



SUB-SECTION-IV: I8


CONTROL VALVES, ACTUATORS


MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) /
NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) /
RAGHUNATHPUR TPP PHASE-II (2 x 660MW)
STEAM GENERATOR PACKAGE


TECHNICAL SPECIFICATION
SECTION-VI
BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2

CLAUSE NO.	TECHNICAL REQUIREMENTS							
	CONTROL VALVES, ACTUATORS & ACCESSORIES							
1.00.00	CONTROL VALVES, ACTUATORS & ACCESSORIES							
1.01.00	General Requirements							
1.01.01	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), 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 standards. All the Control Valves, their actuators and accessories to be furnished under this Sub-section will be fully suitable and compatible with the modulating loops covered under the Specification.							
1.01.02	All the control valves and accessories offered by the Bidder shall be from reputed, experienced manufacturers of specified type and range of valves.							
1.01.03	For control valve such as pressure and temperature control valve for Aux PRDS applications, Separator Drain Control Valves etc., also refer to the corresponding mechanical section in addition to requirements stipulated in this subsection.							
1.02.00	CONTROL VALVE SIZING & CONSTRUCTION							
1.02.01	The design of all valve bodies 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.							
1.02.02	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 him as well as noise calculations, which will be subject to Employer's approval during detailed engineering.							
1.02.03	Control valves for steam and water applications shall be designed to prevent cavitation, wire drawing, flashing on the downstream side of valve and down stream piping. Thus for cavitation/flashing service, only valve with anti cavitation trim shall be provided. Detailed calculations to establish whether cavitation will occur or not for any given application shall be furnished.							
1.02.04	Control valves for application such as SH Spray Control, RH spray Control, Heavy Oil Heating, pressurizing and Control system shall have permissible leakage rate as per leakage Class V. All other control valves shall have leakage rate as per leakage Class-IV.							
1.02.05	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.							
<table><tr><td>MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE</td><td>TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2</td><td>PART - B SUB-SECTION-IV:18 CONTROL VALVES, ACTUATORS & ACCESSORIES</td><td>PAGE 1 OF 6</td></tr></table>					MOUDA STPP-II (2x660MW) / SOLAPUR STPP (2 x 660MW) / NABINAGAR STPP (3x 660MW) / MEJA TPP-I (2 x 660MW) / RAGHUNATHPUR TPP PHASE-II (2 x660MW) STEAM GENERATOR PACKAGE	TECHNICAL SPECIFICATION SECTION-VI BID DOC NO.: CS-9575/ 9571/ 0370/ 0360/ 9586-102(R)-2	PART - B SUB-SECTION-IV:18 CONTROL VALVES, ACTUATORS & ACCESSORIES	PAGE 1 OF 6
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CLAUSE NO.	TECHNICAL REQUIREMENTS			
2.00.00	VALVE CONSTRUCTION			
2.01.00	All valves shall be of globe body design & straightaway pattern with single or double port, unless other wise specified or recommended by the manufacturer to be of angle body type. Rotary valve may alternatively be offered when pressure and pressure drops permit.			
2.02.00	Valves with high lift cage guided plugs & quick-change trims shall be supplied.			
2.03.00	Cast Iron valves are not acceptable.			
2.04.00	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.			
2.05.00	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.			
2.06.00	All valves connected to vacuum on down stream side shall be provided with packing suitable for vacuum applications (e.g. double vee type chevron packing)			
2.07.00	Valve characteristic shall match with the process characteristics.			
2.08.00	Extension bonnets shall be provided when the maximum temperature of flowing fluid is greater than 280 deg. C.			
2.09.00	Flanged valves shall be rated at no less then ANSI press class of 300 lbs.			
3.00.00	VALVE MATERIALS			
	Sr. No.	Service	Body material	Trim Material
	1	Non-corrosive, non-flashing and non-cavitation service except DM water	Carbon steel ASTM-A216 Gr. WCB for fluid temperature below 275 Deg. C Alloy steel ASTM-A217Gr. WC9 for fluid temperature above 275 Deg. C	316SS stellited with stellited faced guide posts and bushings.
	2.	Severe flashing/cavitati on services	Alloy steel ASTM-A217 Gr. WC9	440 C
	3.	Low flashing/cavitati on service	Alloy steel ASTM-A217 Gr. WC6	17-4 PH SS
	4.	DM water service	316 SS	316 SS
	NOTE Valve body rating shall meet the process pressure and temperature requirement as per ANSI B16.34.			
	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 Employer's consideration and approval.			
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CLAUSE NO.	TECHNICAL REQUIREMENTS							
4.00.00	END PREPARATION Valve body ends shall be either butt welded/socket welded, flanged (Rubber lined for condensate service) or screwed as finalized during detailed engineering and as per Employer's approval. The welded ends wherever required shall be butt welded type as per ANSI B 16.25 for control valves of sizes 65 mm and above. For valves size 50 mm and below welded ends shall be socket welded as per ANSI B 16.11. Flanged ends wherever required shall be of ANSI pressure-temperature class equal to or greater than that of the control valve body.							
5.00.00	VALVE ACTUATORS All control valves shall be furnished with pneumatic actuators except for pressure and temperature control valve for auxiliary PRDS application (electro-hydraulic / pneumatically operated) and separator drain control valve (electro-hydraulic type).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 stem 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 travel time of the pneumatic actuators shall not exceed 10 seconds.							
6.00.00	CONTROL VALVE ACCESSORY DEVICES							
6.01.00	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.							
7.00.00	SPECIFICATIONS FOR MICROPROCESSOR BASED ELECTRONIC POSITIONER							
	Electrical	Input Signal	4-20 mA					
		Power Supply	Loop Powered from the output card of Control System.					
		Hart Protocol	Compatibility For Remote Calibration & Diagnostics (Super-Imposed HART signal on Input Signal 4-20 mA)					
		Valve Position Sensing	Position Sensing (Non Contact-Type), 4-20 mA O/P Signal For Control System to be provided					
	Environment	Operating Temp	(-)30 To 80 Deg. C					
		Humidity	0-95 %					
		Protection Class	IP-65 Minimum					
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CLAUSE NO.	TECHNICAL REQUIREMENTS			
	Remote Configuration and Diagnostics	a. The following functions shall be provided in the positioner: Remote Configuration, Calibration and Testing of the Actuator and advanced Diagnostic Features Like Stroke Counter or Travel Counter, Leakage In Actuators, On Line Partial Closure Test, Valve Signature Analysis, Step Response Test, Valve Friction/ Jamming Detection etc. (See Note* below) b. Factory Valve Signature Tests Reports (Pr Vs Valve Travel And Travel Vs I/P Signal) are to be provided.		
		Tests Certificates		
	Tests Certificates	Test certificates as per Manufacturer Standard/Relevant Standard are to be submitted		
	Configuration/	Remote Calibration, Auto & Manual Calibration Shall Be Possible		
	Operating	Operating Range	Full Range & Split Range Signal Range	
	Modes	Valve Action	Direct & Reverse. Valve Action	
		Flow Characterization	Possible To Fit Valve Characteristic Curve Linear & Equal Percentage	
	Fail Safe/Fail Freeze	Fail Safe/Fail Freeze Feature is to Be Provided.		
	Pneumatic	Air Capacity	Sufficient To Handle The Valves Selected/Boosters To Be Supplied If required.	
		Air Supply Pressure	To Suit The Air Supply Pressure/Quality Available.	
		Process Connection	1/4 Inch NPT	
	Performance	Characteristic Deviation	<=0.5 % Of Span	
		Ambient Temp Effect	<=0.01 %/Deg C Or Better	
	EMC & CE Compliance	Required To International Standard Like EN/IEC.	En50081-2 & En50082 Or Equivalent	
	Accessories	In Built Operator Panel	Display With Push Buttons For Configuration And Display On The Positioner Itself (Password Protected/Hardware Lock)	
Hand Held Hart Calibrator		Universal Hart Calibrator To Be Provided, One Per Unit		
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CLAUSE NO.	TECHNICAL REQUIREMENTS		
		Press Gauge Block	For Supply & Output Pr., Filter Regulator Other Accessories Shall Be Provided As On Required Basis For Making System Complete.
		Electrical Cable Entry	1/2-Npt,Side Or Bottom Entry To Avoid Water Ingress
		Valves Mounting Assembly	For Sliding Stem/Rotary/Single Acting/ Double Acting On Required Basis
	<p>* Note:</p> <p>Employer is providing a centralized HART management system including the HART multiplexing/interfacing system. The HART signals shall be picked up from marshalling terminals of DDCMIS (SG/TG DDCMIS as well as BOP DDCMIS), as applicable. The details of the above mentioned employer's HART management system are as below:</p> <p>The following functionalities are provided through software of the HART management system:</p> <p>1. For electronic transmitters, temperature transmitters and analysers:</p> <ul style="list-style-type: none">a. Constant scanning to monitor faults or changes to instrument configuration.b. Employer-defined and standard calibration and configuration procedures for all transmitters.c. Constant signal data collection facilities to maintain continuously updated records.d. Automatic tracking of configuration changes made in the field, such as may be introduced by hand-held communicator. All configuration function associated with hand-held communicators shall be available in the system.e. Event and log reports on screen as well as on printer.f. Any addition/deletion of transmitter will be reported on printer and logged in hard disk. <p>2. For electronic positioners:</p> <ul style="list-style-type: none">a. Remote Configuration, Calibration and Testing of the Actuatorb. Advanced Diagnostic Features Like Stroke Counter or Travel Counter, Leakage In Actuators, On Line Partial Closure Test, Valve Signature Analysis, Step Response Test, Valve Friction/ Jamming Detection etc. <p>Above functionalities are achieved by the Employer's HART management system by providing industry standard softwares. If the bidder has any observations on the above, the same is to be brought out in the bid. Further, Bidder has to list out in his bid the softwares that are compatible with his electronic positioners.</p>		
8.00.00	TEST AND EXAMINATION		
	All valves 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 tests shall include but not be limited to the following:		
8.01.00	Non Destructive Test as per ANSI B-16.34.		
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CLAUSE NO.	TECHNICAL REQUIREMENTS	<div>एनटीपीसी NTPC</div>	
8.02.00	Hydrostatic shell test in accordance with ANSI B 16.34 prior to seat leakage test.		
8.03.00	Valve closure test and seat leakage test in accordance with ANSI-B 16.34 and as per the leakage class indicated above.		
8.04.00	Functional Test: The fully assembled valves including actuators control devices and accessories shall be functionally tested to demonstrate times from open to close position.		
8.05.00	<p>CV Test: Please refer CI No. 1.00.00, Sub-section-IV:I9 (Type test requirements), Control Valves.</p> <p>Bidder shall furnish all the control valves under this main plant package as finalized during detailed engineering stage without any price repercussions whatsoever depending on the process requirements. All the control valves provided by the Bidder for this project shall meet the specifications requirements specified herein. Specification for control valves in this Sub-section has to be read in conjunction with other relevant Sub-sections of this specification.</p>		
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