



BHARAT HEAVY ELECTRICAL LIMITED

UNIT'S ADDRESS: BHOPAL, MADHYA PRADESH, INDIA

Enquiry No:

Due Date:

Supplier Quote No.

Date:

SPECIFICATION CUM COMPLIANCE CERTIFICATE OF BRINELL HARDNESS MACHINE

NOTE:
1. Vendor must submit complete information against Qualifying Conditions (Clause no. 3.0) . The offer meeting this clause would only be processed.
2. 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 .
3. The offer and all documents enclosed with it shall be in English language only.

NAME & ADDRESS OF THE OEM :	NAME & ADDRESS OF THE VENDOR
TELEPHONE NO.:	TELEPHONE NO.:
FAX NO.:	FAX NO.:
E-MAIL ADDRESS :	E-MAIL ADDRESS

SCOPE: SUPPLY, ERECTION & COMMISSIONING OF BRINELL HARDNESS MACHINE COMPLYING WITH SPECIFICATION AS BELOW:

CLAUSE NO.	DESCRIPTION FOR BHEL REQUIREMENT	SUPPLIERS REMARK OK/ NOT OK	BHEL's REMARK	DEVIATIONS
1.0	PURPOSE			
1.1	The specification deals with the details of automatic, table top Brinell hardness machine. The Brinell hardness tester shall be capable of carrying out full cycle of Brinell hardness test i.e. sample positioning, indentation, focus, display of indentation and measurement in a closed loop.	Vendor to Confirm		
2.0	SCOPE OF SUPPLY			
2.1	The scope of supply shall include:	Vendor to Confirm		
2.2	Brinell hardness machine, one no.	Vendor to Confirm		
2.3	Calibration Certificates as per clause 7.0	Vendor to Confirm		
2.4	Standard Indenters with holders as in clause 6.0	Vendor to Confirm		
2.5	Documentation as per clause 14.0.	Vendor to Confirm		
2.6	Any other accessories if required.	Vendor to Confirm		
3.	QUALIFYING CONDITION			
3.1	Vendor should be Original Equipment Manufacturer (OEM) or authorized dealer/ distributor of OEM. In case the party is dealer/ distributor, they should give valid authorization certificate of OEM.	Vendor to Confirm		
3.2	Only those vendors shall quote, who or their principal have supplied and commissioned at least one number of similar automatic Brinell Hardness Machine, (for similar applications, within last 5 years and such is working satisfactorily (For at least one year).	Vendor to Confirm		
3.3	Overview about OEM (When established, Product Range, market etc.)	Vendor to Confirm		
3.4	Details about Service Centre in India.	Vendor to Furnish		
3.5	OEM must have an experience of at least 05 years in manufacture of Brinell Hardness machine of similar, design.	Vendor to Specify		
3.6	Following documents shall be furnished along with technical bid to support above mentioned qualification criteria:	Vendor to Furnish		
3.6.1	The list of supplied Brinell Hardness Machine having following information:	Vendor to Furnish		
3.6.2	Make & Model	Vendor to Furnish		
3.6.3	Capacity	Vendor to Furnish		
3.6.4	Quantity	Vendor to Furnish		
3.6.5	Month & Year of Supply	Vendor to Furnish		

CLAUSe NO.	DESCRIPTION FOR BHEL REQUIREMENT	SUPPLIERS REMARK OK/ NOT OK	BHEL's REMARK	DEVIATIONS
3.6.6	Customer Name	Vendor to Furnish		
3.6.7	Customer Address	Vendor to Furnish		
3.6.8	Customer Contact Person	Vendor to Furnish		
3.6.9	Customer Contact Nos/Email	Vendor to Furnish		
3.6.10	Minimum one number of unpriced copy of Purchase order of equipment supplied mentioned in clause 2.2.	Vendor to Furnish		
3.6.11	Minimum one number of Performance Certificate (issued by customer for satisfactory performance of at least one year) of Brinell Hardness Machine mentioned in clause 3.2.	Vendor to Furnish		
3.7	BHEL reserves the right to verify the information provided by vendor. If the information provided by vendor is found to be false/incorrect at any point of time, the offer shall be rejected.	Vendor to Confirm		
4	GENERAL REQUIREMENTS			
4.1	The offer shall be submitted in two bids (Techno-commercial and Price Bid). The bidder's technical representative shall visit BHEL Bhopal for technical discussions and on the spot finalisation of technical issues, if needed, within two weeks of technical bid opening. Exact date will be confirmed to vendor by BHEL.	Vendor to Confirm		
4.2	Considering the specification requirement, vendor shall identify the quoted items in following category and clearly mention in both technical and price bid:	Vendor to Confirm		
4.2.1	Mandatory Items (Required essentially for fulfilling the purpose and complying the requirement of this specification).	Vendor to Confirm		
4.2.2	Optional Items (Not required essentially but available with vendor for enhancement of performance/extension of machine capability/simplify the operations. The vendor shall quote item wise unit price for these items.	Vendor to Confirm		
4.3	The vendor shall furnish unpriced copy of Commercial Bid along with Technical Bid	Vendor to Furnish		
4.4	The vendor shall furnish item wise scope of supply along with technical bid	Vendor to Furnish		
5.0	SPECIFICATION: (MINIMUM REQUIREMENT)			
5.1	TECHNICAL REQUIREMENTS			
5.1.1	Type: Automatic Brinell Hardness Machine (as per EN ISO 6506-2).	Vendor to Confirm		
5.1.2	Capacity: 62.5-3000 kgf (Load Range) or wider.	Vendor to Specify		

CLAUSE NO.	DESCRIPTION FOR BHEL REQUIREMENT	SUPPLIERS REMARK OK/ NOT OK	BHEL's REMARK	DEVIATIONS
5.1.3	Indentation Load Accuracy : with in 1.0% of applied test force as per Clause 4.2.4, IS2281/ISO 6506-2 or better. Vendor to specify values.	Vendor to Specify		
5.1.4	The time from the initial application of force (F1) to the time the full test force (F2) is reached shall be changeable depending upon type of material.	Vendor to Confirm		
5.1.5	Indentation and its measurement shall be possible with balls of dia 2.5mm, 5 mm, 10 mm.	Vendor to Confirm		
5.1.6	Digital microscope shall be there for automatic indentation measurement.	Vendor to Confirm		
5.1.7	The resolution of measuring scale or display shall be at least 0.001mm.	Vendor to Confirm		
5.1.8	The scale of the measuring device shall permit estimation of the diameter (or shall estimate diameter) of the indentation within at least $\pm 0.4\%$ of the indicated value.	Vendor to Specify		
5.1.9	Design Feature: During Operation; the turret, indenters and lenses shall be well protected from unwanted contact with the test piece.	Vendor to Confirm		
5.1.10	After the measurement of indentation by objective, the software shall automatically convert reading into required hardness scale with all the results being displayed on a screen in built into the system.	Vendor to Confirm		
5.1.11	Brinell hardness machine shall be able to perform the complete hardness cycle on the sample varying from 08 mm dia to at least 100 x100 mm ² area.	Vendor to Specify		
5.1.12	Specimen accommodation: Horizontal 220mm (at least) from centreline. Vertical 220 mm (at least).	Vendor to Specify		
5.1.13	A hardened anvil/ platform for keeping the samples for indentation shall be inbuilt in to the machine to accommodate different size of specimen as per clause 5.1.12 & 5.1.13.	Vendor to Confirm		
5.1.14	There shall be inbuilt ports to connect the hardness machine with printer and local network etc.	Vendor to Confirm		
5.1.15	There shall be facility of inbuilt user learning with provision for help or reference guide.	Vendor to Confirm and specify		
5.1.16	There shall be facility in Machine (by way of connecting ports/inbuilt hardware etc.) that in case the software of machine crashes, it can be reinstalled for that an executable copy of software has to be supplied in CD/DVD/Pendrive etc. The BHEL personnel shall be trained in reinstalling of testing software.	Vendor to Confirm and specify		
5.2	INBUILT SCREEN/ DISPLAY			
5.2.1	The inbuilt screen shall be a touch screen with dimensions of 100 x100 mm 2 minimum.	Vendor to Specify		
5.2.2	Indentation display and its measurement shall be performed using the screen.	Vendor to Confirm		
5.2.3	There shall be provision of increasing/ decreasing the brightness, contrast, sharpness, Zoom level up to atleast 30X with intermediate zoom level in the inbuilt screen/display to obtain the clarity in display.	Vendor to Specify		

CLAUSE NO.	DESCRIPTION FOR BHIEL REQUIREMENT	SUPPLIERS REMARK OK/ NOT OK	BHIEL's REMARK	DEVIATIONS
5.3	FUNCTIONS TO BE CONTROLLED BY THE INBUILT SCREEN / DISPLAY:			
5.3.1	There should be facility of Hardness conversion in Vickers hardness, Rockwell hardness, Leeb Hardness and Tensile strength with correction factor.	Vendor to Confirm		
5.3.2	Force indication in both kgf and option for test force selection shall be provided.	Vendor to Confirm		
5.3.3	Machine shall automatically sense the dia of the indentation used and same shall be displayed on the screen. There shall be provision to verify the dia manually also.	Vendor to Confirm		
5.3.4	Machine shall be able to perform hardness with appropriate force diameter ratio as per table 3 of ISO 65064 :1999, on copper and its alloys, cast iron, steel nickel and titanium alloys, aluminium and its alloy, light metals and their alloys, Lead, tin, sintered metals etc.	Vendor to Confirm		
5.3.5	Length of diagonals, hardness value, converted value, test force shall be displayed on the screen.	Vendor to Confirm		
5.3.6	The Machine should have an inbuilt screen on the system on which the indentation, its measurement could be viewed and performed. The display of result, conversion etc. shall also be on the same screen.	Vendor to Confirm		
5.3.7	There shall be facility to calculate distance from the edge of the test piece to the centre of each indentation and distance between the centres of two adjacent indentations.	Vendor to Confirm		
5.3.8	The equipment shall have inbuilt memory so that test results could be stored and recalled from the system on the inbuilt screen.	Vendor to Confirm		
5.3.9	The control panel and its input shall appear on the touch screen and shall have the facility for; main menu start test, stop test, dwell time, conversion chart, print, clear, menu, selecting the degree of loading	Vendor to Confirm		
5.3.10	The language used to operate the Brinell Hardness machine shall be English	Vendor to Confirm		
6.0	STANDARD INDENTORS			
6.1	Tungsten Carbide Indenters of dia indicated below has to be provide with the machine as standard accessories 10 mm dia ball with its holder : six balls and one holder 5 mm dia ball with its holder : six balls and one holder 2.5 mm dia ball with its holder : six ball and one holder	Vendor to Confirm		

CLAUSE NO.	DESCRIPTION FOR BHEL REQUIREMENT	SUPPLIERS REMARK OK/ NOT OK	BHEL's REMARK	DEVIATIONS
6.2	Calibration certificates traceable to NMI for indentors mentioned in clause 6.1 and 6.2, inline with clause 4.3 of ISO 6506-2 & clause 4.3 of ISO 6507-2 has to be supplied.	Vendor to Confirm		
6.3	All the indentors and the holders shall be given in well packed durable boxes so that they can be stored for longer use without any distortions.	Vendor to Confirm		
6.4	Additionally Hardness Test Blocks (made of Fe alloy) of reputed make, as per ISO 6506-3 or Clause A1.4.6.1, ASTM E10-12 has to be supplied for the hardness range specified below:	Vendor to Confirm		
6.5	In 10/3000 scale One block HBW <125 One blocks 200 < HBW < 400 One blocks 450 < HBW < 650	Vendor to Confirm		
6.6	In 10/1000 scale : one block 50 < HBW < 200	Vendor to Confirm		
6.7	In 5/750 scale : One blocks HBW < 125 One blocks 200 < HBW < 400 One blocks 450 < HBW < 650	Vendor to Confirm		
6.8	In 2.5/62.5 Scale one blocks in the scale of 50 < HBW < 100	Vendor to Confirm		
6.9	Valid calibration certificates (with validity of 5 years) for Hardness blocks mentioned in clause 6.6 to 6.10 has to be supplied traceable to NMI. So total 10 calibration certificates needs to be supplied.	Vendor to Confirm		
6.10	All the Hardness blocks shall be given in well packed durable boxes so that they can be stored for longer use without any distortions.	Vendor to Confirm		
6.11	A steel platform, 27-32 inch height and appropriate width, depth etc. having drawers for keeping tools, fixtures, hardness blocks, indentors etc. has to be provided for keeping the Brinell hardness machine. The platform shall be strong enough to hold the weight of Brinell Hardness machine and jobs to be tested on it. Also the platform shall be stable and shock proof so that Hardness test can be performed without any shock and vibrations.	Vendor to Specify		
6.12	Any other accessories to be supplied with machine shall be mentioned as optional accessories.	Vendor to Specify		
7.0	CALIBRATION			
7.1	All the Indenter balls shall be standardized and traceable certificates as mentioned in clause 6.3 to be submitted.	Vendor to Specify		
7.2	All hardness Test Blocks shall be standardized and certificates to be submitted as mentioned in clause 6.11	Vendor to Confirm		

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7.3	Vendor shall get the machine calibrated, in all ranges and traceable to National /International standards, by an accredited agency (NABL/UICAS/A2LA accredited) after its installation in BHEL according to direct verification of the Brinell Hardness Machine as per Clause A.1.3 of ASTM E 10-12/ Clause 4, IS-2281/ IS06506-2. Valid Calibration certificates (ASTM and ISO compliance), traceable to NMIs shall be furnished after installation.	Vendor to Confirm		
8.0	ELECTRICAL SYSTEM :			
8.1	Power Supply available at 415VAC $\pm$ 10%, 3 phase,3 wire system OR 240 VAC $\pm$ 10%, 50 Hz $\pm$ 3%, single phase.	Vendor to Confirm		
8.2	Tropicalisation: All electrical / electronic equipment shall be tropicalized.	Vendor to Confirm		
8.3	All electrical & electronic cabinets & panels should be dust and vermin proof & earthed when being installed.	Vendor to Confirm		
8.4	All power supply related devices (Protection device, Stabilizers etc.) if required, shall be supplied along with the machine.	Vendor to Confirm		
9.0	SAFETY ARRANGEMENTS:			
9.1	Machine should have adequate and reliable safety devices to avoid damage to the machine, indenter, work piece and the operator due to the malfunctioning or mistakes.	Vendor to Confirm		
9.2	Machine functions should be continuously monitored and alarm / warning indications through lights/ sound alarm with messages (on display) should be available.	Vendor to Confirm		
9.3	Emergency Switches at suitable locations as per national/ International standards are to be provided. Vendor to specify the safety standards machine is compliant to.	Vendor to Confirm		
10.0	PREDISPATCH INSPECTION			
10.1	Predispatch Inspection of the equipment will be done by BHEL at OEM's works	Vendor to Confirm		
10.2	Following points will be checked by BHEL Engineers at OEM/ vendor's place before despatch. a) Demonstration of features of the machine & accessories up to the satisfaction of BHEL for their efficient and effective use. b) Inspection of the scope of supply (clause.2.0).	Vendor to Confirm		

CLAUSE NO.	DESCRIPTION FOR BHEL REQUIREMENT	SUPPLIERS REMARK OK/NOT OK	BHEL's REMARK	DEVIATIONS
10.3	The equipment is to be completely inspected and duly verified by BHEL Engineers before despatch and four copies of inspection certificates are to be provided with machine.	Vendor to Confirm		
10.4	Travel, boarding & lodging expenditure of BHEL personnel deputed for PDI will be borne by BHEL.	Vendor to Confirm		
10.5	Two weeks advance information shall be furnished for inspection.	Vendor to Confirm		
11.0	ERECTION AND COMMISSIONING			
11.1	Supplier to take full responsibility for carrying out the installation, start up, testing of machine, its control & all types of other supplied accessories, testing of samples and software etc. to the satisfaction of BHEL engineers without any price implication. In case there is price implication the same shall be quoted as lump sum price which shall be loaded to vendor's offer. Per day price will not be acceptable.	Vendor to Confirm		
11.2	Schedule of Commissioning shall be submitted with the offer.	Vendor to Confirm		
11.3	Service requirement like power shall be provided by BHEL at points to be indicated by supplier. Connectivity of the system with power supply from the points shall be the responsibility of the supplier. The Other requirements like crane and helping personnel shall be provided by BHEL. Details of these requirements should be informed by vendor in advance.	Vendor to Confirm		
11.4	Compatible cables for connection shall be supplied along with the equipment.	Vendor to Confirm		
11.5	Any additional equipment/accessories required for satisfactory operation of the system and identified during commissioning shall be supplied by vendor without any price implication.	Vendor to Confirm		
11.6	All tools and equipment required for erection of the machine shall be brought by the vendor.	Vendor to Confirm		
12.0	GUARANTEE/ WARRANTY			
12.1	The equipment should be guaranteed with respect of design, material construction, operation and any manufacturing defects for a period of 24 months from the date of commissioning of complete equipment at BHEL Bhopal.	Vendor to Confirm		
12.2	Free after sales services including spares is to be provided during the guarantee period at BHEL Bhopal.	Vendor to Confirm		
13.0	LITERATURE WITH OFFER			
13.1	The following documents shall be enclosed with offer by vendor.	Vendor to Confirm		

CLAUSE NO.	DESCRIPTION FOR BHEL REQUIREMENT	SUPPLIERS REMARK OK/ NOT OK	BHEL's REMARK	DEVIATIONS
13.2	Leaflets /Datasheet having detail specification, Model No & Manufacturer's name of Items to be quoted.	Vendor to Confirm		
13.3	A CD containing the specification/ brochure in pdf/ word or any other format for easy evaluation of the offer.	Vendor to Confirm		
13.4	Customer list as per clause 3.4.	Vendor to Confirm		
14.0	DOCUMENTATION TO BE SUPPLIED WITH THE MACHINE			
14.1	Four sets of Operation and Service Manual (two hard and two soft copies) shall comprise of operating procedure, calibration procedure, applicable calibration certificates trouble shooting charts, circuit diagram and parts list etc. have to be supplied.	Vendor to Confirm		
14.2	Guarantee certificates.	Vendor to Confirm		
15.0	PACKAGING			
15.1	Sea/ air worthy & rigid packing to avoid any damage/loss in transit. When machine is despatched in containers, all small loose items shall be suitably packed in boxes. Any damage, loss, theft during transit shall be the sole responsibility of the vendor.	Vendor to Confirm		
16.0	SPARES (OPTIONAL- TO BE QUOTED SEPARATELY)			
16.1	List of all spares with unit price should be supplied along with recommendation for 5 years of trouble free operation. The spares will be ordered as per requirement.	Vendor to Furnish and note		
16.2	Party to ensure the availability of spares and services for a period of 10 years after the supply of equipment.	Vendor to Confirm		
17.0	ACCEPTANCE TESTS TO BE CARRIED OUT AT BHEL WHILE COMMISSIONING THE MACHINE			
17.1	Physical Inspection	Vendor to Confirm		
17.2	Demonstration of Control Function including all features of the equipment.	Vendor to Confirm		
17.3	Verification of Technical Specification as per Clause 5.0	Vendor to Confirm		
17.4	Final acceptance of the machine at BHEL will be given after verification and ensuring that all the clauses of this specification are duly complied and the required training as per clause 19.0 has been provided to the BHEL personnel.	Vendor to Confirm		
18.0	PROVING OF MACHINE			
18.1	Demonstration by actual use of all supplied units to their full capacity.	Vendor to Confirm		

CLAUSE NO.	DESCRIPTION FOR BHEL REQUIREMENT	SUPPLIERS REMARK OK/ NOT OK	BHEL's REMARK	DEVIATIONS
18.2	Brinell Hardness test at all possible load and indenter dia as per Table 2 of ISO 6506-1: 1999 shall be done by running machine continuously for at least 4 Hrs.	Vendor to Confirm		
19.0	TRAINING			
19.1	BHEL Persons should be trained to the satisfaction of BHEL, for mutually agreed period in the following areas (a) Electrical, Electronic, Mechanical & general maintenance for Brinell Hardness Machine & other supplied equipment and accessories. (b) Operation of the machine including detail software applications & other supplied equipment and accessories. (c) Safety precautions.	Vendor to Confirm		
19.2	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel without any price implication	Vendor to Confirm		
19.3	Expenditure of training cost if any shall be quoted as total consolidated training cost (Inclusive of travel Lodging & boarding of Expert) which will be loaded to the vendor's offer. Per day charges are not acceptable.	Vendor to Confirm		
20.0	TERMS			
20.1	Delivery period of the machine after getting PO should be 3 months	Vendor to Confirm		