



An ISO 9001
Company

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

ENQUIRY	Phone: +91 431 257 70 49 Fax : +91 431 252 07 19 Email : csguna@bheltry.co.in Web : www.bhel.com
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	Enquiry Number: 2620800040	Enquiry Date: 06.06.2008	Due date for submission of quotation: 09.07.2008
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	Valve Hydro Test Station – 1600 Kg / Sqcm as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	1 No.	31.07.2009
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 “2620800040”.			
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 Manager / Capital Equipment / MM	

PART A
VALVES HYDRO TESTING STATION – 1600 Kg/Sq.Cm

SECTION – I : QUALIFYING CRITERIA

The BIDDER has to compulsorily meet the following requirements to get qualified for consideration of the technical offer for the VALVES HYDRO TESTING STATION – 1600 Kg/Sq.Cm

S. No.	REQUIREMENTS	VENDOR's RESPONSE
1	Only those vendors (OEMs), who have supplied and commissioned at least ONE VALVE HYDRO TEST STATION, for testing valves, with pressure rating of 1000 Kg/Sq. Cm or higher in the past and such station is presently working satisfactorily for more than one year after commissioning (on 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 (on 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.	
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.	

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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 TESTING STATION have been supplied in the past.	
4.0	Details of VALVES HYDRO TESTING 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.	

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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	
11.0	For obtaining the performance certificate from the customer, a suggestive format is provided in SECTION - IV .	

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SECTION – IV

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

PERFORMANCE CERTIFICATE

1. Supplier of the 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. The diameter of the largest 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	
<div style="display: flex; justify-content: space-between; align-items: flex-end; padding: 10px;"> <div>Date:</div> <div>Signature & Seal of the Authority Issuing the Performance Certificate</div> </div>	

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PART B`**Technical specification for HIGH PRESSURE VALVE HYDRO TEST STATION 1600 Kg/Sq cm**

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER (With Technical Details)
1	Area of Application	The Hydro Test Station is intended to test Globe, Gate and Non-return Valves with ANSI or DIN flanges and sizes ranging from 2½" to 20". 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	<p>The Valves to be tested will have flat ends.</p> <p>Max length of test body (Inlet flange to outlet flange): 2000 mm.</p> <p>Max opening distance between sealing heads : Vendor to specify</p>	
2.2	Weight of the Valves	Maximum - 15000 Kg.	
2.3	Test Medium	<p>1. Water</p> <p>2. Air</p>	
2.4	Tests to be done	<p>1. With water as medium, the following tests shall be carried out:</p> <p>a. Shell</p> <p>b. Back Seat</p> <p>c. Seat</p> <p>2. With Air as medium, the following test shall be carried out</p> <p>a) Seat</p>	

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER (with Technical Details)
2.5	Test Pressure	Maximum test pressure with 1) Water : 1600 kg / cm ² 2) Air : 9 kg / cm ² Test body shall be pressurized from both side 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 given in Annexure-1. Vendor to furnish details.	
2.7	Testing capacity	The Hydro Test Station is expected to have a testing capacity of 15 Valves on an average of various sizes with in the testing range - 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 crane.	
3.1.2	Valve loading	The clamping unit shall be designed for loading the test body from the operator side, transverse 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 both low & rapid speed 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 litres.	

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 proportionately 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 max 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 at around 4 bar.	

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 Multiple stages of Air operated pump to achieve a maximum test pressure of 1600 kg / cm ² . The line pressure of compressed air at BHEL will be 4 kg / cm ² . Vendor to specify make, number of stages and the discharge details.	
B	Pump operation	The various stages of pumps shall be operated independently or 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	

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER (With Technical Details)
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.	
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 M20 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. 0-12 kg / cm ² (for air) - 2 Nos 0-1000 kg / cm ² (for water) - 2 Nos 0-2000 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	

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER (With Technical Details)
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.	
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 <ol style="list-style-type: none"> 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	Details of any other controls required on the operator panel, shall be specified by the Vendor	

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER (With Technical Details)
3.8	Foundation for the machine		
3.8.1	Foundation of the machine shall be designed by BHEL suitably. Vendor to provide details of foundation layout and loads.		
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.		
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.		

S. No	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER (With Technical Details)
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		
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 Annexure -1 of the specification shall be supplied.	
7.3	Special Accessories	Any other special accessories shall be quoted separately as optional items	

S. No	BHEL SPECIFICATION		OFFER [With Technical Details]
7.4	REPAIR KIT	<p>'O' ring repair kit with complete accessories Shall be supplied with machine. - 2 Sets</p> <p>Tool kit consisting of all hand tools, spanner sets, Screw drivers, Allen key set both in metric and inches. - 2 Sets</p>	
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	<p>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.</p> <p>0-12 kg / cm² (for air) - 2 Nos 0-1000 kg / cm² (for water) - 2 Nos 0-2000 kg / cm² (for water) - 2 Nos</p> <p>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</p>	
9	ELECTRICAL POINTS		
9.1	The electrical input power supply shall be AC 415 V ± 10 %, 50 Hz ± 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		

S. No	BHEL SPECIFICATION	OFFER [With Technical Details]
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 24Volt DC.	
9.6	Electrical Control panel shall have built in 230V, 5 amps, 3pin 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 ferrules.	
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 / Telemecanique.	
9.13	The centrifugal pump, air pump and vacuum pump shall be of reputed makes, acceptable to BHEL	
10	PNEUMATICS	
10.1	Nylon reinforced synthetic rubber hoses shall connect Pneumatics forming part of the machine and associated equipment and / or steel tubes.	
10.2	BHEL will supply compressed air at a single point. Vendor shall provide Filter / Regulator /Lubricator Unit at the inlet to the Hydro test station.	

S. No	BHEL SPECIFICATION	BIDDER's OFFER (With Technical Details)
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 grades 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 +45°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 SPECIFICATION	BIDDER's OFFER (With Technical Details)
15	ERECTION & COMMISSIONING	
15.1	<p>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.</p> <p>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.</p> <p>3. Requirement like crane and helping personnel will be provided by BHEL, free of cost.</p> <p>The supplier shall depute his engineer(s) & personnel for prove-out trials and supervision of erection and commissioning of the machine at BHEL.</p>	
16	<p>INSPECTION AND PERFORMANCE PROVE-OUT AT SUPPLIER'S WORKS</p> <p>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:</p>	
16.1	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.	
16.2	The vendor shall prove-out the leak tightness of the entire test station by holding pressure at 1600 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.	

S. No	BHEL SPECIFICATION	BIDDER's OFFER (With Technical Details)
16.3	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 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.	
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 1600 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.	

S. No	BHEL SPECIFICATION	BIDDER's OFFER (With Technical Details)
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	
19	DOCUMENTS AND MANUALS	
19.1	<p>Operation & Maintenance Manuals:</p> <p><u>Operation manual</u> 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.</p> <p><u>Maintenance manual</u> shall include all machine construction drawing, Component drawings, assembly drawings, explanation and details about the sequence of operations of Electrical, Electronic & Hydraulic circuits.</p> <p style="text-align: right;">Hard copy : 3 Nos CD Media: 1 No</p>	
19.2	<p>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.</p> <p style="text-align: right;">Hard Copy : 3 Nos.</p>	

S. No	BHEL SPECIFICATION	BIDDER's OFFER (With Technical Details)
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 data / 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.	
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 the following Chart (Annexure – 1) for valve sizes.

ANNEXURE – 1

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

GATE VALVE

TYPE-1

SL. No.	VALVE SIZE	L	Ød	ØD	L1	C1
01	65	254	47	97	–	–
02	80	305	60	116	–	–
03	100	406	78	136	–	–
04	125	483	98	161	–	–
05	150	559	125	190	600	270
06	200	711	165	244	630	275
07	250	864	205	302	660	300
08	300	991	245	359	690	365
09	350	1067	280	381	706	375
10	400	1194	320	446	736	425
11	450	1346	360	501	781	475

TYPE-2

SL. No.	VALVE SIZE	L	Ød	ØD	L1	C1
01	350	1118	260	401	–	–
02	450	1400	340	556	–	–

TYPE-3

SL. No.	VALVE SIZE	L	Ød	ØD	L1	C1
01	65	330	42	117	–	–
02	80	368	51	136	–	–
03	100	457	65	125	581	–
04	125	533	80	156	591	–
05	150	610	100	186	605	315
06	200	762	140	242	666	325
07	250	914	165	304	685	375
08	300	1041	210	359	735	415
09	350	1118	250	464	785	445
10	400	1245	265	452	785	445
11	450	1397	260	509	840	475

TYPE-4

SL. No.	VALVE SIZE	L	Ød	ØD	L1	C1
01	500	1960	305	561	660	515
02	80	368	50	115	–	–
03	350	1118	190	385	775	425

NON RETURN VALVE

TYPE-A

SL. No.	VALVE SIZE	L	Ød	ØD	SL. No.	VALVE SIZE	L	Ød	ØD
01	65	254	47	101	01	65	330	50	115
02	80	305	60	111	02	80	368	55	126
03	100	406	78	141	03	100	457	70	151
04	125	483	96	166	04	125	533	80	166
05	150	559	118	191	05	150	610	105	186
06	200	711	165	236	06	200	762	140	241
07	250	864	205	291	07	250	914	165	284
08	300	991	245	338	08	300	1041	210	353
09	350	1067	280	391	09	350	1118	250	417
					10	400	1245	270	461
					11	450	1397	300	511

GLOBE VALVE

TYPE-A

SL. No.	VALVE SIZE	L	Ød	ØD	SL. No.	VALVE SIZE	L	Ød	ØD
01	65	340	50	91	01	65	420	48	101
02	80	390	60	105	02	80	470	55	115
03	100	480	78	135	03	100	570	70	136
04	125	580	98	161	04	150	760	100	203