



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirapalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY

NOTICE INVITING TENDER

Phone: +91 431 257 7421/ 7297

Email : ykaruna@bhel.in

hari.r@bhel.in

Web : www.bhel.com

TWO PART BID

Tender to be submitted in two Parts

Enquiry
Number:

2741900020

Enquiry
Date:

21.11.2019

Due date for submission
of quotation:

16.12.2019

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer should reach physically on or before 14.00 Hrs(IST) on the Date of tender opening. Tenders received after 14.00Hrs (IST) will not be considered for evaluation.

Item	Description	Quantity	(Indigenous Vendors) Matl. Will be Delivered to
10	Portable Ultrasonic Flaw Detector as per the technical specification & commercial conditions applicable (To be downloaded from web site www.bhel.com or https://eprocure.gov.in/epublish/app)	1 No	FOR, BHEL, Stores, PPPU, Tirumayam

Important points to be taken care during submission of offer

- 1) Material shall be delivered to (By Indigenous vendors): As stated above.
- 2) By Foreign Vendors: CFR Chennai Seaport / Airport
- 3) Delivery required 4 months from the date of purchase order.
- 4) Erection & Commissioning period required 1 Week from the date of intimation by BHEL to vendor for deputation of their Engineers for E&C.
- 5) EMD for this Tender will be (INR): NIL
- 6) Compliance Forms. TMM/IMP/04 & TMM/IND/04A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
- 7) All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.

BHEL's General guidelines / instructions (refer MM / CE / GENL / GENL / 001 – NO EMD) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site <http://www.bhel.com> or from <https://eprocure.gov.in/epublish/app> under Enquiry reference 2741900020.

Tenders should be submitted before 14.00Hrs (IST) on the due date
Tenders will be opened online at 14:30 hours on the due date
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.

Yours faithfully,
For BHARAT HEAVY ELECTRICALS LIMITED

V. Karunakaran 21/11/19

DGM / Capital Equipment / MM

V. KARUNAKARAN
Dy. General Manager
Capital Equipment / MM
BHEL / Tiruchirappalli - 620 014

PART - A

Qualifying Criteria for Portable Ultrasonic Flaw Detector.

Sl. No.	Description for BHEL Requirement	Bidder's Offer
1	The BIDDER / VENDOR shall have a minimum of last FIVE Years of Continuous Experience in the Field of Design, Manufacture and Supply of Portable Ultrasonic Flaw Detector and associated accessories. Vendor shall indicate the actual no. of years of experience in the field.	
2	Only those BIDDER / VENDOR should quote who have supplied in the last 5 years at least 2 numbers of the model quoted against this tender of "Portable Ultrasonic Flaw Detector."	
3	Number of Portable Ultrasonic Flaw Detectors supplied, installed and commissioned till date.	
4	The Bidder/vendor to furnish reference list of customers	
5	Year of Launch of the Model quoted against this tender enquiry	
6	The BIDDER has to submit a Performance Certificate from customers who are Heavy Engg. Fabricators like Manufacturers of Pressure Vessels and Heat-Exchangers, Off-Shore Oil Rigs, Thermal Power Plant Equipment, etc. for satisfactory performance of the quoted model against this tender, for a minimum period of one year from the date of commissioning (as on original date of opening of tender).	
7	Details on SERVICE AFTER SALES Set-Up in India including the Addresses of Agents / Service Centres in India, to be furnished.	
8	BHEL reserves the right to verify the information provided by vendor. In case, it is found to be false/ incorrect, the offer shall get rejected.	

PART B
Technical Specifications for Portable Ultrasonic Flaw Detector.

Sl. No.	Description for BHEL Requirement	BHEL Parameters	Offered Parameters / Confirmation	Bidder's Offer (with technical details)
I	Application			
	Portable Ultrasonic Flaw Detector (UFD) is used for Testing of materials and welded structures made of Steel.		bidder to note	
II	Specifications			
1	<u>Purpose:</u> The equipment is proposed to perform conventional Ultrasonic testing, to detect planar/ volumetric defects in welds present in plates, pipes, tubes and pressure vessels in shop & site conditions. Hence the equipment shall be compact and single unit type comprising of all the sub systems like electronics, display, processors, keypad etc.		bidder to confirm	
2	<u>Principle of operation:</u> The Ultrasonic Flaw Detector works on the principle of Reflection of Ultrasounds at Interfaces of varying acoustic impedance. By using Piezoelectric Transducers, which can convert electric signals to ultrasonic vibrations, Ultrasound is sent to the test objects and the reflected Ultrasonic energy from the defects is converted back to electric signals, which in turn are displayed on the LCD screen.			
3	<u>Design base:</u> UFD shall compliant to EN 12668-1, IEC 60068-2-27, IEC-60068-2-6, IP67 Ultrasonic search units (probes) shall compliant to ASTM-E 1065.		bidder to specify	
4	<u>Pulse:</u> Spike or Tunable Square wave pulse. The pulse is to be electronically controlled on both rising and falling edges to maximize probe performance and increasing near surface resolution.		bidder to specify	

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4.1	Pulse repetition frequency : 15 Hz to 2000 Hz	bidder to specify	
4.2	Energy Settings: Pulse voltage shall be adjustable	bidder to specify	
4.3	Pulse width: Shall be adjustable from 30ns to 500ns (0.1MHz)	bidder to specify	
4.4	Damping: Shall be adjustable from 50 to 400 Ω	bidder to specify	
5	<u>Receiver</u>		
5.1	Gain: 0 to 100 dB with 0.5,1,2,6 dB steps & user defined gain step adjustments	bidder to specify	
5.2	Total instrument Bandwidth: 0.5 to 18 MHz	bidder to specify	
5.3	Digital Filter settings: User selectable narrow band and broad band filter options to be provided to optimize receiver performance	bidder to specify	
5.4	Rectification: Full wave, Positive half wave, Negative Half wave, RF	bidder to specify	
5.5	System linearity: Horizontal, Vertical and amplifier linearity shall meet the requirements of ASME section V	bidder to specify	
5.6	Reject: Shall be adjustable with visual warning.	bidder to specify	
6	<u>Measurement</u>		
6.1	Types: Thickness, Sound path, Projection, Depth, Amplitude, Time of flight for both Gates.	bidder to specify	
6.2	Echo to Echo: Standard	bidder to specify	
6.3	DAC / TVG Standard: Up to 15 points to be captured, ASME Section I, Section III, 100 dB dynamic Range, full gain, range and delay adjustments during set up, view switchable between DAC & TVG	bidder to specify	
6.4	CUSTOM DAC: System shall have multiple DAC options including -6dB and - 14dB DAC.	bidder to specify	

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6.5	DGS probe data: For time varied gain applications. DGS set ups to be built from DGS/ AVG diagram with standard probe data and user defined probe data. Defect size evaluation to be performed with predefined probe settings. Defect size to be directly displayed. Data sheet for each probe giving all technical details shall be furnished.	bidder to specify	
6.6	Amplitude measurement: 0 to 100% full screen height with 0.25% resolution	bidder to specify	
6.7	Curved Surface correction: For Angle measurements shall be available.	bidder to specify	
6.8	X-Value correction: Beam index point to front of transducer shall be available.	bidder to specify	
7	<u>Gates</u>		
7.1	Minimum two fully independent Gates for amplitude and Time of flight measurements.	bidder to specify	
7.2	Gate start & width: Start and width of the gate shall be adjustable within the entire range with positive and negative threshold.	bidder to specify	
7.3	Gate height: Variable from 5 to 95% full screen height	bidder to specify	
7.4	Alarms: Positive and Negative thresholds: Minimum Depth on Gate1 and Gate 2	bidder to specify	
8	<u>Display</u>		
8.1	"A" scan display (Rectified as well as RF mode) and Color Liquid Crystal Display with user defined, user selectable color schemes and brightness having split screen, full screen modes and Auto freeze facility. Supplier shall specify available display modes.	bidder to specify	

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8.2	Base line break mode: All zero cross points on the RF wave form shall be shown as zero points in full wave mode.	bidder to specify	
8.3	Amplitude Grid mode: 100% Amplitude display	bidder to specify	
8.4	Time base grid modes: Standard 0 to 10 major divisions, each having five equal minor divisions.	bidder to specify	
9	<u>Instrument Input / Output</u>		
9.1	USB port: For communication with PC/ Data cables /Flash drive/mouse etc.	bidder to specify	
9.2	SD card slot: SD card connector for easy data archival	bidder to specify	
9.3	LEMO Hardware I / O: Alarm outputs, Trigger In / Out	bidder to specify	
9.4	Data Storage: At least 1000 "A scan" data files storage capacity should be available. Supplier to specify the average size of a data file and also number of data files that can be stored.	bidder to specify	
10	<u>Calibration</u>		
10.1	Supplier to specify the calibration set up memory. At least 100 different calibration setups should be stored and recalled.	bidder to specify	
10.2	Automated distance Calibration: Automatic calibration of range shall be available for velocity and zero offset adjustments	bidder to specify	
10.3	Test modes: Pulse echo, Dual or through transmission	bidder to specify	

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10.4	Units: Millimeters, Inches	bidder to specify	
10.5	Range: 5 mm to 5000 mm for longitudinal beam in steel	bidder to specify	
10.6	Velocity: 1000 m/s to 10000 m/s.	bidder to specify	
10.7	Zero offset: shall be adjustable from 0 to 500 micro seconds	bidder to specify	
10.8	Display delay: shall be adjustable	bidder to specify	
10.9	Refracted angles: shall be adjustable from 10 deg to 85 deg in 0.1 deg resolution	bidder to specify	
11	<u>Probes / Accessories</u>		
11.1	Longitudinal single crystal Probes		
11.1a	1No. of 4MHz- Ø 10mm with suitable lemo connector, removable protective membrane and test certificate with suitable standard cable (2m long)	bidder to specify	
11.1b	1No. of 2MHz- Ø 10mm with suitable lemo connector, removable protective membrane and test certificate with suitable standard cable (2m long)	bidder to specify	

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11.2	Shear wave single crystal Probes		
11.2a	2 MHz-38deg Size: 8 x 9mm active area , to produce 38deg refracted shear wave in steel, with suitable lemo connector and test certificate (2No.s)	bidder to specify	
11.2b	2 MHz-45deg, Size: 8 x 9mm active area , to produce 45deg refracted shear wave in steel, with suitable lemo connector and test certificate (1No.)	bidder to specify	
11.2c	4 MHz-38deg, Size: 8 x 9mm active area , to produce 38deg refracted shear wave in steel, with suitable lemo connector and test certificate (2No.s)	bidder to specify	
11.2d	4 MHz-45deg, Size: 8 x 9mm active area , to produce 45deg refracted shear wave in steel, with suitable lemo connector and test certificate (1No.)	bidder to specify	
11.2e	Suitable standard cables(2m long) for above probes 11.2a to 11.2d (2No.s)	bidder to specify	
11.3	Supplier should Furnish data sheet for probes with the crystal diameter, probe center frequency, Spectrum, roof angle of twin crystal probe etc. along with technical data sheet as per ASTM E-1065 with band width of operation for each probe shall be provided.	bidder to specify	
12	<u>Cables</u> : Supplier to specify the details of Power cables, Transducer connector cables etc.	bidder to specify	

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13	<u>Calibration Certificate & Test Certificate:</u> The calibration and test certificates shall be supplied with the equipment. The supplier should supply data sheets for the probes with crystal diameter, probe center frequency, frequency response curve, roof angle of twin crystal probe etc. The technical data sheet shall be supplied as per ASTM E 1065.	bidder to confirm	
14	<u>Software Options:</u> DAC, DGS / AVG	bidder to specify	
15	<u>General features</u>		
15.1	Weight: Shall be less than 3 kg (including battery)	bidder to specify	
15.2	Transducer connections: LEMO type connections (Equipment side and transducer side)	bidder to specify	
15.3	Battery: Lithium ion / Nickel Metal Hydride / Alkaline C-Cells preferably. The system shall have the provision for Internal rechargeable battery with charger adapter. The battery after charging should work for minimum 6 hours before next recharging.	bidder to specify	
15.4	Power requirement: AC-mains, 200-240V (50Hz)	bidder to specify	
15.5	Environmental ratings: Temperature: 5 to 50 degree C Humidity: RH 20 - 80%	bidder to specify	

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16	<u>Scope of Supply</u>		
16.1	Portable Ultrasonic flaw detector (UFD) meeting BHEL Part A- technical specifications - 01 No.	bidder to confirm	
16.2	Probes/Accessories as per clause 11	bidder to confirm	
16.3	Cables as per Clause 11 and 12	bidder to confirm	
16.4	Battery as per clause 15.3	bidder to confirm	
16.5	Battery charger	bidder to confirm	
16.6	Calibration & Test Certificates as per Clause 13	bidder to confirm	
16.7	Service tool kit	bidder to specify	
16.8	Operation and Maintenance manuals	bidder to confirm	

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16.9	Installation, Commissioning & Performance Prove-Out and Training on Operation, Trouble Shooting & Maintenance	bidder to confirm	
17	<u>Documentation in ENGLISH Language:</u> Three Copies (In English) of the Operation, Maintenance & Service Manuals containing Electric Schematics, Circuit Diagrams, Drawings, Trouble Shooting Charts, Mechanical Sub-Assemblies, Rating of Bought-Out Items, etc. shall be supplied, at the time of inspection by BHEL Engineers. In addition, two soft copies in CDs to be supplied.	bidder to confirm	
18	<u>Pre dispatch Inspection:</u> The system and accessories (consisting of the items) shall be offered for pre dispatch Inspection by BHEL at supplier's works.	bidder to confirm	
19	<u>Packing and delivery:</u> Packing and delivery of the total equipment from manufacturer's place to BHEL, Trichy in safe condition without any damage is under the responsibility of the SUPPLIER.	bidder to confirm	
20	<u>Installation and commissioning:</u> The system and accessories (consisting of the items mentioned) is to be installed & commissioned at BHEL Works, by the Service Engineer of the SUPPLIER.	bidder to confirm	
21	<u>Performance Prove out:</u> Vendor to perform the job trails and to prove the performance of the equipment at BHEL works	bidder to confirm	

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22	<u>Training on Operation & Maintenance:</u> Complete Training for BHEL Engineers is to be given on Operation & Maintenance of the OFFERED equipment at BHEL, after the successful commissioning of the Equipment & Accessories.	bidder to confirm	
23	<u>Guarantee:</u> The system and accessories (consisting of the items mentioned in the scope of supply) are to be guaranteed for its performance for 12 months from the date of commissioning of the equipment at BHEL Works.	bidder to confirm	
24	<u>Service and Spares Support Requirements:</u> Vendor shall ensure after the guarantee period, through trained service personnel in India for next 5 years as and when need arise. Spares to be made available within the shortest time.	bidder to specify	
25	<u>Annual Maintenance Contract - AMC:</u> Vendor to indicate whether Annual Maintenance services can be provided on contract after the guarantee period is completed	bidder to specify	
26	<u>Safety and Quality Standards:</u> Supplier to ensure that Safety and Quality of system and accessories (consisting of the items mentioned in the scope of supply) shall conform to International Standards mentioned in clause 3. Conformance certificate to be provided along with the equipment.	bidder to confirm	
27	<u>Price for accessories:</u> Separate rate shall be quoted for Optional / Compulsory Accessories	bidder to specify	