

Annexure - C to Tender BAP/CAP/2015-16/OT-03

Item List and Technical Specification

Sl. No.	Description	Unit	Quantity	Quoted Yes / No
1	Digital Densitometer	No	1	
2	Film Viewer	No	1	
3	Black Light	No	1	
4	LPI Test Blocks and Panels	Set	3	
5	UV Light Meter	No	1	

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TECHNICAL SPECIFICATION

Annexure I (a)

1. DENSITOMETER

S. No.	Particulars	Required Specifications
1.0	Area of Application	Densitometer is a device used for measurement of Optical film density of radiographs as per ASME Section V requirements, as part of Radiographic film evaluation. It is used for evaluation of Radiographs of Weldments in Boiler components with Steel thickness Ranging from 4 mm to 200 mm.
2.0	Light source	Built in lamp.
3.0	Density Range	0.1 to 4.0 D
4.0	D Aperture	Preferably 1mm
5.0	Accuracy	+/- 0.02 D
6.0	Repeatability	+/- 0.01D
7.0	Display	Digital, LCD / LED
8.0	Controls	On/Off, Zero error /Other settings
9.0	Warm up Time	60 seconds
11.0	Size	Supplier to specify
12.0	Weight	Supplier to specify
13.0	Operating temperature	15deg to 40 degree Celsius
14.0	Power Requirement	Supplier to specify
15.0	Voltage range	230 V ± 10 % AC, 50 Hz Single phase
16.0	Scope of supply	Densitometer as per specification along with all accessories (Power connection cable, Density Strip etc.)
17.0	Spares for Densitometer	a. BIDDER has to list down the essential spares for normal working of the densitometer. b. BIDDER has to compulsorily quote for the Spares with the TECHNICAL OFFER.
18.0	Operation and maintenance manual	2 Copies (In English) of the Operation & Maintenance Manuals containing. In addition, one SOFT COPY in CD to be supplied.
19.0	Installation and commissioning	The system is to be installed & commissioned at BHEL Works by the SUPPLIER.
20.0	Performance prove out at BHEL	The satisfactory performance of the equipment should be demonstrated at BHEL works by the SUPPLIER
21.0	Warranty	The Densitometer along with accessories are to be guaranteed for its performance for a minimum Period of one year from the date of performance acceptance at BHEL Works.

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TECHNICAL SPECIFICATION

Annexure I(b)

3. BLACK LIGHT

PARTICULARS	BHEL SPECIFICATIONS
Application	For Fluorescent particle testing Inspection and evaluation of materials and welds
Power Supply	230 V 50Hz 1 phase supply.
Power cable	5 metres
Current Draw	1 Amp
UV Intensity at 300mm	4000 Microwatts/Sq.Cm
Visible light emission at 300mm	less than 0.1 Lux or 1 foot candle
Wavelength	365 nanometers
U.V.Bulb	100 Watts
Filter	Koop Filter
Running Temperature at 20deg.centigrde	Less than 40 deg.centigrade
Weight (with Fan Cooled hand lamp)	Vendor to specify
Wt (Fan Cooled hand lamp+ Control unit)	Vendor to specify
Cable length from lamp to control unit	5 metres
Performance Guarantee	1 Year
Calibration certificate and Operating manuals	To be furnished with Black Light supply



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TECHNICAL SPECIFICATION

Annexure I(c)

2. Film Viewer

SPECIFICATION:	CFL Type High Intensity Film Viewer
View Port	250mm x 100mm
View Pieces density	Up to 4.0 D
Light Source	CFL lamp
Input Voltage	230V AC, 50~60 Hz
Rated Output	Vendor to specify
Mandatory Accessories	Foot Switch, cooling Fan, Power cable with connector
Continuous Highest Brightness	12 Hours
Surface Temperature Rise	Less than 30°C
Contour Dimension (L x W x H)	Vendor to specify
Housing	Stainless steel corrosion resistance case
Maximum Brightness	Up to 80,000 Lux
Light Intensity Control	From 1% ~ 100% Continuous
Cooling Unit	120mm X 120mm Square 230V AC High Capacity fan : 2nos
Foot Switch	ON/OFF Control
Operating Weight	Vendor to specify
Mandatory Spares	Vendor to specify

Note: Suppliers to take adequate precaution during dispatch as the film viewer and accessories are fragile in nature and are easily damaged during transportation. All electrical lamps shall be separately packed and are not to be fitted with illuminators

TECHNICAL SPECIFICATION

Annexure I(d)

4. LPI Blocks and Panels
(a) AI Test Block

Total quantity= 1 Set

PARTICULARS	BHEL SPECIFICATIONS
Application	The Aluminium Test Block is used for the comparing of penetrants used within the LPI inspection process and performance comparison of the Liquid Penetrant Inspection (LPI) Systems. This shall be applicable for all the type of LPI (Visible, Fluorescent, Water washable, Post emulsifiable and Solvent removable)
Design Standard	In accordance with MIL Standard 6866, and ASTM E1417
Dimensions	Length 100mm, Width 71mm, Thickness 2mm
Material and Dimensions	The Block shall be made of Aluminium
Crack dimensions	There shall be Quenched Crack on the surface of the Block.
Package	AI Test Block shall be stored in a light weight compact box(plastic/wooden)
Scope of supply	1)One Set. Of AI Test Block conforming to the clauses in this specification. 2)Calibration certificate for each set 3)User manual -1 No
Performance Guarantee	1 Year from the Date of Commissioning of the equipment
Calibration certificate	Supplier shall furnish the calibration certificate for each AI Test Block at the time of supply.



TECHNICAL SPECIFICATION

(b) Ni-Cr panel

Total quantity= 1 Set

PARTICULARS	BHEL SPECIFICATIONS
Application	The Nickel Chromium Panels are used for assessment of the performance checking (Sensitivity) and performance comparison of the Liquid Penetrant Inspection (LPI) Systems. This shall be applicable for all the type of LPI (Visible, Fluorescent, Water washable, Post emulsifiable and Solvent removable)
Design Standard	In accordance with MIL Standard 6866, and ASTM E1417
Dimensions	Length 100mm, Width 71mm, Thickness 2mm
Material and Dimensions	The Plate shall be made of Brass with Coating of Ni-Cr
Crack dimensions	There shall be linear cracks on the Ni-Cr side along the width of the Panels. There shall be 3 Panels in One set, with the following uniform crack sizes. 1) 50 Micron 2) 20Micron 3) 10 Micron.
Package	The Nickel Chromium panel shall be stored in a light weight compact box(plastic/wooden)
Scope of supply	1)One Set (consists of 50 Micron , 20Micron , 10Microns .of Ni-Cr panels conforming to the clauses in this specification. 2)Calibration certificate for each set 3)User manual -1 No
Performance Guarantee	1 Year from the Date of Commissioning of the equipment
Calibration certificate	Supplier shall furnish the calibration certificate for each Ni-Cr panel at the time of supply.

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TECHNICAL SPECIFICATION

(c) TAM panel

PARTICULARS	BHEL SPECIFICATIONS
Application	The Penetrant System Monitor (PSM) or Star burst Penetrant Testing And Monitoring (TAM) Panel is used for performance checking (Sensitivity) of the Liquid Penetrant Inspection (LPI) System. This shall be applicable for all the type of LPI (Visible,Fluourescent,Water washable, Post emulsifiable and Solvent removable)
Design Standard	In accordance with MIL Standard 6866, and ASTM E1417
Material and Dimensions	The TAM panel shall be made of Stainless Steel and measure 100mm width X 150mm length and the thickness should be 1.16mm \pm 0.127mm. One side there shall be a coating of a Chrome plated strip 44.5mm wide and 0.076 mm thick covering the length side of the Panel. The remaining portion of the length side should have a grit blasted surface with medium roughness. In accordance with Pratt & Whitney's drawing Tam 146040
Number of Star cracks	The Chrome plated strip should contain FIVE cracked centres (pattern cracks)
Spacing of the star cracks	The cracked centres should be evenly spaced 25mm apart
Dimensions of the cracks	Diameter of the smallest star crack shall be 3.8mm and it shall increase sequentially such that the diameter of the biggest (fifth) crack is 6.3mm.
Package	The TAM panel should be packed in a compact, light weight wooden/plastic box so that it can be safely stored permanently whenever not in use.
Scope of supply	<ol style="list-style-type: none"> 1) One No. TAM panels conforming to the clauses in this specification. 2) Calibration certificate for each Panel. 3) User Manual-2 Numbers.
Performance Guarantee	1 Year from the Date of Commissioning of the equipment
Calibration certificate	Supplier shall furnish the calibration certificate along with the Equipment at the time of supply.



TECHNICAL SPECIFICATION

Annexure I(e)

5. UV Meter

Description	BHEL specification
UV- A Sensor	Minimum 1000 micro Watt/cm ²
Power	Vendor to specify
Centre wavelength	365nm
Size	Vendor to specify
Weight	Vendor to specify
Battery operation	Vendor to specify
Performance Guarantee	1 Year from the Date of Commissioning of the equipment
Calibration certificate	Supplier shall furnish the calibration certificate, user manual along with the Equipment at the time of supply