



Purchase Specification for X-RAY INSPECTION MACHINE

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Pre-qualification criteria

1. A) The vendor shall be an Original Equipment Manufacturer (OEM) Based in India,
(OR)

Foreign OEM with Authorized Indian dealer(s) / representative(s) for sales, spares and service.
The authorization letter for the dealer/ representative shall be provided,

B) i) Offer can be submitted by the OEM or their authorized dealers in India along with a latest and valid authorization letter.

ii) MII certificate: For this tender, Non-Local supplier whose local content is less than 20% are not eligible to participate. (For details, refer Government of India Circular No. P-450212/2017-PP (BE-II) issued by ministry of Commerce and Industry, DPIIT (Public Procurement Section) dt 16.09.2020 and its subsequent revisions.) MII Certificate is given in Annexure TS 1 and vendors are required to fill and submit the signed / sealed copy of the same.

iii) If the offer is from an authorized representative in India, the Indian representative cannot quote for the same equipment from 2 or more different OEMs.

iv) Additionally, if an Indian dealer is submitting the offer, an authorization letter from OEM to submit the offer for this RFQ is also to be provided.

2. The offer shall be only for new equipment and not for any refurbished / used equipment. A declaration to the above effect to be furnished.
3. All the parts used in the machine shall also be new and not used / refurbished ones. A declaration to the above effect to be furnished.
4. The OEM should certify that the model offered is currently under production and will provide service / spares support for at least 10 years from date of supply of the machine.
5. The vendor should have already supplied and installed 3 nos. of Industrial X Ray inspection machines in India during the last five years. The details of the customers with contact details, machines installed, date of installations etc. to be provided.
6. The vendor shall be in a position to provide service and spares support for the installations in India.
7. The vendor or their authorized service representatives should have trained engineers in India for commissioning & service for the offered equipment. A declaration to the above effect to be furnished.
8. The vendor shall be in a position to undertake AMC for the equipment with BHEL after the expiry of the warranty/ guarantee period either directly or through a service representative with authorization from OEM for spares and service support.



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9. The vendor shall arrange for a demonstration of the machine or a similar system operating in India, as required by BHEL.
10. The vendor shall furnish a comprehensive warranty for at least 24 months from the date of commissioning or 30 months from the date of delivery, whichever is early.
11. The vendor shall guarantee the performance of the equipment for at least 12 months from the date of commissioning.
12. The model proposed by the vendor should have got the approval of M/s AERB for selling the machine in India. Necessary proof to be submitted.
13. The vendor should provide all necessary support in obtaining AERB approval by BHEL for Procurement, Installation and operation of the machine.

NOTE:

1. Pre-qualification evaluation will be carried out based on the details furnished by the vendor / feedback from their customers / inspection of the company / product if required by BHEL and at its sole discretion.
2. Pre-qualification criteria are mandatory requirements and the technical bids will be evaluated only when the Pre-Qualification criteria are met.

A.) Scope:

Supply, Installation, Erection & Commissioning of X-RAY INSPECTION MACHINE as per the following specifications.

B.) Technical Specifications:

The offer shall be corresponding to the parameters under the specifications below or better. Pointwise compliance to the following specification is required

SPECIFICATION FOR X-RAY INSPECTION MACHINE

SL.NO.	Parameters	Requirement
1	Main System Requirements	
1.1	Application	X-Ray inspection of PCBA (PCB Assembly)
1.2	Components to be Inspected	BGA, BTC, THT components, Bare PCB and other SMD Components.
1.3	Size of Component	From 0201 package to 50 X 50 mm Packages.



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1.4	Type	2.5 D Inspection (2D with oblique view option)
1.5	Inspection Parameters	BGA : 1. Void percentage for each ball 2. Overall Void percentage 3. Circularity of the ball 4. Diameter of the ball 5. Head in Pillow defect identification. 6. Bridging 7. Missing ball. 8. Volume Analysis.
		BTC / QFN / QFP : 1. Void identification with percentage 2. Bridging.
		PTH : 1. Void identification with percentage 2. Fill percentage 3. Crack of minimum 0.1 mm
2	X-Ray Source	
2.1	Max kV	160 KV or higher
2.2	Max. Electron Beam Power (Target power)	15W or higher
2.3	X-Ray Source	Open tube
2.4	Focal Spot size / Spatial resolution	< 5 μ m
2.5	Feature recognition /Tube Resolution	< 1 μ m
2.6	Geometric magnification	\leq 2500X
2.7	System Magnification	\leq 7500x
3	Image detector	
3.1	Detector Type	High resolution flat panel detector
3.2	Pixel size	130 microns or less
3.3	Pixel Area	125 X 125 mm or more



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	Frame rate	10 FPS or more
4	Manipulator	
4.1	Manipulator control	5- axis (X,Y, Z, T, R) control with joystick and software control with necessary safety features.
4.2	Tilt	> +/-55 deg
4.3	Sample size	460 x 435 or higher
4.4	Radiographic area	300 X 300 mm or higher
4.5	Max. Sample Weight	5 kg or more
5	Inspection method	<p>Manual: To move the manipulator to the require spot and capture the X Ray Image as required.</p> <p>Semi-automatic: To move the manipulator to required spot and run a Program to do Inspection and give desired results.</p> <p>Automatic inspection: By selecting a particular program and loading the PCB, the machine should do inspection of all programmed locations and give the results as programmed.</p> <p>Programming results required as in clause 1.5</p>
6	Safety	
6.1	X-ray Radiation safety	< 1 μ Sv/hr at 100 mm from the cabinet surface
7	System Controller requirement	
7.1	Anti-collision mechanism	System shall have anti-collision mechanism to avoid tube touching the sample
8	Control System	
8.1	Operating System	Windows 10 64-bit or better
8.2	Display	21" or higher



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8.3	SPC	Statistical Process control data of the inspection results to stored and retrieved on demand.
8.4	Barcode reader	Built-in feature with choice of enabling and disabling based on operator's choice.
8.5	Capturing Image Format	RAW/JPEG/TIFF/GIF/BMP
8.6	User profiles	Real-time enhancements and filters stored as user profiles to be used during manual inspection.
8.7	Authorization level	Operator, Administrator, Service logins to access system for authorized persons only
8.8	Printer	A LAN printer should be supplied along with the machine, for printing the Inspection results on demand.
9	Machine Size	
9.1	Cabinet dimensions (W x D x H)	not exceeding 1700mm(W)x2300mm(D)x2300mm(H)
9.2	System Weight	not exceeding 2500 Kgs
10	POWER	
10.1	Input Power	Single phase 210-230 VAC 50/60 Hz or Three Phase 415V AC, 50 Hz.
10.2	Typical Power Consumption	2.5 KW or less
11	WORKING ENVIRONMENT	
11.1	Operating Temperature	15-30°C
11.2	Humidity	<85% (non-condensing)
12	General requirements	
12.1	Emergency stop	To shutdown system in case of any emergency
12.2	Radiation Safety	Compliance to Radiation Safety standards and CE regulation is required
12.3	Interlock system	Front Load door with automatic interlocked X-ray off function in addition to key interlock
12.4	Signal Tower / X-ray on caution light	Signal Tower / X-ray on caution light with interlock



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Note:

1. Specify the machine parameters and briefly explain features wherever applicable.
2. If more than one configuration is quoted, separate offers shall be submitted.

Warranty & AMC

1. The vendor shall provide a comprehensive warranty (Which includes, Preventive maintenance as recommended by the OEM) for X-RAY INSPECTION MACHINE for a period of 24 months from date of successful commissioning or 30 months from date of delivery at BHEL EDN whichever is earlier.
2. Vendor shall quote separately with this tender for non-comprehensive AMC (Annual maintenance contract) for a period of at least 5 years after the expiry of warranty. (With 4 Preventive Maintenances or as recommended by OEM, whichever is higher and unlimited breakdown Calls per year). The vendor has to have a dosimeter and during every PM, radiation levels to be measured and recorded.
3. The AMC prices and spare parts prices shall also be considered for evaluating cost to BHEL and for cost comparison to arrive at L1 vendor. The ordering of AMC after the end of warranty period shall be at the discretion of BHEL.



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Details to be furnished along with the offer

- 1) If more than one configuration is quoted, separate offer with complete technical details shall be submitted.
- 2) Unpriced Price bid (ie. Offer with prices blanked out) is to be submitted along with the techno-commercial offer.
- 3) Clause-wise deviations, if any, have to be brought out clearly. If there are no deviations, the vendor has to indicate clause-wise compliance with the specifications.
- 4) The complete technical information and catalogue shall be given.
- 5) If the offer is from foreign OEM, Details of Authorized service agents in India to be furnished
- 6) With regard to the handling and operations of the equipment being supplied to BHEL, vendor should provide details of the identified hazards and assessed risks (HIRA), and the precautions and control measures to be adopted.
- 7) Vendor shall spell out any aspects which can pollute the environment, and assessment of their impact on environment.
- 8) Vendor shall provide details of disposal mechanism of the equipment at the end of the lifecycle.

GENERAL TERMS

- 1) Operation, Maintenance, Service & spare parts manual has to be supplied in hard copy and soft copy along with the equipment. Detailed Electrical and Electronic circuit diagram if any have to be provided as part of the manuals. Routine maintenance schedules and the activities shall be provided in the manual.
- 2) The machine shall be installed at BHEL-EDN by the vendor. The cost of installation and commissioning if extra need to be included in the price bid.
- 3) Training shall be provided for operation & maintenance to BHEL personnel at BHEL premises. Training cost, if any is to be included in the Price Bid, which will be considered for arriving at L1 Vendor.
- 4) Certificate of conformance along with test results should be furnished to BHEL along with the equipment.



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Annexure TS 1

On Bidder Letter Head

Date:

To,

M/s Bharat Heavy Electricals Ltd.
Electronics Division, Mysore Road,
Bangalore – 560026

Sub: Model Clause / Certificate as per clause 9 (a) of Revised Public Procurement (Preference to Make in India Order, 2017 of DPIIT dated 13.06.2020.

Ref: BHEL Tender / RFQ / NIT Number

I, (authorized signatory
for M/s) a 'Class-I Local Supplier' / 'Class-II Local Supplier' at the time
of tender, bidding or solicitation hereby confirm that the item meets the Local Content requirement for
'Class-I Local Supplier' / 'Class-II Local Supplier' (Tick appropriate option & cut the other one) and the
Local Content percentage is

The address is as below, where the local content / value addition is made:

[Factory Address]

For M/s

Authorized Signatory
(with company seal & Name)