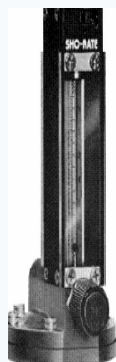


FLOW CONTROLLERS & ACCESSORIES

Description

IE Flow controllers are designed to maintain a constant differential pressure across an integral manual flow regulating valve. An internal diaphragm actuated control valve is positioned by the incoming fluid pressure on one side of the diaphragm, and outlet pressure plus spring action on the other side. Variation in the supply and/or discharge pressure disturb the balance of forces on the diaphragm, causing the control valve to open or close, thus maintaining a fixed differential across the manual flow regulating valve. The Series 8800 controllers are for all the liquid and gas flow with constant downstream pressure. Series 8900 controllers are for all liquid and gas flow with constant upstream pressure.



INTEGRAL FLOW CONTROLLERS FOR GAS AND LIQUID SERVICES

Design Features

- No external piping – integral, needle valve eliminates the sources of leakage in externally piped needle valves
- Integral or separate flow controller and rotameter assemblies
- Wide range of models for high and low flow rates
- Operating pressures up to 1000 psi, temperatures upto to 300°F
- Easily Panel mounted
- Models for constant upstream or downstream pressure service. Ratings, Capacities, Connections Pressure Rating (PSI) Capacity Range Total Pressure Drop (PSI) Connection Sizes Inches (NPT) Model No. Brass, Alu m. Stn. Stl. Water Air (STP)*** Min Max Inlet Outlet Maximum Temp

Ratings

- Diaphragm Material 8800D ¼
 - ** 8802D ¼ ¼ 8900D
 - ** ¼ 8902D ¼ ¼ 8805D -- 1000 cc/min 15 gph scf/min 110 scfh ¼ ¼ Neoprene 180°F 8810 ¼ ¼ 8910 ¼ ¼ 8815 - 1000 0.1 gpm 2.5 gpm 0.4 scfm 9.0 scfm ¼ ¼ 8830B -- 0.6 gpm 8.0 gpm 2.4 scfm 35 scfm ¾ ¾ Teflon 300°F
- Notes: ** Capacities for gas flow are based on air at 14.7 psia and 70°F. Pressure, temperature and flow are measured downstream of the controller for 8800 Series, upstream for 8900 Series. *** Untapped connection: Must be used integral with IE Sho-Rate meters. October 2007. Sho-Rate "150" Flowmeter with Optoal Integral Flow Controller

Ratings, Capacities, Connections

Model No.	Pressure Rating (PSI)		Capacity Range				Total Pressure Drop (PSI)		Connection Sizes Inches (NPT)		Maximum Temp. Ratings Diaphragm Material
	Brass, Alu m.	Stn. Stl.	Water		Air (STP)***		Min	Max	Inlet	Outlet	
8800D	250	300	50 cc/min	15 gph	100 scc/min	110 scfh	10	300	1/4	***	Neoprene 180°F
8802D	250	300					10	300	1/4	1/4	
8900D	250	300					10	150	***	1/4	
8902D	250	300					10	150	1/4	1/4	
8805D	--	1000					10	300	1/4	1/4	
8810	250	300	0.1 gpm	2.5 gpm	0.4 scfm	9.0 scfm	15	150	1/4	1/4	Teflon 300°F
8910	250	300					15	150	1/4	1/4	
8815	--	1000					15	150	1/4	1/4	
8830B	--	300	0.6 gpm	8.0 gpm	2.4 scfm	35 scfm	25	75	3/4	3/4	

Notes: ** Capacities for gas flow are based on air at 14.7 psia and 70°F. Pressure, temperature and flow are measured

II. Models : 8844 & 8944

Description

IE NRS Flow controllers are designed to accurately adjust and maintain small gas and liquid flows. Model 8844 is designed to control flows when downstream pressure is constant and upstream pressure is variable. Model 8944 is designed for constant upstream, variable downstream pressure applications.

Design Features

Integral 1/8" tubing fittings
Performance tested on Helium
Non-rotating needle control valve
Six interchangeable needle tapers for increasing flow ranges
Bubble-tight, o-ring seal shut-off – Can't be damaged by over tightening.

Specifications

CONNECTIONS

Standard: Needle taper No. 1, 2 & 3 -1/8" NPT
Needle Taper No. 4, 5 & 6 – requires 1.4" connections.

PRESSURE DROP

Minimum: 15 psi; Maximum: 300 psi

Capacities

Helium gas at 50 psig, valve full open

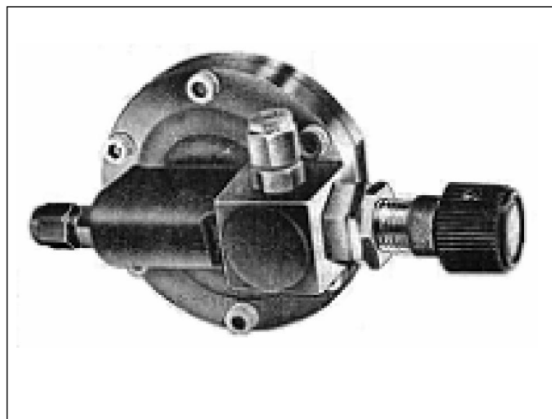
Needle Taper	SEC/MIN	
	Model 8844 **	Model 8944
1	150	300
2	450	900
3	900	1,700
4	3,500	7,000
5	10,000	20,000
6	40,000	55,000

Flow capacities will vary for different gases and pressures.

** These capacities are for 50 psig supply, atmospheric exhaust. Downstream pressure in excess of atmospheric (14.7 psia) will increase capacity.

Ordering information

- Model number of flow controller
- Aluminium/Brass or Stainless Steel Body
- Size 1 through 6 needle value.



Materials of construction

CONTROLLER BODY – Aluminium, 316 Stainless Steel, Brass

CONTROLLER DIAPHRAGM – Standard: Neoprene on Aluminium Brass body, Teflon on stainless Steel.

NEEDLE – 316 Stainless Steel

NEEDLE VALVE SEAT – Brass (Al. & Brass body) 316 Stainless Steel (Stainless Steel body)

O-RINGS – Standard : Neoprene (Al. & Brass body), Viton (Stainless Steel body)

PRESSURE RATINGS

Al. & Brass body: 250 psig; Stainless Steel body: 300 psig

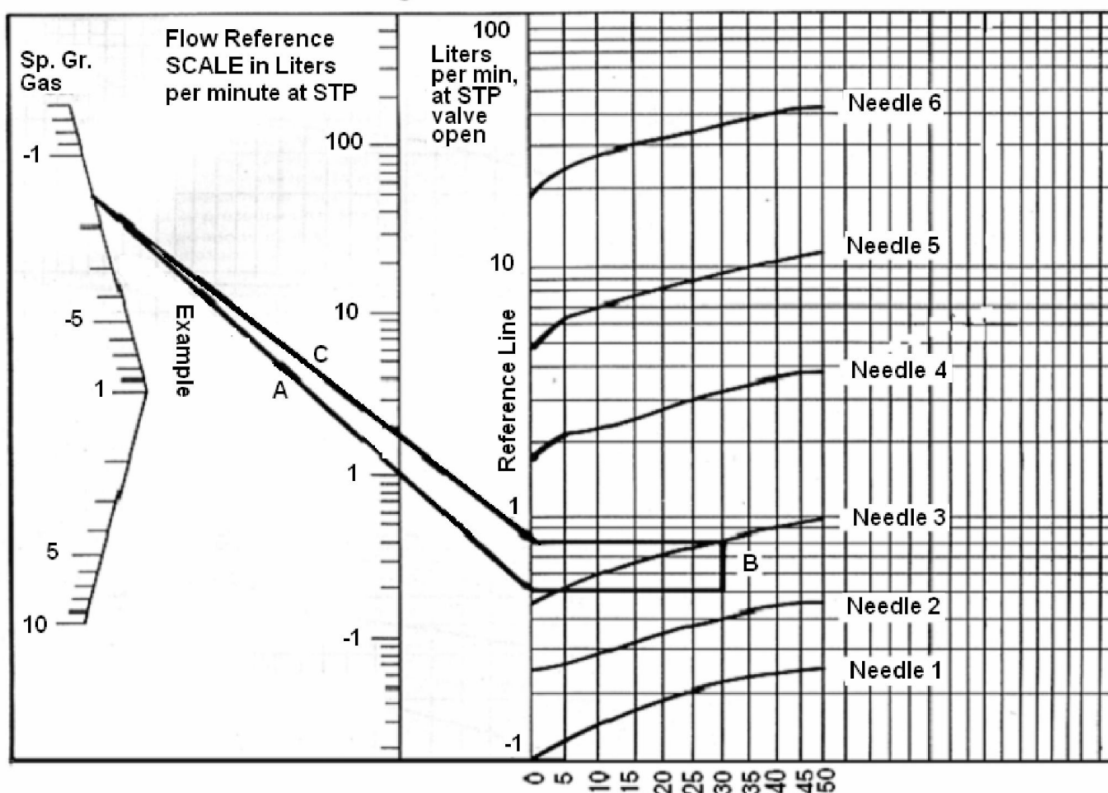
TEMPERATURE RATINGS

Neoprene: 180°F; Teflon: 300°F

Water (Liquid Sp. Gr. 1.0)

Needle Taper	CC/MIN			
	Model 8844		Model 8944	
	Min.	Max.	Min.	Max.
2	0.29	7.4	0.29	7.5
3	1.10	19.0	1.10	19.0
4	1.90	49.0	1.90	45.0
5	3.20	144.0	3.20	145.0
6	11.00	365.0	11.00	500.0

Model 8844 Flow Controller Sizing Table



Needle Size Determination

The correct controller valve needle size suitable for control of a specific gas at a given flow rate and outlet pressure may be determined by using the table above. Proceed with the above description and refer to the example as shown in the table.

- Draw line "a" from specific gravity through desired flow rate to Reference Line. Extend the "a" horizontally to known value of outlet pressure as shown in example.
- Note relationship between termination point of the "a" and the six needle taper curves. Any needle taper whose curve is above this point may be used. Maximum resolution will be achieved by using the needle taper whose curve is immediately above the termination point.
- Maximum flow that may be achieved with a needle taper can be determined by drawing vertical line "b" up to the desired needle taper curve. Draw a horizontal line from intercept point to Reference Line as shown and continue line "c" from Reference Line to specific gravity of gas.
- Where line "c" intersects Flow Reference Scale, read maximum flow capacity for selected needle at given flow conditions.

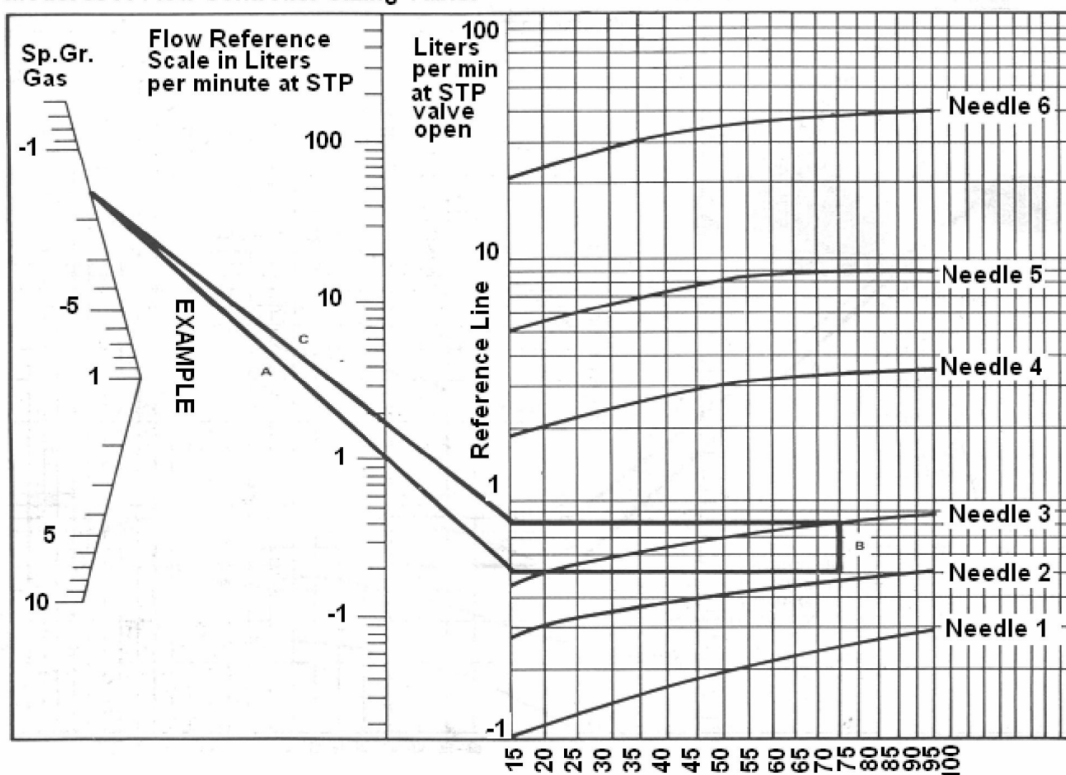
EXAMPLE

Gas – Helium with Specific Gravity of 0.13

Desired Flow Rate – 1 Liter/minute

Outlet Pressure – 30 psi.

Model 8944 Flow Controller Sizing Table.



Needle Size Determination

The correct controller valve needle size suitable for control of a specific gas at a given flow rate and supply pressure may be determined by using the table above. Proceed with the above description and refer to the example as shown in the table.

- Draw line "a" from specific gravity through desired flow rate to Reference Line. Extend the "a" horizontally to known value of outlet pressure as shown in example.
- Note relationship between termination point of the "a" and the six needle taper curves. Any needle taper whose curve is above this point may be used. Maximum resolution will be achieved by using the needle taper whose curve is immediately above the termination point.

- Maximum flow that may be achieved with a needle taper can be determined by drawing vertical line "b" up to the desired needle taper curve. Draw a horizontal line from intercept point to Reference Line as shown and continue line "c" from Reference Line to specific gravity of gas.
- Where line "c" intersects Flow Reference Scale, read maximum flow capacity for selected needle at given flow conditions.

EXAMPLE

Gas – Helium with Specific Gravity of 0.13

Desired Flow Rate – 1 Liter/minute

Supply Pressure – 75 psi