KLM Technology Group
#03-12 Block Aronia,
Jalan Sri Perkasa 2
Taman Tampoi Utama
81200 Johor Bahru
Malaysia

FUNCTIONAL SPECIFICATION FOR CONTROL VALVE

(PROJECT STANDARDS AND SPECIFICATIONS)

TABLE OF CONTENT

SCOPE

This Project Standard and Specification describes the essential considerations in the selection, installation, calibration and testing of Control Valve.

The Contractor shall be responsible for the selection of Control Valve suitable for its intended application, its design, engineering, procurement, packing, calibration, testing at yard and offshore site, shipment to site and installation and commissioning at site.

REFERENCES

Throughout this Standard the following dated and undated standards/codes are referred to. These referenced documents shall, to the extent specified herein, form a part of this standard. For dated references, the edition cited applies. The applicability of changes in dated references that occur after the cited date shall be mutually agreed upon by the Company and the Vendor. For undated references, the latest edition of the referenced documents (including any supplements and amendments) applies.

CONTROL VALVE

Valve Selection & Construction

1. The Contractor shall select control valve based upon plant capacity. The Contractor shall select reduced trim as required to satisfy the expected flow rate range.
2. Valve selection shall consider all possible effect of erosion, cavitations and noise.
3. Maximum permissible noise level shall be 85 dBA at 1 m from valve in all direction.
4. When minimum flow would require valve to be positioned at 15% travel provision shall be made to prevent erosion of valve trim.
5. Equal percentage and linear trim characteristic shall be used as applicable to process requirement. Quick opening trim may be used for ON/OFF service only.
6. Globe valves are preferred for general service, and shall be cage guided except in dirty or abrasive services (Produced liquids) where post guiding is preferred.
7. Ball valve may be considered on sizes above DN 100.

8. Butterfly control valves shall be used for water services only.
9. Cage type and single seated globe body valves shall be having process Fluid tending to open the valve.
10. Body rating and flange rating and facing shall be in accordance with the piping class specification for the associated piping.
11. Valve packing boxes shall be flange bolted to the bonnet. Valve packing shall be spring loaded and adjustable. Teflon V rings shall be used up to 2120C. Above this temperature graphite shall be used with an external lubricator and isolation valve.
12. Valve bonnets shall be flange bolted to the body. Screwed bonnet s shall not be provided. For operating temperature of 2000C or greater, a radiating finned bonnet may be required. For temperature below 0C an extension bonnet is required.
13. Minimum body size shall be DN25.
14. In cases where the above conditions cannot be satisfied through control valve selection as described above, the contractor shall present alternatives for the company consideration.
15. Where a valve is venting to flare, soft seals are preferred. For high-pressure drop application in gas service multiple orifice trim design shall be used. Labyrinth design shall not be used.
16. Pneumatic connections shall be ¼" NPTF as minimum. Larger Port sizes shall be used wherever required for larger sizes of actuators.
17. Termination in wiring enclosures shall be via fixed terminals. Flying leads shall not be used.
18. Flow direction shall be stamped or cast on the body of all valves.
19. The Contractor shall provide detailed pressure temperature envelope curves for each combination of valve body, trim and elastomer material.

Control Valve Sizing

The Control valve shall be sized to pass high and low extremes of flow at no more than

80% and no less than 20% travel respectively. Butterfly valves shall be sized with 60% representing 100% Travel.

The Contractor shall submit Control Valve sizing calculation performed in accordance with ISA S 75.01 and based on Process data, Approved Process flow diagram and material balance.

Actuator

1. Control valve actuators shall be pneumatic, spring return type, diaphragm or piston type. Spring shall be corrosion resistant, cadmium plated or equal. Piston type actuator shall be used where diaphragm actuator cannot be used due to capacity limitation. Electric actuator shall be used wherever specified.
2. Actuators shall be sized for operation under maximum shutoff pressure drop across the valve minimum instrument air pressure or voltage to the actuator as specified in this specification.
3. Actuators shall be selected to achieve specified valve failure positions. All accessories, including pilot valves, relays, volume bottles etc. for double acting actuator or air block relays for fail in position valves, shall be supplied with the valve.
4. A valve stem position indicator shall be provided. All control valve scales shall be calibrated from 0-100 %.
5. Detachable side mounted heavy-duty hand wheels shall be provided for control valves wherever specified.
6. Actuator action shall be field reversible.
7. Diaphragm actuators shall be multiple bolted, pressed steel with Nylon reinforced Neoprene or Buna N Rubber Diaphragm.

Positioner

1. Control valve shall be supplied fitted with positioner for all services except on/off control.
2. On Process Complexes, the Valve positioner shall be intrinsically safe “smart” type with integral I/P converter and shall be direct acting, with field reversible action.
3. Gauges shall be fitted to indicate both input & output pressure.

Material

Control valve bodies shall generally be cast or forged carbon steel to ASTM A216 Gr

WCB or A105 respectively with 316 SS trim as a minimum, however more demanding services may require other materials as specified in the applicable

piping specification/Material selection chart. Consideration shall be given in selection of all other valve part materials for corrosion due to process fluid and ambient conditions.

Accessories such as mounting bolts shall be of SS 316.
Tubing shall be seamless 316 SS tube 3/8" OD minimum with 316 SS double ferrule compression fittings.

INSTALLATION REQUIREMENT

1. Where practicable, valves shall be installed in horizontal lines with Actuator above the valve.
2. Clearance shall be provided to allow in- line maintenance of valves. Adequate clearance shall be provided above and below the valve to allow removal of the valve operator and internal cage (trim) and valve bottom plate as applicable while not impeding access ways.
3. Control valve assembly shall be provided with double block, double bleed and bypass piping and valves. The bypass valve shall be a globe valve no smaller than one pipe size than the control valve but with a C_V no greater than that of the control valve.
4. Control valves shall be installed in the direction recommended by the manufacturer and the valve shall not be subjected to stress due to pipeline movement or misalignment.

CALIBRATION, INSPECTION AND TESTING

1. All valves shall be tested in accordance with API 589, hydro-tested to ASME B 16.34 clause 7.1 and leak tested to ASME / FCI 70.2.
2. Contractor shall remove in line instruments and control valve and provide necessary spool pieces/ Flanges prior to flushing/hydro testing.
3. All diaphragm and piston operated control valve shall be stroked pneumatically using a pressure regulator and pressure gauge against spring range shown on name plate Mechanical sealing and travel shall be checked against name plate. Check shall be made in shop prior to installation.
4. Valve position shall be calibrated on control valve in accordance with nameplate data and instrument specification. Split range or reverse acting positioner shall not have bypass and shall be check carefully. Zero position shall be live zero (just off the seat at minimum setting on seat with air). Volume bottle shall be checked for proper filling. Signal line shall be bled to zero and failure action shall be confirmed.