

SELECTING BACK PRESSURE PILOTS

Any of the Main Valves described in the Main Valve Section can be combined with any of the Pilots listed below to produce the SPENCE Back Pressure Regulator. Provided the delivery (discharge) pressure is sufficiently below the desired back pressure to operate the Regulator, it will maintain a steady back pressure regardless of fluctuations in the load. The Pilot is guaranteed to shut tight when the back pressure falls below a predetermined

setting. The table below lists the principal Back Pressure Pilots. **THE SPENCE BACK PRESSURE REGULATOR IS NOT A SAFETY VALVE AND SHOULD NEVER BE USED AS SUCH.** The discharge pressure must always be low enough in relation to the back pressure to provide the required minimum differential listed in the Main Valve Selection Chart in the Technical Reference Section.

BACK PRESSURE REGULATOR PILOTS

Type	Service Conditions							Diaphragm		Main Valve
	Cast Iron		Cast Steel		Delivery Pressure		Normal Accuracy ±	Diameter inches	Material	
	Maximum Initial Pressure psi	Maximum Temperature °F	Maximum Initial Pressure psi	Maximum Temperature °F	Minimum psi	Maximum psi				
Q	150	366	150	366	3	150	1 psi	3½	St. Stl.	E or C Series
Q2	250	450	600	750	100	400	2 psi	3½	St. Stl.	E or C Series
Q73 ^b	150	366	150	366	3	150	½ psi	3½-7¼ ^c	St. Stl.	E or C Series
F14	250	450	600	750	3	150	1 psi	4½	St. Stl.	E or C Series
F13	250	450	600	750	100	300	2 psi	3½	St. Stl.	E or C Series
F15	250	450	600	750	2	25	1/2 psi	5¾	St. Stl.	E or C Series
F32	250	450	600	750	200	2000	10 psi	¾ piston	St. Stl.	E or C Series

^bType Q73 is air adjusted, all others are spring loaded.

^cThese Pilots have dual diaphragms, the first size being the control diaphragm and the second, the air loading diaphragm.

NOTES ON SELECTION OF PILOTS

TYPE Q SERIES meet the requirements of the majority of all back pressure problems. They are packless and spring or air loaded. The Type Q Pilot can be furnished for service on refrigerants on special order.

TYPE F SERIES have bellows stem seals and separate diaphragm chambers. They are designed for applications where a regulator is required to open on rise in pressure of a fluid other

than that flowing through the regulator. Type F Series Pilots are also recommended for usual back pressure service in the event that long control pipes are unavoidable.

In either series of back pressure pilots, a larger Diaphragm will produce closer accuracy of control but with less range in back pressure.

SIZING BACK PRESSURE REGULATORS

DATA REQUIRED FOR ORDERING

1. **SERVICE** Fluid flowing through Regulator.
2. **INITIAL (INLET) PRESSURE**
 - (a) Maximum/Minimum.
 - (b) Superheat, Gravity, etc.
 - (1) Steam Service—Total Temperature or Degrees Superheat, if any.
 - (2) Air, Gases, Water and Liquids—Temperature and Specific Gravity.
3. **DISCHARGE (OUTLET) PRESSURE** Maximum/Minimum.
4. **CAPACITY** Maximum required flow through Regulator.
5. **END CONNECTIONS** Screwed or Flanged. (If flanged, state drilling.)

SELECTION OF TYPE AND SIZE OF REGULATOR

MAIN VALVE	PILOT
A. TYPE —See Selection Criteria for Steam, Air, Gases or Water and Liquids in beginning of this Section.	See Selection Criteria and Selection Charts opposite.
B. SIZE —See applicable Valve Capacity Tables in this Section.	
C. MATERIAL — See Main Valve Selection Chart in Technical Reference Section or individual Product Pages.	See Pilot Selection Chart opposite or individual Product Pages.
D. ACCESSORIES —See Accessories in Other Products Section.	

EXAMPLE

Select size and type Regulator to pass 9000 lb steam per hour retaining a back pressure of 5 psi and exhausting into a condenser at 6" Hg vacuum. Pilot to be packless, spring loaded and to control the pressure within $\pm 1/2$ psi.

1. Steam
2. (a) 5 psi
(b) None (saturated, 228°F total temperature)
3. 6" Hg vacuum
4. 9000lb. per hour
5. Flanged, if 2 1/2" size or larger

SELECTION OF TYPE AND SIZE OF REGULATOR

MAIN VALVE	PILOT
A. Since Initial Pressure is less than 15 psi and the least pressure drop exceeds "minimum differential": SELECT TYPE E2	Since maximum Initial Pressure 5 psi, Total Temperature 228°F, accuracy of control $\pm 1/2$ psi and Pilot spring loaded: SELECT TYPE F15
B. For 9000 lb. per hour and 5 psi Initial Pressure: SELECT 8" SIZE.	
C. For 5 psi, 228°F: SELECT CAST IRON, FLANGED 125 LB.	For 5 psi, 228°F: SELECT CAST IRON
D. For discharge into vacuum: Condensation Chamber required.	None required in this case.

ANSWER: 8" SPENCE TYPE E2F15, CAST IRON BODY, 125 LB. FLANGED ENDS, EQUIPPED WITH CONDENSATION CHAMBER.
 NOTE: Back Pressure Regulators should always be protected by properly designed Strainers.