S.No	Description	Qty
1	**Temperature Assisted Hydraulic Press**	**01 Unit**
	• General description of equipment • Double action 50 ton Hydraulic press of open type construction. The press should use a single cylinder for both down and return strokes • Press capacity. 50 tons • Maximum working temperature. 1000 ^{0}c • Mode of heating : induction • Heating chamber. Quartz tube • Ultimate vacuum = 5x 10^{-5} mbar cold state • Ultimate vacuum= 5 x 10^{-4} mbar (hot state) at 1000 ^{0}c • 380v , 3phase, 50 Hz Complete unit with water cooled vacuum chamber, MF generator for inducting heating, vacuum chamber, cooling and pneumatic lifting system.	
2	• Press construction • Double action 50 ton vacuum hydraulic press of open pillar type construction. The press should use a single cylinder for both down and return strokes. Compact hydraulic system with oil reservoir and control accessories mounted at the top of the hydraulic frame. Other controls like pressure regulating valve, ON/OFF switches shall be attached to the front of the frame with touch screen. • Press capacity. 50 tons • Ram stroke. 200 mm max. • Minimum measureable load. 0.2 or lower • Load measurement accuracy. 1% of the rated capacity of the press or better • Positional accuracy. 0.1mm • Pressing speed : 0.5 to 2mm/sec (adjustable) Return speed. 1 to 4mm/sec adjustable • Ram size. Diameter: 100 mm (option for adjustable ram diameter and also attachment for pressing) • RAM material. the top and bottom ram should be made from solid heat treated and corrosion resistance stainless steel with water cooling arrangements. Movement of RAM: both upper and lower RAM should be operated individually according to operator's control.	
3	• Quartz Tube & sealing Flanges and Supporting Frame	
	• Quartz tube vacuum chamber • Quartz tube OD=300 mm, ID=250mm, L=600 mm (or as suitable) • Quartz tube heating chamber with upper end fixed, lower end movable. Stainless steel water cooled plates for vacuum tightening of quartz tube. • Vacuum port, pressure gauge, gas inlet port etc. • Provision for placing dies of dia 150mm x H150mm with necessary supports. • The system should consist of hydraulic press frame and vacuum chamber in single unit and equipped with press RAM at the top and bottom. The structure will be installed on flat floor, no need of mezzanine level or pit. • The sliding seal ports shall be located t the top and bottom of the vacuum chamber to accommodate the top and bottom ram stroke length within the chamber height. This arrangement must facilitate attachment of various types of "PUNCHES" and compacting device to the water cooled rams. The bottom ram shall be made to place die set on the graphite/metallic plate over the lower machine punch. • Number of ports to be provided for viewing gas inlet feed through, thermocouple feed through, electrode feed through, vacuum pumping ports etc. all ports/flanges should be water cooled and vacuum pumps shall be located on the side of the chamber. All vacuum seals should be made of viton "O" rings and water cooled to avoid heat damage. Leak testing should be carried out by using helium mass spectrometer.	

4	• Heating zone and method of heating	
	• Heating mechanism. Induction coil • Uniform heating zone. Dia 250mm x H350mm • Maximum temperature. 1000 ^{0}C • Heating rate. 1-20 C/min • Temperature uniformity : ± 3 ^{0}C at 400 ^{0}C during holding temp. for 10-60 minutes. Temp. uniformity: ± 5 ^{0}C at 1000 ^{0}C	
5	• MF Generator	
	• Generator type. MIF solid state, IGBT based circuit • Rating .15kw (Or as suitable) voltage. 220/380 V • Frequency. 2.5-5 KHz or as per requirement. Power should be digitally displayed and increase or decrease by factor of 0.1 kw	
6	• Vacuum pumping system	
	• Ultimate vacuum=5.0x10^{-5} mbar (cold state), ultimate vacuum=5.0 x10^{-4} mbar (hot state) at 1000 ^{0}c • Vacuum system compresses rotary, roots and oil diffusion pumps of Seybold or Edwards. • Fully automatic and manual control for pumping and vacuum measuring system with necessary interlocking • Fore line and bypass valves (electro pneumatic), bellows & pipes should be accordingly to vacuum requirement. • Necessary spare for 2-3 years trouble free operation. • All valves, gauges, bellows and pipes should be of stainless steel. • Vacuum measuring devices (digital) Vacuum pumps (Mechanical roots and high vacuum diffusion pump) should be made of M/s. leybold or Edwards only and compatible with the system.	
7	• Inert Gas System	
	The inert gas IN/OUT system should be provided in vacuum chamber. A digital gauge shall be provided to measure the pressure and pressure switch to cut off the gas supply line by closing the solenoid valve once the pressure reaches the set pressure.	
8	• Instrumentation and control	
	• Control panel. Control panel should be provided in a separate cabinet includes controls for IGBT MF generator, temperature, vacuum system ON/OFF pressure, time, safety indications etc. input & output power, voltage, current, open/close of high, low and pre vacuum valves, RAM speed, pressure of hydraulic press and frequency etc are digital displayed on LED • Digital temperature programmer and control: microprocessor based digital programmable controller of M/s. Eurotherm or equivalent European make should be provided for temperature measurement and control . • Over temperature controller. Digital temperature controller should be provided with a relay output which is interlocked with furnace power supply in the event of any malfunctioning of PID and if the temperature level shoots beyond the normal operating level. Thermocouples. Sheathed thermocouples should be provided to control temperature up to 1000 ^{0}C	
9	• Induction coil • Suitable for hot zone ID: 250mm x H350mm	
10	• Die table movement Up/down system for replacing die set with necessary arrangements	
11	• Cooling water Lines	
	Cooling water lines should be provided to different system of the equipment. Water flow switches to be provided on the outlet of each system	

12	• **Spares**	
	• Supplier should provide list of spare in quotation	
	• IGBT power module. 02 Nos	
	• Main board. 02 Nos	
	• Induction coil. 02 Nos	
	• Quartz tube with complete sealing sets 05 Nos	
	• Thermocouples (K-Type) 10 nos	
	• Thermocouples cover pipes. 03 Nos	
	• Low vacuum gauge head. 03 Nos	
	• High vacuum gauge head 05 nos	
	• Sealing ring 03 Nos	
	• Viewing glass 02 Nos	
	• Vacuum pump oil for mechanical, roots and diffusion pumps. 20 liters each 20 ltr each.	
	• Temperature controller. 02 nos	
	• Any other necessary spares.	
13	• Documents/Drawing	
	• Press layout, complete drawing of vacuum chamber, IGBT generator, hydraulic system pumps, control panel, technical/maintenance manuals and brochures in English etc.	
14	• Inspection	
	Preliminary design review. A preliminary design review meeting should be carried out at manufacturer site. The equipment will be fabricated only after the approval of design document from purchaser.	
	Pre-shipment inspection. Pre-shipment inspection will be carried out at seller's premises. Two engineer of buyer will conduct inspection at seller's location. The firm should demonstrate two complete cycles of heating and cooling with max. load applications, under full vacuum at 400 c and 1000 c of brass and stainless steel job. Suitable job height and dia should be selected to verify the maximum capability of equipment and qualification of product with minimum tolerance. Product should be finished and defect free. Die and processing material will be arranged by manufacturer.	
	• **Make. China , Korea or Europe (In case, press is made of china then vacuum system should be made of Europe.)**	