Steam specialty and fluid control solutions for HVAC, commercial and institutional applications

Spence™ Steam and Fluid Control Products
Portfolio includes pilot-operated regulators, direct operated valves, control valves, safety relief valves and accessories
Pressure Regulator

APPLICATIONS
- Pressure Regulation for Steam Distribution • Single Point or Multiple Use Applications
- Pressure Control for Steam Plants • District Heating Systems • Single Stage Reduction Stations
- Two Stage Reduction Stations • Parallel Reduction Stations

Three Pilot Mounting Options
Include standard side mount (shown), integral mount and remote mount.

SECO Metal Seats and Discs
Resist wiredraw – not one case of SECO Metal being cut by steam in 75 years

Packless Construction
Eliminates leakage and greatly reduces friction and stem wear

Two Main Spring Options
For superior regulation over a wide range of applications

Large Protected Metal Diaphragm
Bathed in condensate, sealed away from steam seldom needs replacement

No Closely Fitted Parts
To stick or bind due to uneven expansion or foreign matter

Few Moving Parts
Mean long service life

Springs Outside Steam Path
Assure exceptionally long life on both Main Valve and Pilot.

Easy Inspection
Provide by external diaphragm loading steam passages

Guaranteed Dead End Shutoff
Meets FCI 70-3 Class IV in steam service, even on large sizes.

SECOWELD Option
Allows easy repair of seat ring threads damaged by high pressure applications
The basic Type ED has been selected to illustrate the operation of a Spence™ Pilot Operated Pressure Regulator. This presentation describes the successive steps in the mechanical cycle of the Regulator.

**MAIN VALVE** is normally closed. On placing Regulator in service, initial pressure fills the passages shown in red.

**PILOT** receives initial pressure through Nipple and Union Connection.

**CONTROL LINE** connects Pilot Diaphragm Chamber to Delivery piping.

**ADJUSTING SPRING** when compressed, forces Pilot Valve open.

**CONNECTION TUBING** conducts fluid from Pilot to Main Valve Diaphragm and Bleed Port. When Pilot opens, fluid flows through Pilot faster than it can escape at Bleed Port, creating a loading Pressure (orange) which forces Main Valve Open.

**DELIVERY PIPE** and Control Line are now being filled with fluid flowing through Main Valve. As delivery pressure (yellow) rises, it overcomes the force exerted by Adjusting Spring and Pilot throttles. This, in turn, allows Main Valve to throttle just enough to maintain the set delivery pressure. If the demand ceases, Pilot closes, allowing the Main Valve to close – effecting a DEAD-END SHUTOFF.
Pilot-Operated Regulators for Commercial and Institutional Applications

The Spence™ Pilot Operated Regulator has been the trouble-free standard for Commercial/HVAC applications for nearly a century. If you are controlling a temperature, pressure, back pressure or differential pressure with a control valve and are plagued with erratic control, poor or slow response, leaky valves and/or complicated support systems, a Spence Pilot Operated Regulator is often the solution.

**Main Valves**
- Fluid, gas, vapor applications
- Precise control
  - Flexible diaphragm
  - Choice of main spring to suit wide range of differential pressures
  - Wide variety of Pilots target specific requirements
- Low maintenance, long service life
- Few moving parts and no fine tolerances
- Packless construction for virtually frictionless, leak free operation
- Main spring isolated from steam
- ANSI/FCI 70-3 Class IV to Class VI shutoff
- Minimum operating pressure to 3 PSI
- Cast Iron - ANSI 250 Threaded 3/8” to 2”; ANSI 125/250 Flanged 1” to 12”
- For Type E, Cast Steel – ANSI 300 threaded 3/8” to 2”; ANSI 150/300/600 flanged 1/2” to 12”

**Main Valve Options**
- Balanced Construction for finer adjustments and smoother operation
- Stellited seat and disc option
- Condensation Chamber for high temperatures
- LP Main Spring for differential pressures below 30 PSI
- Composition Disc for ANSI/FCI 70-3 Class VI shutoff
- Parabolic Discs and Seat Rings for special flow requirements
- Dashpot to prevent water hammer for liquid service on single seat valves
- Integrally mounted pilot
- Insulcap Jacket to limit energy loss and reduce noise transmission

**Type E**
- Stainless steel multiple sheet diaphragm for durability
- Normal closed
- Single seat regulator
- Easy in line maintenance

**Type E2**
- Nitrile diaphragm for maximum flexibility
- Low pressure and low differential applications

**Type E5**
- For low differential pressures in higher pressure and/or high capacity applications
- Condensation chamber and long, finned base cool nitrile diaphragm for long service life

**Type E6**
- For cool gas service and high capacity applications
- Nitrile diaphragm for maximum flexibility
- Composition disc provides ANSI/CFI 70-2 Class VI shutoff

**Type E8**
- Economical alternative to pilot operated regulator - ideal for “dirty steam”
- Direct operated via air signal

**Type C34**
- Balanced plug and composition disc for liquid service
- Nitrile diaphragm for maximum flexibility
## Pilot-Operated Regulators – Pressure Pilots

### Type D Pressure Reducing
- The right choice in over 85% of pressure reduction applications
- Self contained
- Spring operated
- Normally closed
- Can be used in conjunction with other pilots i.e. T14
- Spring pressure ranges from 30 inches vacuum to 300 PSI

### Type N Differential Pressure
- Controls system pressure above or below another process variable
- Accurate within ±1 PSI
- Three pilots with four spring pressure ranges from 3 to 150 PSI

### Type F Back Pressure
- Prioritizes load allocation when system demand exceeds supply
- Add Type D or A Pilot to also control downstream pressure
- Four F Series pilots with eight spring pressure ranges from 2 to 600 PSI

### Type A Air Adjusted Pressure Reducing
- Pneumatic remote adjustment
- Multiple pilots from 30 inches vacuum to 150 PSI

### Type P and Type F46 Pump Governor
- Controls high differential pressures in steam driven pumps
- Maintain an average discharge pressure regardless of load changes
- Five pilots with 10 spring pressure ranges from 30 inches vacuum to 2000 PSI

### Type D210 Electronic Actuator
- Modulates a process variable in relation to a proportional electronic control input signal
- Permits interfacing with Energy Management Systems
- Accepts 4-20, 10-50 and 1-5 mA input signals, as well as 0-24 VDC

### Type VH210 Electronic Actuator Pilot
- Modulates a process variable in relation to a proportional electronic control input signal
- Returns actuator to a closed position on power loss in 3 seconds or less.
- Accepts 4-20 or 0-10 VDC input signals, 24 VAC 50-60 Hz power supply, 17VA/12W power consumption

### Type P125 Trip Stop
- Quickly shuts off flow when overpressure condition exists
- Four spring pressure ranges from 5 to 175 PSI

### Type Q Back Pressure
- Maintains constant adjustable initial pressure and responds rapidly to sudden load changes, preventing overpressure
- Spring control or pneumatic adjustment
- 5 spring pressure ranges from 3 to 300 PSI

### Type SP/P Pressure Safety
- Emergency control when low pressure valve fails in two stage pressure reducing station where a safety relief valve is not an option
- Typically used with Type D or A Pilot
- Five spring pressure ranges from 5 to 175 PSI
**Pilot-Operated Regulators – Temperature Pilots**

**Type T124/134 Temperature & Pressure**
- For wide ranging, fast changing loads on instantaneous heaters and difficult process applications
- Cascade control varies pressure relative to temperature
- Reduced pressure ranges from 0 to 125 PSI
- Eleven temperature ranges from 20° to 500°F

**Type T52 Cooling Temperature Series**
- Controls flow of liquid cooling medium to maintain constant output temperature
- Eleven temperature ranges from 20° to 500°F

**Type T14 Vapor Tension**
- Maintains constant outlet temperature to a storage heat exchanger
- Add Type D or A Pilot to limit maximum pressure
- Eleven temperature ranges from 20° to 500°F

**Type SP/T Pressure Safety**
- Emergency control when primary pilot fails
- Typically used with Type T124/134 or T14 Pilot
- Settable temperature range to 500°F

**Types T61, T62, T63, T64 Pneumatic Temperature Controller**
- Remote adjustment for wide ranging, fast changing loads on instantaneous heaters and difficult process applications
- Manually adjusted proportional controller with two temperature ranges from 50° to 350°F
- Output range up to 0-30 PSI permits more accurate control than typical 3-15 output

**Pilot-Operated Regulators – Pilot Accessories**

**M Solenoid Control**
- Remote electrical actuation for on/off control with minimal pressure drop
- Typically used with Type D Pilot

**A and B Panels**
- Remotely adjusts air pilots
- Gauges indicate air loading, air supply and/or delivery pressures
- Integral filter regulator conditions dirty shop air to instrument quality
- Typically used with Type A Pilot or for remote manual operation of regulator
Direct-Operated Valves

**Series 2000 Temperature**
- For steam, gases, water and other liquids
- Simple, low cost solution for gradually changing continuous loads
- Direct or reverse acting for heating or cooling; Three way for mixing
- Cast Bronze - ANSI 250 Threaded 1/2” to 2”
- Temperatures -15° to 400°F

**Type D/D2 Pressure Reducing**
- For steam, gases, water and other liquids
- Four spring pressure ranges for pressures from 3 to 300 PSI

**Type D50 Pressure Reducing**
- For steam, gases and water
- Cast Iron - Threaded 1/2” to 2”
- Reduced pressure ranges from 3 to 140 PSI

**Type N6 Differential Pressure**
- Maintain pump discharge pressures at a constant differential above a separate source of pressure
- Bypass and constant differential valve on boiler feed water systems
- Cast Iron & Cast Steel - ANSI 250 Threaded 3/4” to 2”; ANSI 250 Flanged 2 1/2”
- Three spring pressure ranges for differential pressures from 5 to 200 PSI

**Type D34 Water Pressure Reducing Valve**
- Self-contained
- Closes tight on dead-end shutoff
- Fast acting for rapid changes in flow
- Sediment settles away from control port when installed horizontally
- ANSI/FCI 70-2 Class VI shutoff

**Type D36 Water Pressure Reducing Valve**
- High capacity
- Sensitive spring and large diaphragm
- Area for accurate pressure control
- Renewable stainless-steel single seat
- Watertight cage assembly
- Soft seat for tight shutoff
- Quiet operation due to opening in direction of flow
- ANSI/FCI 70-2 Class VI shutoff

Noise Attenuation

**Muffling Orifice Plate**
- Reduces noise by 6 dBA to 12 dBA
- Engineered for each application; reduction estimates available
- Designed to fit between ANSI or DIN flanges

**Insulcap Insulating Jacket**
- Average sound reduction of 6 dBA
- Provides insulation to limit heat energy losses
- Durable surface membrane barrier over woven glass reinforcement
- Fits Spence™ Type E and C Main Valves through 12”
- Also Available for pumps & traps

**Noise Suppressor**
- Reduces noise up to 26 dBA
- Straight through design minimizes pressure drop, permitting normal valve sizing
- Effective over a broad frequency band (up to 12,000 Hz)
- Engineered for each application; reduction estimates available
- Standard sizes 3/8” to 8”. Consult factory for additional sizes
**Control Valve**

**APPLICATIONS**
- Process control systems for food, pulp and paper, chemical, petrochemical & other industries
- HVAC systems
- Feed water and fuel system controls in boiler rooms
- Packaged systems (OEM) such as heat exchangers, water purification systems & vaporizer, metal cleaning and plating

**Pressures to 1440 PSIG**
- **Temperatures to 600°F**

**High-thrust, Compact Actuator**
- Offers the muscle required to positively position the plug in response to control signal

**36 & 60 Inch Actuator**
- Sizes match different operating conditions

**Bolted Diaphragm Joint**
- For maximum strength, ease of maintenance and high-pressure tightness

**Molded, Reinforced Rolling Diaphragm**
- Provides dependable, accurate control

**Corrosion-protected Multiple Springs**
- For lower hysteresis and positive shutoff with 3 -15 psi signal

**Low-friction Actuator Stem Guiding**
- For accurate repetitive positioning

**Mounting Pad NEMUR 4 Compliant**
- Drilled and tapped for accessories

**Super finished Stem**
- Reduces friction, extends packing life

**High Performance, Low Friction Packing**
- Selections to meet your system requirements

**High-capacity Streamlined Body**
- Minimizes turbulence and pressure drop

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Control Valves

**Series K**
- Globe style for steam, water and other liquids
- Pneumatic or electric actuator
- Two way or three way
  - Shuts off to 400 PSI without positioner
  - Cast Iron - ANSI 250 Flanged 2 1/2” to 4”
  - Cast Bronze - ANSI 125/250 Union End 1/2” to 2”

**Type J**
- Globe style for steam, water and other liquids
- Pneumatic actuator
- Compact, high capacity streamlined body
  - Metal seat meets ANSI/ISA 70-2 Class IV shutoff; Teflon® seat meets ANSI/ISA 70-2 Class VI shutoff
  - Cast Iron - ANSI 250 Threaded 1/2” to 2”
  - Stainless Steel - ANSI 600 Threaded or Flanged 1/2” to 2”

Control Valve Accessories

**EPC Electropneumatic Controller**
- Simplified installation eliminates need for positioner, I/P, external power supply and instrument quality air
  - No air consumption at steady state
  - Output range 0-100 PSI permits more accurate control than typical 3-15 output

**Steam Scrubber Sanitary Filter**
- All stainless steel construction
- Double O-ring EPDM gasket seals
- High porosity sintered filter media in 1, 5 and 25 micron
- Single clamp closure
  - For clean steam filtering
  - Pressures to 145 PSIG
  - Temperatures to 353°F
  - NPT, welded, flanged or sanitary clamp 1/2” to 3”

**Eliminator Steam Separator**
- Extracts nearly all moisture and solids above 10 microns
- No moving parts
- Capacities to 35,000 lbs/hr
  - Pressures to 900 PSIG
  - Temperatures to 650°F
  - NPT, socket weld or flanged 1/2” to 6”

**Additional Products**
- Positioners–Pneumatic, Electropneumatic, PS-2 & Smart Pos.
- IP Transducer
- RTD Resistance Probe Thermometer
- Electronic Pressure Transmitter
- Biasing Relay
## Desuperheaters

### Steam atomizing desuperheater
- Reduces the temperature of superheated steam by controlled direct injection of cooling water
- Mechanical atomizing 2.5:1 turndown
- Steam atomizing 20:1 turndown
- Line sizes 311 to 2411 (larger sizes available upon request)
- Velocities to 8000 feet per minute
- Air operated only

### Safety Relief Valves

#### Figure 31, 41, 41A Bronze Series
- Meets ASME Sections I and VIII for steam, air and gases
- Brass/bronze trim standard; Stainless steel trim optional
- From 5 to 300 PSI at 422°F
- Bronze - Threaded inlets 1/2’’ to 2 1/2’’

#### Figure 10 & 15 Series
- Meets ASME Section IV for steam, air and gases
- From 5 to 15 PSI at 400°F
- Cast Iron - Threaded inlets 3/4’’ to 3’’
- Aluminum - Threaded inlets 2’’

#### Figure 31, 41, 41A Cast Iron Series
- Meets ASME Sections I and VIII for steam, air and non-hazardous gases
- Semi nozzle, dual ring control and open lever
- Stainless steel base and disc optional
- From 5 to 250 PSI at 406°F
- Cast Iron - Threaded or Flanged inlets 1 1/2’’ to 6’’

#### Figure 800 Series
- Meets ASME Section VIII for steam, air and gases
- Stainless steel trim and optional soft seat for tighter shutoff
- Plain, open or packed cap
- Bronze - Threaded inlets 1/2’’ to 1 1/2’’
- Stainless Steel - Threaded inlets 1/2’’ to 1 1/2’’
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