

HEAT EXCHANGERS

SHELL AND TUBE HEAT EXCHANGERS

INTRODUCTION

Shell & tube heat exchangers offer large surface area in combination with efficient heat transfer and compactness. These are widely used in industries for various duties like cooling, heating, condensation, evaporation etc. GOEL are the pioneers in the field of glass shell and tube heat exchangers in India and their product has a wide market acceptability.

SALIENT FEATURES

1. Universal corrosion resistance an excellent alternative to expensive MOCs like graphite, hastelloy, copper titanium, tantalum and other exotic metals.
2. Excellent heat transfer as fouling does not occur on smooth glass surfaces.
3. Flexibility of installation vertical / horizontal.
4. Easy replacement of tubes for repair and cleaning.
5. Available in wide range of HTAs.
6. Ease of installation due to light weight.
7. Economical.
8. Suitable for applications where large HTAs are required in limited space.

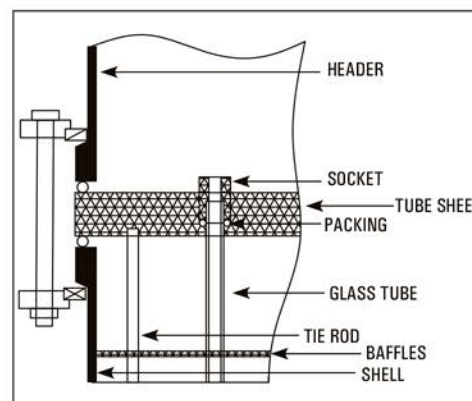
ADVANTAGES OVER CONVENTIONAL COIL TYPE HEAT EXCHANGERS

- (1) The overall heat transfer coefficient in shell and tube heat exchanger is about 3 times higher than in coil type heat exchanger.
- (2) The pressure drop in shell and tube heat exchanger is minimal compared to 2-3 kg/cm² in coil side of coil type heat exchanger.
- (3) For requirement of higher heat transfer areas shell and tube heat exchanger is the only alternative.

CONSTRUCTION FEATURES

The glass tubes are sealed individually into PTFE tube sheet with special PTFE sockets and packing. This unique ferrule type sealing arrangement permits easy replacement and cleaning of tubes. Baffles on shell side ensure improved heat transfer by increased turbulence. Further details of construction can be seen in the diagram.

- Made from SCHOTT DURAN.
- Joint less tubes offer better pressure rating.



TYPE

Three basic versions * are available :

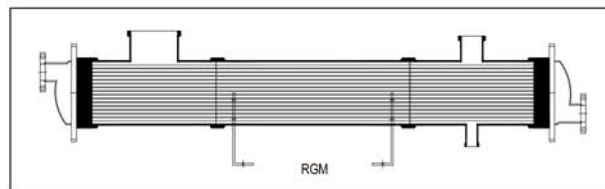
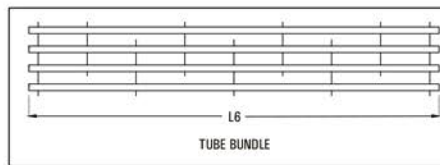
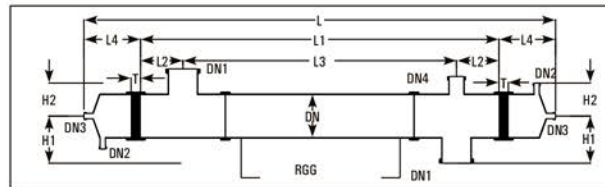
Model	Material Of Construction			Duty
	Shell	Tube	Header	
RGG	Glass	Glass	Glass	For heat transfer between two aggressive media.
RGM	Glass	Glass	Steel/ FRP	For heat transfer between aggressive media in shell & non-aggressive media in tubes.
RMG	Steel/FRP	Glass	Glass	For heat transfer between aggressive media in tubes & non-aggressive media in shell.

* GOEL provides assistance to clients for selecting the right model for specific duty.

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DIMENSIONAL SPECIFICATIONS

Cat. Ref. RGG/RMG	6/3	6/4	6/5	6/6	9/6	9/8	9/10	9/12	12/12	12/16	12/21	12/25	16/21	16/25
Area (m ²)	3	4	5	6	6	8	10	12	12	16	21	25	21	25
DN	150				225				300				400	
DN1	80				100				150				225	
DN2	50				80				80				100	
DN3	25				40				40				50	
DN4	50				50				50				80	
H1	175				250				300				450	
H2	150				200				250				300	
L	2500	3100	3700	4300	2620	3220	3820	4520	2550	3150	3950	4550	3100	3500
L1	1900	2500	3100	3700	1900	2500	3100	3800	1800	2400	3200	3800	2000	2400
L2	150	150	150	150	225	225	225	225	225	225	225	225	400	400
L3	1600	2200	2800	3400	1450	2050	2650	3350	1350	1950	2750	3350	1200	1600
L4	250	250	250	250	300	300	300	300	300	300	300	300	550	550
L5	125	125	125	125	175	175	175	175	175	175	175	175	225	225
L6	1980	2580	3180	3780	2000	2600	3200	3900	1930	2530	3330	3930	2185	2585
T	50				60				75				100	
No. of Tubes	37				73				151				241	
No. of Baffles	11	15	19	23	7	9	13	17	5	7	9	11	5	7



RANGE OF APPLICATIONS



Permissible temperature range for both shell & tube sides - 40°C to 150°C.

Maximum permissible temperature difference between shell & tube sides 120°C.

All sizes & models are suitable for full vacuum on both side. Maximum limiting pressures are tabulated here below :

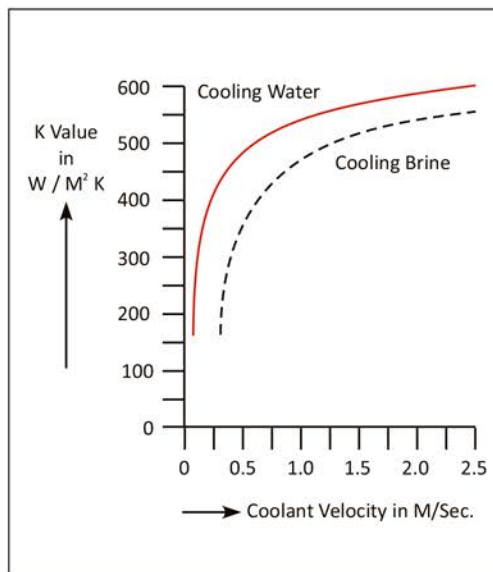
Model	Side	Maximum Permissible Pressure Range, Kg/cm ² (g)		
		150 DN	225 DN	300 DN
RGG	Shell-Glass	2.0	1.0	1.0
	Tube-Glass	2.0	1.0	1.0
	Dome-Glass			
RGM	Shell-Glass	2.0	1.0	1.0
	Tube-Glass	3.5	3.5	3.5
	Dome-Metal			
RMG	Shell-Metal	3.5	3.5	3.5
	Tube-Glass	2.0	1.0	1.0
	Dome-Glass			

The above ranges of application are admissible limiting values. For each specific case GOEL recommends the admissible operating data based on the relations between pressure and temperature, size and model.

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PERFORMANCE & DESIGN DATA

The particular advantage of shell & tube heat exchanger is high heat transfer performance. The relation between heat transfer and velocity of flow can be easily seen in the diagram. On receipt of the operating data from client the most favourable shell and tube heat exchanger is selected. This accurate design combined with most reliable quality assurance ensure economy and operational reliability for the user. For approximate sizing some typical heat transfer coefficients are given here below :



Media	use	U-Values	
		kcal/m ² hr k	W/m ² k300
Steam water	Condensation	350-550	410-640
Water-Water	Cooling	250-350	290-410
Water-air	Cooling	30-60	35-70

