

	Transformer Plant, BHARAT HEAVY ELECTRICAL LIMITED, BHEL, JHANSI.		Machine No		
			Quantity	1 Nos	
			Spec. No.	6208/R1	
Specification cum Compliance Certificate for CNC PIPE BENDING MACHINE					
Note:-					
1. The "Offered" Column and where applicable, the "Deviations" Column of this format shall be filled in by the Bidder/ 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.					
3. Vendor(OEM) must submit complete information against clause no. 21. The offer meeting this clause would only be processed.					
Name & Address of the supplier:			Name & Address of the Indian Agent:		
Telephone No.			Telephone No.		
Fax No.			Fax No.		
e-mail :			e-mail :		
Scope: Manufacturing, Testing, Supply, Erection & Commissioning of CNC PIPE BENDING MACHINE complying with specification as below.					
S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	
1	GENERAL FEATURES				
1.1	Pipe bending machine is required for bending Heavy Grade Steel Tubes of varying wall thickness & in length of any radius, irregular shapes and compound bends in similar and different planes without any filling.	Vendor to confirm			
1.2	The pipe bending machine is required to be electro- hydraulically operated and self contained & sturdy in construction. The machine is to be designed to facilitate bending of complicated shapes without any obstruction. The machine is to be simple in design & easy to operate without undue fatigue of operator. The machine is to be provided with linear scale calibrated in metric units & angular scale in degrees on body of the machine to show the angle of bend & length being bent.	Vendor to confirm			
1.3	suitable lubrication points to be provided wherever necessary & displayed on the body of machine. Details with types and quantity of lubricants are to be given including their source of supply.	Vendor to confirm			
2.0	SPECIFICATION				
2.1	Max. tube capacity (D X T)	D 65 x t 6 mm (Ferrous tubes UTS 45 kg/mm ²)			
2.2	Min. tube capacity (D)	10 mm			
2.3	Max. bend radius (CLR)	Vendor to specify			
2.4	Min. bend radius	Vendor to specify			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations
2.5	Length of mandrel	6 mtrs		
2.6	Bend angle range	5 to 180 degrees		
2.7	Direction of bending	Vendor to specify		
2.8	Bending speed(Vendor to confirm that in manual operation speed can be adjusted to very low value and inching operation is available)	Vendor to specify and confirm		
2.9	Repetitive bend accuracy	±0.2 degrees		
2.10	Tube indexing facility (Rotary and linear)	Manual (against preset stops)		
2.11	Rotary index stations (for Plane of bend)	Vendor to specify		
2.12	Setting accuracy(for Plane of bend)	Vendor to specify		
2.13	Linear index station (For distance between bends)	Vendor to specify		
2.14	Setting accuracy(For distance between bends)	±0.2 mm		
2.15	Chucking arrangement	Hydraulic		
2.16	Memory capacity	Vendor to specify		
2.17	Motor capacity	Vendor to specify		
2.18	Machine lubrication:Centralised automatic(motorised) oil lubrication system	Vendor to confirm and furnish details		
3.0	Control system and panel			
3.1	PLC based system with OPCON having display & switches for various auto/manual operations.System should be of Siemens/Reputed equivalent .	Vendor to confirm and furnish details		
3.2	Electric Control panel having PLC modules and other electrives.	Vendor to confirm		
4.0	<u>Hydraulic System(Details to be submitted with offer)</u>	Vendor to furnish details		
4.1	Suitable hydraulic power pack of Vickers/Rexroth/ reputed make.	Vendor to confirm and furnish details		
4.2	Hydraulic valves of reputed make of suitable capacity for various operations	Vendor to confirm and furnish details		
5.0	ELECTRICAL:			
5.1	415V(fluctuation + 10% / -10%), 50HZ(fluctuation +/-3 HZ), 3 Phase AC (4 wire system with 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 and submit		
5.2	Tropicalisation: All electrical / electronic equipment shall be tropicalized	Vendor to confirm and submit		
5.3	All electrical & electronic control cabinets & panels should be dust and rodent proof	Vendor to confirm and submit		
5.4	All electrical components should be mounted on DIN Rail	Vendor to confirm and submit		

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5.5	All electrical and electronic panels including operator's panel should be provided with 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 and submit		
5.6	Motors shall conform to IEC or Indian Standards	Vendor to confirm and submit		
5.7	All cables moving with traversing axes should be installed in Drag chain. Additionally, all the cable trays required for laying of cables should be included in the offer.	Vendor to confirm and submit		
5.8	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to confirm and submit		
5.9	In-cycle hour counter with reset facility.	Vendor to confirm and submit		
6.0	SAFETY ARRANGEMENTS:			
	Following safety features in addition to other standard safety features should be provided on the machine:	Vendor to confirm and submit		
	1. Machine should have adequate and reliable safety interlocks / devices to avoid damage to the machine, workpiece and the operator due to the malfunctioning or mistakes. Machine functions should be continuously monitored and alarm / warning indications through lights/ alarm number with messages (on CNC display and panels) should be available.			
	2. A detailed list of all alarms / indications provided on machine should be submitted by the supplier.			
	3. 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.			
	4. All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations.			
	5. Emergency Switches at suitable locations as per International Norms are to be provided.			
	6. Oil & water pipe lines should not run with electrical cable in the same tray / trench.			
7.0	ENVIRONMENTAL PERFORMANCE OF THE MACHINE :			
	The Machine shall conform to following factors related to environment :	Vendor to confirm and submit		
	(a) If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.			
	(b) Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.			
8.0	LEVELING & ANCHORING SYSTEM			
8.1	Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc should be supplied	Vendor to confirm and submit		
9.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE :			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations
9.1	Special tools and equipment required for erection and 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 confirm and submit		
10.0	SPARES:			
10.1	Itemised breakup of mechanical, hydraulic, electrical and electronic spares used on the machine in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation on three shifts continuous running basis should be offered by vendor. The list to include following, in addition to other recommended spares: (Unit Price of each item of spare should be offered)	Vendor to confirm and submit		
	a) Mechanical & Hydraulic Spares: All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses etc.	Vendor to confirm and submit		
	b) Electrical /Electronic / CNC Spares:	Vendor to confirm and submit		
10.2	All types of spares for total machine and accessories should be available for atleast 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 them in advance, if required	Vendor to confirm and submit		
10.3	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	Vendor to confirm and submit		
11.0	DOCUMENTATION : Five sets of following documents (Hard copies) in English language should be supplied along with the machine	Vendor to confirm		
11.1	Operating manuals of Machine & CNC system			
11.2	Programming Manuals of Machine & CNC system			
11.3	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Pneumatic/Hydraulic circuit diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list also			
11.4	Maintenance, Interface & commissioning manuals for CNC system, spindle & feed drives.			
11.5	Manufacturing drawings for all supplied tool holders, coolant connections, adapters, sleeves, fixtures etc.			
11.6	Catalogues, O&M Manuals of all bought out items including drawings,wherever applicable.			
11.7	Detailed specification of all rubber items and hydraulic/lube fittings			
11.8	PLC program print-outs with comments in English.			
11.9	PLC program on CD, NC data & PLC data on floppy/equivalent drive.			
11.10	Complete back-up of hard disk on GHOST CD and clear written Instructions (3 copies) to take back-up and reloading of a new hard disk.			

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11.11	Complete Master List of parts used in the machine shall be submitted by the vendor.			
11.12	One additional set of all the above documentation on CD ROM, wherever possible.			
12.0	TRAINING			
12.1	BHEL Personnel should be trained at supplier's Works for 10 working days each in the area of (a) CNC Part Programming / Technology, Use of all CNC Features, & supplied accessories etc. (b) Electrical, Electronic & CNC maintenance for machine & other supplied equipments (c) Mechanical & Hydraulic maintenance of the machine & other supplied equipments (d) Operation of the machine & other supplied equipments.	Vendor to confirm		
12.2	Air-fare, boarding & lodging for the trainees shall be borne by BHEL.	To be noted		
12.3	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel.	Vendor to confirm		
12.4	Vendor to quote for training on man - day basis	Vendor to confirm		
13.0	FOUNDATION :			
13.1	Vendor shall submit the layout drawing for getting BHEL's approval within one month from the date of Letter of Intent (LOI) / P.O. . The layout should consist of all requirements pertaining to complete machine including space requirement for any accessories. BHEL shall construct complete foundation for the machine under supervision of supplier and at supplier's responsibility. Vendor should arrange equipments required for the testing of foundation, if required by the vendor. The vendor shall also indicate detailed specifications of grouting compound and Grouting procedure etc. for foundation bolts of the machine.	Vendor to confirm		
14.0	ERECTION & COMMISSIONING			
14.1	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 confirm		
14.2	Successful proving of BHEL components by the supplier shall be considered as part of commissioning.	Vendor to confirm		
14.3	Tools, Tackels, Test Mandrels, instruments and other necessary equipment including Laser equipment required to carry out all above activities should be brought by the supplier. .	Vendor to confirm		

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14.4	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to confirm		
14.5	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 confirm		
14.6	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to confirm and submit		
14.7	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to confirm and submit		
15.0	OPERATING CONDITIONS & THERMAL STABILITY :			
15.1	Total machine including CNC system and all supplied items should work trouble free and efficiently under following operating conditions and should give specified accuracies. Power Supply: Voltage: 415 V - 10%, +10% Frequency: 50 Hz +3%, - 3% No. of phases = 3 Ambient Conditions: Temperature = 5 to 45 degree celsius Relative Humidity = 95% max. (Vendor to confirm that machine is suitable for above and details of provisions on the machine for the same are to be furnished by Vendor)	Vendor to confirm and submit		
15.2	Weather conditions are tropical, Atmosphere may be dust laden during some part of the year. Machine shall be kept in the normal shop floor condition. Max. temperature variation is up to 25 deg Celsius in 24 hours. (Vendor to confirm that machine is suitable for above and details of provisions on the machine for the same are to be furnished by Vendor)	Vendor to confirm and submit		
15.3	Thermal Stability of the complete machine keeping in view specified Ambient Conditions and accuracy requirements of BHEL components and trouble free operation of the machine should be ensured by vendor. (Confirm that machine is suitable for above and details of provisions on the machine for the same should be furnished)	Vendor to confirm and submit		
16.0	MACHINE ACCEPTANCE: (Tests/Activities to be Performed by Vendor)	Vendor to confirm		
16.1	Tests/Activities to be witnessed by BHEL representative at supplier's works on the machine before dispatch :	Vendor to confirm		
16.1.1	Demonstration of all features of the machine, control system & accessories	Vendor to confirm		
16.2	Tests/Activities to be carried out at BHEL works while commissioning the machine :	Vendor to confirm		
16.2.1	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine	Vendor to confirm		
16.2.2	Two weeks supervision of independent operation of machine by BHEL after job acceptance	Vendor to confirm		

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations
16.2.3	Training of BHEL machine operators/maintenance personnel in operation/maintenance of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works	Vendor to confirm		
16.2.4	Demonstration by actual use of all supplied attachments and accessories to their full capacity.	Vendor to confirm		
17.0	TOOLING:			
	Supplier will supply all tooling required for pipe bending for pipe sizes as per attached annexure-I for one machine	Vendor to confirm and submit details		
18.0	PACKING:			
18.1	Sea worthy & rigid packing for all items of complete machine, CNC System, 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 confirm		
19.0	GUARANTEE :			
19.1	24 months from the date of acceptance of the machine.	Vendor to confirm		
20.0	GENERAL : The vendor should submit the following information:			
	Equipment Model	Vendor to furnish		
	Total connected load (KVA):	Vendor to furnish		
	Total weight of the system	Vendor to furnish		
	Detailed catalogues , sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to furnish		

21	COMPANY PROFILE/QUALIFYING CONDITIONS :			
21.1	COMPANY PROFILE			
21.1.1	The BIDDER has to provide the details pertaining to each clause in the table given below to understand the profile of the BIDDER's COMPANY.	Vendor to submit		
21.1.2	Number of years of experience of the BIDDER/ VENDOR in the field of Design, Manufacturing, & supply of similar machine or other SPMs.	Vendor to submit		
21.1.3	Details on the Codes/Standards adopted for the machine design and manufacturing.	Vendor to submit		
21.1.4	Details on Manufacturing facilities available with the VENDOR for:	Vendor to submit		
	(a) Sourcing/Building large machine casting or fabricated components	Vendor to submit		
	(b) Heat treatment facilities	Vendor to submit		
	(c) Machine assembly & testing Rigs	Vendor to submit		
21.1.5	Manufacturing capacity of company for such machine:	Submit details		
21.1.6	Bidder shall have capacity to supply this machine within 4 months after LOI.	Vendor to confirm		
21.2	QUALIFYING CONDITIONS			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations
	Only those vendors, who have supplied and commissioned at least one similar machine in the past ten years(on the date of opening of tender) and such machine is presently working satisfactorily for more than one year after commissioning (on the date of opening of tender) should quote.The following information should be submitted by the vendor . This is required from all the vendors for qualification of their offer..			
	1. Name of the customer / company where similar system is installed. (Copy of Purchase order should be furnished)	Vendor to submit		
	2. Complete postal address of the customer.	Vendor to submit		
	3. Year of commissioning. (Copy of commissioning report should be furnished)	Vendor to submit		
	4. Application for which the system is supplied with details of accuracies achieved on the job.	Vendor to submit		
	5. Name and designation of the contact person of the customer.	Vendor to submit		
	6. Phone, FAX no. and email address of the contact person of the customer.	Vendor to submit		
	7. Performance certificate from the customers regarding satisfactory performance of system supplied to them	Vendor to submit		
21.3	BHEL reserves the right to verify information submitted by vendor. In case the information is found to be false/incorrect, the offer shall be rejected.	Vendor to confirm		

I Mathur Sr. Manager(WE & S)	Arjun Singh Manager (WE&S)	Umesh Sagar Mgr. (LMM)
S.J.Chakraborty SR. DGM (WE&S)	K.D.Manjhi DGM (LMM & LMP)	