



An ISO 9001  
Company

## Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

<b>ENQUIRY</b>	Phone: +91 431 257 79 38 Fax : +91 431 252 07 19 Email : <a href="mailto:tvenkat@bheltry.co.in">tvenkat@bheltry.co.in</a> Web : <a href="http://www.bhel.com">www.bhel.com</a>
<b>NOTICE INVITING TENDER</b>	

<b>TWO PART BID</b>	<b>Enquiry Number:</b>	<b>Enquiry Date:</b>	<b>Due date for submission of quotation:</b>
Tender to be submitted in two Parts	<b>2731100006</b>	<b>07.04.2011</b>	<b>09.05.2011</b>

You are requested to quote the Enquiry number date and due date in all your correspondences. 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 is reaching physically our office before 14.00 hrs on the date of tender opening.

Item	Description	Quantity
10	<b>160kV Constant Potential X – Ray Equipment for Industrial Applications</b> as per the technical specification & commercial conditions applicable (to be downloaded from web site <a href="http://www.bhel.com">www.bhel.com</a> or <a href="http://tenders.gov.in">http://tenders.gov.in</a> )	<b>1 No.</b>

### Important points to be taken care during submission of offer:

1. Delivery required 3 months from the date of purchase order.
2. Grace period of 1 month beyond the above delivery period will be considered.
3. Check-list to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.

**BHEL's General guidelines / instructions 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 the Government tender website <http://tenders.gov.in> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference "2731100006".**

Tenders should reach us before 14:00 hours on the due date Tenders will be opened 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  Sr.Manager / Capital Equipment / MM
--	--

## **PART A**

### **QUALIFYING CRITERIA FOR THE SUPPLY OF 160 kv Constant potential X ray equipment**

<b>S. No</b>	<b>PARTICULARS</b>	<b>VENDOR'S RESPONSE</b>
<b>1.0</b>	Number of Years of Experience of the BIDDER/ VENDOR in the field of design, manufacture and supply 160kV constant potential X-Ray system . Indicate the actual experience.	
<b>2.0</b>	The BIDDER / VENDOR shall have supplied at least one number of 160kV constant potential X-Ray system within the last five years. Indicate the number of equipment (of QUOTED MODEL) sold in India & Other Countries.	
<b>3.0</b>	Reference List of Customers and Performance Certificate from CUSTOMERS (minimum ONE Customer) with full contact details of CONTACT PERSON.	
<b>4.0</b>	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	
<b>5.0</b>	DELIVERY - The bidder shall quote the best possible delivery. However the delivery shall not exceed 3 months with an additional grace period of 1 month. The additional grace period will attract a penalty which is explained in the commercial terms of the enquiry. The delivery period shall be reckoned from date of purchase order to despatch from the vendor works.	

## SECTION – II

S. No.	PARTICULARS	VENDOR's RESPONSE
6.0	Number of Years of Experience of the BIDDER/ VENDOR in the field of design, manufacture and supply of '160kV constant potential X-Ray system.	
7.0	YEAR of LAUNCH of the Model quoted against this ENQUIRY	
8.0	Is there any other model launched after the quoted Model? Otherwise, indicate the likely year in which the next model is likely to be launched	
9.0	Number of 160kV constant potential X-Ray system .supplied, installed and commissioned till date, in the QUOTED MODEL	
10.0	Number 160kV constant potential X-Ray system .supplied, installed and commissioned till date for the following category of CUSTOMERS (within INDIA): a) Government Organisations b) Private Sector Companies [Large Scale Industries]	
11.0	Number of 160kV constant potential X-Ray system . supplied, installed & commissioned till date in the following Category (around the GLOBE) : a) Universities b) R&D Labs c) Reputed Heavy Engineering Works/Manufacturing firms	
12.0	Details of Design Set-Up and Technology Back-Up assured for the PRINCIPAL Equipment Maker	
13.0	Details on International Standards followed in Design of the System	
14.0	Comprehensive Details on Performance Testing - of the Equipment quoted, to be ensured in presence of BHEL Executives, prior to dispatch from Supplier's Works.	
15.0	Details of Quality System followed (Kindly furnish the salient aspects of the QA system followed)	
16.0	Details on SERVICE-after-SALES Set-Up in India including the addresses of Agents/Service Centers in India and Asia	
17.0	Any Additional Data to supplement the manufacturing capability of the BIDDER	

### **SECTION – III**

The BIDDER / VENDOR has to comply with the following, for accepting the Technical Offer for scrutiny by the Purchaser :

<b>S.No.</b>	<b>REQUIREMENTS</b>	<b>VENDOR's RESPONSE</b>
<b>18.0</b>	The BIDDER / VENDOR shall submit the offer in TWO PARTS - Technical [with <b>PART A &amp; PART B</b> ] & Commercial and Price Bid. The Technical Offer shall be in line with the BHEL Technical Specifications and the Guidelines or Annexure mentioned, wherever applicable.	
<b>19.0</b>	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. A just 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	
<b>20.0</b>	The BIDDER / VENDOR shall assure a continuous support for SPARES and SERVICE for FIVE Years, from the date of commissioning of the equipment at BHEL Works.	
<b>21.0</b>	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details of 'Bought-Out-Items' with copies of Product Catalogue and Selection Criteria	
<b>22.0</b>	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation of Scope of Supply.	
<b>23.0</b>	The reference List of Customers shall be accompanied with the details (Phone Number / E-Mail ID) of the CONTACT PERSON for cross reference by BHEL.	

  
**R.J. Pardikar**  
AGM/NDT

**R.J. Pardikar**  
Additional General Manager  
Non - Destructive Testing  
Bharat Heavy Electricals Ltd.,  
Tiruchirappalli - 620 014.

# PART - B

## TECHNICAL SPECIFICATIONS FOR 160 KV CONSTANT POTENTIAL X-RAY EQUIPMENT FOR INDUSTRIAL APPLICATIONS. QTY-1NO.

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER'S OFFER [with Complete Technical Details]
1.0	Area of Application	The 160kV Constant potential X-Ray system is used for Film Radiography of welded joints Boiler Components having steel thickness up to 30mm.	
2.0	Principle of Operation	160 kV constant potential X-Ray equipment is used as the Radiation source in Film Radiography. It generates continuous X- rays by bombardment of high speed electrons on high atomic number Target (Tungsten)	
3.0	Design Base	Constant potential metal ceramic X ray tube with capacity 160 kV/10mA (by varying potential difference across the electrodes (5 kV to 160 kV) with varying tube current 0 to 10mA High frequency: 40KHz technique for out put stability, low ripple and better sensitivity.	
4.0	Equipment Configuration	The minimum desired features are enlisted below	
5.0	Operating Parameters	<b>Tube voltage:</b> Minimum 5 kV to 160 kV (Variable insteps of 0.1kV). With reproducibility ~(+ or -)0.01% of max kV value at constant temperature. <b>Tube Current:</b> Minimum 0.2 mA to 10mA (in ~0.1mA steps from 0.5mA to maximum value at operating voltage.). With reproducibility ~(+ or -)2 µA	
5.1	Focal Spot	Dual focal spot preferable (with large focus 1.5mm and mini focus 0.4 mm) .Measurement as per IEC 336 . Source size Certificate to be issued along with Equipment supply.	
5.2	Duty Cycle:	Duty Cycle: 100%	
5.3	Tube current	To be specified by supplier for large focus and mini focus at 160kV.	
5.4	Emergent Beam Cone angle	~ 40°	
5.5	Exposure Time	Digital display: 1 Second, in steps up to 60minutes.	
5.6	Pre warning	1 to 30 seconds	
5.7	Programmed operation	For storing 100 data sets, with read out message for error (With passwords). supplier to specify	
5.8	Inherent filter	Preferably Beryllium filters. Supplier to specify	

5.9	High voltage unit	<ul style="list-style-type: none"> <li>• Ripple: 10V/mA, minimum 20V with 10 meter HV cable</li> <li>• Insulation : SF6 gas insulated</li> <li>• HV power supply cable length : 20 mm diameter with 20 meter long PVC hose to protect the PVC cable</li> <li>• Power cable length : 10m</li> </ul> <p>Two plugs socket with locking lever and safety features, to be specified by the bidder..</p> <p>Radiation output data at various kV at 1 m from focal spot to be furnished. Supplier to specify</p>	
5.10	Dose out put with inherent filter		
5.11	Dose-Rate	in Sv/min (R/ min) at 1 M with and without filter - Supplier to specify	
5.12	Leakage level radiation (at full load)	Leakage radiation levels measured at a distance of 1m at max voltage of 160kV and max current at that voltage be given. These should be within limits prescribed by AERB. During installation this must be demonstrated. Shall not exceed 1R in 1Hour at 1metre from focal spot.	
5.121	AERB approval	The quoted model shall be Type approved by AERB, Copy of certificate to be enclosed.	
5.13	Control Unit	Digital Control Unit containing Power Module, Control Module [with clear text in English], Control Cabinet [with table top], Standard Operating Programs, Inter- Connecting Cables [with length of approximately 20 meters], Control Unit Lock & Key, etc. Control unit shall have facility for recalling the exposures. Display must be LCD. With provisions for adjusting kV, mA, time & to select focal spot. & selections of parameters through PC required. Provision for recording the exposure parameters and their recollection. Text messages of faults be displayed for rectification. Built in automatic warm-up program. Auto-trip facility at higher target loadings & higher target/cooling oil temperatures.	
5.14	Cooling Unit	<p>a) A water cooling pump shall be provided and cooling shall be of closed circuit type with rate monitor.</p> <p>b) A pair of water hoses to connect the X-Ray tube with cooling pump shall be supplied</p> <p>c.) BIDDER to furnish complete details on the Cooling System with Accessories provided and to list down Essential Spares like Cooling Fans, pair of Coolant Circulation, Hoses with end connectors, etc.</p>	
5.15	Flash Lamp	A Warning Flash Lamp with fail-proof safety circuit shall be supplied with 20 meter long cable.	


<b>6.0</b>	Transport Trolley for X-Ray Unit	A sleek and elegant trolley to accommodate all components like generator, water cooler, HV cable tube head and control unit secured on the carriage and capable of easy detachment to be provided. The trolley should be sturdy and should be capable of carrying the x-ray unit and accessories and allow easy transportation. The system shall be mounted on a transport trolley fitted with pneumatic tyres as per the specifications	
<b>6.1</b>	Tripod stand	Tripod stand (Sturdy) for mounting X ray head, height adjustable arrangements with spirit level indicator.	
<b>7.0</b>	Weight	Supplier to specify.	
<b>8.0</b>	Safety interlocks	Built in safety interlocks to switch off the system in case of emergency and safety with door interlocks, meeting AERB regulations.	
<b>9.0</b>	Input Electric Power Supply	a. BHEL will provide Electric Input Power Supply at ONE POINT only, With $230 \pm 10\%$ V, 50 Hz, Single Phase AC through a 3 wire system [Phase, Neutral & Protective Earthing]. b. BIDDER to take supply from this SINGLE Point to all the sub-systems of the equipment through proper step-up or step-down transformers.	
<b>9.1</b>	Maximum Power output of tube	Supplier to specify. For Small and Large focus.	
<b>10.0</b>	Ambient Condition	a.) The uncontrolled ambient room conditions are : 1)Temp:18 to 45° C 2)Relative Humidity : 45 to 85 % b.) BIDDER to specify the atmospheric conditions, as the working environment for the OFFERED Equipment to deliver precise results and serve for a prescribed life of the Equipment.	

<b>11.0</b>	Accessories	<p>1) Laser centering device with device holder  2) Warning flash light with 10m cable.  3) All necessary spares for and control PCBs for 5 years of trouble free operation to be offered.</p> <p>BIDDER to list down (with UNIT RATE) the various ACCESSORIES to be procured with the EQUIPMENT to enhance the Operating Efficiency and Features of the OFFERED EQUIPMENT, over and above those mentioned in the SPECIFICATIONS.</p>	
<b>12.0</b>	Safety and Quality Standards	<p>a. Supplier to ensure Safety and Quality of X-Ray System, which shall conform to International Standards.  b. Conformance certificate to be given along with the equipment</p>	



13.0	Scope of supply	<p>Following shall be supplied compulsorily with the Equipment as per clause 4.0:</p> <ol style="list-style-type: none"> <li>1. X ray head as per specifications- INO..</li> <li>2. High voltage Generator.</li> <li>3. High Voltage Cable</li> <li>4. Power connection cables</li> <li>5. Digital Control unit</li> <li>6. Cooling system:</li> <li>7. Warning flash lamp</li> <li>8. Programmable motor control Diaphragm</li> <li>9. Transport Trolley movement (height adjustment) of x-ray head.</li> <li>10. Radiation Safety equipments: Radiation Survey meter in ranges (0-5mR, 0- 50 mR/hr, 0-500mR/hr, 0-5000mR/hr)-1 No</li> <li>11. HT Silicon paste: 0.5 kg (in 100 grams pack)</li> <li>12. Service tool kit</li> <li>13. Necessary Standard / Certificate traceable to National/International Standard.</li> <li>14. Compulsory Accessories as in Clause <b>6.0, 6.1 and 11.0</b></li> <li>15. Spares &amp; Consumables</li> <li>16. Inspection at Supplier's Works &amp; Training</li> <li>17. Installation, Commissioning &amp; Performance Prove-Out and Training on Operation, Trouble Shooting &amp; Maintenance</li> <li>18. Documentation: Testing &amp; Calibration Certificates</li> <li>19. O &amp; M Manuals [3 Sets]</li> </ol>	
14.0	Consumables for Main Equipment & Accessories	<p>BIDDER has to list down the CONSUMABLES to be used in the Operation of the Equipment and QUOTE with UNIT RATE for all the listed consumables, to be procured with the equipment.</p>	

15.0	Spares for Main Equipment & Accessories	<p>a. BIDDER has to list down the SPARES under Mechanical, Electrical &amp; Electronic Category for the Main Equipment &amp; Accessories for Equipment Operation in 3 shifts a day and for 365 days in a year.</p> <p>b. BIDDER has to compulsorily quote for the following Commissioning Spares with the TECHNICAL OFFER:</p> <ol style="list-style-type: none"> <li>1) High Voltage Cable for 160kV - 1 pair</li> <li>2) All types of PCBs for X-Ray Control System-1 set</li> <li>3) Critical Spares for X-Ray Head and HT Transformer</li> <li>4) Spares for Cooling System</li> <li>5) All Signal Cables - 1 No. each</li> <li>6) All Fuses - 3 Sets.</li> </ol>
16.0	Inspection	The X-Ray system and accessories (consisting of the items mentioned in the scope of supply) shall be offered for Inspection by BHEL and Performance Prove-Out.
17.0	Installation and commissioning	The X-Ray system and accessories (consisting of the items mentioned in the scope of supply) is to be installed & commissioned at BHEL Works, FREE OF COST, by the Service Engineer of the SUPPLIER.
18.0	Documentation in ENGLISH Language	3 Copies (In English) of the Operation & Maintenance Manuals containing Electric Schematics, Circuit Diagrams, PCB 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, one SOFT COPY in CD to be supplied.
19.0	Performance Guarantee	The X-Ray system and accessories (consisting of the items mentioned in the scope of supply) are to be guaranteed for its performance for a minimum period of two years from the date of performance acceptance at BHEL Works.
20.0	Service and Spares Support Requirements	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 with in 1 week.
21.0	Training on Operation & Maintenance	Complete Training for 2 BHEL Engineers is to be given on Operation & Maintenance of the OFFERED Training has to be provided at BHEL Works, after the successful commissioning of the Equipment & Accessories.
22.0	Annual Maintenance Contract - AMC	The BIDDER has to QUOTE for AMC with detailed scope of work.
23.0	Safety and Quality Standards	Supplier to ensure that Safety and Quality of X-Ray system and accessories (consisting of the items mentioned in the scope of supply) shall conform to International Standards. Conformance certificate to be along with the equipment.

  
**R.J. Pardikar**  
 Additional General Manager  
 Non - Destructive Testing  
 Bharat Heavy Electricals Ltd.,  
 Coimbatore - 620 014.