



**Bharat Heavy Electricals Limited,**

Enquiry No. :

Due Date :

Supplier's Ref.:

Date :

**Specification cum Compliance Certificate for CNC BRAKE PRESS MACHINE**

**Note:-**

1. The 'Offered' Column and where applicable, the 'Deviations' & 'Remarks' Column of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous or unsustainable information against any of the clauses of the specifications / requirements shall be treated as non-compliance.

2. The offer and all documents enclosed with offer should be in English language only.

Name & Address of the supplier:

Name & Address of the Indian Agent:

Telephone No.

Telephone No.

Fax No.

Fax No.

e-mail :

e-mail :

**Scope: Supply, Erection & Commissioning of CNC BRAKE PRESS MACHINE complying with specification as below.**

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
1.0	<b><u>Application :-</u></b>				
	The press brake should be able to carry - out all the forming operation upto 25 mm thick M.S sheets and equivalent thickness of S.S. sheets.	Vendor to offer			
2.0	<b><u>Type:-</u></b>				
	CNC Hydraulic Press Brake.	vendor to offer			
3.0	<b><u>Technical specification :-</u></b>				
3.1	Job requirement / capacity				
3.1.1	Bending capacity upto M.S. sheet size 25 mm (thick) x 3000 mm (width) for material UTS between 42-48 kg/mm <sup>2</sup>	Vendor to confirm			
3.1.2	Vendor to provide capacity in Tonnage, considering minimum inside bending radius. Vendor to provide calculation for Tonnage & bending chart.	Vendor to submit			
3.1.3	Capacity of Press - 400 MT (minimum)	Vendor to submit			
3.2	Maximum bending length -4200 mm	Vendor to confirm			
3.3	Horn at both ends(for full cone bending) -500 mm on each side	Vendor to confirm			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
3.4	Distance between housing 3050 mm (minimum)	Vendor to confirm			
<b>3.5</b>	<b>Adjustable Ram Stroke -300 mm</b>	Vendor to confirm/specify			
3.6	Throat Gap -500 mm	Vendor to confirm/specify			
3.7	Table width -300 mm	Vendor to confirm/specify			
3.8	Speed	Vendor to specify.			
3.8.1	Approach speed -100 m/sec	Vendor to confirm/specify			
3.8.2	Return speed – 90 mm/sec	Vendor to confirm/specify			
3.8.3	Working speed- 8-10 mm/sec	Vendor to confirm			
3.9	Stroke length/stroke adjustment	Vendor to specify.			
3.10	<b>Motor Power</b>				
<b>3.10.1</b>	<b>Vendor to specify with necessary calculation to ensure required tonnage capacity</b>	Vendor to submit			
3.11	Size & weight of the machine	Vendor to specify			
3.12	<b>Oil tank capacity</b>				
3.12.1	Vendor to specify w.r.t. tonnage capacity	Vendor to submit			
3.13	Programming accuracies axis - $\pm 0.1$ mm R-axis - $\pm 0.1$ mm Z-axis - $\pm 1$ mm	X- Vendor to confirm/specify			
3.14	Back gauge range X-axis - 1000 mm R-axis - 200 mm Z-axis - 150 mm (minimum) to full range	Vendor to confirm/specify			
<b>3.15</b>	Machine should be equipped with CNC Y1,Y2 axis for beam lifting & conical components.	Vendor to offer			
3.16	CNC back gauge should be with X1,R1,Z1-X2,R2,Z2 module. (i.e. 6-axis back gauge)	Vendor to offer			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
3.17	Input power supply	Vendor to note			
3.17.1	415 V +/- 10% Variation 3 phase 50 Hz + 3 % Variation	Vendor to note			
3.18	Working condition	Vendor to note			
3.18.1	Ambient temperature 3 to 50 deg.C				
3.18.2	Relative humidity upto 95% in rainy season.				
4.0	<b>TECHNICAL FEATURE:-</b>	Vendor to confirm/offer			
4.1	Construction				
4.1.1	Rigid and compact suitable for tough working condition at Fabrication shop floor.				
4.1.2	Mono-lithic construction to ensure precision and machine's lasting efficiency and reliability.				
4.2	Special feature				
4.2.1	In –built automatically controlled backgauge facility for X and R axis.				
4.2.2	Built –in anti- deflection system in the bottom table for automatic compensation for bending				
4.2.3	CNC automatic control system for punch movement, positioning of backgauge, conical bending in reference to required bend radii/angles, material strengths, thicknesses.				
4.2.4	Built –in colour graphic display and control system to enable the operator for proper set up and check bending accuracy during operation.				
4.2.5	Programming and storage of parameter for representative use.				
4.2.6	CNC controller with display screen.				
4.2.7	Centralized lubrication system				
4.2.8	CNC Control System Battery Back up required	Vendor to confirm / offer			
4.3	<b>INSTALLATION:-</b>				
4.3.1	Block diagrams for layout details, foundation details, electrical cable sections, weight of assemblies to assess working space requirements & handling during erection.				
4.4	Air conditioning of CNC cabinet & electrical cabinet :				

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
4.4.1	Cabinets housing, CNC system, drive controllers & operator's pendant are to be equipped with air conditioner with built in dehumidifier of suitable capacity and all other cabinets are to be properly ventilated considering the working conditions				
5.0	<b>STANDARD ACCESSORIES AND TOOLINGS:-</b>	Vendor to offer			
5.1	All standard toolings /hand tools for easy operation.				
5.2	Hydraulic tool clamping system for dies and punches.				
5.3	Universal type hardened , ground and sectioned dies and punches for bending radii 2 mm and above like Multi V- Block, Straight Punch,Semi-gooseneck punch.				
5.4	Adjustable front sheet support attachments.				
5.5	In- built safety devices for both hydraulic and electrical system				
6.0	<b>OPTIONAL ACCESSORIES:</b>	Vendor to offer			
6.1	Handling facility for components during bending covering the total span (Jib crane / hoists )				
6.2	Provision to operate in manual mode for punch movement by a convenient hand wheel on the programmer.				
6.3	Adjustable intermediate clamps for top beam to facilitate folds on plate with very high side edge and making of box type jobs.				
6.4	Provision of sheet follower to allow processing of medium and large size sheets with one operator. This helps in eliminating sagging / counter folding in large jobs of sheet metals.				
7.0	<b>SPARES</b>				
	Recommended mechanical /hydraulic /electrical / electric spares / toolings for minimum 2 years of smooth operation of the machine with individual identification no. and price including the following :	Vendor to offer			
7.1	<b>Mechanical &amp; Hydraulic Spares:</b> All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses etc.				

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7.2	<b>Electrical /Electronics:</b> All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch, etc.				
7.3	<b>Spares for CNC system-</b>				
	One set of PCBs used in CNC system with price break up				
7.4	<b>Spares for drive controller</b>				
7.4.1	One set of PCB's				
7.4.2	Power thyristors / Transistors				
7.4.3	Tacho/ Rotor position encoder etc.				
7.4.4	Spares for position feed back device.				
7.4.5	linear transducer /Rotary encoder etc.				
7.5	<b>Spares for auxiliary system:</b>				
7.6	Set of PCB's used in various auxiliary system e.g. lubrication unit, chiller unit, proportional valve controller etc.				
7.7	All types of spares for total machine and accessories should be available for at least ten years after supply of the machine. If machine or control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawings of parts / details of spares & suppliers to enable BHEL to procure these in advance, if required				
7.8	Recommended set of spares for all attachments are to be offered with details.				
7.9	Vendor to confirm that complete list of spares for machine and accessories, along with specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the machine				
<b>8.0 TRAINING</b>					
8.1	BHEL Persons should be trained at supplier's Works for mutually agreed period in the area of (a) Electrical, Electronic maintenance for machine & other supplied equipments (b) Mechanical & Hydraulic maintenance of the machine & other supplied equipments (c) Operation of the machine & other supplied equipments.	Vendor to confirm /offer			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
8.2	Fare, boarding & lodging for the trainees shall be borne by BHEL.	Vendor to note			
8.3	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel.	Vendor to note			
8.4	Vendor to quote for training on <i>per diem</i> basis	Vendor to note			
9.0	<b>DOCUMENTS / INSTRUCTION MANUALS:</b>	Vendor to confirm/offer			
	<b>Five sets of documents to be provided as below:-</b>				
9.1	Installation / commissioning manual.				
9.2	Functions of all major components / accessories with assembly diagrams.				
9.3	Interface description.				
9.4	Diagnostic /fault listing manual.				
9.5	Programming manual.				
9.6	Operational manual of CNC system.				
9.7	Commissioning manual of drive controller.				
9.8	Electrical schematic diagram.				
9.9	Wiring diagram				
9.10.	Hydraulic & details assembly diagrams of machine.				
9.11.	Lubrication chart with oil /grease grades.				
9.12.	PLC ladder diagram & PLC programming manual alongwith cross reference list.				
9.13.	Circuit diagram of CNC system.				
9.14.	Circuit diagrams of drive controller.				
9.15.	Circuit diagram of PCB's used in the machine.				
9.16.	Machine operation manual.				
9.17.	Details spare part list for mechanical / electrical/ electronics with identification.				
10.0	<b>ELECTRICAL :</b>				

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
10.1.	415V + 10% / -10%, 50HZ +/-3 HZ, 3 Phase AC (3 wire system with out neutral) Power Supply Voltage will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/control cabinets, shall be the responsibility of vendor. Requirement of grounding/earthing with required material details is to be informed by vendor well in advance so that same could be incorporated during construction of foundation.	Vendor to confirm			
<b>11.0</b>	<b>Tropicalisation:</b> All electrical / electronic equipment shall be tropicalized	Vendor to confirm			
11.1	All electrical & electronic control cabinets & panels should be dust and vermin proof	Vendor to confirm			
11.2	All electrical components in the cabinets should be mounted on DIN Rail	Vendor to confirm			
11.3	All electrical and electronic panels including operator's panel should be provided with Compact Fluorescent Lamps for sufficient illumination and power receptacles of 220Volts, 5/15 Amp AC. All adapters/receptacles should have compatibility with Indian equivalents.	Vendor to confirm			
11.4	Motors shall conform to IEC or Indian Standards	Vendor to confirm			
11.5	All cables and cable trays required for the machine should be included in the offer.	Vendor to confirm			
11.6	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to confirm			
11.7	The electrical components used shall be from reputed international makes such as Siemens / Telemecanique / Merlin Gerin / GE/ ABB and shall be accordance with DIN/IEC Standards.	Vendor to confirm			
<b>12.0</b>	<b>SAFETY ARRANGEMENTS:</b>				
	Following safety features in addition to other standard safety features should be provided on the machine:	Vendor to confirm/ furnish details			
<b>12.1</b>	Machine should have adequate and reliable safety interlocks / devices to avoid damage to the machine, work piece and the operator due to the malfunctioning or mistakes. Details shall be submitted in the technical bid.				

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12.2	In case of overloads due to wrong manoeuvres /malfunctions the machine should stop to avoid damage to machine and man.				
12.3	Detailed list of safety alarms / indications provided on the machine shall be submitted along with the offer.				
12.4	All the pipes, cables etc. on the machine should be well supported and protected. These should not create any hindrance to machine operator's movement for effective use of machine.				
12.5	Emergency Switches at suitable locations as per International Norms should be provided.				
12.6	9. Necessary protection shall be provided in the Hydraulic power pack to prevent from over loading.				
13.0	ENVIRONMENTAL PERFORMANCE OF THE MACHINE :				
	The Machine shall conform to following factors related to environment :	Vendor to confirm			
	(a) Maximum noise level shall be 85 dB(A) at normal load condition, 1 meter away from the machine with correction factor for back ground noise, if necessary. This will be measured as per international standards like DIN 45635-16. Supplier to demonstrate compliance to noise level, if so required.				
	(b) If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.				
	(c) Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.				
14.0	LEVELING & ANCHORING SYSTEM				
14.1	Complete anchoring system including foundation bolts, anchoring materials, leveling shoes etc should be supplied	Vendor to confirm			
15.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE :				
15.1	Special tools and equipment required for erection of the machine shall be brought by the vendor. Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc. for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer	Vendor to note and agree			
16.0	FOUNDATION				



S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
16.1	Vendor shall submit the foundations layout drawings giving load points,static/ dynamic loading for BHEL's approval within one month from the date of Letter of Intent (LOI) or Purchase Order, whichever is earlier.	Vendor to confirm			
16.2	Foundation of the machine will be designed by BHEL and will be concurred by the supplier.	Vendor to confirm			
16.3	Construction of foundation will be carried out by BHEL under the supervision of supplier/ supplier representative.	Vendor to confirm			
17.0	<b>ERECTION &amp; COMMISSIONING</b>				
17.1	Supplier to take full responsibility for carrying out the erection, start up, testing of machine, it's control & all types of other supplied equipment, machining of test pieces etc. Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by supplier in their foundation/layout drawings. Other requirements like crane and helping personnel shall also be provided by BHEL. Details of these requirements should be informed by vendor in advance.	Vendor to note			
17.2	Successful working of full capacity of the machine by the supplier shall be considered as part of commissioning. All tests, as mentioned at <b>clause 18</b> (Machine Acceptance) shall form part of the commissioning activity.	Vendor to note			
17.3	Tools, Tackles, instruments and other necessary equipments required to carry out all above activities should be brought by the supplier.	Vendor to note			
17.4	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to note			
17.5	All Cover Plates required for the machine and its peripherals including pits, if any, shall be supplied and installed by the vendor.	Vendor to note			
17.6	Portion, if any, of the machine, accessories and other supplied items where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colours of paint used.	Vendor to note			
17.7	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to note			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
17.8	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to note			
<b>18.0</b>	<b>MACHINE ACCEPTANCE: (Tests/Activities should be Performed by Vendor)</b>	Should be accepted & confirmed by Vendor			
<b>18.1</b>	<b>Tests/Activities should be carried out at supplier's works on the machine before dispatch :</b>	Vendor to confirm			
18.1.1	The machine should be tested for all functions at supplier works before despatch.				
18.1.2	Demonstration of all features of the machine, control system & accessories.				
<b>18.2</b>	<b>Tests/Activities should be carried out at BHEL works while commissioning the machine :</b>	Vendor to confirm			
18.2.1	Full load test to demonstrate the maximum power & bending capacity of the machine at BHEL works.				
18.2.2	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine.				
18.2.3	Training of BHEL machine operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works.				
18.2.4	Demonstration by actual use of all supplied attachments and accessories to their full capacity for actual jobs.				
<b>19.0</b>	<b>PACKING:</b>				
19.1	Sea worthy & rigid packing for all items of complete machine with all Accessories and other supplied items to avoid any damage/loss in transit. When machine is despatched in containers, all small loose items shall be suitably packed in boxes.	Vendor to note			
<b>20.0</b>	<b>GUARANTEE :</b>				
20.1	24 months from the date of acceptance of the machine at BHEL works.	Vendor to agree			
<b>21.0</b>	<b>GENERAL :</b>				
21.1	Machine Model	Vendor to furnish			
21.2	Total connected load (KVA):	Vendor to furnish			
21.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to furnish			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
21.4	Painting of Machine / Electrical Panels : RAL 6011 Apple Green (Polyurethane Paint)	Required			
21.5	Total weight of the machine	Vendor to furnish			
21.6	Weight of heaviest part of machine	Vendor to furnish			
21.7	Weight of the heaviest assembly / sub-assembly of the Machine	Vendor to furnish			
21.8	Dimensions of largest part/ sub-assembly/ assembly of the machine	Vendor to furnish			
21.9	Vendor to submit, along with offer, reference list of customers where similar machines have been supplied mentioning broad specifications of the supplied machine i.e. Model, capacity, CNC System etc	Vendor to furnish			
21.10	Detailed catalogues, sketch/photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to submit			
21.11	Hydraulic, Pneumatic & oil pipings should be preferably metallic except places where flexible pipings are essential. All the pipes required for the same shall be included in the standard scope of the machine.	Vendor to note			
22.0	<b><u>Technical condition:-</u></b>	Vendor to offer & confirm			
22.1	All wires are to be properly numbered/ marked in control cabinet /junction boxes & at terminal strip.				
22.2	All machine elements e.g. solenoids, switches must have identification tags.				
22.3	All cabinet must have power point and tube lights.				
22.4	Machine Light to be offered to provide sufficient illumination of working area.				
22.5	Complete Erection, Installation, Commissioning & trial job proving is the responsibility of vendor at BHEL works.				
22.6	Guarantee for 2 year trouble free operation and prompt after sales service during & after guarantee period.				
23.0	<b><u>QUALIFYING CONDITION:-</u></b>				
	Vendor to submit, along with offer, reference list of customers where similar or higher size machines have been supplied mentioning broad specifications of the supplied machine i.e. Model, capacity and the supplied machines are working since last one year.	Vendor to submit			