5.00 RATE OF FLOW CONTROL VALVE

1. Supply a *insert size* Singer Model *specify model as 106/S106/206/S206* – RF Rate of Flow (Flow Limiting) Control Valve.
   1. The valve shall be equipped with the following available options:
      1. Orifice housing with sensing port*.*
      2. *specify*
      3. *specify.*
   2. Singer Valve schematic *specify*.
2. Function: The valve shall be a pilot operated flow control valve which will limit flow rate to a preset maximum. The valve shall be normally open to provide flow demand and will limit the maximum flow rate by differential pressure control across a downstream orifice plate, regardless of fluctuations in upstream or downstream pressure.
3. Operation: The pilot shall be a normally open Singer Model 160-RF Rate of Flow Pilot that reacts to small changes in differential pressure across a downstream orifice plate, which acts to modulate the main valve bonnet pressure to hydraulically adjust the inner valve assembly position to maintain a maximum flow rate as a function of the orifice plate bore and differential pressure control setting.
   1. Quality Assurance
4. The control valve shall be tested prior to shipment. The standard test shall include a functional stroke test and pressure and leak test of valve body, seat, fitted pilots and accessories.
5. The control valve shall be covered by a minimum three (3) year warranty against defects in materials and workmanship. The AISI 316 stainless steel seat ring shall be covered by a lifetime guarantee.
6. All control valve maintenance and repairs shall be possible without removing the main valve body from the line, when installed in accordance with manufacturer’s recommendations.
   1. Main Valve
7. The main valve shall be a Singer *specify main valve model number (106/S106/206/S206)* -PG single chamber, diaphragm actuated *specify (full/reduced)* port model.
8. Main valves, 6” (150mm) and larger, shall provide smooth frictionless motion to ensure a low flow stability to *specify minimum USGPM or L/s*, achieved using SRD-Single Rolling Diaphragm technology.
9. The main valve, bonnet and removable stem cap shall be constructed of ASTM A536 (Grade 65/45/12) ductile iron.
10. Main valves of 2.5” (65mm) and larger shall have a removable stem cap for access to the main valve stem for alignment check, spring installation and ease of service and assembly.
11. The main valve trim, consisting of seat ring and stem shall be constructed of AISI 316 stainless steel. The valve stem shall have wrench flats for ease of maintenance.
12. The main valve bonnet shall be located using two or more locating guide pins to maintain the inner valve assembly alignment and for ease of maintenance.
13. The main valve shall provide a drip-tight seal using a mechanically retained resilient disc, having a rectangular cross section, against the stationary AISI 316 stainless steel seat ring.
14. The stationary AISI 316 stainless steel seat ring of main valves 2.5” (65mm) and larger shall be held in place using Spiralock® self locking screws and seat ring retainers.
15. All internal and external ferrous components, including all mating surfaces, shall be coated with an NSF-61 approved fusion bonded epoxy to a minimum of 10mils DFT-Dry Film Thickness.
16. The main valve elastomers: diaphragm, resilient disc and seals, shall be of EPDM or Buna-N.
17. All main valve fasteners (bolts, nuts, studs, cap screws) shall be supplied as AISI 18-8 or 304 stainless steel. All bonnet bolts shall be fitted with stainless steel washers to prevent damage to the bonnet coating.
18. Valve shall have flanged, threaded or grooved end connections. Flanged connections shall be *specify ANSI/ASME B16.42 Class 150#/300# or ISO 7005-2 PN10/16/25/40* flange drilled, faced and rated. Threaded connections shall be *specify NPT or BSPT*.
19. Due to the potential for noise, vibration and erosion damage from cavitation, the valve manufacturer shall provide, upon request, a computerized sizing and cavitation analysis, using independent third party software. Cavitation analysis shall provide the status of cavitation based on customer supplied parameters as to valve size, flow rate requirements and pressure conditions. The cavitation analysis shall also provide information as to Cv factor, percent of valve lift, cavitation index and noise level.
20. The valve manufacturer shall be able to supply cavitation control trim which shall be engineered to be optimized to the actual operating parameters of the control valve application and warranted to perform correctly and prevent main valve cavitation damage under the stated conditions. Orifice plates or other non-engineered cavitation control devices shall not be used to prevent or minimize valve cavitation.
    1. Pilot Controls
21. The rate of flow control pilot shall be a Singer Model 160-RF normally open pilot with a spring to adjust the differential pressure setting. The pilot shall be self-cleaning and self-flushing with the outlet of the pilot located at the bottom of the pilot flow with the pilot stem and guide free from any debris build-up.
22. The pilot trim, consisting of a seat ring, stem and yoke shall be constructed of AISI 316 stainless steel.
23. The pilot elastomers: diaphragm, inner valve and seals, shall be of EPDM or Buna-N.
24. The adjustable pilot spring range shall be supplied with a spring range of *specify range (2 to 20psid or 25-50psid)*. The pilot shall be factory preset at *specify setpoint* psid to provide a maximum flow rate setpoint of *specify USGPM (L/s)*.
25. The pilot body and spring casing shall be constructed of *specify material (ASTM B62 bronze or ASTM A351 CF8M stainless steel)*.
26. The supplied orifice plate shall be of 11 Ga. (0.120in) AISI 18-8 stainless steel. The machined orifice bore, to a +/- 0.005in tolerance, shall provide a 2:1 adjustable flow ratio of *specify USGPM (L/s)* over 3 to 12psid adjustment of the Model 160-RF pilot. Orifice bore calculations shall be provided by the manufacturer.
27. A paddle style orifice plate shall be provided to fit between and within the bolt circle and fasteners of the specified flange rating. The orifice bore shall be engraved on the paddle portion and visible with the orifice plate installed.
28. A fixed restriction shall be supplied as AISI 303 stainless steel with an orifice bore selected by the manufacturer based on the valve size and operation.
29. An adjustable needle valve closing speed control shall be supplied as *specify material ASTM B16 brass or AISI 316 stainless steel*.
30. The adjustable flow stabilizer shall be a Singer Model 26 self-cleaning opening speed control, supplied as a stainless steel assembly. Optional for main valve sizes 10” (250mm) and larger.
31. The pilot fittings shall be supplied as *specify material (ASTM B16 brass or AISI 316 stainless steel)*.
32. The pilot tubing shall be supplied as *specify material (ASTM B280 seamless copper or AISI 316 stainless steel or PTFE lined flexible braided stainless steel)*.
33. (3) pilot isolation ball valves shall be supplied as standard. Pilot isolation ball valve(s) shall be constructed of *specify material (B16 brass or 316 stainless steel)* with stainless steel handle operator.
34. A pilot strainer shall be supplied as standard. Strainer material to be ASTM A351 CF8M stainless steel with a 40-mesh or 80-mesh 316 stainless steel screen. The external pilot strainer shall have a removable plug for easy maintenance access to the pilot screen and have provision for installation of a ball valve for pilot screen flushing.
35. The control valve shall be supplied with a Singer Model X107 Position Indicator as standard. The valve position indicator shall provide a visual reference to the main valve open position. The indicator stem rod shall be AISI 316 stainless steel, threaded or pinned to the main valve stem. The indicator rod shall move within a *specify material (B16 brass or 303 stainless steel)* hexagonal housing having a clear Pyrex sight glass. A cap and bleed valve shall be provided to purge any air that may become trapped within the main valve bonnet and stem cap.
    1. Control Valve Components – Available Options
36. The control valve assembly shall be supplied with orifice plate housing with integral sensing port for downstream pressure sensing connection to the Model 160-RF pilot. The orifice plate housing shall be flange drilled to match the control valve connection rating. The orifice housing shall be of ASTM A536 ductile iron with an NSF-61 approved fusion bonded epoxy to a minimum of 10mils DFT-Dry Film Thickness.
37. *specify.*