 432-003	<b>ENQUIRY</b> VALVES	<b>Bharat Heavy Electricals Limited</b> (A Government of India undertaking) HIGH PRESSURE BOILER PLANT PURCHASE DEPARTMENT/VALVES TIRUCHIRAPPALLI-620 014.	Phone:04312577913 FAX :0431-2520383 Email: <a href="mailto:fayasmalik@bheltry.co.in">fayasmalik@bheltry.co.in</a>	
		<b>ENQUIRY NO.</b>	<b>DATE</b>	<b>DUE DATE FOR QUOTATION</b>
		EN:SFV:136	16.05.2015	08.06.2015
Please quote Enquiry No., and due date in correspondences This is only a request for quotation and not an order.				
Supply of high pressure and temperature gate and check valves.  <u>Date , Time &amp; Venue of tender opening :</u>  08.06.2015 at 14.30 Hrs. at Valves Purchase Conference Hall , Building No 24, III Floor BHEL, Tiruchirappalli-620 014, Tamil Nadu State, India.	<b><u>Scope of supply</u></b>  Supply of high pressure and temperature gate and check valve as per the purchase specification enclosed.  -List of Annexures Annexure 1A- Scope of Supply Annexure 1B- Specification Annexure 2- General terms & Conditions Annexure 3A- Schedule of Deviation Format Annexure 3B- Performance Bank Guarantee Annexure 4- Unpriced format Annexure 5- Priced format			
<p>The rate of Excise Duty and Sales Tax, Prevalent on the date of quotation, should be clearly indicated in the quotation itself.</p> <p>Please, submit your lowest quotation in duplicate subject to our terms and conditions , for the above materials, so as to reach us on or before the due date by 14.00 Hrs. (IST)</p> <p>Quotation will be opened at 14.30 Hrs. (IST) on the due date in the presence of tenderers who may like to be present.</p> <p>Late tenders will not be considered.</p>			<p style="text-align: center;">Yours faithfully,</p> <p style="text-align: center;">For Bharat Heavy Electricals Ltd</p> <p style="text-align: center;">Fayaz Malik K Engineer/Purchase/Valves</p>	

## Annexure 1

Sl No	Material Code	Description	Qty	SPEC
10	979990230000	5"-PR164.4KG/SC-T735D.C-GV-INCONEL-BW-MO	2	SPEC:CV:0002
20	979990240000	6"-PR49KG/SC-T720D.C-GV-INCONEL-BW-MO	2	SPEC:CV:0002
30	979990250000	5"-PR49KG/SC-T720D.C-NRV-INCONEL-BW	1	SPEC:CV:0002
		<b>Total Quantity</b>	<b>5</b>	



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REGULATING AND CHECK VALVES OF SIZE 65 MM  
AND ABOVE OF INCONEL MATERIAL**

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Revision	Date	Altered	Chd	Appd	Revision	Date	Altered	Chd&Appd	Sheet 1 of 18
01	19.11.2014	S.S.K	K.R.S	S.S.S					
Prepared	S.S.K	Chd	K.R.S	Appd	S.S.S	<b>SPEC:CV:0002</b>		01	
Date	30.07.2014	Date	30.7.2014	Date	30.07.2014				



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## TECHNICAL SPECIFICATION FOR GATE, GLOBE, REGULATING AND CHECK VALVES OF SIZE 65 MM AND ABOVE OF INCONEL MATERIAL

### 1. GENERAL

1.1) This specification covers design, material, construction features, manufacture, inspection, testing, painting and packing requirements of Gate, Globe Regulating and non-return valves of size 65 mm & above at vendor's or/ and his sub vendor's works and delivery to project site.

1.2) The offer shall be submitted along with all the documents required in this specification. Offer without all supporting documents requested in this specification will not be considered.

### 2) CODES AND STANDARDS:

(a) The design, material, construction, manufacture, inspection and testing of valves shall conform to the latest applicable codes and standards.

ANSI-	American National Standards Institute
ASME-	American Society of Mechanical Engineers
ASTM-	American Society for Testing and Materials.
AWS-	American Welding Society
IBR-	Indian Boiler Regulations
OSHA-	Occupational Safety and Health Administration
DIN-	Deutsche Industrie Norm
BS-	British Standards

(b) The material specification shall be as per DIN material no. 2.4663/ ASTM B564 UNS N06617

(c) Nothing in this Specification shall be construed as relieving the Bidder of his responsibility for compliance with all applicable codes and regulations.

(d) The valves covered under this specification shall be tailor made for the design temperatures and pressures as mentioned in Annexure I.

### 3) DESIGN REQUIREMENTS:

3.1) These valves shall be used for services like water, steam, superheated steam and gas unless otherwise specified in specific requirements.

3.2) Valves shall be designed according to guidelines mentioned in the applicable standards.

3.3) These valves are coming under the purview of IBR and shall satisfy all the requirements of IBR.

3.4) Materials:



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Material requirement is indicated in Annexure I enclosed with the specification. Materials shall be as per ASTM or IS or other National/ International Standards. For materials other than ASTM, corresponding equivalent ASTM standard and nominal composition shall be indicated.

### 4) CONSTRUCTION FEATURES:

#### 4.1) End Connections:

4.1.1) The edge profile for valves with butt welding ends shall be as per ASME B16.25 /as specified in our specification and shall suit the given matching pipe / material.

4.1.2) The overall length of valve shall meet the applicable standards.

4.2) Gate and globe valves shall be of outside screw and yoke type with rising spindle and shall be capable of being closed against the rated pressure.

4.3) Gland & Gland flange shall be in two pieces for uniform tightening of gland packing.

4.4) Gate valves shall be provided if necessary with bonnet pressure relieving pipe with check valve (to be connected to upstream / downstream) to avoid pressure built up when the valve is closed.

4.5) All Globe valves shall have an arrow indicating the direction of flow, cast or embossed on the valve body. The direction of flow for globe valves shall be from under to over the disc.

4.6) Gate and globe valves shall have back seating arrangement for replacement of packing while working under full working pressure.

4.7) All globe valves shall have conical or spherical or flat seating.

4.8) For globe valves, the disc shall be free to revolve on the spindle.

4.9) Globe valves for regulating duties shall be provided with profiled type disc/ parabolic type disc and shall be capable of regulating the flow from zero flow to fully open. All regulating valves shall be designed to prevent erosion of the valve discs and seats when the valves are operated partially opened conditions.

4.10) Suitable hard facing of minimum thickness 1.6 mm shall be made on valve seatings.

4.11) For severe service conditions, cushioned / dashpot check valves are preferred to obviate valve clatter

4.12) All the gate/ globe valves intended for manual operation shall be equipped with gear box and thrust bearing, (for force exceeding 18 kgf) if considered necessary to enable easy operation i.e. the effort required to open/ close the valve against the maximum differential pressure. The gearbox shall be totally enclosed, bevel gear type and capable of delivering required torque and thrust. All hand



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operated/ gear operated valves shall be necessarily provided with a position indicator to show the valve open/ close position.

4.13) Valves shall preferably have construction of pressure seal type. For pressure seal bonnet type valves, suitable inlay in the gasket area and gaskets with standing the pressure and temp as mentioned in Annexure-I or other acceptable proven features shall be provided.

4.14) Eye bolts shall be provided to facilitate handling heavy valves or part of valves, where the weight is greater than 500 kg.

4.15) All the gate valves shall be required with integral bypass valve, if considered necessary, for ease of operation of main valves. The valves for which the integral bypass is envisaged, the size of the same shall conform to MSS-SP-45 as a minimum standard. Tube of bypass thickness to meet design pressure and temperature of main valve and of a material of the same composition as that of the main valve.

4.16) All the gate and globe valves shall be closed by rotating the hand wheel in the clockwise direction when looking at the face of the hand wheel. In case where the hand wheel is not directly attached to the valve spindle, suitable gearing shall be introduced to reconcile the above condition. The face of each hand wheel shall be clearly marked "Open" and "Shut" with arrows indicating the direction of rotation to which they refer. Each valve shall be fitted with a tag plate of stainless steel indicating the valve tag no., duty or service condition intended and the function of the valve. This is in addition to name plates and labels being provided by the manufacturer as per MSS SP 25.

4.17) Protective covers shall be provided for spindles of gate/ globe valves exposed to weather.

4.18) All gate, globe and check valves shall be designed for reconditioning of seating surfaces and replacement of stem and disc without removing the valve body from pipeline.

4.19) Motorized Valves:

4.19.1) The Motorized valves shall be offered as per specifications with the electric actuators of any of the following makes or equivalent with proper technical justification, unless otherwise specified elsewhere:

- i) Rotork,
- ii) Limitorque
- iii) Auma
- iv) Nippon Gear

The actuator can be designed for the actual working pressure at the elevated temperature and pressure. The selected actuator's stall torque shall be minimum 1.3 times the rated torque. The



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offered actuator shall be so selected to open/ close within 90 seconds or as specified. Sufficient length of stem protection tube is to be provided where the stem rises beyond the actuator top.

4.19.2) Wiring Diagram shall be in line with the following scheme:

Actuator with Plug & Socket (Wiring diagram 3-V-MISC-24283 R0), Control connection types i.e., Standard (1 power cable gland & 3 control cable glands – cable glands shall be double compression, nickel plated brass) / 9 pin plug & socket (internally looped for limit & torque switches – 2 nos. per actuator) and type of actuator motor protection i.e., thermostat (with trip unit to be included for standard actuator for mounting in MCC & for integral starter type it will be a part of starter). Integral Starter, if required shall be as per Annexure IV. For all motorized valves, the kilowatt rating of the actuator proposed by the valve supplier is to be indicated. Valve Actuator Data sheet is to be furnished in the typical format in Specification enclosed.

4.19.3) In case integral bypass is provided to the main valve which is motorized, the integral bypass valve shall also be motorized.

4.19.4) All motor operated globe valve's actuator for regulating duties shall be suitable for inching operation.

4.19.5) If actuator and gearbox combination is used, the gearbox shall be totally enclosed, bevel gear type. The gearbox design/ make shall be proven type.

4.19.6) The final valve assembly with electric actuator or bevel gear box or combination of bevel gear box + electric actuator shall be self-locking. i.e. on removal of power in the middle of valve travel, the disc shall remain in its position.

4.20) Lubrication:

4.20.1) Provision shall be made for suitable lubrication wherever necessary to ensure a smooth easy operation and freedom from undue wear.

4.20.2) Where oil filled gear boxes are used they shall be provided with filling and drain plugs, oil level gauges or dipsticks. Housing for ball and roller bearings shall be packed with grease at the time of assembly.

4.20.3) Choice of oil and grease for all motor drives shall be based on ambient temperature of 60°C.

4.20.4) Type of oil/ grease to be used and its annual consumption (based on 100 operations per year) shall be indicated by the bidder.



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### 5) SHOP INSPECTION AND TESTS:

All quality and stage/ final inspection requirement (minimum) shall be carried out as per the relevant Purchaser approved Quality Plan. The quality plan shall be drawn by the supplier. However if customer would like to associate for witnessing or verification, the same would be indicated in the QP before manufacturing of valves.

- 5.1) For body, bonnet and cover, the material test certificates (correlated to melt number) shall be furnished by the vendor for identification and correlation.
- 5.2) For components like spindle, body seat, disc/ wedge seat stellite, back seat bushing, bonnet/ cover bolts and nuts etc. material test certificates (typical) shall be furnished for identification & correlation.
- 5.3) For butt-welding ends of all valves, dye-penetrant test as per ASTM E165 shall be carried out on 100% of the valves and the results shall show no defects.
- 5.4) Hardness testing shall be done on body seat, disc/ wedge facing, spindle, backseat bushing, thrust plate etc. The Purchaser's representative shall also check hardness of random samples.
- 5.5) 100% blue matching of seats shall be carried out and records shall be maintained for verification by the Purchaser.
- 5.7) Minimum NDT requirements extent of check for Pressure retaining parts/components shall be as per applicable standards.
- 5.7) Hydrostatic/ Air Tests:
  - 5.7.1) Manually operated valves: All valves shall be tested hydraulically for strength, tightness of seats and tightness of back seating at the pressures as mentioned in IS6157/ API 598/ASME 16.34.
  - 5.7.2) Motor operated Valves:
    - 5.7.2.1) All the motor operated valves shall be tested hydraulically for seat/ backseat with the motor actuator at rated power supply.
    - 5.7.2.2) Motorized valves shall also be tested hydraulically for body, seat and backseat at the pressures as mentioned in IS 6157/ API 598 with hand wheel on the actuator.
  - 5.7.3) Gate and Globe valves seats shall also be tested on air at a pressure of 6 kg/cm<sup>2</sup>.
  - 5.7.4) The duration of test, leakage rate/ acceptance criteria are as per relevant testing standard.
  - 5.7.5) For motor operated valves, the type tests (including degree of protection) one for each type of actuator (type tested actuators shall not be supplied) and duplicate tests for job actuators as per the requirements of IS 325 and technical specification shall be performed. Performance tests of the



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actuators such as operation of limit switches, smooth functioning, noise, vibration, opening and closing time, torque required etc., shall also be done.

5.7.6) Dimensional and functional checks shall be carried out.

5.7.7) Valves coming under the purview of IBR shall be inspected by Independent Inspecting Authority approved by Indian Boiler Board and the test certificate in IBR form III-C duly countersigned by IBR approved authority shall be submitted.

### 6) CLEANING AND PROTECTION FOR DESPATCH:

6.1) Valve ends shall be protected by means of metallic covers/ polythene caps/ rubber and protectors to prevent damage to ends and also to avoid foreign material entering the valve while shipment and storage.

6.2) All the valves shall be packed suitably in wooden cases in order to avoid damage during transit and also during storage at site.

6.3) Valve tag nos. shall also be incorporated in all the dispatch documents.

### 7) DATA/ DOCUMENTS/ DRGS TO BE FURNISHED:

7.1) Relevant drawings/ leaflets for the offered valves showing following information.

7.1.1) Complete cross sectional arrangement of the valve. Vendor shall specify the valve overall length, height (both open & closed condition) in addition to other general dimension and weight of valves in their GA drawings.

7.1.2) Binding dimensions, dismantling clearances and weights.

7.1.3) Bill of material incorporating all the materials of construction of various parts along with IS/ ASTM/ ASME standards to which the materials conform.

7.1.4) Special features, if any, as called in the specific requirements.

7.1.5) Cv calculations for regulating globe valves

7.1.6) Cv test report i.e. lift versus flow for regulating globe valves

7.1.7) Torque calculations for motor operated valves actuator selection.

7.2) Relevant catalogue/ leaflet of the actuators.

7.3) Storage, operation and maintenance manual for valves and actuators (one copy of this shall be enclosed with the packing slip / wooden cases so that at receiving end care can be taken for proper storage and commissioning)

7.4) Quality Plan.



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### 7.5) Special Tools & Tackles And Special Equipment

Bidder shall submit with the equipment, complete set of all special tools & tackles & special equipment required for site erection, assembly, disassembly and proper maintenance of valves.

### 7.6) Spare Parts For Erection & Commissioning

It will be the responsibility of the bidder to provide all commissioning spares required for initial operation till satisfactory completion of the trial operation. One set of seal kit (packing rings and gaskets) to be supplied along with Valves.

### 7.7) Spare parts for 3 years of operation

Recommended spare parts list for 3 years of operation shall be furnished for each valve and actuator. Detailed list of spare parts with item no. shall be furnished in the O&M manual. Bidder shall indicate price of each spare part separately. BHEL reserves the right to order any or all of the components/items/quantity offered as recommended spares.

### 7.8) Drawings / documents submission schedule:

The mere approval of documents like drawings, data sheets, wiring diagrams, actuator sizing calculations, flow calculations, etc., will not however relieve the suppliers from meeting our specification requirements, relevant product and testing standard requirements and general accepted engineering principles. Ultimately, the valves have to perform satisfactorily at the service conditions and at the end user place.

### 7.9) Deviations:

If the bid submitted has got any deviation from the technical stipulation in the tender document, the Tenderer shall tabulate in the appropriate "schedule of deviation" furnishing full particular of such deviations. Deviations are to be furnished with specific mention to clause number. Only such deviations will be discussed and resolved. Reasons/ explanation for such deviations shall be furnished. Any other notes/ comments viz. "refer to forwarding letter" etc. is not acceptable. Even if there is no deviation from the Tender document, the Tenderer shall submit the deviation form and indicate as "no deviations".

## 8) GURANTEE:

The complete system shall be guaranteed for 24 months of trouble free performance from the date of shipment or 18 months from commissioning date whichever is earlier. In case of



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any failure or trouble reported from site, the supplier shall depute their representative immediately to attend the problem and replace the defective components/parts, if required.

### 9) BREAK UP FOR SUPPLY OF GATE & CHECK VALVES:

S. No.	EQUIPMENT	PART NO.	QTY/ UNIT
1	5"-PR49KG/SC-T720D.C-NRV-INCONEL-BW	979990250000	1 No.
	5"-PR164.4KG/SC-T735D.C-GV-INCONEL-BW-MO	979990230000	2 No.
	6"-PR49KG/SC-T720D.C-GV-INCONEL-BW-MO	979990240000	2 No.
2	Special Tools & tackles required for 1 No. of equipment offered against S.No. 1 above	---	1 SET
3	Spares parts for erection and commissioning	---	1 SET*
4	Spare parts for 3 years of operation	---	1 SET*

\* 1 SET shall consist of spares required for each of Equipment offered against S.No. 1 above.

### 10) EDGE PREPARARION DETAILS:

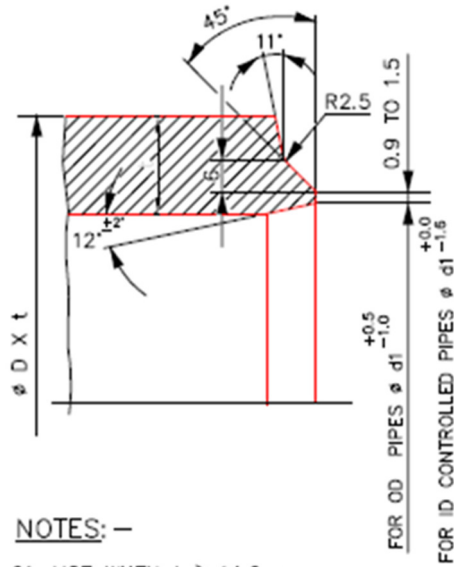
Pipe Dia D(mm)	Pipe thickness T (mm)	d1 (mm)	Style
127	8	111	D
127	20	90.7	P
168.3	20	131.6	P



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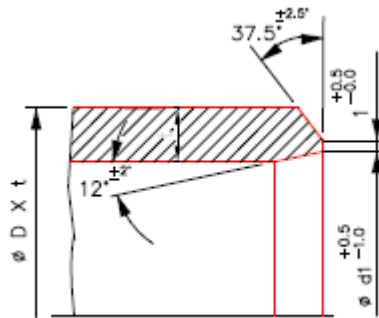
**STYLE-P**



**NOTES: -**

01. USE WHEN  $t \geq 14.2$  mm.

**STYLE-D**





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**Annexure - I**

SL. NO.	TAG NO	VALVE TYPE	PIPE MATERIAL / SIZE	SIZE (NPS)	VALVE MATERIAL	PRESSURE	TEMP	QTY	Mode of operation	Flow
						[kg/cm <sup>2</sup> (g)]	(°C)			T/Hr.
1	4	NRV	Inlet -SA106 GR. B Dia 127 X 8 Outlet-UNS N06617 Dia 127 X 8	5"	UNS N06617	49	720	1	Auto	12
2	18	GATE VALVE	UNS N06617 Dia 127 X 20	5"	UNS N06617	164.4	735	2	Motor operated	20
3	19	GATE VALVE	UNS N06617 Dia 168.3 X 20	6"	UNS N06617	49	720	2	Motor operated	20

NRV Valve (Tag no:4) should be provided with inlet side Spool material compatible with SA106 Gr. B pipe to avoid dis similar welding at site.



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### Annexure - II

Technical specification for electrical valve actuator with Integral starter

- 1.1 Actuator shall be of totally enclosed weather proof and dust proof construction with NEMA6 enclosure and shall be suitable for outdoor applications.
- 1.2 Actuator shall be suitable for 415V, 3 Phase, 3 wire, 50 Hz power supply. Control voltage for starter shall be derived from the 415 V input supply.
- 1.3 Opto isolation shall be provided for the remote open / close / stop command inputs of 24 V DC
- 1.4 Actuator shall be sized such that it can open/close close the valve at rated speed against designed differential pressure at 90% of the rated voltage
- 1.5 Interface with the control system shall be with 24 V DC interposing relays (coil burden of 2.5VA) in the actuator. The interposing relays shall be energized by 24 V DC signal from external control system.
- 1.6 A common potential free contact (disturbance monitoring signal relay) shall be available to annunciate overload, thermostat, control supply failure Local/remote selector switch at local & other protection operated.
- 1.7 The actuators shall be designed to take the full thrust. All Gears used shall be metallic. Fiber gears are not acceptable. Metallic gear trains used shall be self-locking to prevent drift under torque switch (wherever applicable) spring pressure when motor is de energised.
- 1.8 Each actuator shall have a hand wheel fitted on it for manual operation in case of power failure. It shall be possible to fully open /close the valve with the hand wheel. The hand wheel shall be designed such that its engaging lever declutches automatically when the power supply to the motor is restored.
- 1.9 Motor shall be conforming to IS 325 / IEC 60034 or any other equivalent international standard for all requirements unless otherwise specified herein. Motor shall have class F non-hygroscopic insulation with tropicalisation suitable for polluted dusty and



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corrosion atmospheres of relative humidity 100%. Motor shall be designed for an ambient temp of 50 degree C. However, the temperature rise of the motor winding shall be limited to the maximum temperature allowed for class 'B' insulation.

- 1.10 Thermal overload relay shall be provided in addition to thermostats embedded in motor winding. Overload relay and thermostats shall be connected in control circuit to trip actuator in case of overload.
- 1.11 Automatic phase correction facility and single phasing prevention shall be available.
- 1.12 Open/Close actuator shall have two Nos. of resistance type position transmitter for remote indication. Rating of position transmitter 100ohms, 50 Volts, AC/DC. A suitable fixed dropping resistor must be put in series for limiting the power consumption. For regulating and inching duty applications, actuators shall have one LVDT type electronic position transmitter (EPT), suitable for 24V DC with an output of 4-20mA and 2 wire.
- 1.13 Two numbers adjustable torque limit switches (one for open and one for close) shall be provided. Each shall be with 2 NO and 2 NC potential free contacts.
- 1.14 Two numbers of end position limit switches (one for open and one for close) each with 2 NO and 2 NC potential free contacts shall be provided. Apart from this two additional Auxiliary limit switches (one for open and one for close) each with 2 NO and 2 NC potential free contacts shall also be provided.
- 1.15 All the limit switches shall be with silver plated with high conductivity and non-corrosive type contact rating sufficient to meet 240 volts, AC, 5 amps and 220 volts DC, 0.5 amps rating
- 1.16 Each actuator shall have a local position indicator to indicate 0 to 100% of valve travel.
- 1.17 Open/Close command termination logic with position and torque limit switches shall be suitably built in the PCB inside the actuator. Provision shall be there for bypassing the torque switch during initial 5% opening and closing of valves. Details for this must



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be indicated in the wiring diagram. This shall be done through electronic circuit or through one 'NC" contact of 'limit switch'.

**1.18** It shall be possible to operate the actuator locally also with a lockable local/ remote selector switch

**1.19** Each actuator shall have a anti-condensation heater in the limit switch compartment. Supply shall be derived from main power supply available in the actuator

**1.20** The data sheet enclosed is to be filled for each type of actuator and submitted for approval

**1.21** A typical wiring diagram is enclosed, the actuator shall meet all the requirement indicated in the wiring diagram

1.22 9 pin plug & socket (internally looped for limit & torque switches – 2 nos. per actuator is required

1.23 Routine Tests/ Acceptance tests:

All routine tests on actuators as per IS 9334, shall be carried out by the manufacturer at his works in presence of Purchaser's representative and six (6) copies of the test certificates shall be furnished to the Purchaser for approval.

1.24 Type tests:

Type tests as required by IS 9334 shall be carried out at the manufacturer's works in the presence of Purchaser's representatives. Also, six (6) copies of the certificates of the type test, carried out by the manufacturer on actuators identical in essential details shall be furnished to the Purchaser for approval.

1.25 Tests for motor:

The motor of actuators shall be tested for relevant requirements as per IS 325.

1.26 Tests in output shaft:

The test on output shaft of the actuator shall be carried out as per IS 9334.



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**ACTUATOR DATA SHEET**

S.No	DESCRIPTION	UNIT	DATA
1	ACTUATOR MANUFACTURER		<i>To be filled by valve vendor</i>
2	TORQUE RANGE & RPM	Kg-M	<i>To be filled by valve vendor</i>
3	DUTY CYCLE		<i>S2-15 minutes</i>
4	ENCLOSURE (TENV)		<i>NEMA6 / IP68</i>
5	AVERAGE / NOMINAL OUTPUT	KW	<i>To be filled by valve vendor</i>
6	RATED VOLTAGE	V	<i>415</i>
7	RATED FREQUENCY	Hz	<i>50</i>
8	No .OF PHASES	φ	<i>3</i>
9	ADMISSIBLE VOLTAGE FLUCTUATION	%	<i>± 10</i>
10	ADMISSIBLE FREQUENCY FLUCTUATION	%	<i>± 5</i>
11	ADMISSIBLE VOLT.& FREQ. VARIATION	%	<i>10</i>
12	NOMINAL CURRENT (AVERAGE)	A	<i>To be filled by valve vendor</i>
13	STARTING CURRENT	A	<i>To be filled by valve vendor</i>
14	FULL LOAD SPEED	RPM	<i>To be filled by valve vendor</i>
15	INSULATION CLASS		<i>F</i>
16	POWER FACTOR (AVERAGE LOAD)		<i>To be filled by valve vendor</i>
17	AVERAGE LOAD EFFICIENCY	%	<i>To be filled by valve vendor</i>
18	ADMISSIBLE AMBIENT TEMPERATURE	° C	<i>-30 TO +70</i>
19	TEMP.RAISE OVER AMBIENT TEMP 50 °C	° C	<i>70</i>
20	TYPE OF STARTER RECOMMENDED		<i>DOL / 3 PHASE / 3 WIRE</i>
21.A	CABLE GLAND SIZE: POWER - 1 No. Double Compression Cable gland		<i>To be filled by valve vendor</i>
21.B	CABLE GLAND SIZE: CONTROL - (1No.) Double Compression Cable gland		<i>To be filled by valve vendor - to suit Copper unarmored PVC insulated OD 14 +2mm</i>
22	GEAR BOX LUBRICATION		<i>To be filled by valve vendor</i>
23	POSITION LIMIT SWITCHES	Nos	<i>2NO 2NC - 4 Nos.</i>
24	TORQUE SWITCHES	Nos	<i>2NO 2NC - 2 Nos.</i>
25	RATING OF SWITCHES	A	<i>5A 240V AC, 0.5A 220V DC</i>
26.A	POSITION TRANSMITTER - ON / OFF DUTY		<i>Potentiometric type</i>
26.B	POSITION TRANSMITTER - INCHING DUTY (IF PROVIDED)		<i>4-20mA , 2 wire 24 V DC LVDT TYPE</i>
27	SPACE HEATER		<i>1 No internally powered</i>
28	THERMOSTAT / THERMISTER	No	<i>3NOS. – ONE IN EACH WINDING</i>
29	INTERNAL WIRING		<i>PVC 1.5 mm<sup>2</sup></i>
30	CONTROL CIRCUIT DIAGRAM (WITH INTEGRAL STARTER)		<i>To be filled by valve vendor - but to in- line with our wiring diagram 3-V-MISC- 24283 enclosed</i>
31	WEIGHT	Kg	<i>To be filled by valve vendor</i>
32	MOTOR DUTY RATING - FOR ON-OFF / INCHING		<i>For On-Off duty= 60 Starts/ hour For Inching Duty= 150 starts/hr</i>
33	MOTOR TYPE & REF. STANDARD		<i>SQUIRREL CAGE INDUCTION , IS 325/ IEC60034</i>
34	OLR SET VALUE (RECOMMENDED)	A	<i>To be filled by valve vendor</i>



PE/ VALVES  
BHEL/TRICHY-14

### TECHNICAL SPECIFICATION FOR GATE, GLOBE, REGULATING AND CHECK VALVES OF SIZE 65 MM AND ABOVE OF INCONEL MATERIAL

35	PLUG & SOCKET (Integral mounted on the Actuator)		<i>1 No 9 pin plug and socket to suit 4 Pair X 0.5 Sqmm Type-G Instrumentation Cable, OD Maximum 18.5 mm . For ON-OFF duty One additional 9 pin plug &amp; socket same as above as spare For Inching duty : One additional 9 pin plug &amp; socket suitable for 4 pair X 0.5 sqmm -F type instrumentation cable , OD maximum 18.5 mm</i>																				
36	THE COLOUR CODING OF CABLES FOR 9 PIN PLUG & SOCKET SUITABLE FOR 4 PAIR G TYPE/F TYPE CABLE		<table border="1"><thead><tr><th><u>PIN. No.</u></th><th><u>Cable Colour</u></th></tr></thead><tbody><tr><td>A (1)</td><td>Blue</td></tr><tr><td>B (2)</td><td>Red</td></tr><tr><td>C (3)</td><td>Grey</td></tr><tr><td>D (4)</td><td>Yellow</td></tr><tr><td>E (5)</td><td>Green</td></tr><tr><td>F (6)</td><td>Brown</td></tr><tr><td>G (7)</td><td>White</td></tr><tr><td>H (8)</td><td>Black</td></tr><tr><td>J (9)</td><td>Shield</td></tr></tbody></table>	<u>PIN. No.</u>	<u>Cable Colour</u>	A (1)	Blue	B (2)	Red	C (3)	Grey	D (4)	Yellow	E (5)	Green	F (6)	Brown	G (7)	White	H (8)	Black	J (9)	Shield
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F (6)	Brown																						
G (7)	White																						
H (8)	Black																						
J (9)	Shield																						
37	MATERIAL OF HAND WHEEL HUB		SG Iron.																				
38	PAINTING SHADE		<i>RAL 5012 (Blue) both for Indoor and Outdoor</i>																				
39	Single-phase protection & Wrong phase sequence protection features available.	Y / N	Yes																				

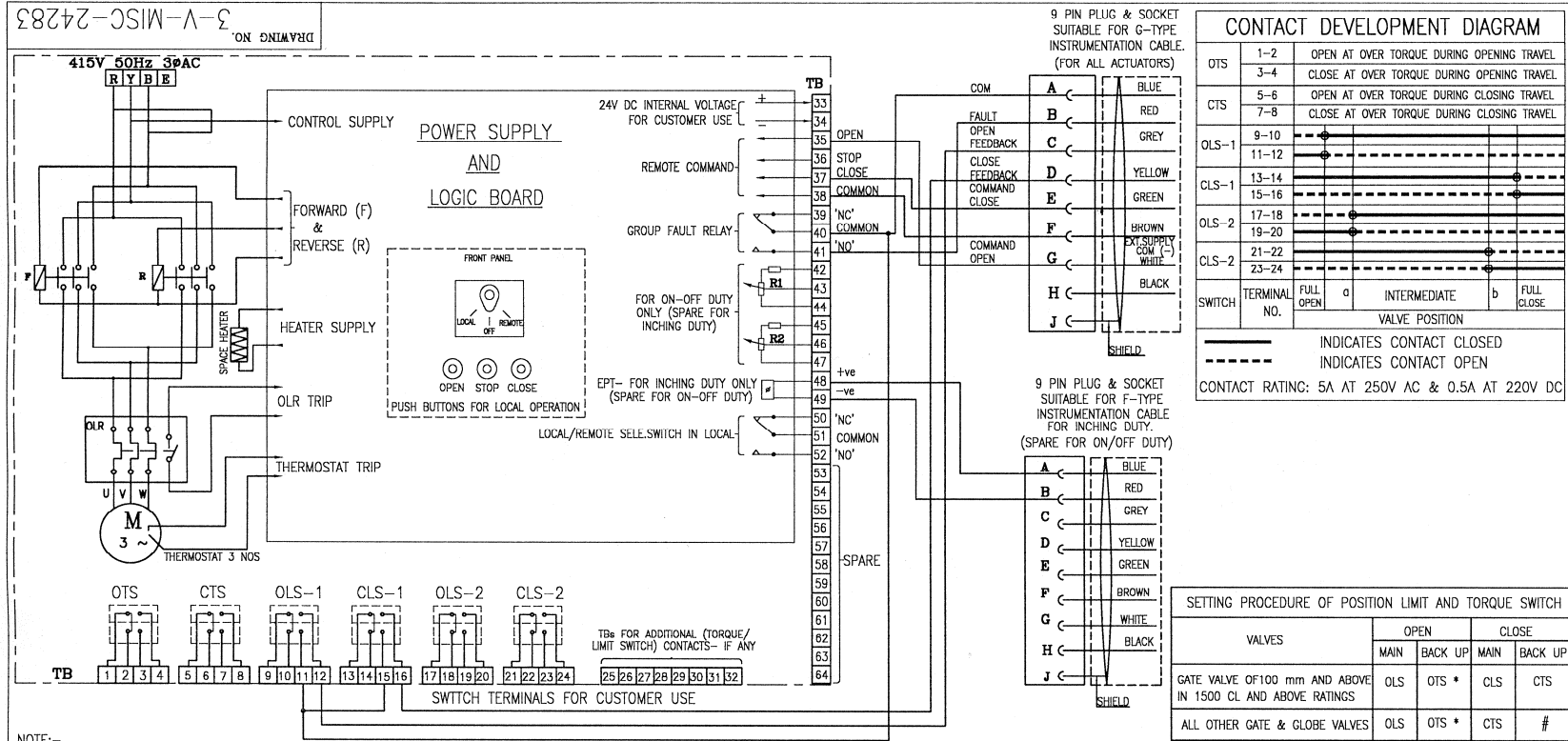


365-147

PE/ VALVES  
BHEL/TRICHY-14

# TECHNICAL SPECIFICATION FOR GATE, GLOBE, REGULATING AND CHECK VALVES OF SIZE 65 MM AND ABOVE OF INCONEL MATERIAL

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



NOTE:-

1. ALL TORQUE AND LIMIT SWITCHES (OTS,CTS,OLS1&2, CLS1&2) ARE WITH 2NO+2NC CONTACTS '1NO+1NC' IS TERMINATED IN TBS 1-24, REMAINING CONTACTS ARE FOR INTERNAL USE. ANY SPARE CONTACTS WHICH ARE NOT USED INTERNALLY ARE TO BE TERMINATED IN TBS 25-32
2. CTS - TORQUE SWITCHES FOR CW ROTATION (CLOSE)
3. OTS - TORQUE SWITCHES FOR CCW ROTATION (OPEN)
4. OLS-1, OLS-2 - LIMITSWITCHES FOR POSITION OPEN
5. CLS-1, CLS-2 - LIMITSWITCHES FOR POSITION CLOSE
6. EPT - ELECTRONIC POSITION TRANSMITTER (CONTACTLESS TYPE, FOR INCHING DUTY)
7. R1-R2-POTENTIOMETER 2 x 100 OHMS (FOR ON-OFF DUTY)
8. FOR COMMANDS & EPT EITHER INTERNALLY GENERATED 24 VDC OR EXTERNAL SUPPLY OF 24VDC CAN BE USED
9. M - MOTOR 3 $\phi$  415V 50 Hz AC SUPPLY
10. TORQUE SWITCH BYPASS WITH LIMITSWITCH BOTH ON OPEN & CLOSE DIRECTION TO BE DONE INTERNALLY.

SWITCH	TERMINAL NO.	VALVE POSITION
OTS	1-2	OPEN AT OVER TORQUE DURING OPENING TRAVEL
	3-4	CLOSE AT OVER TORQUE DURING OPENING TRAVEL
CTS	5-6	OPEN AT OVER TORQUE DURING CLOSING TRAVEL
	7-8	CLOSE AT OVER TORQUE DURING CLOSING TRAVEL
OLS-1	9-10	POSITION OPEN
	11-12	POSITION CLOSE
CLS-1	13-14	POSITION OPEN
	15-16	POSITION CLOSE
OLS-2	17-18	POSITION OPEN
	19-20	POSITION CLOSE
CLS-2	21-22	POSITION OPEN
	23-24	POSITION CLOSE
SWITCH	0	FULL OPEN
	b	INTERMEDIATE
		VALVE POSITION
		FULL CLOSE

INDICATES CONTACT CLOSED  
INDICATES CONTACT OPEN  
CONTACT RATING: 5A AT 250V AC & 0.5A AT 220V DC

VALVES	OPEN		CLOSE	
	MAIN	BACK UP	MAIN	BACK UP
GATE VALVE OF 100 mm AND ABOVE IN 1500 CL AND ABOVE RATINGS	OLS	OTS *	CLS	CTS
ALL OTHER GATE & GLOBE VALVES	OLS	OTS *	CTS	#

# - CLS NOT TO BE CONNECTED IN TRIP CIRCUIT  
\* - BYPASS OTS FOR INITIAL 5% OF TRAVEL (FOR GATE VALVES ONLY)

<b>BHARAT HEAVY ELECTRICALS LTD.</b> UNIT: HIGH PRESSURE BOILER PLANT. TRUCHIRAPALLI 620014.								
365-139								
DRAWN	M.P.SELVAKUMAR	<b>TITLE</b> INTERNAL WIRING DIAGRAM FOR NTPC VALVE ACTUATORS (AC) WITH INTEGRAL STARTERS (DRAWN FOR INTERMEDIATE POSITION OF VALVES)						
CHECKED	D.DINAKARAN							
APPROVED	K.ARUNACHALAM							
DATE	20.10.2005							
REV	DATE	CHED	APPD	DESCRIPTION	DRAWING No.	3-V-MISC-24283	REV	00



# BHARAT HEAVY ELECTRICALS LTD

Annexure 2A

## VALVES PURCHASE

Trichy - 620 014. India

### GENERAL TERMS AND CONDITIONS

#### **1. QUOTATIONS:**

- a. **BID system:** The offers are invited in Three part bid system (Part I will be Prequalification bid, Part II will be Techno-commercial bid and part III will be Price Bid)
- b. **Submission of Tender:** Each offer should be sent in triple cover separately for each bid and the same should be sealed and super scribed with correct Tender No., description & due date of opening. The outer cover should only bear the address of this office and should not have any indication that a tender is within. Two or more quotations should not be sent in one cover. Tender should not be addressed to any individual's name but only by designation.

BOX NO 5, VALVES/PURCHASE, THE TENDER OPENING TEAM/MM  
ROOM NO 26, GROUND FLOOR, BUILDING 24  
BHARAT HEAVY ELECTRICALS LIMITED  
TIRUCHIRAPALLI – 620014, TAMILNADU, INDIA

- c. **Late tenders:** Late tenders will not be considered under any circumstance.
- d. **Regulations:** Tenders should be free from CORRECTION AND ERASURES. Corrections if any must be attested. All amounts shall be indicated both in words as well as figures. Where there is difference between amount quoted in words and figures, amount quoted in words shall prevail.
- e. **PVC:** Price Variation clause not acceptable. Prices should be firm.
- f. **Deviation.** Any deviations from the specification are to be furnished separately as "Annexure 3A Schedule of Deviation ".If there is no deviation vendor should indicate "No Deviation".
- g. **Confirmation:** Confirmation for compliance is to be given in the offer for all the techno commercial conditions specified in the specification.

#### **2. COMMERCIAL TERMS & CONDITIONS:**

- a. **Terms of Payment:**
  - Import:** Payment 100% against cash against documents after 45 days.
  - Indigenous:** Payment 100% after 45 days on satisfactory receipts and acceptance of material at BHEL stores. Offers requesting for advance payment will be rejected.
- b. **Liquidated Damage:** 0.5% of price for each week of delay up to a maximum of 10% of the undelivered goods.
- c. **Delivery Terms:**
  - Import:** Price should be quoted as CIF/C&F as per ICC Incoterms 2010.
  - Indigenous:** Prices should on FOR BHEL Trichy stores
- d. **Validity of Offer:** Prices should be valid for 120 days from the date of opening of this tender.
- e. **Custom Duties:** As per FTP 2009-2014.
- f. **Risk Purchase:** Alternatively the purchaser at his option will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of seller either the whole of goods or any part which the supplier has failed to deliver or dispatch within the time stipulated as aforesaid or if the same were not available, the best and the nearest available substitute therefore. Supplier shall be liable for any loss which the purchaser may sustain by reason for such risk purchases in addition to penalty.
- g. **TAXES/DUTY:** If taxes/Duty is payable, the chapter head/sub-head reference and the rate of the duty should be quoted mentioned in the offer separately. Where ever MODVAT benefit can be availed same have to be passed on to purchaser.
- h. **Miscellaneous:** Any conditions quoted by the seller and are in contravention to the terms prescribed in order and which have not been specifically accepted by Purchaser will not be applicable to the contract.
- i. **Delivery period:** Delivery should be less than 6 months.
- j. **Bank Charges:** All Bank charges outside India are to vendor's account only.
- k. **Supply Record:** Vendor should submit Supply record of Valves with material SB564 UNS N06617 with application, end user details, raw material test certificate, unpriced Purchase order copy,
- l. **Performance Bank Guarantee:** Vendor should provide a performance bank guarantee (PBG) for 10% of the total Purchase order value valid for the guarantee period with an additional claim period of 2 months. Bank guarantee should be as per BHEL format from list of consortium Banks (Annexure 3B).



# BHARAT HEAVY ELECTRICALS LTD

Annexure 2A

## VALVES PURCHASE

Trichy - 620 014. India

### GENERAL TERMS AND CONDITIONS

#### **3. GENERAL CONDITIONS**

- a. BHEL reserves the right to finalize the tender as per item sl no wise or as a total package or project wise. Separate orders will be released for each project and documents should be supplied for each order separately.
- b. BHEL reserves the right to increase or reduce or split the Tender Quantity and NOT to order for some or all material based on the changes in project.
- c. BHEL shall have the right to visit vendor works during the execution of contract along with end customer for verifying status, inspection and testing of the material.
- d. BHEL reserves the right to negotiate or re-float the tender in case the quoted prices are not acceptable.
- e. Supplier shall arrange packing to avoid lose or damages during Road Transport, Site handling & Storage.
- f. Purchase Order, PO Item SI No, Material code, Quantity should marked the Packing clearly.
- g. BHEL reserves the right to finalize the tender either through price bid opening or through Reverse Auction route.
- h. BHEL reserves the right to reject the offer of a particular bidder due to unsatisfactory past performance in the execution of a contract at any of BHEL projects / units.
- i. The Drawings and Technical documents given in this enquiry are the sole property of BHEL. This should not be misused in any form.

#### **4. DOCUMENTATION:**

- a. **With Consignment:**
  - One set of Non Negotiable Documents, O&M Manual, packing list, Fumigation Certificate.
- b. **Through Bank:** All originals in Triplicate, material description in all documents shall be exactly as indicated in PO.
  - Bill of lading /Airway Bill and Certificate of Origin.
  - The invoice indicating the Unit price & total price.
  - Packing List contains quantity, net & gross weight of each item, packing dimensions, PO, Item SI No.
  - Inspection test certificates as per PO, Guarantee/warranty certificates.
  - Original Performance Bank Guarantee in the BHEL format from list of consortium bank, If applicable
- c. **To Purchase :** In soft copy
  - Copy of All Test Certificates as per purchase order.
  - Certificate that materials shipped and shown in the packing list are not less than that invoiced.
  - Copy of Non-negotiable documents
- d. **Identification:** Material code, Purchase Order, PO item SI No, Unique SI No if any should be provided in all despatch documents, materials and packing clearly.

#### **5. TENDER EVALUATION:**

##### **Part I-Pre Qualification Bid-**

- All Vendors should submit supply record, end user certificate and PO reference, catalogue etc...
- Vendor who are not registered in BHEL Trichy Product Material Directory (PMD) should register online in <http://supplier.bhel.in/> and should submit copy of online registration form wit part I bid.
- BHEL reserves right to visit vendor works before registration for verification of facilities.
- Vendor who doesn't have manufacturing capacity/capabilities/credentials will be rejected.

##### **PART II Techno-commercial Bid.**

- All vendors should submit General arrangement drawing, datasheet and C&I diagrams of the offered product
- Point by point technical confirmation of all pages of our technical specifications and commercial conditions are required with your sign and seal along with techno commercial Offer.
- Filled Annexure 4A and Annexure 4B should be submitted.
- IBR certification of the factory should be confirmed with the offer.
- Offers from supplier not having technical capability or not agreed for commercial terms, will be rejected

##### **PART III Price Bid.**

- Bidders qualified for both part I and part II will be intimated for participating in priced bid opening/Reverse Auction.
- L1 bidder will be decided based on landed cost for the equipment to BHEL.
- Price Bid should be in BHEL format Annexure 4C
- For evaluation, the exchange rate shall be taken as TT selling rate of SBI on date of Part-1 bid opening.

**Note: PART I and PART II will be opened together at time of tender opening**

**SCHEDULE OF DEVIATIONS**

Enq Ref:

Offer Ref:

Date:

**Commercial Deviation:**

<b>Annexure / Clause No.</b>	<b>Description</b>	<b>Supplier Deviation</b>

**Technical Deviation:**

<b>Annexure / Clause No.</b>	<b>Description</b>	<b>Supplier Deviation</b>

We confirm acceptance of all the Technical and Commercial requirements as per BHEL Tender, except the above deviations.

Signature with Seal

(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT AND THE EXPIRY DATE OF BG MUST BE AFTER 60 DAYS FROM THE DATE OF COMPLETION OF WARRANTY PERIOD)

## PERFORMANCE BANK GUARANTEE

In accordance of M/s. Bharat Heavy Electricals Limited (A Government of India undertaking, a company incorporated under the Companies Act 1956 having its Registered Office at "BHEL House", SIRI Fort, New Delhi 110 049) through its High Pressure Boiler Plant Division located at Tiruverumbur, Tiruchirapalli- 620 014 (hereinafter called 'the Company') having entered into a contract with .....hereinafter called ' the said contractor ' which term includes 'suppliers' for the purpose of this Bond and under the terms and conditions of the contract No..... Dt ..... Between BHEL, Trichy and as per the contract, the contractor / supplier is to furnish a performance Bank guarantee for Rs. .... for the due performance of the equipment to be supplied under the above referred contract and for the fulfillment of all the terms and conditions of the contract, We .....(indicate the name of the bank) (herein after referred to as the bank) at the request of ..... (Contractor(s) ) do here by undertake to pay the company an amount not exceeding Rs.....against any loss or damage caused to or suffered or would be caused to or suffered by the company by reason of any breach by the said contractor (s) of any of the terms and conditions contained in the said agreement.

2. We .....(indicate the name of the bank with full address), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company by reason of breach by the said Contractor(s) of any of the terms and conditions contained in the said Agreement or by the reason of the contractor(s) 'failure to perform' the said agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs.\_\_\_\_\_.

3. We undertake to pay unconditionally to the Company any money so demanded notwithstanding any dispute(s) raised by the Contractor in any suit, or proceedings pending before any Court or Tribunal or Arbitration or before any other authority relating thereto our liability under this present being absolute and unequivocal. The payment under this guarantee would not wait till the disputes have been decided by any Court or Tribunal or in the arbitration proceedings or by any other authority. The payment so made by us under this Bond shall be a valid discharge of liability for payment thereunder and the Contractor(s) shall have no claim against us for making such payment.

4. We.....( indicate the name of Bank), further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till \_\_\_\_\_Office / Department/ Division of the Company certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.

5. (I) Unless a demand or claim under this guarantee is made on us in writing on or before the \_\_\_\_\_ we shall be discharged from all the liability under this guarantee thereafter. But where such claim or demand has been preferred by the Company with the Bank before the expiry of the said date, the claim shall be enforceable notwithstanding the fact that the said enforcement is effected after the said date.

(ii) For the purpose of this clause, any letter making demand on the Bank by M/s. BHEL dispatched by Registered Post with Ack.Due or by Telegram or by any Electronic media addressed to the above mentioned address of the Bank shall be deemed to be the claim / demand in writing referred to above irrespective of the fact as to whether and when the said letter reaches the Bank, as also any letter containing the said demand or claim is lodged with the bank personally.

6. We .....(indicate the name of Bank), further agree with the company that the Company shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Company against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said Contractor(s) or for any forbearance, act or omission on the part of the company or any indulgence by the company to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating would, but for this provision, have effect of not so relieving us.

7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

8. It shall not be necessary for the company to proceed against the contractor before proceeding against the guarantor-bank and the guarantee herein contained shall be enforceable against them notwithstanding any security, which the company may have obtained or obtain from the Contractor shall, at the time when proceedings are taken against the guarantor hereunder be outstanding or unrealised.

9. Any claim or dispute arising under the terms of this document shall only be enforced or settled in the Courts at Tiruchirapalli.

10. The guarantor hereby declare that it has power to execute this guarantee and the executant has full powers to do so on its behalf under the proper authorities granted to him/them by the guarantor.

11. We .....(indicate the name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the company in writing.

In witness whereof we....., (indicate the name of Bank) have hereunto setout Bank Seal the \_\_\_\_\_ day \_\_\_\_\_ month 200  
BANK E-MAIL ID:  
BANK PHONE NO.  
BANK FAX NO:



				Annexure 4
<b>BHEL Enquiry No. &amp; Date</b>		<b>Vendor's Offer Ref No. &amp; Date</b>		
<b>MODEL UNPRICE BID FORMAT</b>				
	<b>Currency</b>			
Enq SI No.	Description	Unit	Qty	Unit Price in Currency
1				Quoted/Not Quoted
2				Quoted/Not Quoted
3				Quoted/Not Quoted
4				Quoted/Not Quoted
5				Quoted/Not Quoted
.				Quoted/Not Quoted
.				
	FOR/CIF Value in Currency			Quoted/Not Quoted
	Validity of Price			
	<b>Consignment Package Details</b>			
	Approximate Net / Cross Weight in Kgs			
	Dimension of Consignment			
	Delivery date from the date of Purchase Order			
				<b>Signature &amp; Seal of Vendor</b>
	<b>NOTE:</b>			
	The Unpriced Bid should be submitted strictly in line with the above <b>FORMAT</b>			

