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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		TECHNICAL SPECIFICATION FOR BOILER FEED PUMP RECIRCULATION (HIGH PRESSURE DROP) CONTROL VALVE FOR SUPER-CRITICAL POWER PLANTS 1.0.0 INTENT OF SPECIFICATION: The intent of specification is to procure High pressure drop control valve for use in the recirculation system of Boiler feed pump of thermal power plant, to ensure minimum quantity of flow through the pump. The valve shall be capable of throttling from discharge pressure of Boiler feed pump to the deaerator pressure for both hot and cold conditions of operation as given at cl. 3.1.0. 2.0.0 SCOPE OF SUPPLY: Scope of supply shall include on-off type control valve with the following accessories. - Pneumatic actuator - Solenoid valve - Limit switches - Air filter regulator with output gauge - Hand wheel for manual operation - Stem travel indicator - Pneumatic tubing - Terminal box for limit switches - Orifice Plate (RO) along with Flanges, O-rings/Gaskets - One set of soft goods for each model of each order (Soft goods shall include total number of gaskets, "O" rings, backup rings, seals, gland packing's and any other seating items required for one valve assembly) supplier shall indicate quantities of each type of packing in the enquiry. 3.0.0 TECHNICAL PARAMETERS: Boiler feed pump is variable speed type and the valve shall be suitable for the following conditions corresponding to maximum & minimum speed and temperature. 3.1.0 OPERATING CONDITIONS: <table border="1" data-bbox="300 1396 1461 1753"> <thead> <tr> <th>Variant No.</th> <th>Operation</th> <th>Feed water Temp. (°C)</th> <th>Inlet Pressure (Kgs/Cm²)</th> <th>Flow (m³/Hr)</th> <th>Down steam Pressure (Kgs/Cm²)</th> <th>Inlet & Outlet Pipe OD & thk. (mm)</th> <th>Valve body Design pressure (Kgs/Cm²)/Temp (°C)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">01</td> <td>Hot</td> <td>190</td> <td>380</td> <td>545</td> <td>18</td> <td rowspan="2">273x50 BW ends ANSI B16.25</td> <td rowspan="2">460/190</td> </tr> <tr> <td>Cold</td> <td>40</td> <td>120</td> <td>290</td> <td>6</td> </tr> <tr> <td rowspan="2">02</td> <td>Hot</td> <td>190</td> <td>380</td> <td>280</td> <td>18</td> <td rowspan="2">219.1x40 BW ends ANSI B16.25</td> <td rowspan="2">400/190</td> </tr> <tr> <td>Cold</td> <td>40</td> <td>80</td> <td>120</td> <td>6</td> </tr> </tbody> </table>					Variant No.	Operation	Feed water Temp. (°C)	Inlet Pressure (Kgs/Cm ²)	Flow (m ³ /Hr)	Down steam Pressure (Kgs/Cm ²)	Inlet & Outlet Pipe OD & thk. (mm)	Valve body Design pressure (Kgs/Cm ²)/Temp (°C)	01	Hot	190	380	545	18	273x50 BW ends ANSI B16.25	460/190	Cold	40	120	290	6	02	Hot	190	380	280	18	219.1x40 BW ends ANSI B16.25	400/190	Cold	40	80	120	6
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Ref. Doc	Revisions: Refer to record of revisions.		Prepared: M. M. RAO		Approved: P. SRINIVAS	Date: 06-11-2009																																		

03	Hot	190	380	650	18	324x56 BW ends ANSI B16.25	450/190
	Cold	40	150	395	6.5		
04	Hot	190	380	325	18	219.1x40 BW ends ANSI B16.25	470/190
	Cold	40	74	133	6.5		
05*	Hot	186.5	394	339	18	273x50 BW ends ANSI B16.25	500/200
	Cold	40	52	93	8		
06	Hot	190	345	330	17	219.1x40 BW ends ANSI B16.25	480/200
	Cold	40	53	96	6.5		
07*	Hot	190	406.5	565	18	323.9X56 BW ends ANSI B16.25	500/200
	Cold	40	37	159	8		
08	Hot	190	372	480	17	273X50 BW ends ANSI B16.25	480/200
	Cold	40	29	143	6.5		
09	Hot	190	416	336	16.8	219.1x42 BW ends ANSI B16.25	500/200
	Cold	40	47	79	8		
10	Hot	190	404	560	16.8	323.9x61 BW ends ANSI B16.25	500/200
	Cold	40	29	141	8		
11	Hot	190	431	543	16	323.9x62 BW ends AMSE B16.25	550/200
	Cold	40	40.5	157	5		
12	Hot	190	405	310	16	ID 150 x THK 34 BW ends ANSI B16.25	460/200 [Orifice Plate Flange Inlet & Outlet Pipe OD & thk.(mm) = 219.1 x 8.18 Pipe design pressure = 25 kg/cm2 (g)]
	Cold	40	46	74	6		
13	Hot	190	393	516	16	ID 185 x THK 40 BW ends ANSI B16.25	460/200 [Orifice Plate Flange Inlet & Outlet Pipe OD & thk.(mm) = 273 x 9.27 Pipe design pressure = 25 kg/cm2 (g)]
	Cold	40	29	131	6		

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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		<u>NOTE:</u> i. Pressure drops indicated above is including orifice pressure drop. ii. Orifice plate supplied should have minimum pressure drop of 1 kg/cm² in cold condition. iii. Valve body to be designed to handle 40% of Design flow as indicated in Design condition column. *Note: For variant 05 & 07 Valve body to be designed to accommodate a flow of 388m³/hr & 646m³/hr respectively as per NTPC Specification. 3.2.0 Valve shall go to full open condition with supply air failure to actuator and supply voltage failure to solenoid valve. 4.0.0 <u>DESIGN FEATURES & GENERAL REQUIREMENTS:</u> 4.1.0 Valve shall be pneumatically operated ON-OFF type 4.2.0 The control valves and accessories equipment furnished by the Bidder shall be designed, constructed and tested in accordance with the latest applicable requirements of code for pressure piping ANSI B 31.1, the ASME Boiler & pressure vessel code, Indian Boiler Regulation (IBR-IIIC), ISA, and other standards specified elsewhere as well as in accordance with all applicable requirements of the "Federal Occupational Safety and Health Standards, USA" or acceptable equal standard. Bidder shall provide the IBR certificates for all the Control valves coming on piping system under IBR scope. Inspection agency for IBR tests & certificates shall be an approved agency of IBR. 4.3.0 The design of valve body shall conform to the requirements of ANSI B-16.34 and other applicable standards for dimensions, material thickness and material specification for their respective pressure classes. 5.0.0 <u>CONTROL VALVE SIZING & CONSTRUCTION:</u> 5.1.0 The design of all valve body shall meet the specification requirements and shall conform to the requirements of ANSI (USA) for dimensions, material thickness and material specification for their respective pressure classes. 5.2.0 The valve sizing shall be suitable for obtaining maximum flow conditions with valve opening at approximately 80% of total valve stem travel and minimum flow conditions with valve stem travel not less than 10% of total valve stem travel. All the valves shall be capable of handling at least 120% of the required maximum flow. Further, the valve stem travel range from minimum flow condition to maximum flow condition shall not be less than 50% of the total valve stem travel. The sizing shall be in accordance with the latest edition of ISA handbook on control valves. While deciding the size of valves, Bidder shall ensure that valves trim exit outlet velocity as defined in ISA handbook does not exceed 8 m/sec for liquid services, 150 m/sec. for steam services and 50% of sonic velocity for flashing services. Bidder shall furnish the sizing calculations clearly indicating the outlet velocity achieved with the valve size selected by them as well as noise calculations, which will be subject to Employer's approval during detailed engineering. 5.3.0 Control valves for steam and water applications shall be designed to prevent cavitation, wire drawing, flashing on the downstream side of valve and downstream		
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		piping. Thus for cavitation/flashings service, only valve with anti-cavitation trim shall be provided. Bidder shall furnish in his proposal detailed calculations to establish whether cavitation will occur or not under any operating condition for a particular application. These calculations clearly indicating shall be subject to Owner's review and approval and in case it is established at any stage of the contract that cavitation will occur, the Bidder shall provide anti-cavitation trim for the same at no extra price. Further the Bidder shall furnish in his proposal the detailed write up, technical literature etc. clearly indicating as to how the occurrence of cavitation shall be prevented by the design of this offered anti-cavitation trim. The valve design which only shifts the occurrence of cavitation for minimizing the erosion will not be acceptable. 5.4.0 Control valves shall have permissible leakage rate as per leakage Class V. 5.5.0 The control valve induced noise shall be limited to 85 dBA at 1 meter from the valve surface under actual operating conditions. The noise abatement shall be achieved by valve body and trim design and not by use of silencers. 5.6.0 Bidder shall furnish the Control valve manufacturer's data sheets and sizing calculations including the inlet/outlet velocity calculations with the proposal which will be subjected to owner's approval during detailed engineering stage. 5.7.0 The exact characteristic (i.e. Linear/equal percentage/quick opening type) for each of the control valves shall be selected so as to match the process requirements and shall be subjected to owner's approval during detailed engineering stage. 6.0.0 VALVE CONSTRUCTION: 6.1.0 All valves shall be of globe body design. 6.2.0 a) Valves with high lift cage guided plugs & quick-change trims shall be supplied. The quick change trim shall consist of a cage and a seating clamped in the valve body by the valve bonnet and sealed with a spiral wound stainless steel asbestos gasket. The trim shall be removable through the top after bonnet removal without any cutting or welding of the valve. Where applicable, plugs shall be designed to include pressure balancing for cage guided valves. b) The flow direction through the valve shall be "flow to open". The valve offered shall have pressure reduction through multi-stage, multi-path, axial flow/radial flow anti-cavitation design. The trim / stack shall be provided with parallel sets of multiple axial/radial holes. The flow path through the holes shall be staggered and shall be determined by the valve plug. Pressure reduction through contours or steps formed on the valve stem/spindle is not acceptable. 6.3.0 Cast Iron valves are not acceptable. 6.4.0 Bonnet joints for all control valves shall be of the flanged and bolted type or other construction acceptable to the Employer. Bonnet joints of the internal threaded or union type will not be acceptable. 6.5.0 Plug shall be of one-piece construction cast, forged or machined from solid bar stock. Plug shall be screwed and pinned to valve stems or shall be integral with the valve stems.		
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.			6.6.0 All valves connected to vacuum on downstream side shall be provided with packing suitable for vacuum applications (e.g. double vee type chevron packing) 6.7.0 Valve characteristic shall match with the process characteristics. 6.8.0 Extension bonnets shall be provided when the maximum temperature of flowing fluid is greater than 280 deg. C. 6.9.0 Flanged valves shall be rated at no less than ANSI press class of 300 lbs. 6.10.0 Valve's gland packing material shall be grafoil. 6.11.0 All control valves shall have stems, guide bushings, plugs, seat rings, stem lock pin, stuffing box parts and other trim parts made of stainless steel. Valve guide posts and bushings shall be stellited faces for applications involving high pressure drop as well as for flashing and cavitation applications. Trim material shall be 440 C SS, depending upon the service conditions to ensure required degree of hard facing so as to avoid erosion. 6.12.0 Stem travel indicators shall be provided on all valves. 6.13.0 Each valve shall have an arrow fixed permanently on the valve body to indicate the correct direction of flow. 6.14.0 Each valve shall have a stainless steel name plate permanently fastened to the yoke which shall be visible when the valves are in service. The name plate shall indicate valve serial no., body material, size, pressure rating, trim material & type, action in air failure, steam travel, Rated Cv etc. 6.15.0 Suitable lugs shall be provided on the valve body/assly for lifting/handling and to assist placement of the valve assembly in the desired position. 6.16.0 Valve orientation (inlet/outlet) shall be as per Annexure-1. 7.0.0 VALVE MATERIALS: I. Body : As per ASTM-A217 Gr. WC9 II. Trim : SS 440 C However, Bidder may offer valves with body and trim materials better than specified materials and in such cases Bidder shall furnish the comparison of properties including cavitation resistance, hardness, tensile strength, strain energy, corrosion resistance and erosion resistance etc. of the offered material vis-a-vis the specified Material for owner's consideration and approval. 8.0.0 END PREPARATION: Valve body ends shall be butt welded type as per ANSI B 16.25 for control valves of sizes 65 mm and above. Valve inlet and outlet pipe size details are given at Cl. No. 3.1.0. Required valve edge preparation details will be furnished during contract execution stage. Bidder shall offer valve body such that it is directly weld able to pipe size without any cost implication to BHEL.		
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		9.0.0 VALVE ACTUATORS: The control valves shall be furnished with pneumatic actuators. The Bidder shall be responsible for proper selection and sizing of valve actuators in accordance with the Pressure drop and maximum shut off pressure and leakage class requirements. The Valve actuators shall be capable of operating at 60 deg.C continuously. Valve actuators and stems shall be adequate to handle the unbalanced forces occurring under the specified flow conditions or the maximum differential pressure specified. An adequate allowance for steam force, at least 0.15 Kg/sq.cm. per linear millimeter of seating surface, shall be provided in the selection of the actuator to ensure tight seating unless otherwise specified. The actuator shall be designed to produce the required stem force with supply air pressure of 5 kg/cm². Diaphragms shall be moulded synthetic rubber and diaphragm housing shall be of pressure steel construction. Diaphragm shall not be fabricated of natural rubber. Piston actuators shall use cast pistons and cylinders with 'O' rings seals. Actuators shall be supplied with name plates which indicate the diaphragm air pressure at full open and full closed positions. For single seated valves the pressure shall be listed for maximum differential and for zero differential across the valve. Pistons any cylinders shall be cast aluminum. Piston rod and extension shall be of nitrile. Yoke shall be cast iron. Opening and Closing time of the valve shall not exceed 10 seconds. 10.0.0 CONTROL VALVE ACCESSORY DEVICES: 10.1.0 All pneumatic actuated control valve accessories such as air locks, hand wheels/hand-jacks, limit switches, microprocessor based electronic Positioner, diffusers, external volume chambers, position transmitters (capacitance or resistance type only), reversible pilot for Positioner, tubing and air sets, solenoid valves and junction boxes etc. shall be provided as per the requirements. 10.2.0 Limit Switches Limit Switches shall have not less than two normally open and two normally closed contacts in both open and closed conditions. Electrical rating of the limit switch contacts shall be 240V AC, 5.0 amps or 220V DC, 0.25 amps. The enclosure of the limit switches shall be as per IP-55. 10.3.0 Solenoid Valves: 1. Operating Principle : Electromagnetic (noiseless). 2. Coil voltage rating : 24 V DC 3. Ways : 2/3/4 way. 4. Port size : 1/4" NPT all ports. 5. Body : SS bar stock Trim : SS-316. 6. Duty : Suitable for continuous energization. 7. Sealing : Airtight and leak proof. 8. Ambient Temperature : 0 - 50 °C.		
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			10.4.0 Tubing & Air Sets: The tubing required to interconnect devices assembled together shall be fully annealed soft copper conforming to ASTM-B.68 or B.75 (USA). Swaged type flare less tubing fittings shall be used for tubing connections. Control valves shall be provided with a combination of filter regulator and shall be mounted on the valve itself. Filter regulator shall be suitable for a maximum inlet pressure of 10 kg/cm². Filter regulator shall have built-in housing blow down valves and a 2” pressure gage. Filter shall be made of sintered bronze and size shall not be more than five microns.		
			11.0.0 QUALITY ASSURANCE & TESTS: All valves including actuators shall be tested in accordance with the quality assurance programme agreed between the Employer and Contractor, which shall meet the requirements of IBR and other applicable codes mentioned elsewhere in the specifications. The valves and actuators in addition to above shall also meet the quality assurance requirements specified in NTPC technical specification - section VI, part B, E29 & E5 given at annexure – II & annexure- III. The quality control plans and reference documents shall be furnished for owner’s approval. If required supplier shall depute their representative for discussions and finalization of quality plan and reference documents with BHEL/owner. The tests shall include but not be limited to the following:		
			11.1.0 Non Destructive Test as per ANSI B-16.34. 11.2.0 Valve closure test and seat leakage test in accordance with ANSI-B 16.34 and as per the leakage class indicated above. 11.3.0 Functional Test: The fully assembled valves including actuators control devices and accessories shall be functionally tested to demonstrate times from open to close position. 11.4.0 Properties of materials shall be determined from the test pieces fully representative of the material and its condition. Detailed results of the test conducted to determine the mechanical properties, chemical analysis and details of heat treatment procedure shall be recorded on certificates.		
Ref. Doc	11.5.0 Hardness check shall be carried out on all hard faced/stellited surfaces, if any.				

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The voltage, current rating and insulation class of solenoid operated valve shall be tested for compliance with specification requirement. 11.13.0 Cv Test: Cv test shall be carried out as type test on each size, type and design of the valves as per ISA-75.02 standard from 0 to 100% of the valve travel insteps of 20% and test valves shall meet published catalogue requirements taking into consideration the allowable tolerances as per ISA-75.11 and test report shall be furnished for Owner's approval. Before commencing the test, Cv type test procedure shall be submitted for owner's review and approval. 11.14.0 WITNESSING OF TESTS BY BHEL/END USER: The following tests shall be offered for Witness by BHEL/End User a) Physical Dimensions of the Valve b) Hydro Test c) Performance Test d) Seat leakage Test d) Cv Type Test (one valve of each type, size & design) 12.0.0 <u>PACKAGE AND TRANSPORTATION:</u> 12.1.0 All the equipment shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling the storage at site till the time of erection. While packing all the materials, the limitations from the point of view of availability of railway wagon sizes in India should be taken into account of. The details of various wagons normally available with Indian Railways for transportation of heavy equipment are enclosed as Appendix 1 to this section. The contractor shall be responsible for any loss or damage during transportation, handling and storage due to improper packing. The Packing shall be Sea-worthy. 12.2.0 Appendix 1 to this section also indicates the dimensions, which can be normally transported on the wagons without infringement of the moving gauge. This is not indicative of the consignments which can be carried out with infringement of moving gauge duly authorised and approved by the Indian Railways. There may be difference between the moving gauge and the fixed structure gauge and consignments infringing the moving gauge can be moved after investigation regarding possible infringement with the fixed structures. As the critical fixed structures in each route are different, consignments infringing moving dimensions have to be individually investigated to select a route and also determine the restrictions under which such movement to be carried out. Such routes selected or other mode of transport envisaged is to be clearly brought out in the proposal wherever transport of over dimensioned equipment is involved. 12.3.0 <u>PROTECTION</u> All coated surface shall be protected against abrasion, impact, discoloration and any other damages. All exposed threaded portions shall be suitably protected with either a metallic or a non-metallic protecting device. All ends of all valves and piping and					
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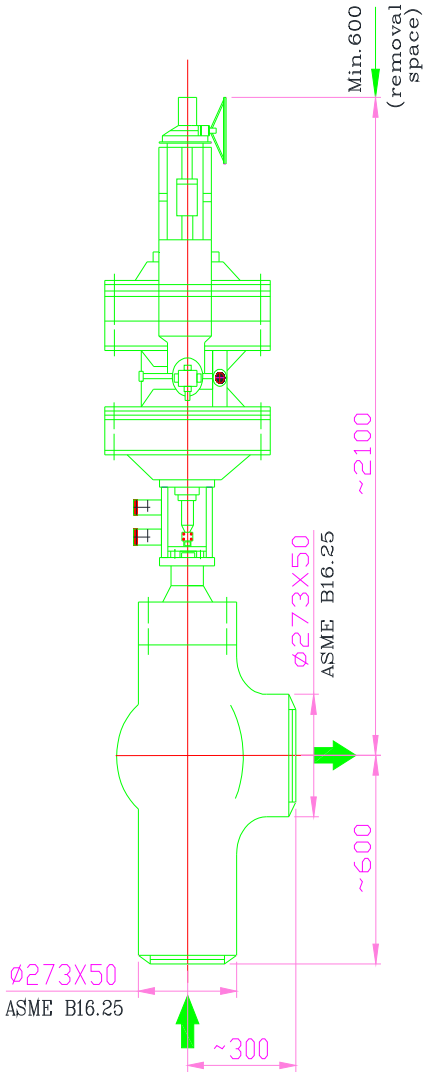
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.			conduit equipment connections shall be properly sealed with parts which are likely to get rusted, due exposure to weather should also be properly treated and protected in a suitable manner. EMI/static charge proof packaging should be used for PLC/Electronic hardware. 13.0.0 <u>PRESERVATIVE SHOP COATING:</u> 13.1.0 All exposed metallic surface to corrosion shall be protected by shop application of suitable coatings. All surfaces which will not be easily accessible after the shop assembly, shall before hand be treated and protected for the life of the equipment. All surfaces shall be thoroughly cleaned of all mill scale oxide and other coatings are Prepared in the shop, the surfaces that are to be finish painted after installation or require corrosion protection until installation, shall be shop painted with at least two coats of primer. Transformers and other electrical equipment, if included shall be shop finished with one or more coats of primer and two coats of high grade resistance enamel. The finished colours shall be as per manufacturer's standards to be selected and specified by the Engineer at a later stage. 13.2.0 Shop primer for all steel surface which will be exposed to operating temperature below 95°C shall be selected by the Contractor. Special high temperature primer shall be used on surface exposed to temperature higher than 95°C. 13.3.0 All other steel surfaces which are not to be painted shall be coated with suitable dust preventive compound subject to the approval of the Contractor. 14.0.0 <u>RATING PLATES, NAME PLATES AND LABELS:</u> 14.1.0 Each main and auxiliary item of plant is to have permanently attached to it in a conspicuous position rating plates of non-corrosive material upon which is to be engraved manufacturer name, equipment, type or serial number together with details of the loading conditions under which the item of plant in question has been designed to operate and such diagram plates as may be required by the Engineer. 14.2.0 Each item of plant is to be provided with nameplate or label designing the service of the particular equipment. The inscriptions are to be approved by the Engineer or as detailed in the appropriate sections of the Technical Specifications. 14.3.0 Such nameplates or labels are to be of white non-hygroscopic materials with engraved back lettering or alternatively in the case of indoor circuit breakers, starters, etc. of transparent plastic material with suitably coloured lettering engraved on the back. 14.4.0 Terms of plant such as valves and dampers, which are subject to handling, are to be provided with engraved chromium plated or label with engraving filled with enamel. The nameplates for valves shall be marked in accordance with MSS standard Sp-25 and ANSI B 16.34 as minimum. 15.0.0 <u>DOCUMENTS TO BE FURNISHED ALONG WITH OFFER:</u>		
			a) GA drawing (shall include welded details and terminal details of limit switches) b) Sectional drawing c) Data sheet		

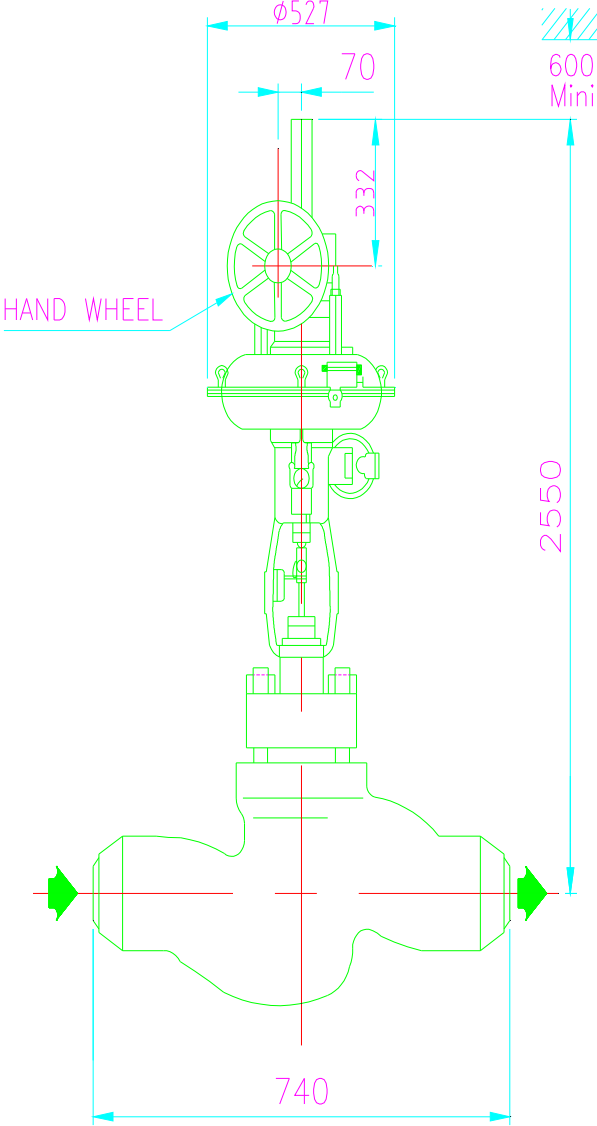
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		d) CV & anti-cavitation calculations along with outlet velocity calculation. e) Catalogue for valve, actuator and accessories. Model nos. chosen shall be marked on the catalogues. f) Quality plans and reference documents (if other than international standards are referred). 16.0.0 DOCUMENTS TO BE FURNISHED AFTER THE PLACEMENT OF ORDER (IN SIX COPIES): a) GA drawing (shall include weld end details , outline dimensions and terminal details of limit switches) b) Sectional drawing (including part list with Material of construction) & Data Sheet. c) O & M instructions d) Quality plans shall be in BHEL format e) Documentation package (Quality file) For (a) & (b) as listed above reproducible shall be furnish Final approved drawings shall be furnished in CD-ROM. 16.1.0 guarantee shall be as specified in the enquiry. 17.0.0 LIST OF ENCLOSURES: (APPLICABLE FOR NTPC ROJECTS) a) Quality Assurance of Control valve & actuators (NTPC Specification annexure – II) b) Quality Assurance of Boiler feed pump (NTPC Specification annexure – III) 18.0.0 VARIANT NOS & MATERIAL CODES: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">VAR. No</th> <th style="width: 60%;">DESCRIPTION</th> <th style="width: 30%;">BHEL Material Code</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">01</td> <td>BOILER FEED PUMP RECIRCULATION (HIGH PRESSURE DROP) CONTROL VALVE</td> <td style="text-align: center;">FP9760191016</td> </tr> <tr> <td style="text-align: center;">02</td> <td>BOILER FEED PUMP RECIRCULATION (HIGH PRESSURE DROP) CONTROL VALVE For 2X660MW BARA PRAYAGRAJ MDG346 - 25% Duty BFP</td> <td style="text-align: center;">FP9760191024</td> </tr> <tr> <td style="text-align: center;">03</td> <td>BOILER FEED PUMP RECIRCULATION (HIGH PRESSURE DROP) CONTROL VALVE for 2X800MW YERAMARUS STPS</td> <td style="text-align: center;">FP9760191032</td> </tr> <tr> <td style="text-align: center;">04</td> <td>BOILER FEED PUMP RECIRCULATION (HIGH PRESSURE DROP) CONTROL VALVE for NTPC MOUDA STG-II,2X660MW. MDG346 - 30% Duty BFP</td> <td style="text-align: center;">FP9760191040</td> </tr> <tr> <td style="text-align: center;">05</td> <td>BOILER FEED PUMP RECIRCULATION (HIGH PRESSURE DROP) CONTROL VALVE for NTPC GADARWARA,2X800MW.</td> <td style="text-align: center;">FP9760191059</td> </tr> </tbody> </table>			VAR. No	DESCRIPTION	BHEL Material Code	01	BOILER FEED PUMP RECIRCULATION (HIGH PRESSURE DROP) CONTROL VALVE	FP9760191016	02	BOILER FEED PUMP RECIRCULATION (HIGH PRESSURE DROP) CONTROL VALVE For 2X660MW BARA PRAYAGRAJ MDG346 - 25% Duty BFP	FP9760191024	03	BOILER FEED PUMP RECIRCULATION (HIGH PRESSURE DROP) CONTROL VALVE for 2X800MW YERAMARUS STPS	FP9760191032	04	BOILER FEED PUMP RECIRCULATION (HIGH PRESSURE DROP) CONTROL VALVE for NTPC MOUDA STG-II,2X660MW. MDG346 - 30% Duty BFP	FP9760191040	05	BOILER FEED PUMP RECIRCULATION (HIGH PRESSURE DROP) CONTROL VALVE for NTPC GADARWARA,2X800MW.	FP9760191059
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03	18.04.2012	Clause 6.2.0 revised Clause 16.2.0 added	PB	BRK																																																																																																									
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05	25.02.2013	Spec generally revised, Clause for Provenances Criteria added at 19.0.0	Prakash	BRK																																																																																																									
06	21.05.2013	Clause 6.1.0 revised. Clause 6.16.0 & annexure-1 added.	DK Gupta	PS																																																																																																									
07	10.06.2013	Var no. 04 is added for MDG346 30% Duty BFP for 660 MW Projects.	ROHIT	MMR																																																																																																									
08	02.12.2013	Clause 2.0.0, clause 9.0.0 and clause 16.1.0 are revised	DBR	BRK																																																																																																									
09	14.12.2014	1. Var no. 05, 06, 07, 08 in Clause 3.1.0 2. Clause no 20.0.0 is added for Spares of R.C valve.	ROHIT	RAJ.CH																																																																																																									
10	11.02.2015	Parameters are changed for Var no's 5 & 7	NVKS	RAJ.CH																																																																																																									
11	18.04.2015	1. Var no. 09, 10, 74, 75, 76, 77, 78 & 79 added. For 3x660MW North Karanpura Project	ROHIT	PS																																																																																																									
12	22.06.2015	Var No's 75, 76, 78, 79 & 80 are added in spares	NVKS	RAJ.CH																																																																																																									
13	24.06.2016	Var. Nos. 81 to 96 added in spares	SANGEETHA	AJK																																																																																																									
14	05.07.2017	Var No's 14, 97, 98, 99 are added in spares	NVKS	RAJ.CH																																																																																																									
15	30.08.2017	1. Var. Nos. 11, 41, 42, 43 and 44 are added. 2. Note added for Var table in page no. 2	KULDEEP	DK GUPTA																																																																																																									
16	02.12.2017	VAR.NO.12,13 & 31 to 39 ADDED	SATISH	KHRK																																																																																																									
17	09.04.2018	GENERALLY REVISED	SATISH	KHRK																																																																																																									
Ref. Doc																																																																																																													

