



Specification No : RAH - 557

Rev. No : 00

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01.	Item	Steam Coil Air Preheater – Secondary				
02.	Application	Used to Heat the Secondary Air during Boiler Startup & Low Ambient Temperature.				
	Parameters	Units	BMCR	60% BMCR	30% BMCR	30% BMCR - Oil
03.	Air flow per SCAPH	Kg / hr	1025000.	1125000.	315000	510000.
04.	Air Temperature - Entering	°C	6.	6.	6	6.
05.	Air Temperature - Leaving	°C	27.	27.	100	100.
06.	Design Pressure of SCAPH	Kg / Cm ² (g)	20.			
07.	Working Pressure of Steam	Kg / Cm ² (g)	16.			
08.	Working Temperature of Steam	°C	290.			
09.	SCAPH Connecting Duct Size	mm	8000 x 3460			
10.	Air flow direction	Horizontal				
11.	Heating Element	Finned Tube; Tube OD: 19.05 mm ; Tube Thickness: 2.032 mm (14 SWG) mini; Fin width : 38.1 mm (max); Fin Thickness : 0.3759mm (28 SWG) mini.				
12.	Fin Spacing	Vendor to specify, not to exceed 7 FPI.				
13.	Materials					
	a) Tubes	Carbon Steel Seamless tube as per SA 179				
	b) Fins	Carbon steel as per IS : 513 DD				
	c) Headers & Nozzles	Carbon Steel as per IS : 1239 / IS : 3589				
	d) Tube sheet	Carbon Steel as per IS : 2002 Gr 2A / SA 516 Gr 60/70				
	e) Casing	Carbon Steel as per IS : 2062 Gr A				
14.	Connection Size	Steam Inlet - 5 numbers of NB 100. Condensate Outlet - 5 numbers of NB 50.				
15.	Maximum air side pressure drop across SCAPH for an air flow of 1125000 Kg / Hr	50 mmWC				
16.	Dimensions & Mounting details	Shall be as per page 04 of 04.				
17.	Painting					
	a)	All external surfaces that require painting shall be cleaned by Power Tool as per surface preparation standard St3 (SSPC-SP3) before applying paint.				
	b)	2 coats of Heat Resistant Aluminium Paint to IS 13183 paint Gr III, shall be applied to have a dry film thickness of 40 microns (minimum).				
18.	General					
	a)	SCAPH shall be of straight tube construction.				
	b)	Casing thickness shall be 5 mm minimum and tube sheet thickness shall be 20 mm minimum.				

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- c) Casing shall be air tight for ± 660 mmWC. Suitable non-Asbestos packing arrangement shall be provided between Casing and Air Inlet & Outlet Nozzles to prevent air leakage.
- d) Tube shall be expanded after the insertion of the Fins.
- e) **Heater is to be designed for maximum heat duty condition. Only latent heat portion of steam shall be considered for heat transfer calculation.**
- f) SCAPH shall be provided with an excess heating area of 10%.
- g) Heating element shall be Hot Dip Galvanized as per IS: 4759.
- h) Steam Inlet & Condensate Outlet connections shall be supplied with mating Flanges & Fasteners to ANSI B16.5 Class 300 lbs.
- i) **Air inlet and outlet duct flanges shall be supplied with mating flanges made of 65x65x6 size angle with inside dimensions of duct opening+10mm as shown in page 03 of 03. Ducts will be inserted inside mating flange angle and welded at site. Required fasteners of size M.16 shall also be supplied. Mating flanges and fasteners shall be shipped integral with each module.**
- j) Suitable Lifting arrangement shall be provided.
- k) Removable stiffeners shall be provided on both sides of the splits, suitably tack welded to the frame, to prevent buckling of finned tubes during transit & handling.
- l) Heating elements shall be accommodated within the Duct Size specified.
- m) Manufacture of SCAPH shall be as per BHEL approved Quality Plan.
- n) Only latest revisions shall be referred for all the standards specified.

19. Vendor shall furnish the following details along with the offer.

- a) **Thermal calculation for heater sizing.**
- b) Pressure Drop Calculations & Pressure Drop Curve, if any.
- c) **Dimensional drawing with Bill of Materials** indicating details of the Fins, Steam Inlet & Outlet Nozzle Connections, Mounting details and Mating Flanges for our approval.
- d) Filled-in Data sheet in the format given in page 03 of 04.
- e) Any other details pertaining to SCAPH.
- f) Supplier should furnish 3 copies of Operation & Maintenance manuals, and Erection procedure of SCAPH, after the award of the contract.

20. Performance Guarantee

Vendor shall guarantee the Pressure Drops & the Air Leaving Temperatures at all the air flows specified.

21. Inspection

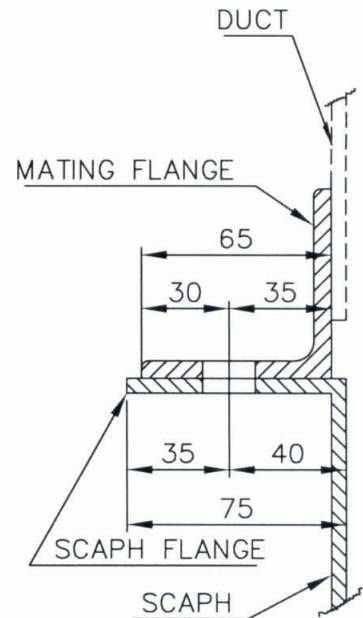
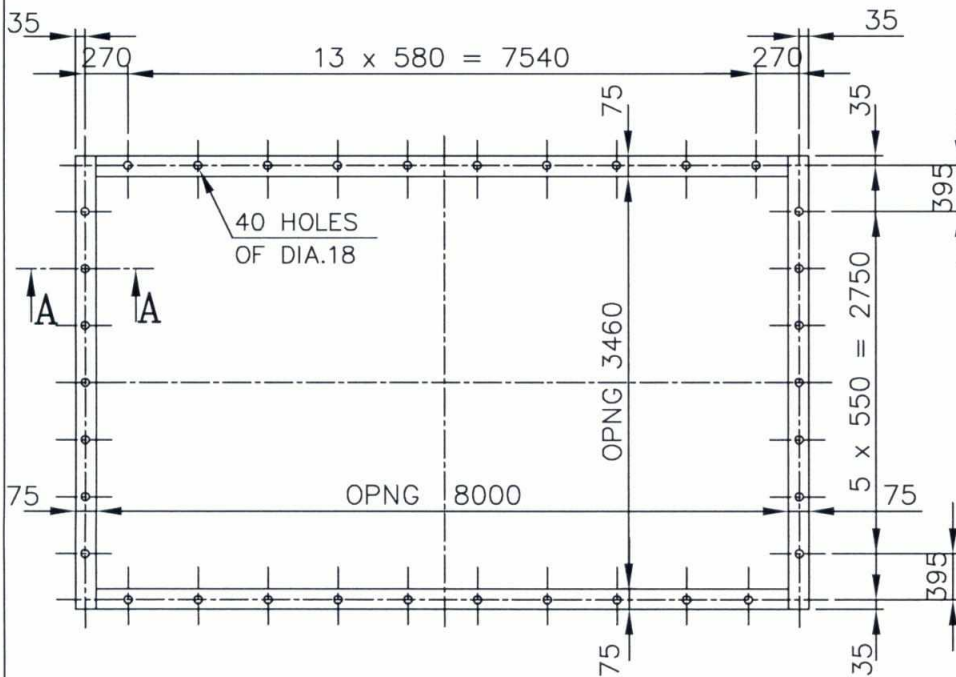
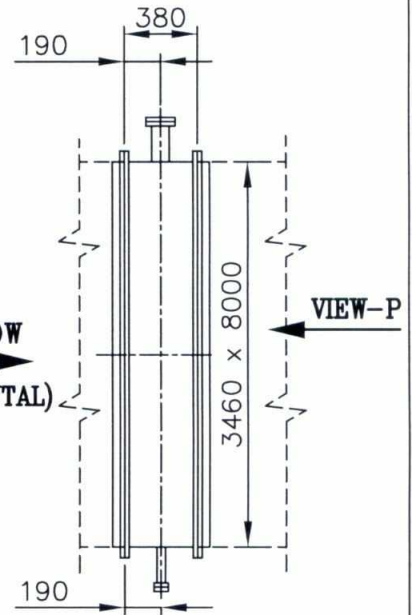
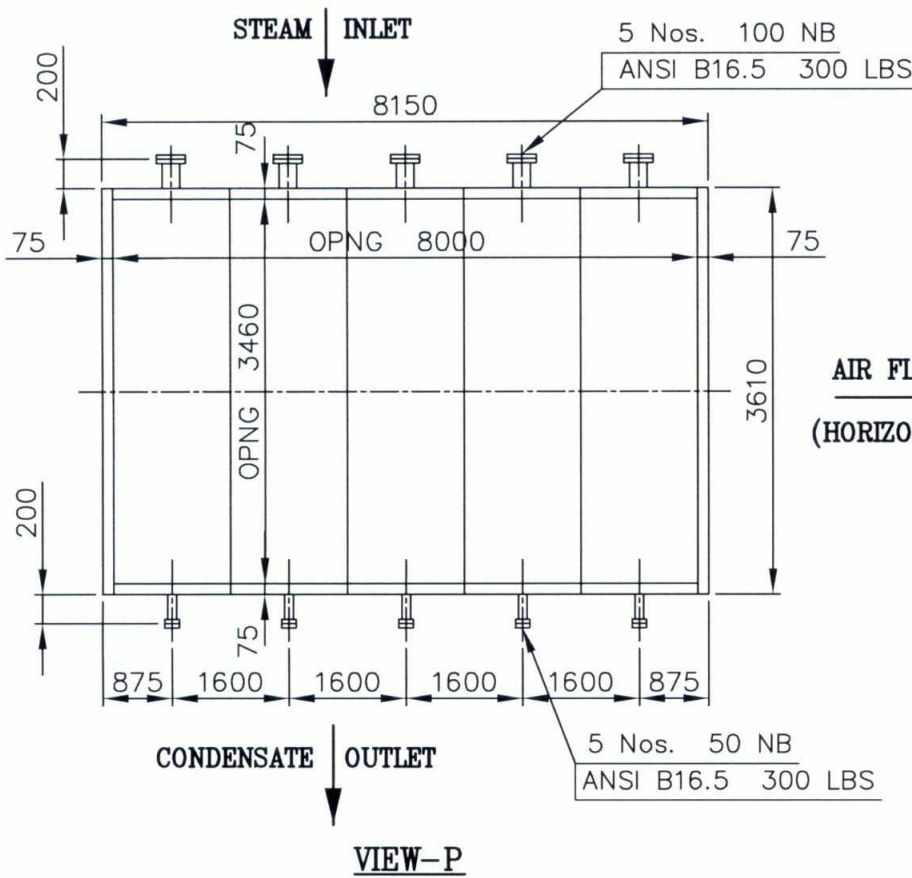
- a) By BHEL Inspector at Vendor's works as per BHEL approved Quality Plan.
- b) SCAPH is to be hydraulically tested to 1.5 times of the Design Pressure.
- c) Necessary Material, Test & Guarantee Certificates shall be furnished.

Parameter / Requirement in the Spec	Unit	Design Condition / Max heat duty condition	Maximum Flow condition	Other condition 1	Other condition 2
Air Flow per SCAPH - Design	Tons / hr				
Air Inlet Temp - Design	°C				
Air Outlet Temp - Design	°C				
Working Pressure of Steam	Kg/cm ² (a)				
Working Temp of Steam	°C				
Design Temp of SCAPH	°C				
SCAPH Connecting Duct Size	mm x mm				
SCAPH height	mm				
Air Flow Direction	Horizontal / Vertical				
Hydro Test Pressure at Tube side	Kg/cm ² (g)				
Design Pressure for Header & Tubes	Kg/cm ² (g)				
Tube OD	mm				
Fin width	mm				
Tube Thickness	mm				
Tube Spacing	mm				
Row Spacing	mm				
Fin Thickness	mm				
Fin Spacing	FPI				
Tube Material					
Fins Material					
Nozzles Material					
Headers Mateial					
Tube Sheet Material					
Connection Size - Steam Inlet / Outlet	NB				
Steam Consumption	Tons/hr				
Weight of SCAPH	Kg				
Heat Transfer Area reqd	m ²				
Heat transfer Area provided	m ²				
% of Excess area provided	%				
Finned Width	mm				
Finned Depth	mm				
Pressure drop Air side	mmWC				
Overall Heat Transfer Coef. - Fin Side	Kcal/m ² Hr°C				
Confirmation to SCAPH dimensions	Yes / No				
No of Sections	Nos				
No of Tubes per Row / Total	Nos				
No of Rows	Nos				
Remarks					
Prepared		Date	Checked & Approved		



ALL DIMENSIONS ARE IN MM

SCAPH GENERAL ARRANGEMENT



SCAPH FLANGE DRILLING DETAILS

SECTION-AA

TOLERANCE FOR UNTOLERENCE DIMENSIONS ARE AS PER MEDIUM CLASS OF IS 2102 PART I