

SUB-SECTION – IIIC-08

CONTROL VALVES AND ACTUATORS

CLAUSE NO.	TECHNICAL REQUIREMENTS			एनटीपीसी NTPC
CONTROL VALVES, ACTUATORS & ACCESSORIES				
1.00.00	CONTROL VALVES, ACTUATORS & ACCESSORIES			
1.01.00	General Requirements			
1.01.01	The modulating duty pneumatic 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 special type of control valves such as combined pressure and temperature control valves for Aux PRDS application, separator drain control valves, refer to the corresponding mechanical sections.			
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, HP/LP heater Emergency level control, Emergency Make-up to condenser hotwell, GSC minimum flow, Deaerator Drain to Condenser Hotwell, Condensate spill to condensate reserve tank, condenser normal make-up and valve gland sealing supplying pressure control, CEPS minimum flow control, BFP circulation control valve shall have permissible leakage rate as per leakage Class V. All other control valves shall have leakage rate as per leakage Class-IV as per ANSI / FCI /70.2,2006 or equivalent.			
Check amendment-6 point no:82 in Part-B (C&I).pg28/31				
TELANGANA SUPER THERMAL POWER PROJECT PHASE-I (2X800 MW) STEAM GENERATOR ISLAND PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOC. NO.:CS-9591-101-2	SUB-SECTION-IIIC-08 CONTROL VALVES, ACTUATORS & ACCESSORIES	PAGE 1 OF 6

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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.			
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			
amendment-6 no:82 in Part- pg.29/31 in WC6 can be or temp: >275 00 deg C planation for flashing is ed	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/cavitation on services	Alloy steel ASTM-A217 Gr. WC9	440 C
	3.	Low flashing/cavitation 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				
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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.

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

1	Electrical	a) Input Demand Signal	4-20 mA
		b) Power Supply	Loop Powered from the output card of Control System.
		c) HART Protocol	Compatibility for Remote Calibration & Diagnostics (Super-imposed HART signal on input Signal (4-20 mA)
		d. Valve position sensing	Position sensing, 4-20 mA output signal to be provided for control system.
2	Environment	a) Operating temp.	(-)30 To 80 Deg. C

Refer amendment-6
point no:82 in Part-
B(C&I) pg.30/31

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			b) Humidity	0-95 %	
			c) Protection class	IP-65 Minimum	
	3	Software for Configuration and Diagnostics	Software	Windows based software. Software shall meet the requirements for Configuration, Diagnostics, Calibration and Testing of the actuator.	
			Diagnostic/Test features	Advanced diagnostic features like Stroke counter or Travel counter, Leakage in actuators, Valve Signature analysis, Step Response test, Valve friction /Jamming detection etc to be provided.	
	4	Test reports/ Certificates	Factory Valve Signature Tests Reports (Pr Vs Valve travel and Travel Vs I/P signal) are to be provided.		
			Test certificates as per Manufacture Standard/Relevant Standard are to be submitted.		
	5	Configuration/ Calibration.	Remote & Local Calibration, Auto & Manual Calibration shall be possible.		
	6	Operating Range	Full range/ Split range.		
	7	Modes	Valve Action	Direct / Reverse Valve Action	
			Flow Characterization	Possible to fit Valve Characteristic Curves- Linear , Equal percentage etc.	
	8	Fail Safe/Fail Freeze	Fail Safe/Fail Freeze feature is to be provided. (In case the fail freeze feature is not intrinsic to the positioner, Bidder shall achieve the same externally through solenoid valve connected in the pneumatic circuit).		
	9	Pneumatic	Air capacity	Sufficient to handle the valves & actuators selected/ Boosters to be supplied, if required.	
			Air pressure	To suit the air supply pressure/quality available.	
			Process connection	¼" NPT	

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8.00.00	10	Performance	Characteristic deviation	<=0.5 % of span.
			Ambient temp effect	<=0.01 %/ deg C or better.
	10	EMC & CE Compliance	Required to International Standard like EN/IEC.	EN50081-2 & EN50082 or equivalent.
	11	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 (for quantity, refer Part-A: Contract quantities of the specification).
			Press Gauge Block	For supply & output pressures, Air Filter Regulator and other accessories shall be provided on as 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 actuators on as required basis
	* Note: The HART signals shall be picked up from marshalling terminals of DDCMIS. The details of HART management system is specified in HART system (Annexure IIIC-02C to DDCMIS). The positioners shall be monitored from this HART management system. Contractor shall provide the necessary software to achieve the functionalities described above under "Software for Configuration and Diagnostics", and this software shall be loaded by the Contractor in his HART management system. 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:			
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8.01.00	Non Destructive Test as per ANSI B-16.34.			
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/ FCI 70.2 standard. 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	CV Test: Please refer CI No. 1.00.00, Sub-section-IV: I9 (Type test requirements), Control Valves. 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.			
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