

TD-106-1

Rev 5

Form No



**PRODUCT STANDRARD
TURBINES & COMPRESSORS
HYDERABAD**

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SPECIFICATION OF FILM DIGITIZER

1.0 Description:

This specification outlines the requirements for Industrial Film digitizer used for digitization of Exposed Radiography films of Compressor jobs.

The supplier shall supply, Install and commission the Industrial Film digitizer system with digital image viewing software for NDT application.

2.0 Specification:

2.1 Purpose: For digitization of Industrial radiography films. The image produced after digitization must have same density and contrast of the original radiography film which was digitized.

2.2 Digitizer ((Film scanner) Technical specification:

- 2.2.1 Light source shall be He-Ne laser (632.8nm) for scanning the radiographic film.
- 2.2.2 The scanning resolution shall be 50 micron (minimum) to 500 micron (maximum).
- 2.2.3 The equipment shall be capable of digitizing the films having Optical Density (OD) range from 0.5-4.7 and the digitizer system shall have the capability to read the above OD range.
- 2.2.4 The scanned image pixel depth shall be 12 bit (4096, Grey levels).
- 2.2.5 The equipment shall be capable of digitizing the following film sizes:

	Minimum	Maximum
Width	4 inch (100mm)	12 inch (300mm)
Length	8 inch (200mm)	16 inch (400mm)

2.2.6 Film digitizer shall meet the requirements of class DS film digitizers according to EN 14096 part 2, BAM and Mandatory Appendix VI Article 2 of ASME Boiler and Pressure Vessel Code, 2019 Edition.

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2.2.7 Performance of the System shall be determined by using digitized representation of the reference targets (images) and the same shall be provided along with the equipment.

2.2.8 The digitizer shall operate with the power supply as follows:

AC Input: 100 V-240V

Frequency: 47-63 Hz

Single phase

2.3 Digitizer viewing software Technical specification:

2.3.1 It is basically a 64-bit software.

2.3.2 The digitiser shall be supplied with digital viewing software with image archival provision.

2.3.3 The software is compatible to acquire the digitised image from scanner and display it in viewer/monitor with same optical density as available in film.

2.3.4 The software shall have the following minimum manipulation/mathematical tools such as;

- Image contrast adjustment
- Annotation tools
- Histogram (line and area profile and first derivative function)
- Region of interest (ROI) on image.
- Image enhancement filters.
- Tools like grey value display for particular pixel, image ruler, degree etc.,
- Facility to export the image Grey value on excel file (XML) or text format.
- Image Area measurement calculation.
- Image wall measurement tools.
- Defect and material loss (DX/X) measurement.
- Multi film inspection tool, that is to stack different density films on one another for evaluating the analysing the part.

2.3.5 The digitised image shall be stored in TIFF, JPG, BMP, DICONDE format, it is a minimum requirement.

2.3.6 The software shall have provision for data base management and to store the image with date and have ability to search the data with keywords.

2.3.7 The software may have report generation feasibility and PDF format also.

2.3.8 Software validation certificate to be submitted.



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2.4 Basic Equipment

The supply equipment Film Digitizer shall be comprised of the following:

1.	Film digitiser (50-micron pitch)	1 No.
2.	Digital viewing software (64-bit)	1 No.
3.	Work station computer	1 No.
4.	High resolution monochrome Monitor (16 bit) (5MP)	1 No.
5	8 – bit normal colour monitor	1 No.

The Minimum Hardware specification of workstation shall be as follows

Sl.No	Minimum Hardware Specifications	
1.	Processor	Intel Xenon / i7 processor or better
2.	Operating system	windows@ latest compatible to Digital Viewing Software 64 – bit
3.	Classis configuration	Mini – Tower
4.	Memory(RAM)	16 GB (4X1GB) DDR2 – 667 ECC
5.	Hard Drive	500GB WD Raptor SATA NCQ 10 K
6.	2nd Hard Drive	500GB WD Raptor SATA NCQ 10 K
7.	DVD	32XDVD±RW super Multi SATA (1st)

3.0 Important notes:

The following points are to be clearly spelt out by vendor in his offer, without which quotation will not be accepted.

3.1 Item- wise, clause-wise deviations (for clauses 2 and its sub clauses) are to be brought out in the technical offer.

3.2 Service centres available with in India and also worldwide to be listed. In the event of the equipment ever requiring service, the vendor should undertake the same upon hearing about it from BHEL/and or its customers. The vendor/agent must lift the equipment and have the same repaired/serviced at its service centres in India /abroad irrespective of whether service is free or chargeable in a reasonable period of time. This responsibility claim must be made in writing by the vendor at the time of the offer.

3.3 Catalogues/Technical brochures of the equipment offered to be enclosed.



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3.4 Acceptance to supply of O & M manuals- two (2) numbers Hard copies in originals. 2 no's of CD/DVDs will be supplied with each equipment.

3.5 Vendor should quote price of all items of equipment kit in one single currency only.

4.0 Material codes:

Var No	Description	Material Code
01	Film Digitizer	TC9752548016

5.0 General terms and conditions:

5.1 Supplier shall give two-year warranty for the complete system after acceptance by BHEL.

5.2 Any updates of Digital Viewing Software shall be provided at free of cost for period of 5 years.

5.3 If the software gets corrupted after commissioning the same has to be re installed at free of cost.

5.4 It is the responsibility of the supplier to arrange boarding, conveyance for their engineers during installation activity.

5.5 Prior intimation shall be given to BHEL, about their readiness of the supply and installation activity.

5.6 The system installation shall be done by party and demonstration to the BHEL Engineers.

5.7 The operation / service and maintenance training shall be provided to BHEL Engineers.

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6.0 Special Instructions:

6.1 Quality Assurance: All materials should be delivered in clean and useable condition. Openings should be securely covered against entry of foreign material where appropriate.

6.2 Marking and packing for shipment.

6.2.1 Packing shall be accomplished in accordance with acceptable commercial practices (for domestic or foreign shipments) unless otherwise indicated in the purchase order.

6.2.2 Shipping containers should be identified with BHEL purchase order number, BHEL material code number, vendor packing list and shipping number. Each Shipping container should contain three copies of packing lists, listing all contents of the particular container with one copy attached in a secure manner to outside. Each part should be identified and keyed to the packing list.



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RECORD OF REVISIONS

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