INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai 400076.

PR No. 1000052280 RFx No. 6100002695

Technical Specification: High Temperature Vacuum Hot Press

Sr. No.	Item Description	Detailed Technical Specification	Technical Compliance (Yes / No)	Additional Information (if any)
1	Vacuum Hot Press			
1.1	Pressing force	5 to 250 kN		
1.2	Pressing stroke	125 mm		
1.3	Inner diameter of heating element	250 mm		
1.4	Height of the heating element	300 mm		
1.5	Pressing mould max. dimensions	Ø 225 x 280 mm		
1.6	Max. pressing diameter	120 mm		
1.7	Ultimate vacuum in cold furnace	5 x 10^{-2} mbar		
1.8	Leakage rate	5 x 10^{-3} mbar l/s		
1.9	Heating principle	resistance heated		
1.10	Heating principle	Graphite		
1.11	Heating power	75 kW		
1.12	Working temperature	2200 °C		
1.13	Working pressure (relative)	+20 - +60 mbar		
1.14	Insulation	graphite felt		
1.15	Required cooling water	6 m^3/h		
1.16	Power supply	3 x 480 V, 60 Hz, 100 kVA		
2	**Equipment Details**			
2.1	Vessel	A. Double-walled, completely water-cooled vacuum container. B. Stainless steel 1.4541 including punch feedthroughs on the		

		furnace closing lid and, on the vessel, water-cooled, double-walled, including vacuum and electrical connections.		
2.2	Heating system	A. Heating element, high density graphite		
2.3	Pressing system	A. Pressing frame in one-piece welded construction for pressure punch and hydraulic pressing cylinder for 250 kN. B. Hydraulic unit, noise level: ≤ 75 dB C. The press punch is displaceable with a maximum speed of 2 mm/min at full power. D. The possible displacement of the cylinder under pressure is 125 mm.		
2.4	Switchboard cabinet, control system	A. Power supply: 3 x 480 V, 60 Hz, 100 kVA B. The switchboard cabinet is obligation-cooled by an air conditioner. C. PLC process control system Eurotherm or equivalent, including touch screen monitor. D. Freely programmable recipes up to 40 segments for each recipe E. Manual and automatic operation via visualisation screen F. Cycle and historical trend display. G. Status display of all relevant system components		

		H. Alarm display and alarm storage. I. Online data graphs should be available J. UPS for PLC K. Step transformer		
2.5	Gauging of Temperature / Force / Displacement	A. 1 pc. optical pyrometer, measuring range 300 to 2400 °C. B. Flexible pressure temperature time programming with PLC. C. Pressing force adjustable from 5 kN to 250 kN D. Displacement transducer with a gauge length of 125 mm to show the densification, accuracy of 5 µm		
2.6	Gas System - Vacuum Equipment	A. All gas input and evacuation procedures are operated automatically via the controller system, manually as well as controlled by PLC. B. Electro pneumatically operated valves C. Safety valve 0.1 bar for releasing the pressure in cases of unintentional operation or faults. D. 1 pc vacuum pump stand consisting of two-stage rotary valve pump (60 m3/h) and roots pump (500 m3/h) E. Dust separator at the inlet of the vacuum pump and oil separator at the outlet. F. 1 pc INFICON vacuum gage 5 x 10-3 mbar G. 1 pc relative pressure		

		measuring transducer ± 1000 mbar. H. Automatic valve combination for the regulation of the furnace internal pressure. I. Valve combination for gas choice (Ar, N2, He). J. Operating modes: i. Vacuum full. ii. Relative pressure control 20 to 60 mbar		
2.7	Cooling water system	A. Internal cooling water distribution with separate cooling water circuits for the main part: upper and lower punch, transformer, inverter, switchboard cabinet, vacuum vessel B. Control of temperature and flow quantity C. Inlet temperature: 20 to 30^0 C D. Temperature difference return flow: ΔT 15^0 C E. Necessary flow quantity: 6 m^3/h F. Necessary main connection: iii. Inlet pressure: 4 to 5 bar iv. Return pressure: < 0.5 bar.		
3	**Other Conditions**	A. Warranty Period: 12 months. B. Delivery within 6 months of receipt of PO.		