	Secondary Condensate In	1	3"	Flanged	300 lb	
Shell Girth Flange	SA 266 4 1 62 t	N2	Secondary Steam Out	1	12"	Flanged	300 lb	
Shell Cover	SA 516-70 1 16 t	N3	Primary Steam In	1	10"	Flanged	300 lb	
Channel	SA 516-70 1 12 t	N4	Primary Condensate Out	1	6"	Flanged	300 lb	
Channel Girth Flange	*** *** t		Shell Side PSV	1	4"	Flanged	300 lb	
Bonnet Cover	*** *** t		Tube Side PSV	1	4"	Flanged	300 lb	
Channel Cover	SA 266 4 1 72 t	N5	Equalizer (from Flash Tan	1	3"	Flanged	300 lb	
Channel Cover Flange	SA 266 4 1 72 t							
Tube	Plain 280 U's							
	SA 213 TP304 OD 19.05 1.245 t							
Tubesheet	SA 266 4 1 62 t							
Baffle	SA 285-C 6 8 t							
Baffle, Long.	*** *** t							
Pass Partition	SA 516-70 1 16 t							
Support Saddle	SA 283-C							

LOADING DATA

Empty	10,014	kg
Oper.	17,410	kg
Full Water	24,677	kg

Notes

- *1) A stand pipe with valves is provided for level gauge and transmitter.
- *2) An orifice is provided at the nozzle N1.
- *3) Ladder & Platform shall be provided by others.
- *4)
- *5)