

Tender Document for:**Design , Supply of Material and Modification of Heat Treatment furnace of Common Workshop**

Sl. No.	Description of item / Activity			Vendor's offer
1.0 Technical details of existing furnace				
1.1	Maximum operating temperature of the Furnace	1150°C	Vendor to confirm	
1.2	Temperature uniformity of the Furnace	±10°C	Vendor to confirm	
1.3	Rate of Heating at Furnace temperature of 1000°C	150°C/Hr	Vendor to confirm	
1.4	Furnace wattage approximately	225 KW	Vendor to specify and confirm	
1.5	No. of Heating zones	3	Vendor to confirm	
1.6	Maximum Surface load on Heating element	2.2 W/Cm ²	Vendor to confirm	
1.7	maximum outer Skin temperature above ambient	20°C	Vendor to confirm	
1.8	Heating element shall be placed on Three inside walls of the furnace i.e right , left and back side		Vendor to confirm	
1.9	Heating element strip type of make	Kanthal AF/A1	Vendor to confirm	
1.10	Minimum thickness of heating element strip	1.5mm	Vendor to confirm	
1.11	Useful volume of the furnace interiors	L=3500 mm W=1500 mm H=1500mm	Vendor to confirm	
1.12	Heating Element connection in each zone	Star	Vendor to confirm	
1.13	Temperature in the three zones of furnace shall be controlled through programmable PID controller in conjunctions with thyristor (90 KW per zone maximum capacity) , Thermocouples and compensating cables.	Existing system is available , to which the furnace to be integrated	Vendor to confirm	
2.0 scope of supply				
2.1	Supply of Ceramic fibre Blanket of size 7200x600x25,density 128 KG / M3 , 1425°C grade.	Reputed make	Vendor to specify the make and confirm	
2.2	Supply of Kanthal AF/A1 strip for heating element of size 20 mm X 1.5 mm	Kanthal AF/A1	Vendor to confirm	
2.3	Supply of Nichrome wire 80/20 for element locking / supporting hooks	Reputed make	Vendor to specify the make and confirm	
2.4	Supply of high alumina Bobbin Bricks	Reputed make	Vendor to specify the make and confirm	
2.5	Supply of Inconel Bar 6mmDia x350mm long with 3.5 mm Dia hole at 10mm from one end(only one hole in one stud material INCONEL 600)for fixing of bobbin bricks and holding of Heating Elements.	Reputed make	Vendor to specify the make and confirm	
2.6	Supply of Miscellaneous items like Collar pipes,Insulator Tube,Copper Flat,bolts,nuts,locking washers etc.	Reputed make	Vendor to specify the make and confirm	
2.7	Supply of any other items not covered above but are essential to meet the furnace working parameters and complete the Modification and commissioning activities.		Vendor to confirm	
2.8	Vendor to design and calculate the material required (indicated above) and shall supply the same to BHEL		Vendor to confirm	
3.0 Scope of work				
3.1	Dismantling of Existing Ceramic fibre blanket lining in the three sides i.e. Left , right and back side along with heating element and studs.		Vendor to confirm	
3.2	Dismantling of all the heating element inter connections		Vendor to confirm	
3.3	Design of heating element loops and arrangements		Vendor to confirm	
3.4	Fixing of Inconel studs 6mm dia/ 350mm long at required places to left , right and back side of existing furnace.		Vendor to confirm	

3.5	Lining of three sides of furnace interiors i.e. Left , right and back side with Ceramic fibre Blanket of size 7200x600x25,density 128 KG /M3, 1425°C grade The combined thickness of the Blanket shall not be less than 300 mm.	Vendor to confirm	
3.6	Fixing of Heating element strips 20X1.5mm on the Ceramic fibre Blanket of three zones to all three sides of furnace interiors i.e. Left , right and back side after inserting the high alumina ceramic pipes, high alumina bobbin bricks and locking with supporting locking washers.	Vendor to confirm	
3.7	Fixing of Collar pipes,Insulator Tube,Copper Flat,bolts,nuts,locking washers etc.	Vendor to confirm	
3.8	Interconnection of heating elements and connecting to thyristor control unit of three zones.	Vendor to confirm	
3.9	Testing of Bogie movement and door lifting mechanism and rectification of faults if any	Vendor to confirm	
3.10	Repair of door linings and roof linings if any	Vendor to confirm	
3.11	Vendor shall carry out any other works not covered above but are essential to meet the furnace working parameters and complete the Modification and commissioning activities successfully.	Vendor to confirm	
4.0 Safety Arrangements			
4.1	Following safety features in addition to other standard safety features should be provided on the furnace:	Vendor to confirm	
4.1.1	All the cables on the furnace should be well supported and protected. These should not create any hindrance to furnace	Vendor to confirm	
4.1.2	The live terminal ends shall be covered by means of protective ventilated steel metal cover	Vendor to confirm	
4.1.3	All the Heating Element terminal connections shall be covered fully.	Vendor to confirm	
4.1.4	Vendor should ensure the proper earthing for the Furnace and its peripherals	Vendor to confirm	
5.0 Prove out			
5.1	Furnace shall meet all the technical specifications mentioned at 1.0	Vendor to confirm	
5.2	Successful proving of 3 specified heat treatment cycles at BHEL for	Vendor to confirm	
6.0 Submission of design			
6.1	Vendor shall submit all the design statistics for the heating element arrangement for each zone along with the offer e.g. Each zone phase current , Resistance of heating element for each phase/zone , Element pitch , corrugation height , No. of elements in series per phase /zone etc.	Vendor to submit	
7.0 GUARANTEE :			
7.1	12 months from the date of completion of Repair of the furnace.	Vendor to Confirm	
8.0 REFERENCE LIST / QUALIFYING CONDITIONS :			
8.1	Only those vendors, who have repaired / reconditioned the similar equipment of same or higher sizes for similar applications should quote. The vendors should submitted the details of such work.	Vendor to Confirm	
9.0	DELIVERY PERIOD	Vendor to specify	