Bharat Heavy Electricals Limited

(High Pressure Boiler Plant**)**
Tiruchirappalli – 620014, TAMIL NADU, INDIA
An ISO 9001 Company
CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY	Phone: +91 431 257 79 38 Fax : +91 431 252 07 19 Email : ramado@bheltry.co.in Web : www.bhel.com

	Enquiry Number:	**Enquiry Date:**	**Due date for submission of quotation:**
	2720800005	**30.09.2008**	**01.11.2008**

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

Item	**Description**	**Quantity**	**Delivery (Item required at BHEL on)**
10	Hydro Test Station for 14" – 24" 120 Kg/Sqcm Valves as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	1 No.	30.10.2009

Note: Offer should be
Foreign Bidders: CFR Mumbai Port

Indigenous Vendors:
FOR, BHEL, Stores
Industrial Valves Plant
433, Industrial Complex
Goindwal – 143 423
District: Tarn Taran (Punjab), India

BHEL commercial terms & conditions with Price Bid and Bank Guarantee formats along with technical specifications 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 "2720800005".

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 / MM / Capital Equipment

PART A

HYDRO TEST STATION for 14" – 24" 120 Kg /Cm^2 VALVES

SECTION – I : QUALIFYING CRITERIA

The BIDDER has to compulsorily meet the following requirements to get qualified for consideration of the technical offer for HYDRO TEST STATION 14"– 24" 120 Kg /Cm^2

S. No.	REQUIREMENTS	VENDOR's RESPONSE
1	Only those vendors **(OEMs)**, who have supplied and commissioned at least ONE HYDRO TEST STATION, for testing valves, with pressure rating of 100 Kg /Cm^2 or higher in the past and such station is presently working satisfactorily for more than one year after commissioning (from the date of opening of Tender), should quote. However, if such station (s) has/ had been supplied to BHEL, then such station should be presently working satisfactorily for more than six months after its commissioning and acceptance (from the date of opening of Tender) in BHEL.	
The vendor should submit the following information where similar station has been supplied, for qualification of their offer.		
1.1	Name and postal address of the customer / company where similar station is installed.	
1.2	Name and designation of the contact person of the customer.	
1.3	Phone, FAX no. and email address of the contact person of the customer.	
1.4	Month and Year of commissioning.	
1.5	Application for which the station is supplied	
1.6	Performance certificate from the customer regarding satisfactory performance of station supplied to them. For obtaining the performance certificate from the customer, a suggestive format is provided in **SECTION - IV**.	
2.0	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.	

SECTION – I I

The BIDDER / VENDOR is requested to provide the following information:

S. No.	REQUIREMENTS	VENDOR's RESPONSE
3.0	The BIDDER/VENDOR to furnish Reference List of Customers, with full address, details of contact person, where VALVES HYDRO TEST STATION have been supplied in the past.	
4.0	Details of VALVES HYDRO TEST STATION supplied to other BHEL units, if any, (Year of commissioning, Max test Pressure of station, Testing Diameter range).	
5.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centers in South India.	
6.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – III

The BIDDER to note:

S. No.	PARTICULARS	VENDOR'S RESPONSE.
7.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS. 1. Technical Offer [with PART A & PART B] and Commercial offer. 2. Price Bid.	
8.0	The Offer shall contain a comparative statement of Technical **Specifications demanded by BHEL** and **Offer Details submitted by the Bidder**, against each clause. A just 'CONFIRMED' or 'COMPLIED' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	
9.0	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	
10.0	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	

SECTION – IV

The Performance Certificate should be produced on Customer's Letter Head.

PERFORMANCE CERTIFICATE

1. Supplier of the Test station	
2. Make & Model of the Test station	
3. Month & Year of Commissioning	
4. Application for which the test station is used.	
5. a. Max. Test Pressure of Test station. b. Max. Distance between the sealing heads. c. Largest sealing diameter (O ring size) of the sealing head.	
6. Performance of the Station (**Strike off** whichever is **not applicable**)	Best in the market Satisfactory Good Average Not Satisfactory
7. Any Other remarks	
Date:	Signature & Seal of the Authority Issuing the Performance Certificate

PSG GCS KPL

RDR AVC NRM

PART B

TECHNICAL SPECIFICATION OF HYDRO TEST STATION FOR 14" - 24" 120 Kg / Cm^2 – VALVES

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [with Technical Details]
1	Area of Application	The Hydro Test Station is intended to test Gate Valves and Non-return Valves of sizes ranging from 14" to 24". Dimensional details of valves to be tested in this Hydro Test station are given in ANNEXURE – 1 at the end of this specification.	

2	**OPERATING PARAMETERS**		
2.1	Valves to be tested	The Valves to be tested will have flat ends. Max length of test body (Inlet flange to outlet flange): 1300 mm. Max opening distance between sealing heads: Vendor to specify	
2.2	Weight of the Valves	Maximum - 2000 Kg.	
2.3	Test Medium	1. Water 2. Air	
2.4	Tests to be done	1. With water as medium, the following tests shall be carried out: a. Shell b. Back Seat c. Seat 2. With Air as medium, the following test shall be carried out a) Seat	

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [with Technical Details]
2.5	Pressure	Maximum test pressure with 1) Water : 120 kg / cm^2 2) Air : 9 kg / cm^2 Test body shall be pressurized from both sides of the flanges alternately for checking seat tightness on both sides of the seat in one setting.	
2.6	Clamping Distance	Minimum / Maximum distance between the clamping flanges shall be suitably decided by the Vendor to accommodate the entire range of valves specified in Annexure - 1. Vendor to furnish details.	
2.7	Testing capacity	The Hydro Test Station is expected to have a production capacity of 15 Valves on an average of various sizes - in 8 hrs shift The Hydro test station will be operated in three shifts a day.	
3.	**HYDRO TEST STATION REQUIREMENTS**		
3.1	**CLAMPING SYSTEM**		
3.1.1	Valve orientation in the test station	The orientation of the clamping unit shall be designed for loading and testing the valve (test body) with its spindle in vertical position and flow axis in horizontal position. For testing, the valve body will be Loaded by BHEL using BHEL's crane.	
3.1.2	Valve loading	The clamping unit shall be designed for loading the test body from the operator side, traverse to clamping axis. For this, care should be taken to give clear space without any hindrance.	
3.1.3	Clamping flanges	The left side Clamping unit of the test bed (when viewed from front side) shall be fixed and the right side clamping unit shall be movable. The to and fro movement of the movable clamping unit for clamping / unclamping shall be effected by motorized mechanical means. The moving elements shall be suitably protected..	

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [with Technical Details]
3.1.4	Inlet / Outlet	The test body shall be pressurized from both the sides alternately for checking seat tightness on both sides of the seat in one setting. The clamping system shall be suitably designed for this feature.	
3.1.5	Utility of clamping flanges	The clamping flanges shall hold sealing heads and have outlet / inlet for venting, prefilling and pressurizing systems.	
3.1.6	Clamping flange operation	Movable clamping flange shall be operated by means of push buttons located on the movable clamp body.	
3.1.7	Speed	The movable clamping flange shall have slow & rapid movement in both directions. The flange shall move as long as the push button is pressed.	
3.1.8	Interlock	Once the pressure inside the test body has reached 3 Kg/cm^2, the movable clamping flange shall not operate.	
3.1.9	Body end sealing	Suitable 'O' rings shall be used for sealing the body ends.	
3.1.10	O - ring quality	Vendor shall specify material, size and shore hardness for each size of 'O' ring.	
3.1.11	Sealing Plugs	Vendor to provide suitable sealing plugs for the entire range of valves given in this specification.	
3.1.12	Sump	A Stainless Steel water sump shall be provided with filtering and re-circulation facility. Capacity of sump shall be minimum 500 liters.	

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [with Technical Details]
3.1.13	Clamping mechanism	The movable end shall be moved by motorized mechanical means and the necessary initial clamping force shall be achieved. Further, as the pressure inside the test body rises, the clamping load shall also increase proportionally in such a way that the final reaction force to the test body at any point of time shall never exceed 3 to 5% beyond the maximum test load. The mechanism used for this shall be of self-sealing type. No pressure sensing, feedback mechanism and hydraulic clamping shall be used. The vendor shall give details of the mechanism deployed to achieve proportional increase of clamping force.	
3.1.14	Facility for visual inspection	For visual inspection of seat tightness of valves, Provision shall be made at the fixed flange side. Vendor to furnish the details of the arrangement in this offer.	
3.1.15	Safety	Suitable safety device shall be provided to protect the clamping system from overloading. Vendor to furnish details.	
3.2	**AIR VENTING SYSTEM**		
3.2.1	Air evacuation	Air venting system shall evacuate the air from inside the test body before filling water.	
3.2.2	Vacuum pump	A vacuum pump has to be provided for evacuating the air from the test body to a level of approximately –1 bar. Suitable gauge to measure the vacuum shall also be provided.	
3.3	**WATER PRE-FILLING SYSTEM:**		
3.3.1	Pump for pre-filling	A centrifugal pump shall be provided for rapid prefilling of the test body with water.	
3.3.2	Pump capacity	Centrifugal pump discharge should not be less than 125 liters per minute	

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [with Technical Details]
3.3.3	Interlock	The pre-filling system shall operate only after the designed vacuum level (approx -1 bar) is achieved in the test body. Suitable interlocks shall be provided.	
3.3.4	Pump cut-off limit	The pre-filling pump shall switch off automatically once the designed prefilling pressure is achieved. Vendor to specify the prefilling details.	
3.4	**PRESSURIZING SYSTEM:**		
3.4.1	Test Medium selector	Necessary mechanism for selection of test medium (water/ air) shall be provided.	
3.4.2	Direction selector	Direction selector mechanism shall be provided to enable pressurizing test body from any side (left or right)	

3.4.3	**Testing with Water**		
A	Multiple stage pump	The water pressurizing system shall consist of single / Multiple stages of Air operated pump to achieve a maximum test pressure of 120 kg / cm^2	
B	Pump operation	The various stages of pumps shall be operated independently and in any combination. Suitable controls shall be provided to control the rate of pressurizing.	
C	Isolating valve	The pressurizing system shall have suitable isolating valves to isolate the pumps from the test body.	
D	Pump On/Off control	ON/OFF controls for operating the pumps shall be provided	
3.4.4	**Testing with Air**		
A	Air supply equipment	Vendor shall provide suitable compressor (reputed Indian make) for pressurizing to 9 kg/cm^2 for testing valves with air. This compressor should also be capable of supplying air for the multi stage pump mentioned in clause No. 3.4.3 A.	

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [with Technical Details]
3.4.4 B	Air pressure regulators	Necessary regulator arrangement shall be provided to regulate the air pressure in the test body.	
3.4.5	Pressure tapping points	Tapping points to be provided to read pressure inside the test body, on both clamping sides. The pressure shall be tapped from both sides of the test body for pressure measurement purpose. The gauge mounting shall be M20x1.5 with necessary isolating valves. Totally six pressure gauge mounting points shall be provided (3 for each side)	
3.4.6	Pressure gauges	One set of Pressure gauges for the below mentioned ranges, with accuracy class 1.0 shall be supplied along with the Hydro test station. 0-16 kg / cm^2 (for air) - 2 Nos 0-125 kg / cm^2 (for water) - 2 Nos 0-200 kg / cm^2 (for water) - 2 Nos	
3.4.7	Accumulators	Suitable accumulators shall be provided to even out pressure surges in the hydro / pneumatic circuit.	
3.4.8	Pressure holding time	The pressure inside the test body will be held till the inspection is completed. Maximum Pressure holding time shall be 45 minutes.	
3.5	**LEAK MEASUREMENT**		
3.5.1	For Water	Suitable system shall be provided for assessing the quantum of leak during seat test with water.	
3.5.2	For Air	Bubble counter shall be provided for checking air leak during seat test with air.	

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [with Technical Details]
3.6	**DEPRESSURIZING**		
3.6.1	Depressurizing	After valve testing is completed, the pressure inside the test body shall be relieved slowly by means of suitable drain valve. Provision to be made for draining the water into the sump.	
3.7	**OPERATOR CONTROL PANEL**		
3.7.1	Controls	The control panel shall have the following minimum essential controls 1. Medium selector 2. Direction selector (pressurizing) 3. Venting system controls 4. Prefilling system controls 5. Pressurizing system controls 6. Draining system valves 7. Provision for Pressure gauge mounting 8. Independent pressure gauges for each line or point. 9. Test load indicator 10. Leak measurement devices for both air and water.	
3.7.2	Other controls	The vendor shall specify details of any other controls required on the operator control panel.	
3.8	**Foundation for the machine**		
3.8.1	Foundation of the machine shall be designed suitably. Vendor to provide details of foundation.		
4	**SPECIMEN TEST BODY**		
4.1	Vendor shall supply a suitable specimen test body to meet the commissioning and prove-out trial requirements. Vendor has to provide details and obtain approval from BHEL The specimen test body shall be able to withstand the maximum test load conditions. Also the specimen test body shall be able to withstand the maximum test pressure conditions.		

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [with Technical Details]
5	**SAFETY**		
5.1	Safety features shall be built -into the system. The supplier shall indicate all the safety interlocks that are provided in the equipment. Vendor to furnish details of Safety interlocks for Critical Operations.		
5.2	All high pressure equipments including pressure vessels if any are to be provided with safety relief valve.		
5.3	Sliding safety doors fitted with transparent, impact resistant polycarbonate sheet window on the clamping system shall be provided, for visual inspection of the test body under pressure. Vendor to submit details on this arrangement.		
5.4	All moving mechanical components are to be suitably guarded for safe operation.		
5.5	The test bench shall have test pressure limiting device.		
5.6	The test bench shall also have test Load limiting device.		
6	**GENERAL**		
6.1	Provision to be made for testing valves independently, outside the clamping system. All the venting, water prefilling, pressurizing and depressurizing systems of the Hydro test station shall be used for testing the valve. Suitable hoses and needed accessories shall be quoted item wise.		
6.2	The general arrangement drawing of the Hydro test station, Electrical circuit, Pneumatic circuit, Water circuit and hydraulic circuit (if any) shall be submitted along with the offer. Rating of individual Valves and other items shall be shown in the general arrangement drawing.		
6.3	All hoses and cables from operator control panel to various systems of the hydro test station shall be neatly routed and suitably protected.		
6.4	All pressure gauges shall be glycerin filled.		
6.5	The noise level from the Hydro test station shall not exceed 85dBA		

S. No	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Technical Details]
6.6	The machine configuration and machine elements arrangement should have easy accessibility and high rigidity. Self-aligning /fitting, locking & piloting arrangement shall be incorporated in the components and modules to ensure 'maintenance free' concept.		
6.7	Vendor to furnish the GA Drawing of the Hydro test station with the offer.		
7	**ACCESSORIES**		
7.1	Standard Accessories	The offer shall clearly indicate the list of standard accessories that will be supplied along with the machine.	
7.2	Sealing Plugs	Pairs of sealing plugs with 'O' rings for all the Valve sizes mentioned in the specification shall be supplied.	
7.3	Special Accessories	Any other special accessories shall be quoted separately as optional items	
7.4	REPAIR KIT	'O' ring repair kit with complete accessories are to be supplied with machine. - 2 Sets Tool kit consists of all hand tools, spanner sets, screw drivers, Allen key set both in metric and inches. - 2 Sets	
8	**SPARES**		
8.1	Operating and Maintenance Spares	The supplier shall quote all spare parts item wise, required for two years of trouble free operation. The list shall include all valves such as DC valves, NRV, Flow regulating valves, Needle valves in the pressure line with seal kits, End fittings and Ferrules.	
8.2	Essential Spares	**1.** One set of Pressure gauges for the below mentioned ranges, with accuracy class 1.0 shall be supplied as spare along with the Hydro test station. 0-16 kg / cm^2 (for air) - 2 Nos 0-125 kg / cm^2 (for water) - 2 Nos 0-200 kg / cm^2 (for water) - 2 Nos **2.** 'O' rings for all sealing plugs - 50 sets in each size.	

		3. Seal kit for air operated pumps - 10 sets for each pump **4**. All high pressure hoses - 1 Set	
S. No	**BHEL SPECIFICATIONS**		**BIDDER's OFFER [with Technical Details]**
9	**ELECTRICAL POINTS**		
9.1	The electrical input power supply shall be AC 415 V $^{\pm 10}$ %, 50 Hz $^{\pm 3}$ %, 3 Phase 3 Wire System. No neutral conductor.		
9.2	BHEL will provide input power supply at one point only and the supplier has to take care of all other electrical distribution network required for the Station.		
9.3	All electrical motors, limit switches etc, on the machine shall be wired using PVC sheathed cable, running in conduits and converging to common terminal block		
9.4	External wiring from / to control panel, control desk, external motors etc shall be by means of screened multi-core cables.		
9.5	Control Voltage for all Solenoid Valves shall be 24 Volt D.C		
9.6	Electrical Control panel shall have built in 230V, 5 amps, 3 pin plug.		
9.7	Electrical control panel shall be adequately illuminated for maintenance purpose.		
9.8	Machine is to be fitted with suitable lighting and provision for 24 V hand lamp 2 Nos in the front and rear side of the equipments.		
9.9	All components/devices/terminals are identified with numbered ferrrules		
9.10	IP54 protection for all electrics. Totally enclosed Motors shall be used.		
9.11	All Electric Motors shall be of any of the following makes : SIEMENS / ABB / other reputed makes acceptable to BHEL, conforming to IEC Standards		
9.12	All electrical devices like contactors, relays, limit switches, push buttons etc shall be from Siemens/ L&T/ Cutler hammer / Telemechanique		
9.13	The centrifugal pump, air pump and vacuum pump shall be of reputed makes, acceptable to BHEL		

S. No	BHEL SPECIFICATIONS	BIDDER's OFFER [with Technical Details]
10	**PNEUMATICS**	
10.1	Nylon reinforced synthetic rubber hoses shall connect Pneumatics forming part of the machine and associated equipment and / or steel tubes.	
11	**HYDRAULICS**	
11.1	Vendor to furnish details of any hydraulic circuits if deployed.	
11.2	Such Hydraulic circuits shall be designed with minimum number of control valves and to suit oil of ISO VG 46 or 68 grade only.	
11.3	Vendor to provide details of Oil chiller used, Hydraulic Tank Capacity, Hydraulic power pack.	
11.4	All hydraulic pipelines to be neatly laid out	
11.5	All Hydraulic elements shall be of Vickers / Rexroth make.	
12	**LUBRICATION**	
12.1	Automatic timer controlled lubrication system is to be provided for sliding surfaces and all mechanical drives.	
13	**AMBIENT ATMOSPHERIC CONDITION**	
13.1	The Hydro test station with all Sub-Systems shall be suitable for operation in an ambient temperature of +50°C and with a Relative Humidity of 90%, both values do not occur simultaneously The entire equipment shall be Tropicalized in Design and construction.	
14	**PAINTING**	
14.1	Painting colour scheme shall be RAL 6011. Apple Green (Polyurethane Paint).	

S. No	BHEL SPECIFICATIONS	BIDDER's OFFER [with Technical Details]
15	**INSPECTION AND PERFORMANCE PROVE-OUT AT SUPPLIER'S WORKS**	
15.1	The Machine shall be offered for inspection and performance trials to test the design features and capacity of the test station, by BHEL Engineers before dispatch, at Supplier's works. The tests shall be conducted using specimen test body. Supplier shall Prove-out the performance of Hydro test station for the following points:	
15.2	The vendor shall prove out the working of the test load safety device, at the maximum test load, by pressurizing the specimen test body with water.	
15.3	The vendor shall prove-out the leak tightness of the entire test station by holding pressure at 120 kg/cm^2 (water) for a minimum period of 1 Hour continuously. Leak tightness shall be proved out for **3** such cycles. During each cycle the specimen test body will be unloaded and loaded into the clamping system. Any visual leak and pressure drop indicated on the pressure gauges will not be acceptable.	
15.4	The vendor shall prove-out the leak tightness of the entire test station by holding pressure at 9 kg/cm^2 (Air) for a minimum period of 45 minutes continuously. Leak tightness shall be proved out for **3** such cycles. During each cycle the specimen test body will be unloaded and loaded into the clamping system. Any pressure drop indicated on the pressure gauges will not be acceptable.	
16	**ERECTION & COMMISSIONING**	
16.1	**1.** Supplier to take full responsibility for supervision of the erection, start up, testing of machine, it's control system & all other supplied equipment etc. **2**. Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by supplier in their foundation or layout drawings. **3.** Requirement like crane and helping personnel will be provided by BHEL, free of cost. The supplier shall depute his engineer(s) & personnel for prove-out trials and supervision of erection and commissioning of the machine at BHEL.	

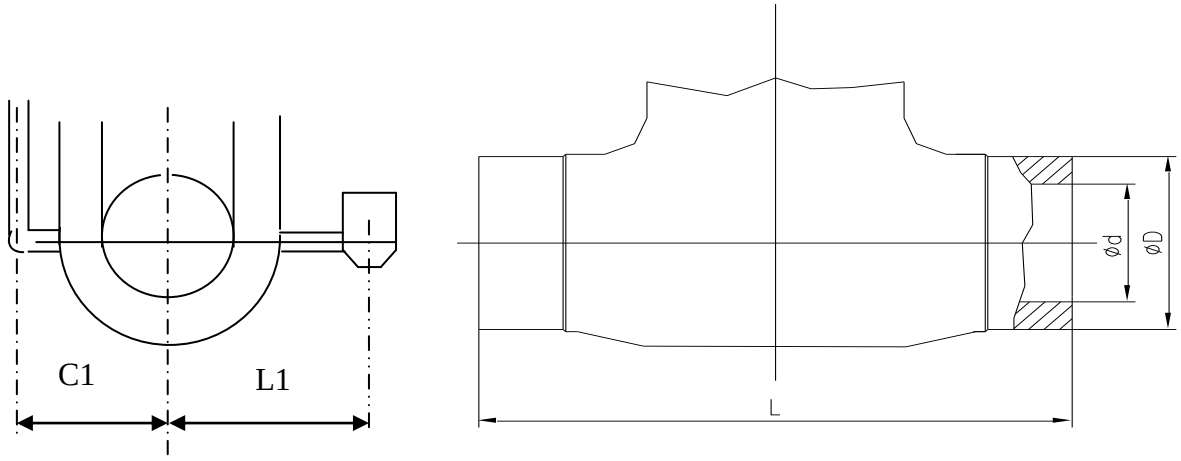
S. No	BHEL SPECIFICATIONS	BIDDER's OFFER [with Technical Details]
17	**PERFORMANCE PROVE-OUT AT BHEL** Supplier shall Prove-out the performance of Hydro test station for the following points:	
17.1	The vendor shall prove out the working of the test load safety device, at the maximum test load, by pressurizing the specimen test body with water.	
17.2	The vendor shall prove-out the leak tightness of the entire test station by holding pressure at 120 kg/cm^2 (water) for a minimum period of 1 Hour continuously. Leak tightness shall be proved out for 5 such cycles. During each cycle the specimen test body will be unloaded and loaded into the clamping system. Any visual leak and pressure drop indicated on the pressure gauges will not be acceptable.	
17.3	The vendor shall prove-out the leak tightness of the entire test station by holding pressure at 9 kg/cm^2 (Air) for a minimum period of 45 minutes continuously. Leak tightness shall be proved out for 5 such cycles. During each cycle the specimen test body will be unloaded and loaded into the clamping system. Any pressure drop indicated on the pressure gauges will not be acceptable.	
18	**TRAINING**	
18.1	The Supplier shall train two BHEL Engineers in the Operation, Trouble Shooting and Maintenance of the Hydro test station at the Supplier's Works for a minimum period of 5 working Days	
18.2	The Supplier's Service Engineer / Application Engineer shall train BHEL Engineers in the Operation, Trouble Shooting and Maintenance of the Hydro test station for a minimum period of 6 Working Days, after commissioning of the Equipment, at BHEL Works.	
18.3	The training shall include the following: a) Safety b) Operation of the machine c) Trouble-Shooting d) All special features of the machine e) Electrical / Mechanical / Electronics systems	

S. No	BHEL SPECIFICATIONS	BIDDER's OFFER [with Technical Details]
19	**DOCUMENTS AND MANUALS**	
19.1	Operation & Maintenance Manuals: Operation manual shall include all operations of the machines and its accessories with full details and safety instructions. All the features of the machine and how to operate them shall be explained in detail. Maintenance manual shall include all machine construction drawing, Component drawings, assembly drawings, explanation and details about the sequence of operations of Electrical, Electronic & Hydraulic circuits. Hard copy : 3 Nos CD Media: 1 No	
19.2	Detailed spare parts specification for the electrical, electronics, mechanical, hydraulics (and pneumatic if any) to be furnished for items made by the supplier and for the items bought out and assembled by the supplier. Hard Copy : 3 Nos.	
19.3	Electrical Wiring Drawings – Power & Control Circuits. Pneumatic/Hydraulic Circuit Diagrams. Specifications/Ratings of All Bought-Out-Items. Trouble Shooting Chart for Main and all Sub-Systems. Hard copy : 3 Nos.	
19.4	Equipment Commissioning data to be provided	
20	**PERFORMANCE GUARANTEE**	
20.1	Equipment has to be guaranteed for its performance, for a minimum of 24 months from the date of commissioning.	

S. No	BHEL SPECIFICATIONS	BIDDER's OFFER [with Technical Details]
21.0	**GENERAL INFORMATION** The vendor should submit the following information	
21.1	Machine Model: Vendor to specify	
21.2	Total connected load (KVA): Vendor to specify	
21.3	Floor area required (Length, Width, Height) for complete machine & accessories: Vendor to specify	
21.4	Painting of Machine/ Electrical Panels: RAL 6011 Apple Green (Polyurethane Paint) : Vendor to Confirm	
21.5	Total weight of the machine : Vendor to specify	
21.6	Weight of heaviest part of machine : Vendor to specify	
21.7	Weight of the heaviest assembly/ subassembly of the Machine : Vendor to specify	
21.8	Dimensions of largest part/ subassembly of the machine : Vendor to specify	

Note: Please refer Annexure – 1 for valve sizes / dimensions.

Annexure– 1: Dimensions for 14" - 24" size valves



Max C1: 550 mm Max L1: 1050 mm (for 14" - 24" valves)

FL= Flanged Valves, BW= Butt Weld Valves

SL No	SIZE	VALVE TYPE	END TYPE	L	D For Flanged Valves (O.D of Flange)	D For Butt welded Valves	d
1	14"	GV	FL	381	535	-	336
2	16"	GV	FL	406	595	-	388
3	18"	GV	FL	431.8	635	-	440
4	20"	GV	FL	457	700	-	491
5	24"	GV	FL	508	749.3	-	594

6	14"	GV	BW	572	-	370	336
7	16"	GV	BW	610	-	424	388
8	20"	GV	BW	711	-	530	491
9	24"	GV	BW	813	-	636	594
10	14"	GV	FL	762	585	-	340
11	16"	GV	FL	838	648	-	390
12	20"	GV	FL	991	775	-	486
13	14"	GV	BW	762	-	385	340
14	16"	GV	BW	838	-	438	390
15	20"	GV	BW	991	-	540	486
16	24"	FV	FL	1295	813	-	594
17	20"	FV	BW	984	-	546	490
18	24"	FV	BW	1295	-	638	594
19	16"	FV	FL	1156	648	-	365
20	16"	FV	BW	1156	-	458	365