

SECTION 230923.11 – CONTROL VALVES

- A. Control valve assemblies shall be provided and delivered from a single manufacturer as a complete assembly.
- B. The manufacturer shall warrant all components for a period of 5 years, except where noted, from the date of production with the first two years unconditional.

1.1 GLOBE-STYLE CONTROL VALVES

- A. Manufactured, brand labeled or distributed by Belimo.
- B. Hydronic system globe valves Performance **NPS 2 (DN 50)** and Smaller

1. Materials:

- a. Body:
 - 1) bronze.
- b. Plug:
 - 1) brass
- c. Seat
 - 1) bronze
- d. Spindle:
 - 1) Stainless steel
- e. Spindle Seal:
 - 1) EPDM

2. Piping Connections:

- a. **NPS 2 (DN 50)** and smaller: (2), female NPT.

3. Media: Water (maximum 60% aqueous propylene glycol solution).

4. Performance:

- a. Media Temperature: **20°F** to **280 °F** (**-7°C** to **138°C**).
- b. Pressure:
 - 1) Body: **ANSI Class 250**
 - 2) Maximum Operating Differential: 35 **psid** (**345 kPa**);
 - 3) Close-off (valve and actuation assembly): 2-way **250 psig** (**1724 kPa**), 3-way 29-250 psig (200-1724 kPa);
- c. Leakage (A-AB): 0%.
- d. Flow Characteristic: Modified Equal percentage

- C. Steam system globe valves shall have the following characteristics:

1. Materials:

- a. Body:
 - 1) bronze.
- b. Plug:
 - 1) Stainless steel
- c. Seat
 - 1) Stainless steel
- d. Spindle:
 - 1) Stainless steel

- e. Spindle Seal:
 - 1) EPDM
- 2. Piping Connections:
 - a. **NPS 2 (DN 50)** and smaller: (2), female NPT.
- 3. Media: Steam (15 **psig (103 kPa)**, **35 psig (241 kPa)**, **100 psig (689 kPa)**).
- 4. Performance:
 - a. Media Temperature: **20°F** to **338 °F** (**Minus 7°C** to **plus 170°C**).
 - b. Pressure:
 - 1) Body:
 - a) **NPS 1/2**, through **NPS 2 (DN 15 to DN 50): 360 psig (2758 kPa)**;
 - 2) Maximum Operating Differential: **50 psid (241 kPa)**;
 - 3) Close-off (valve and actuation assembly): 2-way **250 psig (1724 kPa)**, 3-way 29-250 psig (200-1724 kPa);
 - c. Leakage ANSI Class VI
 - d. Flow Characteristic: Modified Equal percentage

1.2 ELECTRIC AND ELECTRONIC CONTROL VALVE ACTUATORS

- A. Manufactured, brand labeled or distributed by Belimo.
- B. The valve assembly (control valve and actuator) shall be provided and delivered from a single manufacturer as a complete assembly.
- C. Agency Listings: ISO 9001, cULus, CE, CSA, and UL 2043The manufacturer shall warrant all components for a period of 5 years from the date of production with the first two years unconditional.
- D. Actuators for Hydronic Control Valves: Capable of closing valve against the system pump shutoff head.
- E. Actuators for Steam Control Valves: Shutoff against [1.2] [1.5] <Insert number> times steam design pressure.
- F. Position indicator and graduated scale on each actuator.
- G. Type: Motor operated, with gears, electric and electronic. Overload protected electronically throughout rotation.
- H. Voltage: [Voltage selection delegated to professional designing control system] [24-V ac] [120-V ac] <Insert requirement>.
- I. Deliver torque required for continuous uniform movement of controlled device from limit to limit when operated at rated voltage at the valve close-off pressure for system design.
- J. Function properly within a range of 80 to 120 percent of nameplate voltage.
- K. Two-Position Actuators: Single direction, fail safe or reversing type.
- L. Modulating Actuators:

1. Operation: Capable of stopping at all points across full range, and starting in either direction from any point in range.
 2. Control Input Signal:
 - a. Three Point, Tristate, or Floating Point: Clockwise and counter-clockwise inputs. One input drives actuator to open position and other input drives actuator to close position. No signal of either input remains in last position.
 - b. Proportional: Actuator drives proportional to input signal and modulates throughout its angle of rotation. Suitable for [zero- to 10-] [or] [2- to 10-]V dc [and] [4- to 20-mA] signals.
 - c. Pulse Width Modulation (PWM): Actuator drives to a specified position according to pulse duration (length) of signal from a dry contact closure, triac sink, or source controller.
 - d. Programmable Multi-Function:
 - 1) Control Input, Position Feedback, Mechanical Travel, and Running Time: Factory or field software programmable without the use of actuator mounted switches.
 - 2) Adaptation: Upon adjustment of operating parameters. The actuator shall be capable of adapting the control input, feedback and run time, to the actual mechanical angle of rotation or travel.
 - 3) Diagnostic: Feedback of hunting or oscillation, mechanical overload, mechanical travel, and mechanical load limit.
 - 4) Service Data: Include, at a minimum, number of hours powered and number of hours in motion.
- M. Position Feedback:
1. [Equip] [Where indicated, equip] two-position actuators with limits switches or other positive means of a position indication signal for remote monitoring of [open] [and] [close] position.
 2. [Equip] [Where indicated, equip] modulating actuators with a position feedback through [current] [or] [voltage] signal for remote monitoring.
 3. Provide a position indicator and graduated scale on each actuator indicating open and closed travel limits.
- N. Fail-Safe:
1. Where indicated, provide actuator to fail to an end position.
 2. Mechanical spring return mechanism to drive controlled device to an end position (open or close) on loss of power.
 3. Electronic fail-safe shall incorporate an active balancing circuit to maintain equal charging rates among the Super Capacitors. The power fail position shall be adjustable between 0 to 100% in 10 percent increments with a 2-second [Insert timing between 0-10 seconds] operational delay.
- O. Integral Overload Protection:
1. Provide electronic overload protection throughout the entire operating range in both directions.
- P. Valve Attachment:
1. Attach actuator to valve drive shaft in a way that ensures maximum transfer of power and force without slippage.
 2. Actuators shall be capable of parallel operation, both mechanically and electrically, to increase force, if required.

3. Directly couple and mount to the valve bonnet stem
- Q. Temperature and Humidity:
1. Temperature: Suitable for operating temperature range encountered by application with minimum operating temperature range of [**minus 22 to plus 122 deg F (minus 30 to plus 50 deg C)**] **<Insert temperature range>**.
 2. Humidity: Suitable for humidity range encountered by application; non-condensing environment.
- R. Enclosure:
1. Suitable for ambient conditions encountered by application.
 2. NEMA Type 2 for indoor and protected applications.
 3. NEMA Type 4 or Type 4X for outdoor and unprotected applications.
 4. Provide actuator enclosure with heater and control where required by application.
- S. Stroke Time:
1. Operate valve from fully closed to fully open within [**15**] [**35**] [**60**] [**75**] [**90**] [**150**] **<Insert**
 2. Operate valve from fully open to fully closed within [**15**] [**35**] [**60**] [**75**] [**90**] [**150**] **<Insert number>** seconds.
 3. Move valve to failed position within [**5**] [**15**] [**30**] **<Insert number>** seconds.
- T. Select operating speed to be compatible with equipment and system operation.