

The Model 900TE Flexflo® Regulator Provides Versatile Pressure Regulation with Top-Entry Design for In-Line Maintenance!

Description:

The Model 900TE (Top Entry) Flexflo® Regulator is a self-contained, pilot-operated pressure regulator that may be used in both gas and liquid applications. The 900TE Flexflo® Regulator design features a simple, top-entry design for easy in-line maintenance. The 900TE incorporates a cast steel body with integral flanged end connections. Multiple trim configurations are available to match a variety of applications. The 900TE Flexflo® is available from 1.5" (40 mm) to 6" (150 mm) bore in pressure classes from 150 ANSI to 600 ANSI. The 900TE Flexflo® Regulator typically is used in tandem with a Flexflo® Pilot for pressure control applications. The environmentally friendly design of the Flexflo® Pilot and Regulator eliminates all atmospheric emissions by maintaining all gas/liquid within the piping system.



Figure 1.0 - Groves Model 900TE Flexflo® Regulator

The 900TE Flexflo® Regulator features Top-Entry Design for easy operation and maintenance. The 900TE Regulator is available with a variety of complementary accessories to solve your application needs.

Specifications:

Item:	Model 900TE Flexflo® Regulator
Type:	Pilot Operated Regulator
Body Materials:	Carbon Steel
Available Sizes:	1.5 in. (40mm), 2 in. (50mm), 3 in. (80mm), 4 in. (100mm), 6 in. (150 mm)
End Connections:	Raised Face Flange (Standard) Weld End (Optional)
Face-to-Face Dimensions:	ASME/ANSI B16.10-1986 (for RFF Ends)
Pressure Ratings:	150, 300, 600 ANSI
Working Temperature:	-20°F to +212°F (-29°C to +100°C) Standard*
Maximum Shutoff Differential:	1480 psid**
Maximum Inlet Pressure:	1480 psig**
Outlet Pressure Range:	1480 psig***
Flow Direction:	Inlet to Outlet

* Optional Low Temperature design allows -40°F (-40°C)

** Limited by Flexflo® tube selection, see Page 6, Table 5.0 for Additional information

*** Limited by Flexflo® Pilot Selection, Consult Page 9 for additional information

The Flexflo® Model 900TE Features:

- Top Entry Design Provides Easy In-line Maintenance or Inspection
- Top Entry Design Accessible Without Removal of Pilot or Plumbing
- Rugged Design Ideal for Demanding Pipeline Applications
- Pulsation Resistant Design Ideal for Power Plant Type Applications
- No Hydraulic Oil or Internal Springs Required
- Simple Design Has Only One Moving Part!
- Environmentally Friendly Design with no Emissions
- Circumferential Regulator Design Provides Superior Shutoff
- Reduced Capacity Trims may be Easily Exchanged to Optimize to Flow Conditions
- Dual Instrument Connection Ports Allow Versatile Control Options / Configurations
- Since 1942, the Groves Flexflo® is the Original Flexible Element Regulator!
- Can be mounted horizontal, vertical or upside down
- Low Noise
- Pressure Reducing, Pressure Relief or Flow Control Applications



Figure 2.0 - The Groves Flexflo® Regulator is the original flexible element regulator!

The 900TE Flexflo® Regulator is the ideal regulator for natural gas transmission/distribution systems and power plants. The combined package of the 900TE, Model FT-35 Filter, and Model 829S1 Pilot shown here provides a reliable and economical regulation package for all your pipeline needs. The 900TE Flexflo® is capable of regulating both gas and liquids, but is most commonly utilized in natural gas pipelines.

Flexflo® Top Entry Regulator Model 900TE



The Grove Model 900TE Flexflo® Regulator is Extremely User Friendly to Maintain

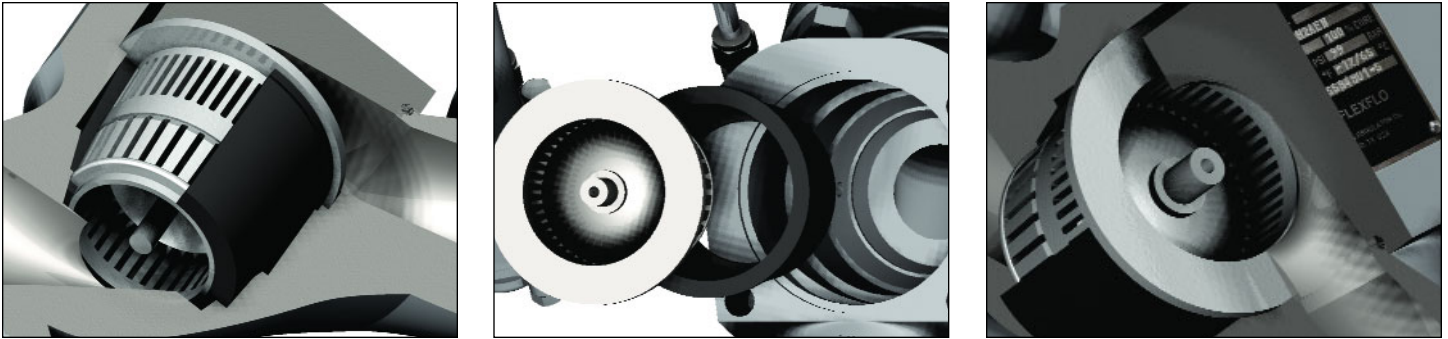
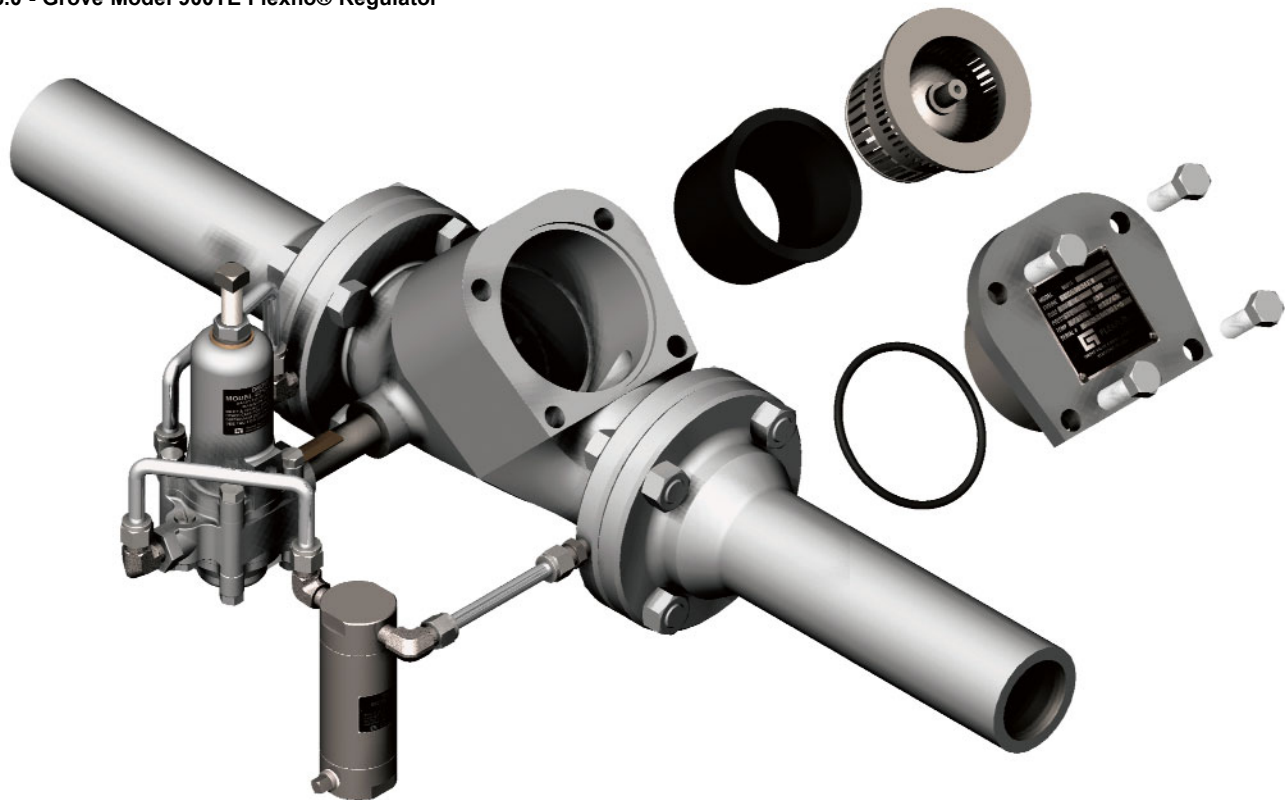


Figure 3.0 - Grove Model 900TE Flexflo® Regulator



The Flexflo® Model 900TE Features:

- Top Entry Design Easy to Maintain
- Low Cost Maintenance and Operation
- Rugged Design Ideally Suited for Natural Gas Regulation
- May be utilized to control liquids pipelines
- Regulator Intervals Accessible without Removal
- Only One Moving Part (Tube)
- No Internal Spring Required
- No Hydraulic Oil Required
- Fewer Parts than other Manufacturers' Pipeline Regulators
- Simplest Pipeline Regulator Design in Industry
- Large Seating Area and Circumferential Tube Design Provide

Superior Flow Shutoff

- Environmentally Friendly Design with No Emissions
- Quick change trims optimize performance and allow room for growth
- Since 1950, The Grove Flexflo® is the ORIGINAL Pipeline Regulator
- Lower Cost Regulation than Control Valves
- Self-Contained Regulator Does Not Require Power Source
- Wide Range of Complementary Instrumentation (Pilots) Provides Limitless Application Solutions
- Dual Ports Allow Pilot to be place on either side of Flexflo® Regulator
- Mount in Any Orientation
- Pilot and Plumbing Does Not Need to be Removed to Open and Inspect

How it Works

Operation of the 900TE Flexflo® Regulator consists of one moving part, the Tube. This single moving part is a flexible element that controls the flow of gas/liquid through the Core of the regulator. Application of Jacket Pressure to the Tube (tube shown in purple) will regulate the volume of gas/liquid that flows through the regulator. The 900TE Flexflo® functions as a "slave" device and requires a "brain" to control the process application. Most commonly, Flexflo® Pilots are utilized as the "brain" to control the process. For complete information on Grove Flexflo® Pilots and other related Flexflo® accessories, see pages 10 and 11 of this brochure.

Legend

- Inlet Pressure (Upstream Pressure) P_1
- Jacket Pressure P_j
- Sensing Pressure (Downstream Pressure) P_2
- Tube

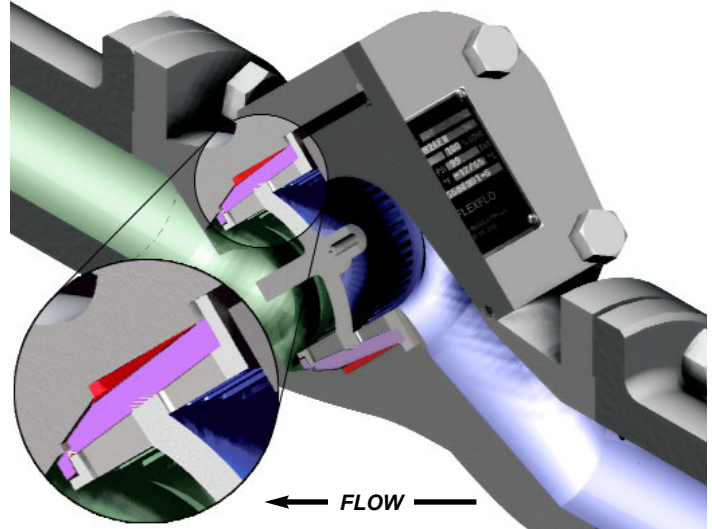


Figure 4.1 - Model 900TE Flexflo® Regulator at Full Closed Position
As Jacket Pressure is increased the Tube will constrict around the Core reducing the flow volume that passes through the Core of the regulator. If Jacket Pressure is maximized, the Tube will seal around the center sealing surface of the Core and completely shut off flow. Jacket Pressure is maximized when it is equal to Upstream Pressure.

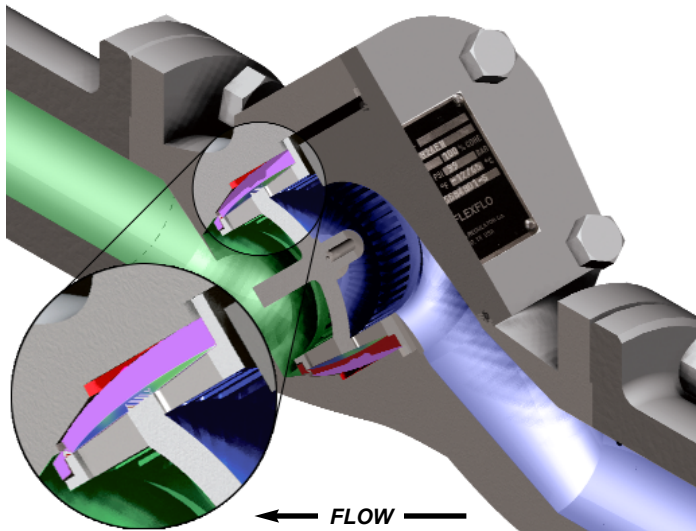


Figure 4.2 - Model 900TE Flexflo® Regulator at Throttling Position
As Jacket Pressure varies, the Tube position will fluctuate. The Jacket Pressure may be varied to achieve the exact flow volume through the core of the regulator that is required. Increasing the Jacket Pressure will reduce the flow volume through the regulator. Decreasing the Jacket Pressure will increase the flow volume through the regulator.

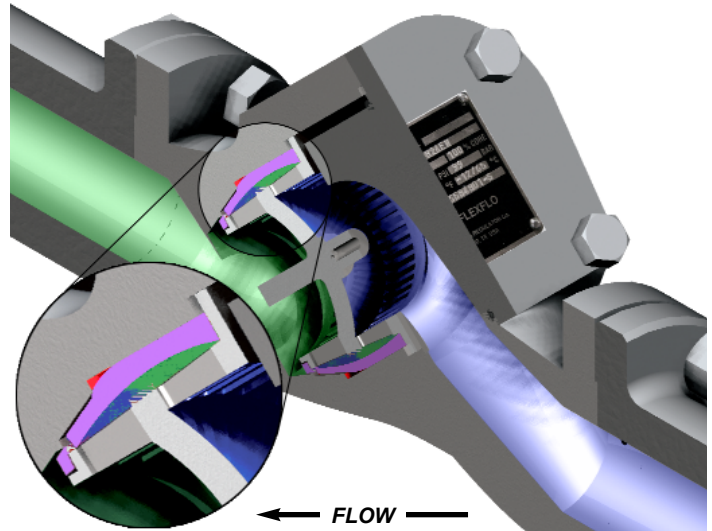


Figure 4.3 - Model 900TE Flexflo® Regulator at Full Open Position
As Jacket Pressure is decreased, the Tube will expand from the Core increasing the flow volume that passes through the regulator. If Jacket Pressure is minimized, the Tube will expand away from the sealing surface of the Core allowing maximum flow. Jacket Pressure is minimized when it is equal to Downstream Pressure.

Flexflo® Top Entry Regulator Model 900TE



Simplify Operations of Your Pipeline with the 900TE Top Entry Flexflo® Regulator

How It's Built!

The 900TE Flexflo® Regulator features the simplest design of all "flexible element regulators" on the market. The 900TE Regulator incorporates a mere six (6) different parts, an improvement over the competition. The straightforward concept of the 900TE Flexflo® reduces maintenance and simplifies operation. The uncomplicated design reduces training time and minimizes required spare parts. The Flexflo® is ideally-suited for trouble-free service to reduce your man-hours in the field and the training room.

Figure 5.0 - The Grove Model 900TE "Top Entry" Regulator is Designed for Your Demanding Pipeline Applications

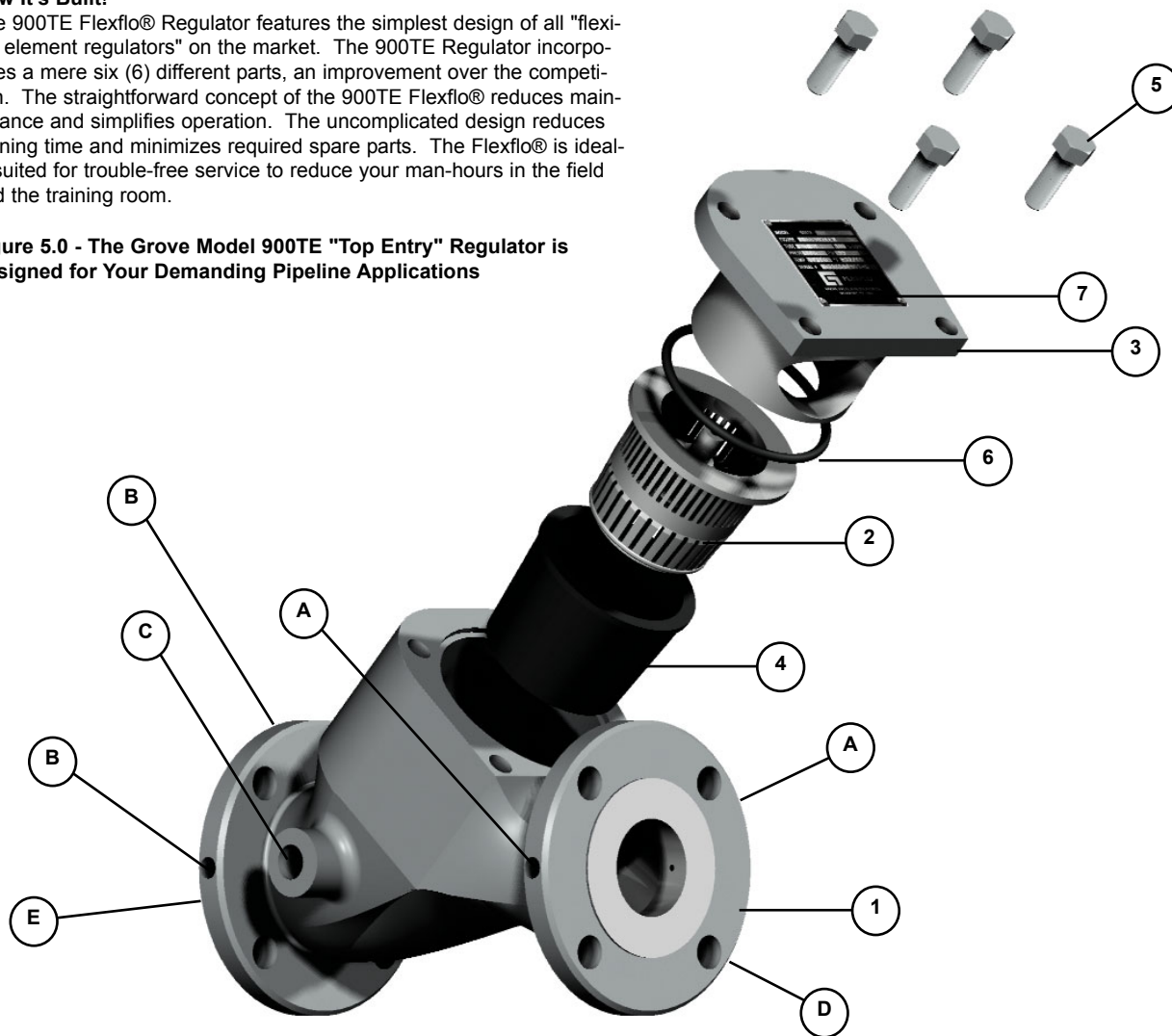


Table 1.0 - Parts Identification and Materials of Construction for Model 900TE Flexflo® Regulator

Item	Description	Material
1	Body	WCB Steel
2	Core ¹	316 Stainless Steel
3	Closure	WCB Steel
4	Tube	Elastomer (See Table 5.0, Page 6)
5	Bolts	Alloy Steel
6	O-Ring	Viton
7	Nameplate	Aluminum
8	Pipe Plug 1/4"	Alloy Steel (not shown) ²
9	Pipe Plug 1/2"	Alloy Steel (not shown) ²

Notes:

1. Core (Item 2) available in reduced capacity configurations consult Grove Regulators for availability
2. 1/4" and 1/2" pipe plugs are used to plug duplicate ports not utilized by pilot hookup.

Table 2.0 - Port Identification for Model 900TE Flexflo® Regulator

Item	Port	Port Size
A	Inlet Port (Supply)	1/4" FNPT (Qty=2) ¹
B	Outlet Port	1/4" FNPT (Qty=2) ¹
C	Jacket Port (Loading)	1/2" FNPT (Qty=2) ¹
D	Upstream Connection	1-1/2" to 6" RFFE (Standard)
E	Downstream Connection	1-1/2" to 6" RFFE (Standard)

Notes:

1. Inlet Port, Outlet Port, & Jacket Ports are on both sides of body for easy pilot mounting

Table 3.0 - Grove Model 900TE Flexflo® Regulator standard weights and dimensions

Size	ANSI Class	Face to Face Dimension (A) ³	Flange Dia (B)	Weight	Recommended Tube (Standard)	Standard tube P/N ^{1,2}
1.5" (40mm)	150	8.75" 222mm	5" 127mm	25lbs 11kg	Hydrin 893	355-01001-893
	300	9.25" 235mm	6.12" 155mm	30lbs 14kg	Hydrin 878	355-01001-878
	600	9.88" 251mm	6.12" 155mm	32lbs 15kg	Nitrile 846	355-01001-846
2" (50mm)	150	10" 254mm	6" 152mm	40lbs 18kg	Hydrin 893	355-02001-893
	300	10.5" 267mm	6.5" 165mm	45lbs 20kg	Hydrin 878	355-02001-878
	600	11.25" 286mm	6.5" 165mm	49lbs 22kg	Nitrile 846	355-02001-846
3" (80mm)	150	11.75" 298mm	7.5" 191mm	96lbs 44kg	Hydrin 893	355-03001-893
	300	12.5" 318mm	8.25" 210mm	103lbs 47kg	Hydrin 878	355-03001-878
	600	13.25" 337mm	8.25" 210mm	119lbs 54kg	Nitrile 846	355-03001-846
4" (100mm)	150	13.875" 352mm	9" 229mm	124lbs 56kg	Hydrin 893	355-04001-893
	300	14.5" 368mm	10" 254mm	144lbs 65kg	Hydrin 878	355-04001-878
	600	15.5" 394mm	10" 254mm	164lbs 74kg	Nitrile 846	355-04001-846
6" (150mm)	150	17.75" 451mm	11" 279mm	294lbs 133kg	Hydrin 893	355-06003-893
	300	18.63" 473mm	12.5" 318mm	338lbs 153kg	Hydrin 878	355-06003-878
	600	20" 508mm	14" 356mm	373lbs 169kg	Nitrile 846	355-06003-846

Notes:

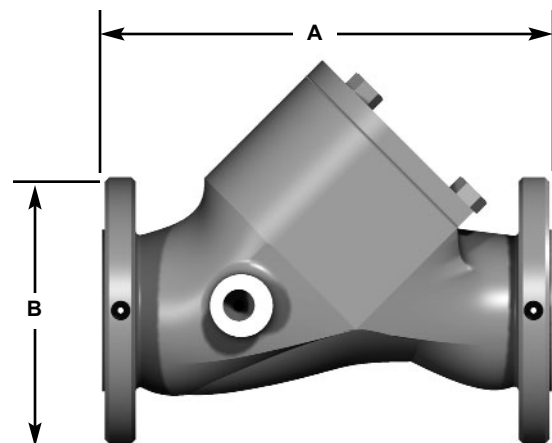
1. Tube materials listed are standard offering for natural gas applications. Tubes listed are limited by allow able Max. ΔP across tube and flow media temperature
2. For additional tube materials and more specific tube specifications, please see table 5.0, page 6.
3. Face-to-Face dimensions are compatible with ASME/ANSI B16.10-1986 Specifications.
4. For assistance, please contact Grove Regulators.

Table 4.0 - Model 900TE Flexflo® Regulator Cv (Flow Coefficient) Data

Size	Max C _v (50% Core) ¹	Max C _v (100% Core) ¹	X _t ⊗	F _l ⊙	Q _{max} H ₂ O
1.5" (40 mm)	18	36	0.47	0.75	165
2" (50 mm)	29	58	0.46	0.74	300
3" (80 mm)	47	94	0.5	0.77	660
4" (100 mm)	64	129	0.46	0.73	1175
6" (150 mm)	152	304	0.55	0.81	2644

Notes:

1. Max. Cv (flow Coefficient) reported is based upon Universal Gas Sizing Formulae.
2. X_t is critical pressure drop ratio
3. F_l is liquid pressure recovery factor
4. Grove Regulators recommends utilizing Flexsize sizing program to confirm accurate sizing of regulators.



Flexflo® Top Entry Regulator Model 900TE



Select the Ideal Tube for your Model 900TE Flexflo® Application!

Table 5.0 - Grove Tube material selection table for Flexflo® Regulators

In order to meet the exact demands of each particular Flexflo® Application, Grove offers a wide variety of different tube compounds. When selecting a tube for a specific application, its important to take into consideration both pressure differential as well as the particular flow media. In table 5.0 there are some of the standard tubes that Grove offers.

Standard Flexflo® Tube Materials											
Grove Material (Code Number)		814 (C)	846 (E)	878 (A)	893 (D)	880 (N)	888 (B)	725 (F)	745 (M) 744 (L) 740 (K)	644 (R)	
Base Polymer		Nitrile	Nitrile	Hydrin	Hydrin	Polyisoprene Natural Rubber	EPDM	Hydrin	Tornac HNBR	Nitrile	
Nominal Durometer		65	75	65	50	65	70	40	65,75,85	75	
Maximum Shutoff Differential (psid)		740	1480	740	285	740	740	60	745,744,740 275,720,1440		
Available in Products Marked	MODEL 80	STD	STD	OPT	OPT	OPT	OPT	OPT	OPT	OPT	
	MODEL 83	OPT	STD	STD	STD	OPT	OPT	OPT	OPT	OPT	
	MODEL 900TE	OPT	STD	STD	STD	OPT	OPT	OPT	OPT	OPT	
Temp. Range (min/max°F) (min/max°C)		10/150 -12/65	10/150 -12/65	-20/150 -29/65	-40/150 -40/65	0/150 -17/65	-20/175 -29/79	-40/120 -40/48	10/212 -12/100	-40/150 -40/65	
Fluid Compatibility	Hydrocarbon	Gaseous	OK	OK	OK	OK	NR	NR	OK	OK	
		Liquid	OK	OK	OK	OK	NR	NR	OK	OK	
		%Aromatic content Max	20	15	30	15	NR	NR	25	40	NR
		Max sulfur % wt	0.5	0.5	5	0.5	NR	NR	5	5	NR
	Water	OK	OK	NR	NR	OK	OK	NR	OK	OK	
	Nitrogen	OK	OK	OK	OK	OK	OK	OK	OK	OK	
	Air	OK	OK	OK	OK	120°F max	OK	OK	OK	OK	
	Synthetic Lubes (Phosphate Esters)	NR	NR	NR	NR	OK	OK	NR	NR	NR	
	Peroxides (Sour Gasoline)	NR	NR	NR	NR	NR	NR	NR	OK	OK	
	Ketones/Amines	NR	NR	NR	NR	NR	OK	NR	NR	NR	
	Max H2S in water % wt	0.5	0.5	NR	NR	NR	Unlimited	NR	1.5	NR	
Methyl. Ethyl Alcohols	NR	NR	NR	NR	OK	OK	NR	OPT	NR		
Remarks		Gen. Hydro-carbon Service, Water	Gen. Hydro-carbon Service, Water	Gen. Hydro-carbon Service, Water at Lower Temperatures	Low Modulus Mat'l. Gen. Hydro-carbon Service, Water	Recommended for Potable water, Mill Scale Applications, Salt Water	Recommended for Std. Water, Ammonia, CO ₂ Service	Low ΔP Applications Only	White Petrol Products, Unleaded gas w/ Alcohols (MTBE)	Gen. Hydro carbon Service, Water	
Notes:											
(STD)	Indicates a standard material for specific Flexflo® Regulator Model										
(OPT)	Indicates optional compatible material for specific Flexflo® Regulator Model										
(OK)	Indicates material is compatible with corresponding fluid.										
(NR)	Indicates material not recommended for specific Flexflo® Regulator Model										

Model 900TE Flexflo® Regulator Figure Number Designation

Table 6.0 - Grove Flexflo® Regulator Model Number Designation Explanation. Every Grove regulator product can be completely identified by its figure number. Listed below is an example of how figure numbers are derived.

Example: 3 in. Grove Model 900TE, Class 150 ANSI, RFFE End Connections with Non-Ribbed Tube.

11559	L	3	A	D	N
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Basic Figure No.		
Standard	11559	100% Cv
	11558	50% Cv
Trim	11574	30% Cv*
	11575	16% Cv*
Nace	11561	100% Cv
Trim	11582	50% Cv

ANSI Rating	
Code	ANSI
L	ANSI CL 150 RF
M	ANSI CL 300 RF
H	ANSI CL 600 RF

Size			
Code	in.	(mm)	End Type
1	1 1/2	40	Flanged
2	2	50	Flanged
3	3	80	Flanged
4	4	100	Flanged
6	6	150	Flanged

Code	Material
A	WCB Cast Steel

Code	Tube Types
N	Non-Ribbed Tube Standard 1 1/2 in. to 6 in.
R	Ribbed**

Tube Material						
Code	Material	Max Diff Pressure	Class 150 VLD	Class 150	Class 300	Class 600
A	Hydrin 878	740 psid (5102 kPa)	NR	OPT	STD	NR
B	EPDM 888	740 psid (5102 kPa)	NR	OPT	OPT	NR
C	Nitrile 814	740 psid (5102 kPa)	NR	OPT	OPT	NR
D	Hydrin 893	285 psid (2034 kPa)	NR	STD	NR	NR
E	Nitrile 846	1480 psid (10205 kPa)	NR	OPT	OPT	STD
F	Hydrin 725	60 psid (414 kPa)	STD	OPT	NR	NR
H	Fluorel 732	740 psid (5102 kPa)	NR	OPT	OPT	NR
J	Hydrin 733	740 psid (5102 kPa)	NR	OPT	OPT	NR
K	Tornac 740	1480 psid (10205 kPa)	NR	NR	NR	OPT
L	Tornac 744	740 psid (5102 kPa)	NR	OPT	OPT	NR
M	Tornac 745	285 psid (2034 kPa)	NR	OPT	NR	NR
N	Ruber 880	740 psid (5102 kPa)	NR	OPT	NR	NR
P	Nitrile 642	1480 psid (10205 kPa)	NR	NR	OPT	OPT
Q	Hydrin 643	1480 psid (10205 kPa)	NR	NR	NR	OPT
R	Nitrile 644	1480 psid (10205 kPa)	NR	NR	NR	OPT

Notes:

- STD** Indicates a standard material for specific Flexflo® Regulator Model
- NR** Indicates material not recommended for specific Flexflo® Regulator Model
- OPT** Indicates optional compatible material for specific Flexflo® Regulator Model
- *** 2in. Size Standard - Please consult Grove Regulators for different Capacity Trims
- **** Grove Regulators has discontinued ribbed tube sales with new Flexflo® Regulators. Limited ribbed tubes are still available for old ribbed tube models.

Flexflo® Top Entry Regulator Model 900TE



The Flexflo® Model 900TE Regulator Provides Limitless Control Capabilities When Combined with the High Performance of Flexflo® Pilots



Figure 6.0 - Top Entry Design of Model 900TE Flexflo® Regulator Allows Easy In-Line Maintenance

The Model 900TE Flexflo® Regulator features a top-entry design that permits accessibility to the internal components of the regulator without removal from the pipeline. Additionally, note that maintenance may be performed without removal of the Pilot control system. The Model 900TE top-entry design provides reliable regulation with minimal maintenance costs. This particular regulator is installed in a natural gas distribution system in southern California. Note that the technician has utilized a core puller (eye bolt) to easily remove the core for inspection.

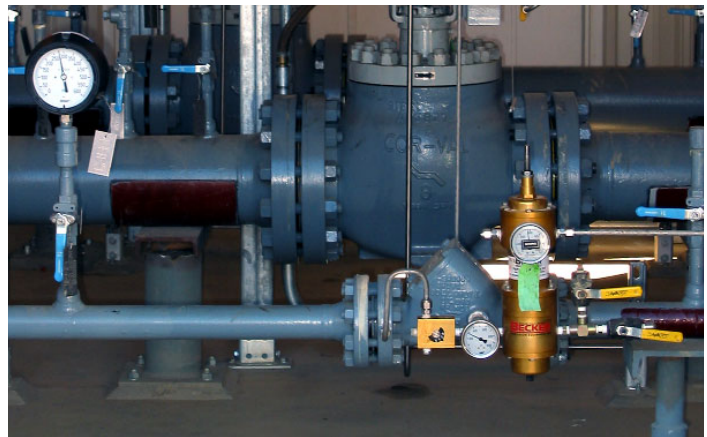


Figure 7.0 - Model 900TE Flexflo® Power Plant "Startup" Regulator for Natural Gas Fired Power Plants

A U.S. power generating company utilized the Model 900TE Flexflo® as a startup regulator in a natural gas fired power plant. The small-bore regulator provides low flow volume capability when the turbine(s) are at startup flow. When flow volumes increase beyond startup flow, the Flexflo® regulator will ensure smooth, stable operation. The Flexflo® pictured is equipped with a FEP-600-CH Pilot. In combination, the FEP-600-CH and Model 900TE Regulator provide the optimum combination for power plant pressure control. The FEP-CH Pilot ensures superior droop and lockup performance, which prevents overpressure of downstream system. Note the higher volume control valve regulator in background.



Figure 8.0 - Model 900TE Flexflo® Power Plant "Startup" Regulator with Flow Control Override

A Houston-based natural gas transmission company utilized the Model 900TE Flexflo® as a startup regulator in a natural gas fired power plant. The Flexflo® pictured is equipped with a FEP-600-CH Pilot and a Model 826 Diaphragm Motor Valve. The FEP-600-CH is ideally suited for high-performance pressure control in natural gas fired power plant applications. The Model 826 DMV is installed to act as a Flow Control Override. Note that an I/P Transducer (not pictured) is required for flow control in this application. The Model 826 DMV in combination with the I/P transducer and an RTU will override the FEP-600-CH Flexflo® Pilot and restrict flow. The system may also provide remote pressure control to override the FEP-600-CH.

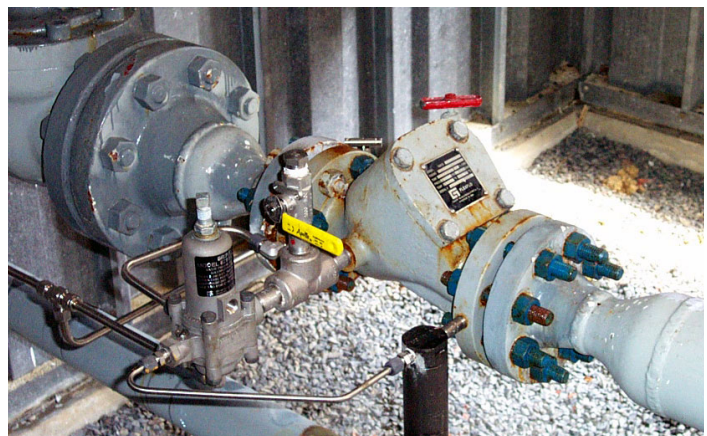
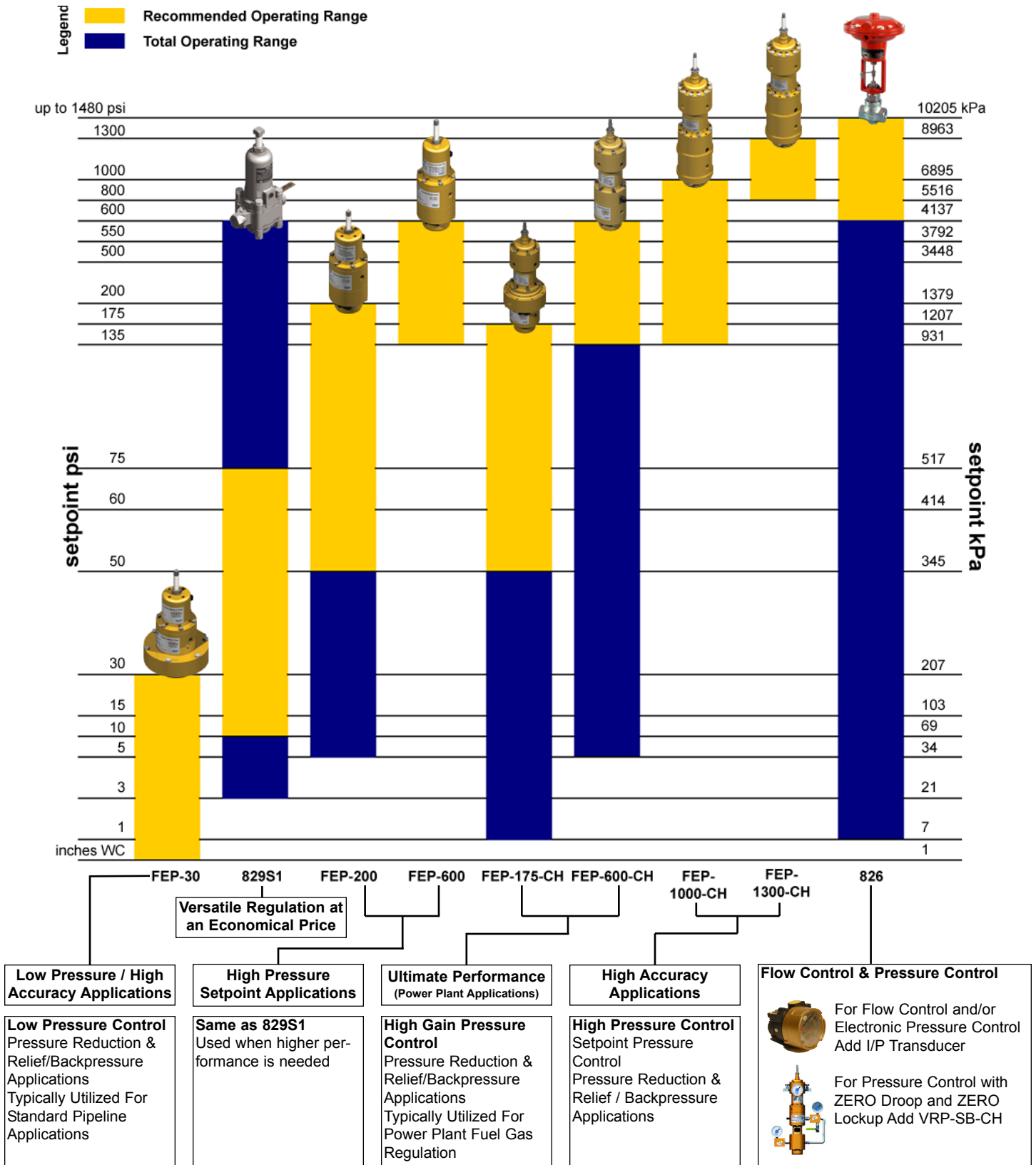


Figure 9.0 - Model 900TE Flexflo® Regulator for Pressure Reducing Service.

A Mid-west utilities company is utilizing a Grove Model 900TE with Grove Model 829S1 Pilot and FT-35 Filter for Pressure Reducing Service.

Grove Regulators Has The Optimum Flexflo® Pilot For Your Regulator Applications



Flexflo® Top Entry Regulator Model 900TE



Model 900TE Flexflo® Regulator Accessories/Options

Realize Optimum Performance of your Model 900TE Flexflo® Regulator with these popular accessories/options!



Model 829S1 Flexflo® Pilot (Versatile Regulation at Economical Price)

The Model 829S1 Flexflo® Pilot is a reversible pressure control regulator (seat & nozzle) that is used in conjunction with Flexflo® Regulators to provide pressure control. The Model 829S1 Flexflo® Pilot is the most widely used Flexflo® pilot because it features all Stainless Steel Construction; NACE compliancy, wide setpoint range; simple design; and an economical price. The Model 829S1 may be utilized in both gas and liquid applications. The 829S1 is particularly well suited for use in natural gas regulation. Applications include pressure reduction, monitor regulators, backpressure control, and relief valve.

Control Range:	3-600 PSIG (21-4137 kPa)	Dimensions:	4.38in x 2.5in x 7.75in (111mm x 64mm x 197mm)
Available Action:	Pressure Reducing Backpressure/Relief	Device Type:	Flexible Element Pilot
Available Models:	High Pressure/Low Pressure Control Ranges	Compatible Regulators:	80, 83, 900TE Flexflo® Regulators
Flow Media:	Gas & Liquids	Weight:	4.25 lbs (1.9 kg)
		Temperature Range:	10°F to 150°F (-12°C to 66°C)
		Device Type:	Flexible Element Pilot



FEP-30 Flexflo® Pilot (Low Pressure/High Accuracy Applications)

The FEP-30 Flexflo® Pilot is a reversible pressure control pilot (seat & nozzle design) that is used in conjunction with Flexflo® Regulators to provide pressure control. The FEP-30 Pilot is typically utilized in low-pressure natural gas distribution systems. The FEP-30 features accuracy and sensitivity to provide unrivaled control accuracy for setpoints ranging from inches H₂O to 30 psig (1.0-207 kPa). The FEP-30 features a large convoluted sensing diaphragm and friction-free design that provides superior sensitivity at critical low-pressure setpoints. Additionally, note that the FEP-30 Series Flexflo® Pilots feature a submersible design that is ideally suited for vault applications that may fill with water.

Control Range:	in WC- 30 psig (1.0 - 206 KPa)	Dimensions:	8.375in. x 6in. Diameter (213mm x 152mm Diameter)
Available Action:	Pressure Reducing Backpressure/Relief	Device Type:	Flexible Element Pilot
Available Models:	FEP-30	Compatible Regulators:	80, 83, 900TE Flexflo® Regulators
Flow Media:	Gas	Weight:	6 lbs. (2.7 kg)
		Temperature Range:	-20°F to 160°F (-29°C to 71°C)



FEP-200/600 Flexflo® Pilot (High Accuracy Applications)

The FEP-200 and FEP-600 Flexflo® Pilots are reversible pressure control pilots (seat & nozzle design) that are used in conjunction with Flexflo® Regulators to provide pressure control. The FEP-200/600 Pilots are typically utilized in conventional pipeline pressure control applications for "medium pressure" setpoints up to 600 psig (4137 kPa). The FEP-200/600 features improved accuracy and droop characteristics over standard issue flexible element pilots. The FEP-200/600 features a friction-free design that provides excellent sensitivity, minimal droop, and good lockup characteristics. Additionally, note that the FEP-200/600 Series Flexflo® Pilots feature a submersible design that is ideally suited for vault applications that may fill with water.

Control Range:	5- 600 psig (34.0 - 4137 KPa)	Dimensions:	8.375in. x 3.75in. Diameter (213mm x 95mm Diameter)
Available Action:	Pressure Reducing Backpressure/Relief	Device Type:	Flexible Element Pilot
Available Models:	FEP-200, FEP-600	Compatible Regulators:	80, 83, 900TE Flexflo® Regulators
Flow Media:	Gas	Weight:	8 lbs. (3.6 kg)
		Temperature Range:	-20°F to 160°F (-29°C to 71°C)



FEP-175/600-CH Flexflo® Pilot Ultimate Performance (Power Plant Applications)

The FEP-175/600-CH Series Pilot is a reversible pressure control pilot (seat & nozzle design) that is used in conjunction with Flexflo® Regulators to provide pressure control. The FEP-175/600-CH is typically utilized for high performance pressure control applications such as power plants. Applications include pressure reduction, monitor regulators, backpressure control, and relief valves. The FEP features a friction-free design, sensitive sensing diaphragm, high sensitivity and minimal droop. Additionally, note that the FEP Series Flexflo® Pilot is a submersible design that is ideally-suited for vault applications that fill with water.

Control Range:	1 - 600 psig (7 - 4137 KPa)	Dimensions:	14.625in. x 3.75in. Diameter (371mm x 95mm Diameter)
Available Action:	Pressure Reducing Backpressure/Relief	Device Type:	Flexible Element Pilot
Available Models:	FEP-175-CH, FEP-600-CH	Compatible Regulators:	80, 83, 900TE Flexflo® Regulators
Flow Media:	Gas	Weight:	12 lbs. (5.4 kg)
		Temperature Range:	-20°F to 160°F (-29°C to 71°C)

Model 900TE Flexflo® Regulator Accessories/Options

Realize Optimum Performance of your Model 900TE Flexflo® Regulator with these popular accessories/options!



FEP-1000/1300-CH Flexflo® Pilot (High Pressure Setpoint Applications)

The FEP-1000-CH and FEP-1300-CH Flexflo® Pilots are reversible pressure control pilots (seat & nozzle design) that are used in conjunction with Flexflo® Regulators to provide pressure control. The FEP-1000/1300-CH Pilots are typically utilized in pipeline pressure control applications for "high pressure" setpoints up to 1300 psig (8963 kPa). Applications include pressure reduction, monitor regulator, backpressure control, and relief valves. The FEP-1000/1300-CH features improved accuracy and droop characteristics over standard issue flexible element pilots. The FEP-1000/1300-CH features a friction-free design that provides excellent sensitivity, minimal droop, and good lockup characteristics. Additionally, note that the FEP-1000/1300-CH Series Flexflo® Pilots feature a submersible design that is ideally suited for vault applications that may fill with water. The FEP-1000-CH and FEP-1300-CH are easily field reversible and supercede Grove Pilot Models 820 and 830.

Control Range:	500 - 1300 psig (3448 - 8963 kPa)	Dimensions:	15.375in. x 4.0in. Diameter (391mm x 102mm Diameter)
Available Action	Pressure Reducing, Backpressure / Relief	Device Type:	Flexible Element Pilot
Available Models:	FEP-1000-CH, FEP-1300-CH	Compatible Regulators:	80, 83, 900TE Flexflo® Regulators
Flow Media:	Gas	Weight:	13 lbs. (5.9 kg)
		Temperature Range:	-20°F - 160°F (-29°C to 71°C)



Model 826 Flexflo® Diaphragm Motor Valve (Remote Setpoint/Flow Control Applications)

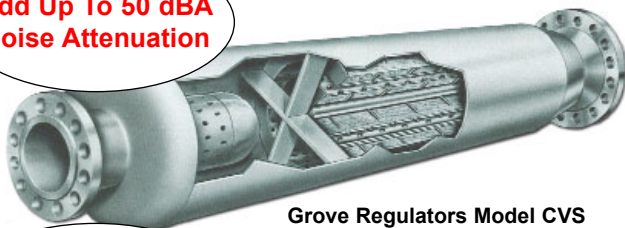
The Model 826 Flexflo® Diaphragm Motor Valve (DMV) is a pneumatically operated control valve that is used in conjunction with Flexflo® Regulators to provide control of a variety of processes. The most common use of the Model 826 DMV includes remote setpoint control, flow control and high-pressure setpoint control. The Model 826 may be utilized in both gas and liquid applications. The Model 826 incorporates a small-bore globe style control valve and a pneumatically operated spring & diaphragm actuator. The Model 826 DMV is available in non-reversible "fail-open" or "fail closed" designs to vary the failure mode of the Flexflo® regulator system. Additionally, an electro-pneumatic version is available in the Model 826-E. The 826-E allows direct communication with electronic signal without a need for an I/P transducer.

Control Range:	Full ANSI Rating of Flexflo® Regulator	Dimensions:	5.1in. Dia. x 8.5in. Ht. (130mm Dia. x 216mm Ht.)
Available Action	Fail-Open, Fail-Closed	Device Type:	Spring & Diaphragm Actuated Globe Valve
Available Models:	Model 826	Compatible Regulators:	80, 83, 900TE Flexflo® Regulators
Flow Media:	Gas & Liquids	Weight:	2.05 Lbs (0.93 kg)
Input Signal:	3-15 psig (21 kPa-103 kPa)* standard	Temperature Range:	-20°F to 160°F (-29°C to 71°C)
End Connections:	¼ FNPT		

* Alternate Input Ranges are available for split range logic. Contact Grove Regulators for additional information.

For applications where noise levels exceed demanded specifications, noise attenuation products are available. These products include the Grove Regulators Model CVS silencer and Grove Regulators model CVD diffuser.

Add Up To 50 dBA
Noise Attenuation

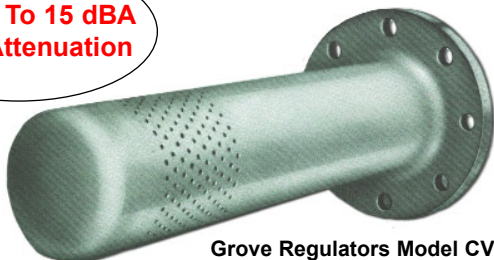


Grove Regulators Model CVS
Control Valve Silencer

Grove Regulators Model CVS Control Valve Silencer

The CVS Control Valve Silencer is a noise attenuating device that is installed immediately downstream of any regulator to provide noise reduction of up to 50 dBA. The CVS is available in a variety of configurations and designs to accommodate almost any natural gas regulation facility.

Add Up To 15 dBA
Noise Attenuation



Grove Regulators Model CVD
Series Control Valve Diffuser

Grove Regulators Model CVD Series Control Valve Diffuser

The CVD Series Control Valve Diffuser is a noise attenuating device that is installed immediately downstream of any regulator to provide noise reduction of up to 15 dBA. The CVD is available in a variety of configurations and designs to accommodate any natural gas regulation facility.

Flexflo® Top Entry Regulator Model 900TE



Table 7.0 - Application Guidelines for Flexflo® Regulators

	Model 80 Flexflo® Regulator	Model 83 Flexflo® Regulator	Model 900TE Flexflo® Regulator	Notes
Applications				
Pressure Control	•	•	•	
Power Plant Control	•	•	•	
Monitor Regulator (Overpressure)	•	•	•	
Relief Service (Overpressure)	•	•	•	
Flow Control	•	•	•	
Line Break Protection	•	•	•	
Backpressure Control	•	•	•	
On-Off Service	•	•	•	
Liquid Surge Relief				1
Features				
In-Line "Top-Entry" Maintenance			•	
Wafer-Style Compact Design		•		
NACE Compliant		•	•	
All Stainless Steel Construction		•		
Optional Reduced Capacity Trims	•	•	•	
Available Configurations				
1 in (25mm) Bore		•		
1.5 in (40mm), 2 in (50mm), 3 in (80mm) Bore		•	•	
4 in (100mm), 6 in (150mm) Bore	•	•	•	
8 in (200mm), 10 in (250mm), 12 in (300mm) Bore	•			
150, 300, 600 ANSI	•	•	•	
End Connections				
Flangeless (Wafer)		•		
Raised Face Flanged End (RFFE)	•		•	
Weld End			•	
Screwed		•		2
Accessories				
CVD Control Valve Diffuser	•	•	•	
CVS Control Valve Silencer	•	•	•	
Compatible Instrumentation				
FEP-30 Flexflo® Pilot	•	•	•	
Model 829S1 Flexflo® Pilot	•	•	•	
FEP-200/600 Flexflo® Pilot	•	•	•	
FEP-175/600-CH Flexflo® Pilot	•	•	•	
FEP-1000/1300-CH Flexflo® Pilot	•	•	•	

Notes:

- Model 80, 83, and 900TE Flexflo® Regulators may be utilized as economical option for Liquid Surge Relief. Model 887 Flexflo® Surge Relieves are primary choice for Liquid Surge Relief due to speed of response.
- Screwed End Connections are available only in 1 in (25 mm) bore Model 83 Flexflo® Regulators.

Note: This information is intended as a guideline for application of Grove Flexflo® Products. We reserve the right to modify product design at any time without notice. We strongly recommend contacting DFS Grove Regulator Operations prior to application of any products.



Figure 10.0 - Model 900TE Flexflo® Regulator Provides Excellent Performance in a Cost-Effective Package

Model 900TE Flexflo® Regulators are the original flexible element regulators. Since the 1950's Grove has continually been improving on the original Flexflo® design. The Model 900TE is the latest improvement in Flexflo® Regulators. The 900TE incorporates a top-entry design that permits quick and easy inspection/maintenance of regulators without removal of the regulator from the pipeline. Additionally, the 900TE may be maintained without removal of the pilot control system, an exclusive feature of the Grove 900TE. The regulators shown here are utilized as a monitor/worker pair in a natural gas distribution system. Grove Model 829S1 Pilots and Model FT-35 Filters have been incorporated to provide reliable, cost-effective pressure control.



Toll-Free Assistance!

(800) 323-8844
USA & Canada

DFS - Grove Regulator Operations
1550 Greenleaf Avenue
Elk Grove Village, Illinois 60007 USA
Phone: 847-437-5940
Fax: 847-437-2549
Toll Free: 800-323-8844

E-mail: grove.regulators@dresser.com
Website: www.bpe950.com