An ISO 9001 Company

Bharat Heavy Electricals Limited
(High Pressure Boiler Plant)
Tiruchirappalli – 620014, TAMIL NADU, INDIA
CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY **NOTICE INVITING TENDER**	Phone: +91 431 257 7421/ 7297 Email : vkaruna@bhel.in, hari.r@bhel.in Web : www.bhel.com

TWO PART BID Tender to be submitted in two Parts	**Enquiry Number:** **2731900015**	**Enquiry Date:** **01.08.2019**	**Due date for submission of quotation:** **26.08.2019**

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 is reaching physically our office before 14:00 hrs on the Date of tender opening.

Item	Description	Quantity
10	**Programmable Automated Hydro Test Station** 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.**

Important points to be taken care during submission of offer

1. **Delivery terms shall be FOR BHEL Stores, Trichy for indigenous vendors.**
2. **By Foreign Vendors: CFR Chennai Seaport / Airport**
3. **Compliance Form MM/ CE/ TRY/ IMP / 02 (for foreign vendors) and MM/ CE/ TRY/ IND / 02A (for indigenous vendors) to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.**
4. **Delivery period required is 3 months from the date of Purchase Order.**
5. **Erection and commissioning activities shall be done by the supplier, at BHEL Trichy works.**
6. **Time period required for Erection and Commissioning activities shall be 3 weeks from the date of intimation by BHEL**
7. **EMD applicable for this Enquiry is INR 1,50,000/-**
8. **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/001-EMD), compliance form and technical specification can be downloaded from BHEL web site http://www.bhel.com or from https://eprocure.gov.in/epublish/app under Enquiry reference "2731900015".

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**

R. HARI
Engineer
MM / Capital Equipment
BHEL, TRICHY - 620 014
Engr / Capital Equipment / MM

PART - A: Pre - Qualifying Criteria

SECTION – 1: Qualifying Criteria

The Bidder has to compulsorily meet the following requirements to get qualified, for evaluation of the technical offer.

S. NO.	PARTICULARS	BIDDER's RESPONSE
1.1	Only those Bidders / OEMs, who have supplied and commissioned at least 1 number of automated programmable hydro testing pump unit of 400 kg/cm^2 or above capacity are eligible to quote	
1.2	Bidder has to submit at least ONE Performance Certificate from their customer, for satisfactory performance of the equipment specified in 1.1. For obtaining the Performance certificate, a suggestive format is provided in **Annexure-A**.	
1.3	BHEL reserves the right to verify the information provided by the Bidder. In case the information provided is found to be false/ incorrect, the offer is liable for rejection.	

Section 2: Information to be provided by the bidder:-

S. NO.	PARTICULARS	BIDDER's RESPONSE
2.1	The BIDDER to furnish Reference List of Customers with Complete contact details where similar machine is supplied.	
2.2	Details of similar Equipment supplied to BHEL unit, if any.(Year of commissioning, Application, Type)	
2.3	Details on SERVICE-AFTER-SALES Set-Up in India including the Address of Agents / Service Centers in India.	
2.4	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

Section 3: The BIDDER to note:

S. NO.	PARTICULARS	BIDDER's RESPONSE
3.1	The BIDDER / VENDOR shall submit the offer in TWO PARTS. 1. Technical Offer [with PART A & PART B] & commercial offer 2. Price Bid.	
3.2	The Bidder's offer against each clause in PART A & B of the offer should be filled by the BIDDER compulsorily with complete details.	
3.3	The BIDDER shall assure a continuous support for Spares and Service for Ten Years, from the date of commissioning of the equipment at BHEL Works.	
3.4	The Technical Offer shall be supported by Product Catalogue and Data Sheets in original and complete technical details / literature on the quoted model of equipment.	
3.5	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.	

ANNEXURE-A

Suggestive Format of Performance Certificate:

The performance certificate to be produced on Customer's Letter Head.

PERFORMANCE CERTIFICATE

1.	Supplier of the Equipment/Machine	:	
2.	Make & Model of the Equipment	:	
3.	Month & Year of Commissioning	:	
4.	Application for which Machine is used	:	
5.	Machine Details	:	
	a) Type		
	b) Max. Pressure (bar)		
6.	Performance of the Machine (Strike off whichever is not applicable)	:	Satisfactory / Not Satisfactory
7.	Any other Remarks	:	

Date :

Signature & Seal of the Authority
Issuing the Performance Certificate

PART - B: Technical Specification

Note: -

1. The Column **"Vendor's offer with Technical details & Remarks"** of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous or unsustainable information against any of the clauses of the specifications / requirements shall be treated as non-compliance.

2. The offer and all documents enclosed with offer should be in **English language** only.

Name & Address of the Supplier:	Name & Address of the Indian agent:
Telephone no.:	Telephone no.:
Fax no.:	Fax no.:
e-mail:	e-mail:

SCOPE: -

This technical specification covers the requirements of Design, Manufacture, Supply, Erection and Commissioning of Programmable Automated Hydro Test Station with all the accessories for trouble free operation. Programmable Automated Hydro Test Station should be of Industrial design for precise & long operating life.

Bidder shall be complying with the technical specification as given below.

S No	BHEL Specification	Bidder's offer with technical details
1.	**Purpose & process:**	
1.1	The components, its sub-assembly and main assembly of the equipment made up of carbon steel, stainless steel & Titanium undergoes hydro test for the strength test. During hydro test, internal pressure of the component is gradually increased from atmospheric pressure to hydro test pressure in steps at a predefined rate of pressure rise followed by holding the pressure for predefined time and then further raising it to next set pressure and this process of raising the pressure and holding it continues till the pressure inside the component/ assembly reaches to the maximum required hydro test pressure. After holding the maximum test pressure for predefined time, depressurising of the component/assembly is carried out gradually at pre-defined rate. The depressurising followed by holding the pressure for predefined time and then further depressurising and so on. This process continues till the pressure inside the components/assembly reduces back to the atmospheric pressure. De-Mineralised (DM) water at ambient temperature is used as medium for hydro test. **Note: The test component will be filled with DM water by prefilling pump before starting the hydro test .The prefilling pump is in BHEL scope.**	
1.2	The Programmable Automated Hydro Test Station equipment shall comprise of pneumatically operated pumps and shall be fully programmable with PLC controlled system. All the test parameters viz. rate of pressurising/de-pressurising, set / interstage pressure and its holding time at set pressure and no. of such stages to achieve the final pressure shall be fed through a suitable HMI. The system should be capable of running in auto mode as well as manual mode as required.	

S No	BHEL Specification	Bidder's offer with technical details
	The system running in auto mode can be taken over by the operator to run in manual mode at any point of time. Vendor to consider this requirement .	
1.3	**Graph plotting on chart recorder during hydro test:** **<u>Present Practice</u>**: In present practice hydro test pump is connected to the job, all the openings of the jobs are closed by dummy flanges. The top most flange has an opening in the center for connecting the vent line which is further branched into 3 outlet fittings. 1st Branch: - Meant for venting out the air bubbles during pre-filling the job with DM water. This will be closed before start of hydro test. 2nd Branch: - Connected to pressure transducer for plotting on chart recorder. 3rd Branch: - Connected to Analog pressure gauge. All three lines have 1 inch BSP female connection. **Bidder to note.**	
1.4	**Graph plotting on chart recorder during hydro test:** **<u>Proposed method</u>**: Since the hydro test pressure of the component/assembly to be taken into account for graph plotting, hence the offered system shall be designed to take feedback from the pressure transducer connected to the vent line of the component/assembly. Additional to PLC digital measurement, the proposed system should have following features for pressure measurement. A. Connection for pressure transducer for plotting on chart recorder. The chart recorder will be in <u>BHEL Scope</u>, pressure transducer to be supplied by the vendor. B. Connection for Analog pressure gauge. **Bidder to confirm.**	

S No	BHEL Specification		Bidder's offer with technical details
2	**Job details**		
2.1	Equipment Material	The components/assembly to be tested is made up of Titanium, Stainless Steel, carbon steel, low alloy steel.	
2.2	Job configuration	The job may be of Tube and welded complex profile cylindrical components.	
2.3	Volume range for above components	0.1 m^3 to 5.5 m^3	
3	**Hydro test requirement & Design features:** Based on the job requirement, various types of hydro test cycles are required to be carried out with the intended equipment. Details of 1 such type of hydro test cycle is explained below from SL No. 3.1 to 3.5. The graph of this hydro test cycle is attached in Annexure-B		
3.1	Pressurization range-1	Atmospheric pressure to 343 kg/cm^2 at a Pressurization rate of 10 kg/cm^2 per minute with intermittent holding the pressure. Refer graph in Annexure-B	
3.2	Pressurization range-2	343 kg/cm^2 to 428.4 kg/cm^2 at a Pressurization rate of 2 kg/cm^2 per minute with intermittent holding the pressure. Refer graph in Annexure-B	
3.3	Depressurization range-1	428.4 kg/cm^2 to 343 kg/cm^2 at a depressurization rate of 2 kg/cm^2 per minute with intermittent holding the pressure. Refer graph in Annexure-B	
3.4	Depressurization range-2	343 kg/cm^2 to Atmospheric pressure at a depressurization rate of 10 kg/cm^2 per minute with intermittent holding the pressure. Refer graph in Annexure-B	
3.5	Holding time	User settable	
3.6	No. of intermittent stages	Pressurising/De-pressurising at a pre-defined rate and followed by holding the pressure for pre-defined time is considered as one stage/step. For a single hydro test cycle, there can be up to 50 such	

S No	BHEL Specification		Bidder's offer with technical details
		stages/steps. Vendor to consider this for designing the hydro test system software. Bidder to confirm and provide details	
3.7	System memory	The system memory should be capable of storing minimum 30 hydro test cycles data which will avoid repetitive feeding the data for same hydro test. Vendor to confirm.	
4	Machine Features required: • Suitable with Automatic, Semiautomatic and manual operation modes. • Suitable Touch screen HMI for setting the test pressure values and no. of stages, holding time etc. Real time display of parameters in minimum 15 inch LED display. • Electronically pressure control mechanism. • Safety Pressure Limit shall be Settable through software. • Automatic Pressure Release Upon Emergency Pressed/Safety Limit Achieved etc. • Peak Pressure Display On Software • Automatically terminate the test against the over pressure. • Emergency stop button: To depressurize the system for any Emergency. • Mechanical Safety relief valve to be considered. • Report generation in Excel format and PDF (graphical) format with test parameters. Provision should be there to feed customer logo, project Number, date, time etc in the report/graph generation. • Tower light for test bay for the indication of test status. Bidder to confirm		
5	**Pump specification**		
5.1	Max working pressure	500 kg/cm^2. Bidder to Confirm and provide details	
5.2	Discharge Capacity	Bidder to specify the discharge capacity in L/min	
5.3	Pump Type	Pneumatically operated. Bidder to confirm	
5.4	Pressure Ratio of the pump	Bidder to Specify (To suit the requirement)	
6	**Pressure Gauges**		

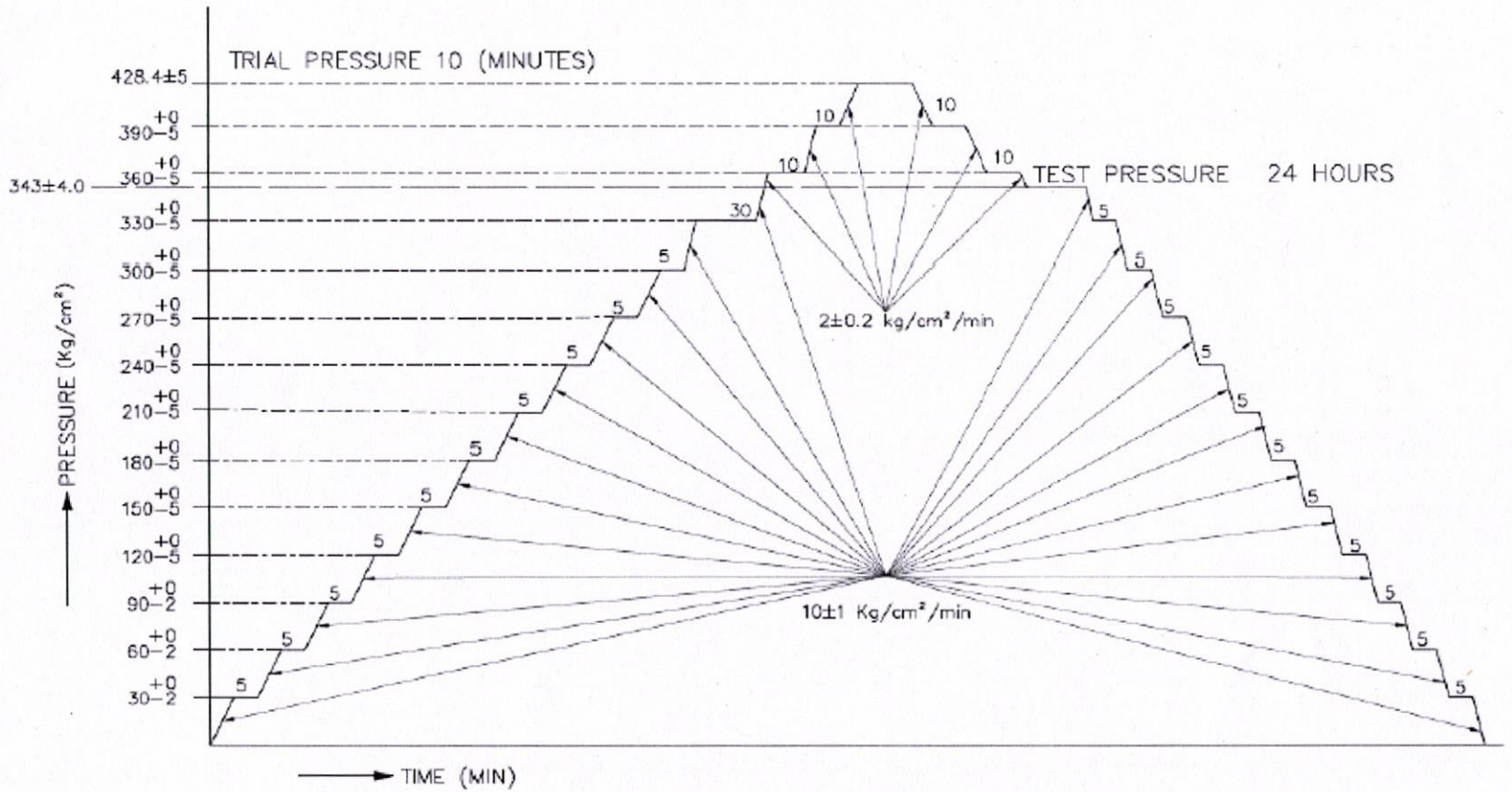
S No	BHEL Specification		Bidder's offer with technical details
6.1	Analog Pressure Gauges	For manually checking the pressure, an Analog Pressure Gauge of range 0 to 600 kg/cm^2 to be connected in the system. The pressure gauge shall be Glycerine filled and dial size shall be minimum 250 mm. Accuracy shall be specified by the bidder.	
7	**Other details to be provided by the vendor:-**		
7.1	List of all the valves required in the circuit. Vendor to provide complete list.		
7.2	PLC of reputed make acceptable to BHEL. Bidder to specify the PLC make .		
7.3	Make of pneumatic/hydraulic hose and its pressure rating.		
7.4	Pumps of reputed make acceptable to BHEL. Bidder to specify the make.		
7.5	Make of polyurethane tubes and other fittings.		
7.6	Make of fasteners.		
7.7	Seals of reputed make acceptable to BHEL. Bidder to specify the make.		
7.8	Make of pressure gauges and Pressure sensors or transducers / suitable sensing device acceptable to BHEL. Bidder to provide details.		
7.9	List of makes of all other component used in your offered system.		
7.10	BHEL reserves the right to accept the offered makes of all components.		
7.11	Pump body, plunger and pressurizing line should be of stainless steel or non-corrosive material.		
7.12	A detailed circuit drawing indicating all the parts of the system viz. valves, HF pump, LF pump, pressure transducer, other sensors etc. to be provided with the technical offer.		
8	**Spares: Vendor to supply all the below mentioned items as spares.**		
8.1	Non return valve used in the system	10 nos.	
8.2	Quick release coupling connecting the pump delivery hose to the job (male and female) for	10 sets. each.	

S No	BHEL Specification		Bidder's offer with technical details
	connecting to pipes of Dia. 17, 21 mm etc.		
8.3	Glycerine filled Analog Pressure gauge 0 to 600 kg/cm^2 and dial size shall be minimum 250 mm.	4 Nos.	
8.4	Seal Kit for Pump	3 sets	
8.5	High pressure NRV	1 no	
8.6	Hydraulic & pneumatic hose.	1 no in each size	
8.7	D C valves	1 no in each model	
8.8	Any other essential spare recommended by the supplier: Addition to above mentioned spares, vendor to provide the list of other spares which are not included here and are essential for trouble free working of system for minimum 2 years.		
9	Portability	The entire Automated Hydro Test station shall be mounted in a steel frame structure with doors and fitted with caster wheels for shifting around the shop floor. Crane hooks shall be provided at suitable locations on the frame for movement by shop crane.	
10	BHEL will provide compressed air at one point near the machine at a pressure of 4.5 to 5 kg/cm^2. Bidder to specify the flow rate of the compressed air required. Supplier shall provide suitable Air booster, Refrigerated air drier/ filter-regulator-lubrication (FRL) unit, if required to meet-out the input air requirement to the machine.		
11	**Documentation**		
11.1	O&M Manuals to be Supplied with Equipment (Hard Copy in booklet form)	Separate Operational Instructions & Maintenance Manual for Automated Hydro Test Station & its associated Accessories in English to be provided.	

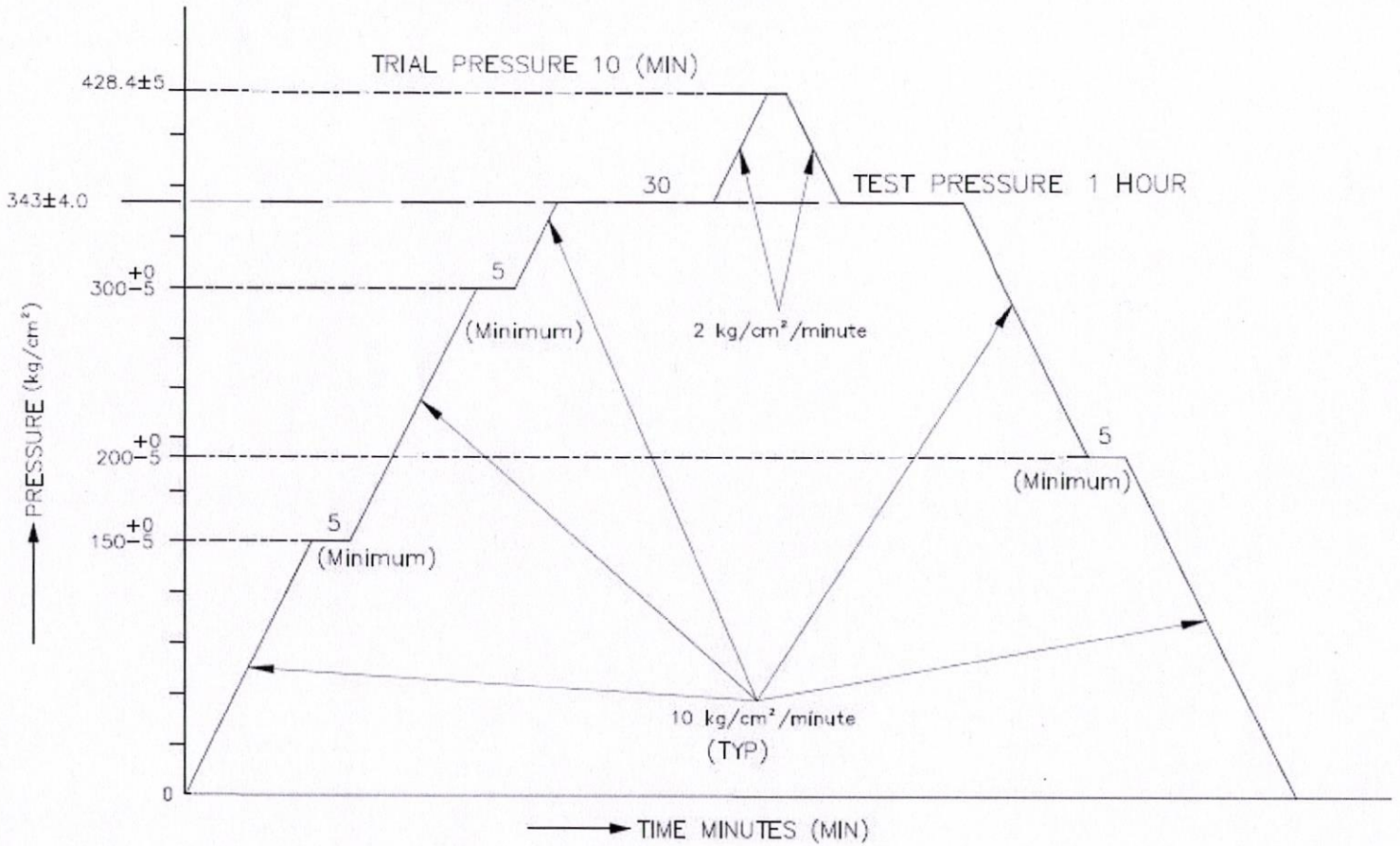
S No	BHEL Specification		Bidder's offer with technical details
11.2	Contents of the Manual	The O & M Manual shall contain details like: • Operation Instructions & Maintenance manual for the total system • Description & Constructional Details • Mechanical Assembly Drawings • Part Drawings • Electrical Schematic Drawings (P&ID) • Bill of Materials • Printed Circuit Board Schematics (if any) • Complete list of Bought–Out items with make and model number • Technical Leaflets of Bought-Out Items • List of Spare Parts (Both Electrical & Mechanical) with Make, Specifications/Rating • Trouble Shooting Details • Pre Maintenance checklist • Safety Instructions – For Erection, Testing, • Operation and Maintenance. Bidder to confirm	
11.3	**No of Copies**	Hard Copies in Original - 3 Sets Soft Copy in CD - 1 No Bidder to confirm	
12	**Note: The bidder shall visit BHEL works to study the hydro test requirement.**		
13	Pre Despatch Inspection	The equipment shall be offered for inspection by BHEL Engineers at supplier's works before despatch. Features such as maximum test pressure, pressurisation and de-pressurisation at pre-set rate along with PLC controls shall be demonstrated by the supplier at their works.	

S No	BHEL Specification		Bidder's offer with technical details
14	Commissioning	The supplier shall depute his representative for commissioning and performance prove-out of the equipment. The equipment shall be proved out for the 2 Hydro test cycles mentioned below. 1st Cycle: Hydro test cycle as per Annexure- C, the Component/assembly will be as per clause-2 of this technical specification. 2nd Cycle: Any other Hydro test cycle as per the availability of Component/assembly at the time of Commissioning. The job will be as per clause-2 of this technical specification. Only successful prove out of above two cycles shall be reckoned as commissioning.	
15	Training	During commissioning of the Equipment at BHEL, training on operation and maintenance of the equipment and system to be imparted to the operators and maintenance crew.	
16	Guarantee period	The equipment shall be guaranteed for a period of 12 months from the date of commissioning or 18 months from dispatch whichever is earlier.	

ANNEXURE-B


TRIAL PRESSURE 10 (MINUTES)
TEST PRESSURE 24 HOURS
428.4±5
343±4.0
PRESSURE (Kg/cm²)
TIME (MIN)
2±0.2 kg/cm²/min
10±1 Kg/cm²/min

ANNEXURE-C



PRESSURISATION/DEPRESSURISATION CYCLE FOR TUBES: