

# Fisher® GX Control Valve and Actuator System

The Fisher® GX is a compact, state-of-the-art control valve and actuator system, designed to control a wide range of process liquids, gases, and vapors.

The GX is rugged, reliable, and easy to select. It requires no actuator sizing -- the actuator selection is automatic once the valve body construction is selected.

The optimized design results in reduced complexity and parts count. As a result, the cost of maintenance is reduced.

The GX meets the requirements of both EN and ASME standards. It is available with a complete accessory package, including the Fisher FIELDVUE® DVC2000 Series integrated digital valve controller.

## Features

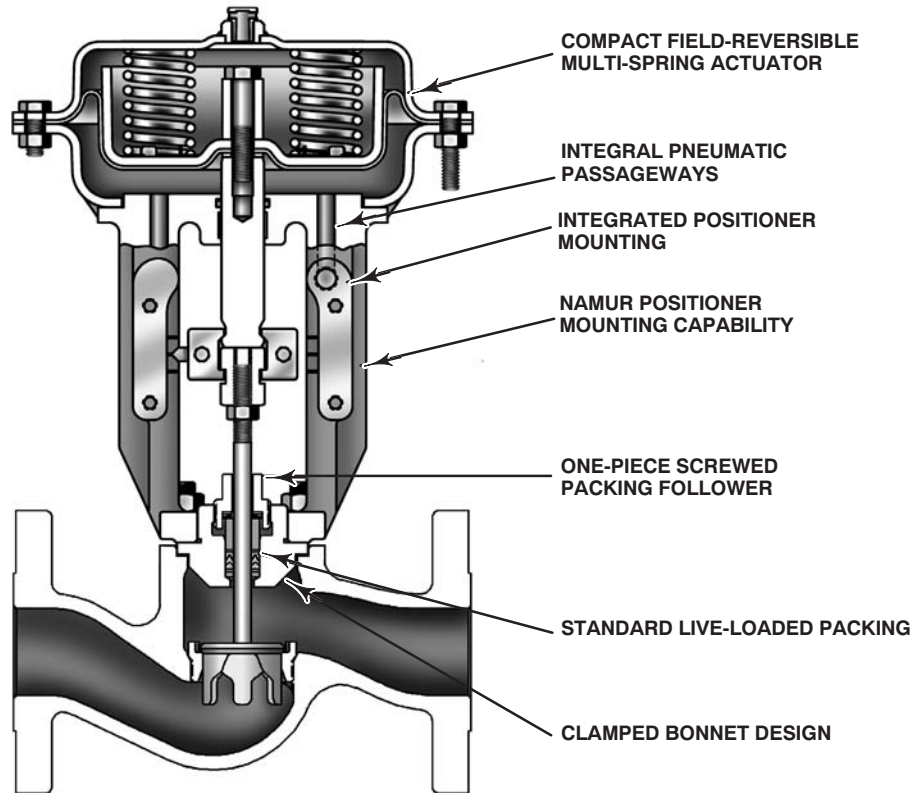
- Easy to size and select
- No actuator sizing required--selection is automatic
- Optimized actuator allows for a wide range of air supply
- Engineered for easy maintenance
- Maximum part commonality across sizes
- Replaceable trim
- Low lifetime costs
- Robust, low-profile design
- Compact multi-spring pneumatic actuator
- Available with integrated, easy-to-calibrate DVC2000 Series digital valve controller
- Valve body sizes DN 15 to DN 150 (NPS 1/2 through 6)
- Pressure Classes PN 10-40, CL150 and 300
- High capacity design
- Valve body flow passage optimized for flow stability
- Full range of materials, including alloys
- Shutoff capabilities: Class IV, V, and VI
- Rangeability of 50:1 (equal percentage)
- Optional metal bellows seal



W8861/L

Figure 1. Fisher® GX Control Valve, Actuator, and DVC2000 Series Digital Valve Controller





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Figure 2. Fisher® GX Control Valve Assembly with Port-Guided Contoured Plug (Port Sizes 36 to 136 mm)

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**Optimized valve and actuator system.** Product simplicity and ease of selection form the foundation of the GX. Mounted with a digital or analog positioner, the GX provides high performance control across a wide range of process applications.

**Compact actuator design.** The GX utilizes a compact, multi-spring actuator. The GX design has been optimized to eliminate complicated actuator sizing procedures - once the valve body, port size, and air supply pressure are selected, the actuator size is fixed.

**Modular design.** The design architecture has been optimized to maximize the use of common parts across sizes. The actuator stem and stem connector are used across all GX sizes. The GX actuator uses a total of 5 different springs across all valve sizes. These spring sets have been optimized to allow for maximum application coverage. The plug/stem assemblies and packing sets are common across several sizes, as well.

**Low lifetime costs.** Reduced product complexity, low parts count, and part commonality all contribute to reduced inventory and maintenance costs.

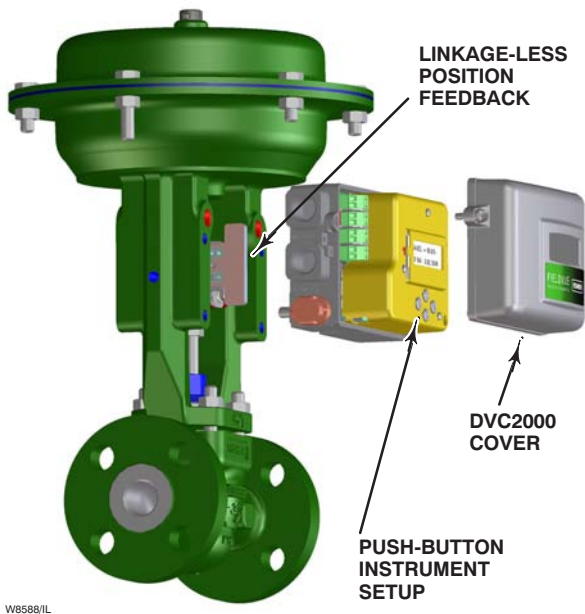


Figure 3. Fisher® GX and DVC2000 Series Digital Valve Controller

**Stable flow control.** The flow cavity of the GX valve body has been engineered to provide stable flow and reduce process variability.

**Live-loaded packing.** The GX comes with live-loaded PTFE V-ring packing as standard. The live-loaded design helps to seal your process to conserve valuable process fluid, while reducing emissions to the environment. The long-life and high reliability of the live-loaded system also reduces maintenance costs and process downtime. For applications exceeding 232°C (450°F), live-loaded ULF (Ultra Low Friction) graphite packing and extension bonnets are available for all sizes except DN150.

**Easy maintenance.** The simple screwed seat-ring and one-piece plug and stem design provide easy maintenance. Design simplicity and parts commonality contribute to reduced spares inventory. The integrated DVC2000 digital valve controller allows easy instrument removal, without a requirement for tubing disconnection or replacement (fail-down construction).

**Long life.** Alloy valve constructions and hardened trim materials are available in the GX to increase valve body, bonnet, and trim life.



Figure 4. Fisher® GX Cryogenic Valve

**Cryogenic offering.** The GX is available in a low temperature construction (see figure 4). The compact design maintains high performance in low temperature applications, while minimizing overall envelope size.

**Digital valve controller.** The GX is available with the DVC2000 Series digital valve controller. The DVC2000 is easy to use, compact, and designed for easy mounting. It converts a 4-20 mA input signal into a pneumatic output signal, which feeds the control valve actuator. Instrument setup is performed with a push button and liquid crystal display (LCD) interface. This interface is protected from the environment within a sealed enclosure. The interface supports multiple languages, including German, French, Italian, Spanish, Chinese, Japanese, Portuguese, Russian, Polish, Czech, Arabic, and English.

Intrinsic safety and non-incendive construction is available to CSA, FM, ATEX, and IEC standards. An optional module provides integrated limit switches and a position transmitter.

**Integrated mounting.** The DVC2000 digital valve controller integrally mounts to the GX actuator, eliminating the need for mounting brackets. The DVC2000 transmits a pneumatic signal to the actuator casing via an air passage in the yoke leg, causing the valve to stroke (see figure 5). This eliminates the need for positioner-to-actuator tubing in the fail-down configuration.

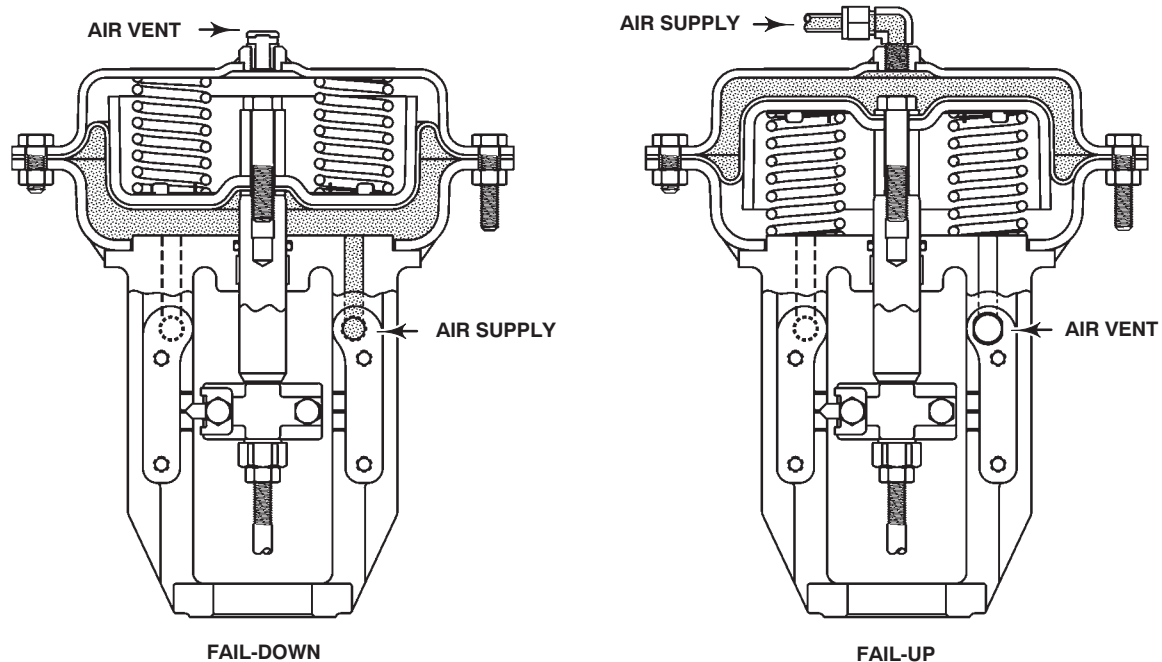


Figure 5. Fisher® GX Principle of Operation -- Actuator Air Supply

The DVC2000 mounting interface is identical on both sides of the actuator yoke for valve body sizes DN 15 through DN 100 (NPS 1/2 through 4). This symmetrical design allows the DVC2000 to be easily moved from one side of the valve to the other without the need to rotate the actuator. The DN 150 (NPS 6) yoke is not symmetrical.

**Linkage-less feedback.** The DVC2000 digital valve controller offers as standard a non-contacting valve position feedback system. This is a true linkage-less design, which uses no levers and no touching parts between the valve stem and the positioner.

**Additional Accessory selection.** The GX is available with a variety of digital or analog

positioners besides the DVC2000 Series, as well as solenoid and limit switches. The actuator is also compatible with the IEC 60534-6-1 (NAMUR) positioner mounting standard.

## Principle of Operation

**Integrated Air Supply.** When mounted with the DVC2000 Series digital valve controller, the GX uses an integrated actuator air supply system. In the fail-down construction, air is supplied to the lower actuator casing via a port on the actuator yoke face -- no tubing is required. In the fail-up configuration, air is supplied to the upper casing via tubing.

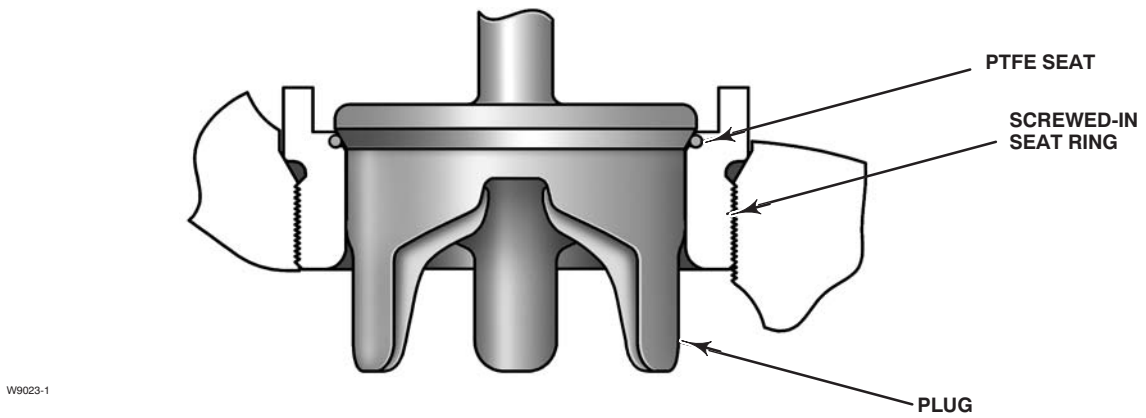


Figure 6. Fisher® GX Control Valve with Typical Soft Seat Trim Construction (Port Sizes of 22 - 136mm)

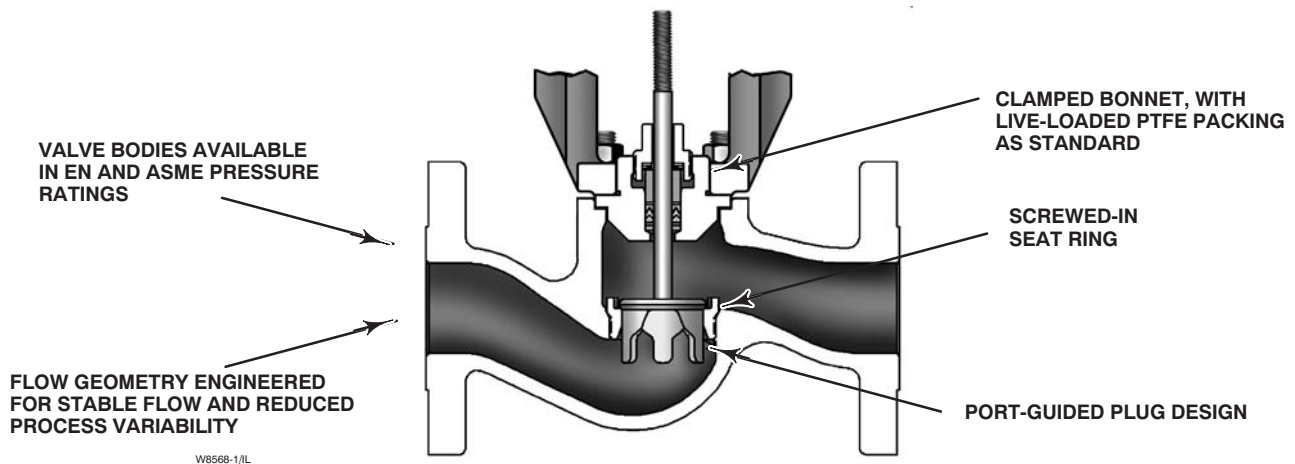


Figure 7. Fisher® GX Control Valve with Port-Guided Plug (Port Sizes of 36 - 136mm)

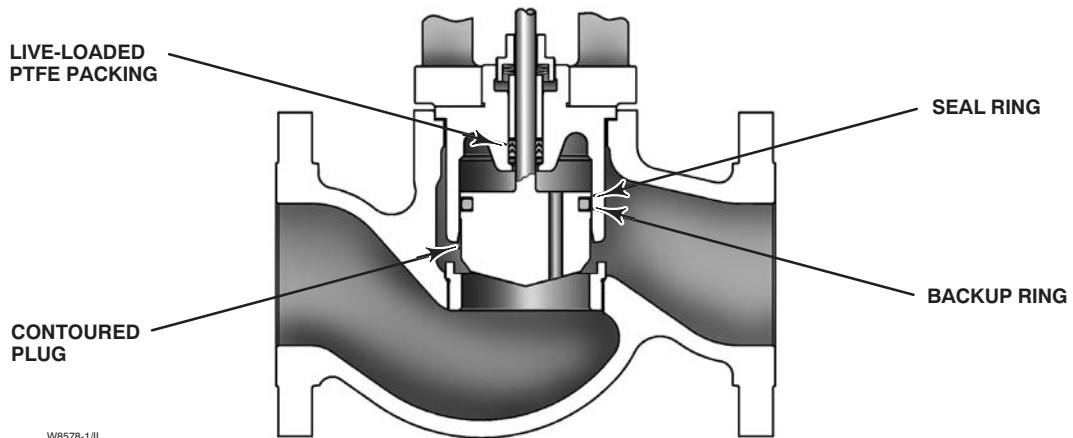
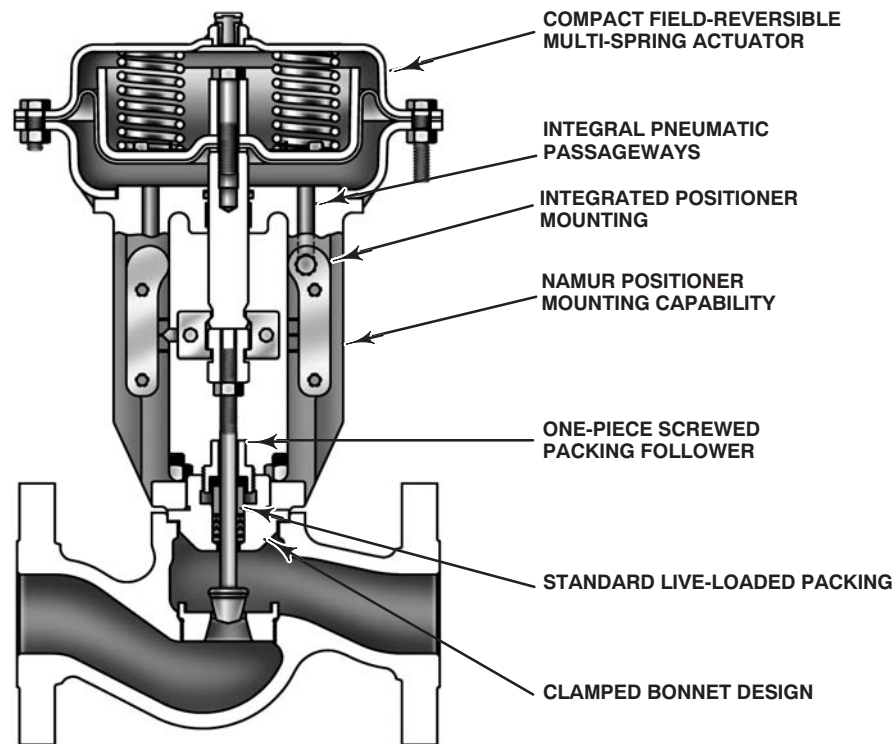


Figure 8. Fisher® GX Control Valve with Balanced Trim (Port Sizes of 70, 90, and 136 mm Only)





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Figure 9. Fisher® GX Control Valve Assembly with Stem-Guided Contoured Plug (Size DN 25/1-Inch)

## The Fisher® GX Control Valve

The GX is a single port, flow-up globe style valve that offers port-guided (figure 2), stem-guided (figure 9), and balanced trim with a screwed-in seat ring (see table 1 for a description of trim style availability). Each valve size offers an unbalanced plug design, which eliminates dead spaces where fluid polymerization might occur. Although the optimized GX actuator allows for wide usage of unbalanced trim, a balanced plug design is available for higher pressure drop applications in DN80, 100 and 150 (NPS 3, 4, and 6) sizes.

The GX incorporates a clamped bonnet and an easy-to-adjust screwed packing follower (see figure 2). The plug and stem are a rugged, one-piece welded assembly.

The standard construction incorporates metal-to-metal seating, with a PTFE soft seat option

for Class VI shutoff (see figure 6). Class V shutoff is available with metal trim. Hardened trim with stellite overlay is available for erosive service, as well.

PTFE V-ring stem packing is standard with the GX. The live-loaded system provides excellent stem sealing and extended service life. Live-loaded graphite ULF packing and extension bonnets are available for high temperature applications.

Both linear and equal percentage flow characteristics are available in full port and restricted trim. Micro-Flow is available for applications requiring low flow control capability.

Standard valve body materials are carbon steel and stainless steel. Alloy materials are available for valve body sizes DN 15 through DN 100 (NPS 1/2 through 4) for highly corrosive applications.

**Fisher® GX Control Valve Specifications and Materials of Construction**

See tables 1 and 2.

Table 1. Fisher® GX Valve Specifications

Specifications	EN	ASME
Valve Body Size	DN 15, 20, 25, 40, 50, 80, 100, 150	NPS 1/2, 3/4, 1, 1-1/2, 2, 3, 4, 6
Pressure Rating	PN 10 / 16 / 25 / 40 per EN 1092-1	CL150 / 300 per ASME B16.34
End Connections	Flanged raised face per EN 1092-1	Flanged raised face per ASME B16.5
Valve Body/Bonnet Materials	1.0619 steel	ASME SA216 WCC steel
	1.4409 stainless steel	ASME SA351 CF3M stainless steel
	CW2M (sizes DN 25 through DN 100 only)	CW2M (NPS 1 through 4 only)
	ASME SA352 LCC	ASME SA352 LCC
Face-to-Face Dimensions	Consistent with EN 558-1 Series 1	Consistent with ANSI/ISA 75.08.01
Shutoff per IEC 60534-4 and ANSI/FCI 70-2	Metal seat - Class IV (standard)	
	Metal seat - Class V (optional)	
	PTFE seat - Class VI (optional) <sup>(1)</sup>	
Flow Direction	Flow-up (Cavitrol® III cage, Flow down)	
Flow Control Characteristics	Equal Percentage and Linear	
Trim Style	<b>Port Diameters</b>	<b>Trim Style Description</b>
	4.8 mm	Micro-Flow trim (unbalanced)
	9.5, 14, 22 mm	Stem-Guided with Contoured Plug (unbalanced) or Port-Guided with Cavitrol III trim (unbalanced)
	36, 46 mm	Port-Guided Plug (unbalanced)
	70, 90, 136 mm	Balanced Trim with Contoured plug (standard) or Unbalanced Port-Guided Plug (optional)
Handwheel	Available as an option	
Travel Stop	Available as an option	

1. For 4.8 to 14 mm ports, Class VI shutoff is achieved without PTFE seat.

Table 2. Materials (Other Valve Components)

Component	Material	
Packing Follower	S21800 SST screwed follower	
Body/Bonnet Bolting and Nuts	SA193-B7 studs / SA194-2H nuts with NCF2 coating for carbon steel and stainless steel constructions	
	DN 15 through DN 100: S20910 (XM19) for alloy (standard) and stainless steel assemblies (optional) DN 150: SA193-B7M studs / SA194-2HM nuts with NCF2 coating (optional)	
Packing	Live-loaded PTFE V-ring (standard) with N07718 Belleville springs	
	Live-loaded Graphite ULF (optional) with N07718 Belleville springs	
Bonnet Gasket	DN 15 through DN 150: Graphite laminate	
	DN 15 through DN 100: PTFE encapsulated N10276 (optional) Applicable from -46 to 232°C (-50 to 450°F) (May be preferable when the standard graphite laminate gasket material is not compatible with the process fluid)	
NACE MR0103 Construction	DN 15 through DN 100	Stainless steel, or heat-treated carbon steel valve bodies and bonnets
		SA193-B7 studs / SA194-2H nuts with NCF2 coating (S20910 SST optional) body/bonnet bolting
		Standard live-loaded PTFE packing
		S31603/CoCr-A plug, S20910 stem, and S31603/CoCr-A seat ring
DN 150	SA193-B7M studs / SA194-2HM nuts with NCF2 coating	
Balanced Trim (Sizes DN 80, 100, and 150 / NPS 3, 4, and 6)	Carbon-Filled PTFE Seal Ring	
	Back-up Rings	Nitrile (Standard) -46 to 82°C (-50 to 180°F)
		Ethylene Propylene [EPDM] (Optional): -46 to 232°C (-50 to 450°F) in steam and hot water; -46 to 121°C (-50 to 250°F) in air (EPDM is not recommended for use in hydrocarbons)
		FKM (fluorocarbon) (Optional): -18 to 204°C (0 to 400°F) (Applicable in a wide variety of solvents, chemicals, and hydrocarbons. Avoid use with steam, ammonia, or hot water over 82°C [180°F])

# GX Control Valve and Actuator

Table 3. Trim Materials for Port Diameters of 4.8 mm (Micro-Flow trim) (Unbalanced Trim)

Valve Body Construction	Trim Type	Stem	Plug	Seat
Carbon steel (1.0619 / WCC and LCC)	Metal to metal	S31603 strain hardened	R31233	SA351 CF3M
	Hard-faced	S31603 strain hardened	R31233	SA351 CF3M / CoCr-A seat
	Metal to metal	N06022	R31233	CW2M
Stainless steel (1.4409 / CF3M)	Metal to metal	S31603 strain hardened	R31233	SA351 CF3M
	Hard-faced	S31603 strain hardened	R31233	SA351 CF3M / CoCr-A seat
	Metal to metal	N06022	R31233	CW2M
CW2M	Metal to metal	N06022	R31233	CW2M

Table 4. Trim Materials for Port Diameters of 9.5 and 14 mm (Unbalanced Trim)

Valve Body Construction	Trim Type	Stem	Plug	Seat
Carbon steel (1.0619 / WCC and LCC)	Metal to metal	S31603 strain hardened	S31603	SA351 CF3M
	Hard-faced	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
	Metal to metal	N06022	N06022	CW2M
Stainless steel (1.4409 / CF3M)	Metal to metal	S31603 strain hardened	S31603	SA351 CF3M
	Hard-faced	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
	Metal to metal	N06022	N06022	CW2M
Carbon steel to NACE MR0103 (1.0619 / WCC)	Hard-faced	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
Stainless steel to NACE MR0103 (1.4409 / CF3M)	Hard-faced	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
CW2M	Metal to metal	N06022	N06022	CW2M

Table 5. Trim Materials for Port Diameters of 22, 36, 46, 70, 90, and 136 mm (Unbalanced Trim)

Valve Body Construction	Trim Type	Stem	Plug	Seat
Carbon steel (1.0619 / WCC and LCC)	Metal to metal	S31603 strain hardened	S31603	SA351 CF3M
	Soft seat	S31603 strain hardened	S31603	SA351 CF3M / PTFE seat
	Hard-faced	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
	Cavitrol III trim	S20910	S31603/CoCr-A seat	S17400 Cage
	Metal to metal	N06022	N06022	CW2M <sup>(1)</sup>
	Soft seat	N06022	N06022	CW2M / PTFE seat <sup>(1)</sup>
Stainless steel (1.4409 / CF3M)	Metal to metal	S31603 strain hardened	S31603	SA351 CF3M
	Soft seat	S31603 strain hardened	S31603	SA351 CF3M / PTFE seat
	Hard-faced	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
	Cavitrol III trim	S20910	S31603/CoCr-A seat	S17400 Cage
	Metal to metal	N06022	N06022	CW2M <sup>(1)</sup>
Carbon steel to NACE MR0103 (1.0619 / WCC)	Hard-faced	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
	Hard-faced	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
Stainless steel to NACE MR0103 (1.4409 / CF3M)	Hard-faced	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
	Hard-faced	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
CW2M	Metal to metal	N06022	N06022	CW2M <sup>(1)</sup>
	Soft seat	N06022	N06022	CW2M / PTFE seat <sup>(1)</sup>

1. Not available for DN 150 (NPS 6).



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Table 6. Trim Materials for Port Diameters of 70, 90, and 136 mm (Balanced Trim)

Valve Body Construction	Trim Type	Stem	Plug	Seat
Carbon steel (1.0619 / WCC and LCC) <sup>(1)</sup>	Metal to metal	S31603 strain hardened	S31603	SA351 CF3M
	Hard-faced/Whisper Trim III	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
	Metal to metal	N06022	N06022	CW2M <sup>(2)</sup>
Stainless steel (1.4409 / CF3M)	Metal to metal	S31603 strain hardened	S31603	SA351 CF3M
	Hard-faced/Whisper Trim III	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
	Metal to metal	N06022	N06022	CW2M <sup>(2)</sup>
Carbon steel to NACE MR0103 (1.0619 / WCC)	Hard-faced	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
Stainless steel to NACE MR0103 (1.4409 / CF3M)	Hard-faced	S20910	S31603 / CoCr-A seat	SA351 CF3M / CoCr-A seat
CW2M	Metal to metal	N06022	N06022	CW2M <sup>(2)</sup>

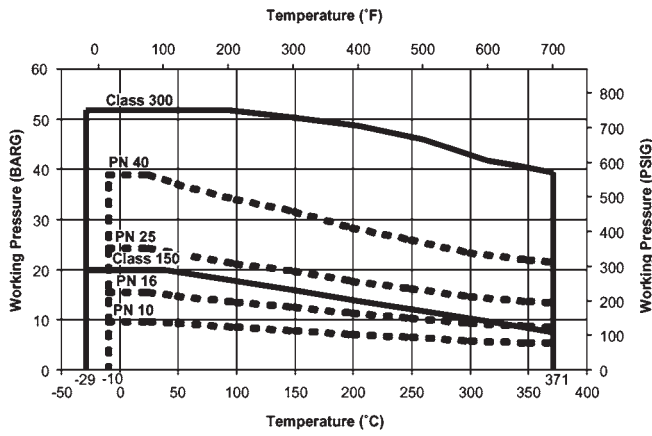
1. The bonnet used in the carbon steel balanced trim construction is made of 1.4409/CF3M stainless steel.  
2. Not available for DN 150 (NPS 6).

Table 7. Allowable Temperature Ranges for Valve Body, Bonnet and Trim<sup>(1, 2)</sup>

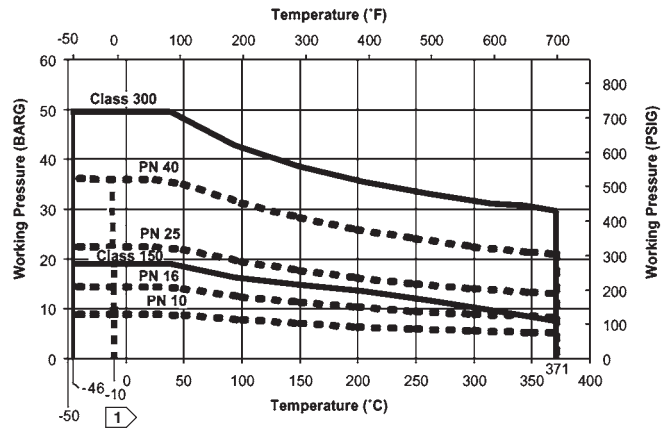
VALVE BODY / BONNET MATERIAL	BONNET STYLE	PACKING	GASKET	TRIM STYLE	TEMPERATURE			
					°C		°F	
					Min	Max	Min	Max
1.0619/SA216 WCC Steel	Standard	PTFE or Graphite ULF	Graphite laminate or PTFE / N10276	Metal to metal; hard-faced; soft seat	-29 <sup>(3)</sup>	232	-20 <sup>(3)</sup>	450
	Extension	Graphite ULF	Graphite laminate	Metal to metal; hard-faced	-29 <sup>(3)</sup>	371	-20 <sup>(3)</sup>	700
	Bellows	PTFE	Graphite laminate or PTFE / N10276	Metal to metal; hard-faced; soft seat	-29 <sup>(3)</sup>	232	-20 <sup>(3)</sup>	450
		Graphite ULF	Graphite laminate	Metal to metal; hard-faced	-29 <sup>(3)</sup>	371	-50 <sup>(3)</sup>	700
1.4409/SA351 CF3M SST	Standard	PTFE or Graphite ULF	Graphite laminate or PTFE / N10276	Metal to metal; hard-faced; soft seat	-46 <sup>(4)</sup>	232	-50 <sup>(4)</sup>	450
	Extension	Graphite ULF	Graphite laminate	Metal to metal; hard-faced	-46 <sup>(4)</sup>	371	-50 <sup>(4)</sup>	700
	Cryogenic Extension	PTFE or Graphite ULF	Graphite laminate	Metal to metal; hard-faced	(5)	371	(5)	700
		PTFE	Graphite laminate or PTFE / N10276	Metal to metal; hard-faced; soft seat	-46 <sup>(4)</sup>	232	-50 <sup>(4)</sup>	450
	Bellows	PTFE	Graphite laminate	Metal to metal; hard-faced	-46 <sup>(4)</sup>	371	-50 <sup>(4)</sup>	700
CW2M	Standard	PTFE	PTFE / N10276	Metal to metal; soft seat	-46 <sup>(3)</sup>	232	-50 <sup>(3)</sup>	450
	Bellows	PTFE	PTFE / N10276	Metal to metal; soft seat	-46 <sup>(3)</sup>	232	-50 <sup>(3)</sup>	450
LCC	Standard	PTFE or Graphite ULF	Graphite laminate or PTFE / N10276	Metal to metal; hard-faced; soft seat	-46 <sup>(3)</sup>	232	-50 <sup>(3)</sup>	450
	Extension	Graphite ULF	Graphite laminate	Metal to metal; hard-faced	-46 <sup>(3)</sup>	343	-50 <sup>(3)</sup>	650
	Bellows	PTFE	Graphite laminate or PTFE / N10276	Metal to metal; hard-faced; soft seat	-46 <sup>(3)</sup>	232	-50 <sup>(3)</sup>	450
		Graphite ULF	Graphite laminate	Metal to metal; hard-faced	-46 <sup>(3)</sup>	343	-50 <sup>(3)</sup>	650

1. Applies to all bolting combinations.  
2. Back-up ring materials used in Sizes DN 80 and 100 (NPS 3 and 4) with balanced trim may be limited by temperature and application. See table 2.  
3. Minimum allowable temperature for PN series flanges is -10°C (14°F).  
4. See requirements of EN 13445-2 Annex B for applications below -10°C (14°F) with PN series flanges.  
5. Consult your Emerson Process Management sales office for minimum temperature limit.

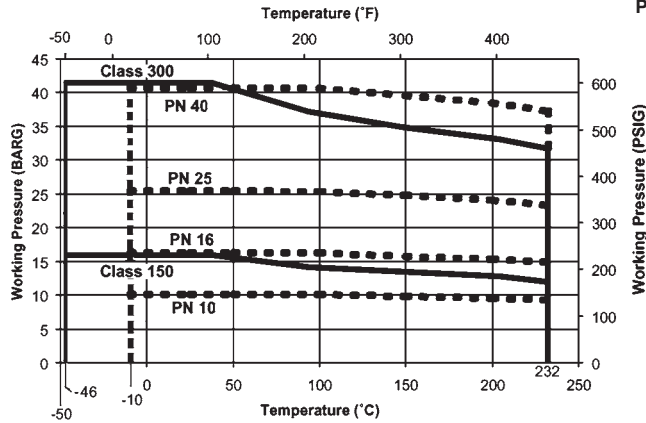
Pressure/Temperature Chart for WCC/1.0619



Pressure/Temperature Chart for CF3M/1.4409



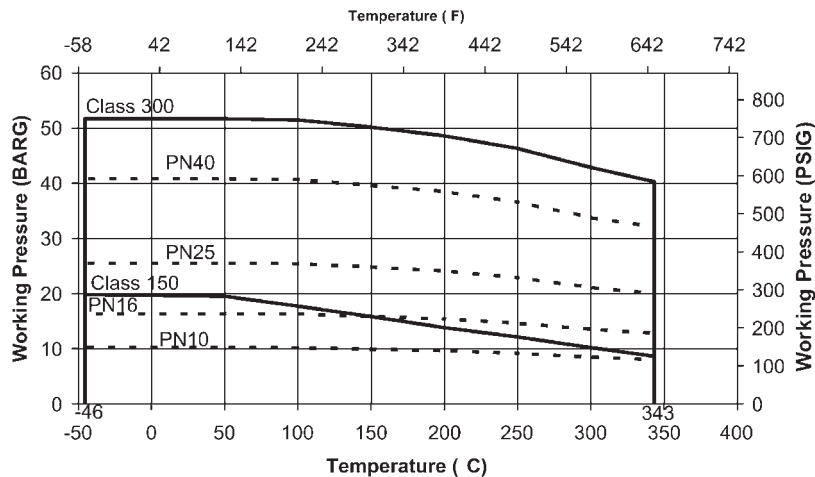
Pressure/Temperature Chart for CW2M



1 SEE REQUIREMENTS OF EN 13445-2 ANNEX B FOR APPLICATIONS BELOW -10°C (14°F) WITH PN SERIES FLANGES

E1026

Pressure/Temperature Chart for LCC



E1140

Figure 10. Material Pressure/Temperature Curves

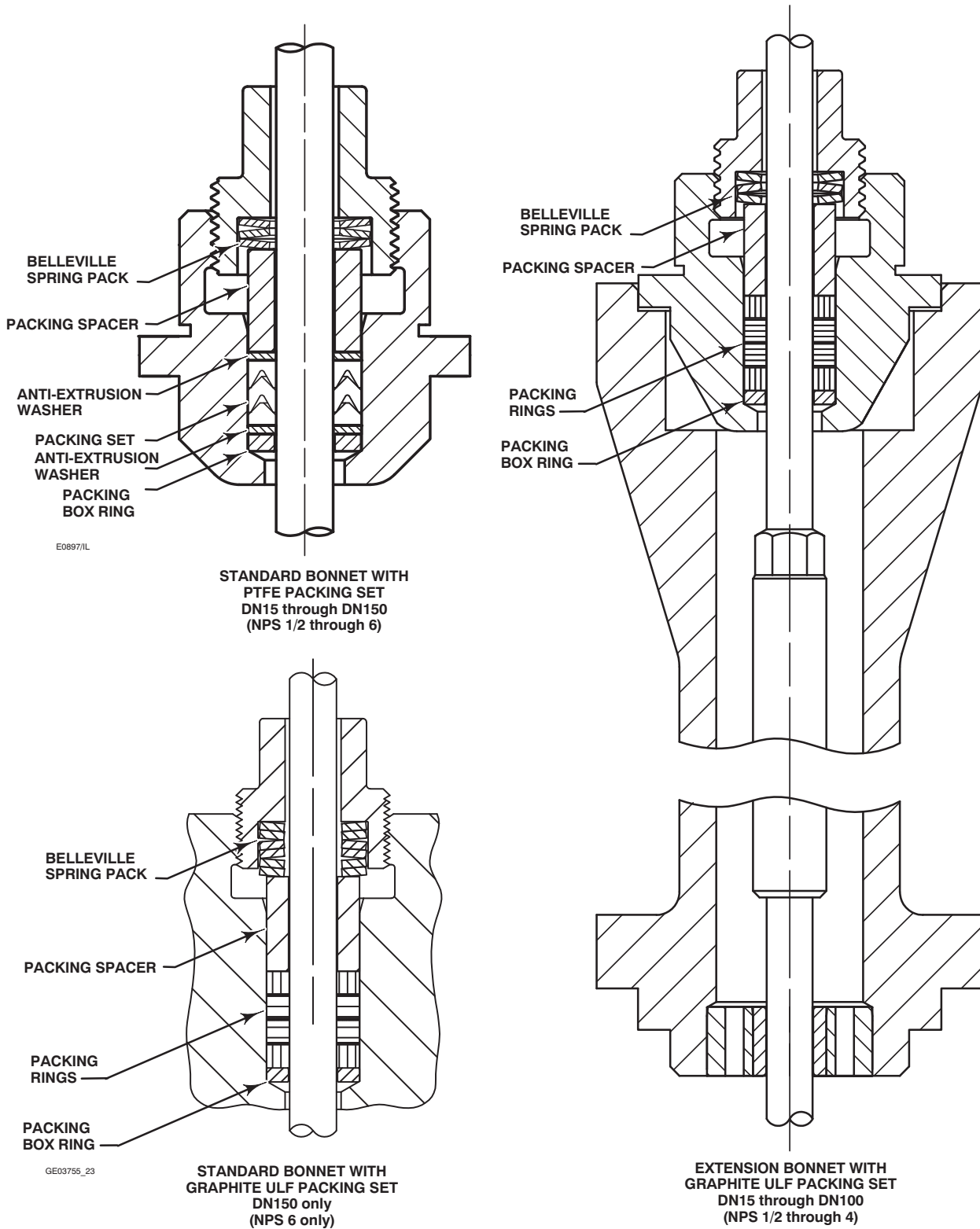
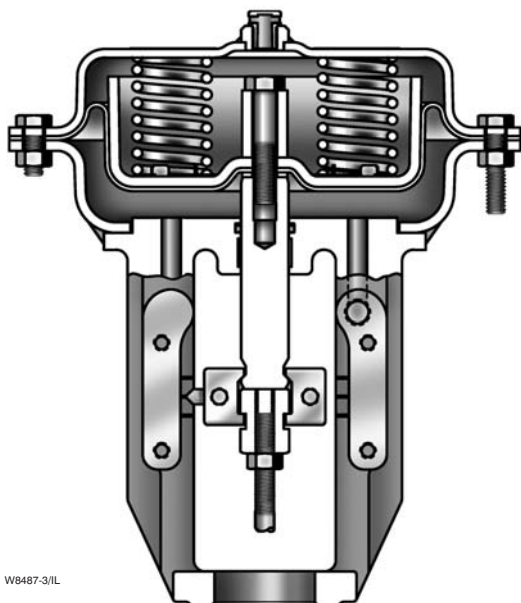


Figure 11. Fisher® GX Packing

# GX Control Valve and Actuator

## The Fisher® GX Diaphragm Actuator



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Figure 12. Fisher® GX Actuator

The GX uses a multi-spring, pneumatic diaphragm actuator (see figure 12). It is capable of air supply pressures to 6.0 barg (87 psig), allowing valve shutoff at high pressure drops.

The GX product selection system automatically matches the actuator to the valve, eliminating the need for complex actuator sizing procedures.

The multiple spring design provides the preload, eliminating the need for bench set adjustment. The actuator is available in spring-to-open and fail-down configurations.

The GX actuator can be used for throttling or on-off service.

The GX is available with the integrated DVC2000 Series digital valve controller. Other digital and analog positioners are available, as well as optional solenoids and limit switches.

Table 8. Actuator Specifications

<b>Description</b>	Pneumatic spring-return diaphragm actuator
<b>Operating Principle</b>	Air-to-open (standard) Air-to-close (optional)
<b>Operating Pressure Ranges</b>	2.0 to 6.0 barg (29 to 87 psig) <sup>(1)</sup>
<b>Ambient Temperature</b>	-29 to 82°C (-20 to 180°F)
<b>Pressure Connection (Fail-up Construction)</b>	G 1/4 female casing connection
<b>Finish</b>	Powder coat polyester
1. May vary depending on construction (see bulletin 51.1:GX(S1))	

Table 9. Materials of Construction

Part	Material
Upper and Lower Casings	AISI 1010 stamped carbon steel
Springs	Steel
Diaphragm (patented)	Nitrile and nylon
Diaphragm Plate	Size 225 and 750: AISI G10100 stamped carbon steel Size 1200: Cast carbon steel
Yoke	Carbon steel (stainless steel optional for some sizes)
Casing Fasteners	A2-70 stainless steel bolts and nuts
Actuator Rod	Stainless steel
Stem Connector	CF3M
Stem Connector Fasteners	SA193-B7 bolts with NCF2 coating
Stem Bushing	High-density polyethylene (HDPE)
Stem Seal	Nitrile

## Product Bulletin

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# GX Control Valve and Actuator

### Actuator Selection

With the GX, actuator selection has never been easier. Once the valve size and port diameter have been determined, the actuator is automatically selected. No spring selection or bench set calculations are required.

The majority of GX constructions (both fail-down and fail-up) are rated to a full pressure class shutoff capability of 51.7 bar (750 psi) for a 4 to 6 bar (58 to 87 psig) actuator air supply. Refer to Fisher bulletin 51.1:GX (S1) for additional information.

The GX actuator has been optimized to allow for varying ranges of supply pressure. See table 10.

Table 10. Fisher® GX Actuator Supply Pressure Ranges

SUPPLY PRESSURE	RANGE	
	Bar	Psig
Standard	4.0 to 6.0	58 to 87
Optional	3.0 to 4.0	44 to 58
Optional	2.0 to 3.0	29 to 44

### Bellows Extension Bonnet

The GX bellows extension bonnet provides reliable and tight stem sealing for those applications where

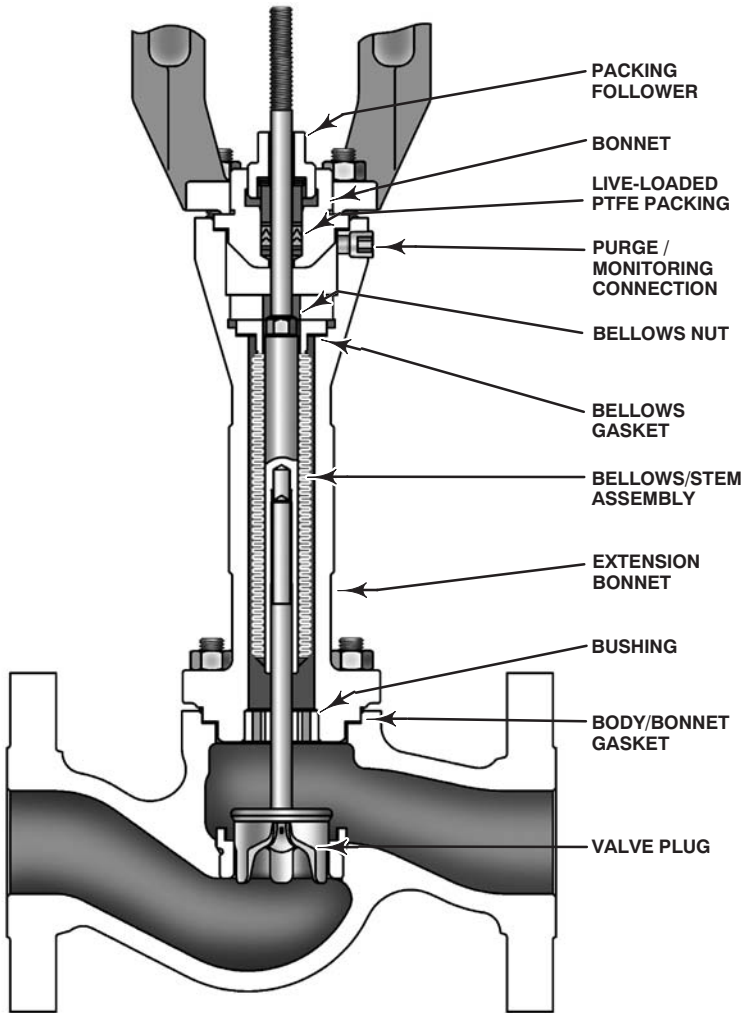
emissions escaping to the environment cannot be tolerated (see figure 13). The GX bellows is available in SST (1.4571 / 316Ti) or N10276 and covers a full range of valve sizes from DN 15 through DN 100 (NPS 1/2 through 4) (see tables 11 and 12).

**The GX bellows system has been designed for 100,000 full-travel cycles at maximum allowable pressure and ambient temperature (20°C [68°F]).**

The mechanically-formed metal bellows provides high operating reliability and extended cycle life (see tables 13, 14, and 15 for details).

The GX bellows design incorporates a rugged double- or triple-wall construction for added security. Each bellows has been tested with helium before it leaves the factory.

The GX bellows bonnet comes standard with a live-loaded, PTFE packing system as a security backup. A connection is provided above the bellows to allow purging or monitoring the integrity of the replaceable bellows.



W8958-1

### Bellows Selection Process

Follow this process to assist in selecting the appropriate bellows for the application.

#### Step 1

Size and select the GX control valve that is appropriate for the application. This will identify the:

- Valve body size
- Actuator size
- Orifice size
- Trim style (balanced or unbalanced)
- Valve body material



#### Step 2

Confirm bellows availability from table 11.



#### Step 3

Using table 12, select the bellows material combination that is appropriate for the application. Using the temperature limits shown in table 7, confirm the selected construction is appropriate for the application temperatures.



#### Step 4

Using bulletin 51.1:GX(S1), verify the application pressure drop does not exceed the actuator capability.



#### Step 5

Using figure 14, check to ensure the maximum process pressure and temperature do not exceed the pressure-temperature rating of the selected bellows.

Figure 13. Fisher® GX Bellows Bonnet and Selection Process



## Product Bulletin

51.1:GX

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# GX Control Valve and Actuator

Table 11. Fisher® GX Constructions with Bellows Availability

VALVE BODY SIZES	PORT SIZE (mm)	ACTUATOR SIZES	PLUG TRAVEL	TRIM STYLE
DN15-50 (NPS 1/2 to 2)	4.8 to 46	225 and 750	20 mm	Unbalanced
DN80 (NPS 3)	36 to 46	750	20 mm	Unbalanced
	70	750	20 mm	Balanced
DN100 (NPS 4)	46	750	20 mm	Unbalanced
	90	750	20 mm	Balanced

Table 12. Bellows Materials of Construction

Valve Body / Bonnet	Bellows	Bellows Stem Extension	Trim Materials		Bolting	Packing	Gaskets	Lower Bushing	Monitoring Connection Plug
			Plug <sup>(1)</sup>	Stem Material					
Carbon Steel (1.0619/WCC and LCC)	SST (1.4571/316Ti)	S31603	S31603 or CF3M	S31603	SA193-B7 with NCF2 coating	Live-loaded PTFE	Graphite laminate	S31600 with R31233 insert	S31600
	N10276	S31603	S31603 or CF3M	S31603	SA193-B7 with NCF2 coating	Live-loaded PTFE	Graphite laminate	S31600 with R31233 insert	S31600
	N10276	N06022	N06022 or CW2M	N06022	S20910	Live-loaded PTFE	Graphite laminate	N10276 with R31233 insert	N10276
Stainless Steel (1.4409/CF3M)	SST (1.4571/316Ti)	S31603	S31603 or CF3M	S31603	S20910	Live-loaded PTFE	Graphite laminate	S31600 with R31233 insert	S31600
	N10276	S31603	S31603 or CF3M	S31603	S20910	Live-loaded PTFE	Graphite laminate	S31600 with R31233 insert	S31600
	N10276	N06022	N06022 or CW2M	N06022	S20910	Live-loaded PTFE	Graphite laminate	N10276 with R31233 insert	N10276
CW2M	N10276	N06022	N06022 or CW2M	N06022	S20910	Live-loaded PTFE	Graphite laminate	N10276 with R31233 insert	N10276

1. Plug material for the 4.8 mm port is R31233.

For bellows height dimensions, see table 17.

## Cycle Life

Bellows service life is affected by several factors, including process pressure, temperature, and plug travel. Tables 13, 14, 15, and 16 provide estimates of cycle life for several cases.

Table 13. Estimated Bellows Cycle Life at 10.3 bar (150 psig) and 20 °C (68 °F)

VALVE SIZE	STEM SIZE	BELLOWS MATERIAL	PLYS	BELLOWS PRESSURE	PROCESS TEMPERATURE		ESTIMATED CYCLE LIFE (50% Stroke [25-75% travel])
					°C	°F	
DN15-50 (NPS 1/2 to 2)	10mm	1.4571 (316Ti)	2	10.3 bar (150 psig)	20	68	1,040,000
		N10276	3	10.3 bar (150 psig)	20	68	910,000
DN80-100 (NPS 3 to 4)	14mm	1.4571 (316Ti)	2	10.3 bar (150 psig)	20	68	1,020,000
		N10276	2	10.3 bar (150 psig)	20	68	980,000

Table 14. Estimated Bellows Cycle Life at Bellows Maximum Allowable Pressure and 20 °C (68 °F)

VALVE SIZE	STEM SIZE	BELLOWS MATERIAL	PLYS	MAXIMUM ALLOWABLE BELLOWS PRESSURE <sup>(1)</sup>	PROCESS TEMPERATURE		ESTIMATED CYCLE LIFE (50% Stroke [25-75% travel])
					°C	°F	
DN15-50 (NPS 1/2 to 2)	10mm	1.4571 (316Ti)	2	40 bar (580 psig)	20	68	830,000
		N10276	3	51.7 bar (750 psig)	20	68	800,000
DN80-100 (NPS 3 to 4)	14mm	1.4571 (316Ti)	2	45 bar (650 psig)	20	68	800,000
		N10276	2	51.7 bar (750 psig)	20	68	810,000

1. Valve maximum allowable pressure drop may be limited by size and material. See GX bulletin 51.1:GX(S1) for additional information.

Table 15. Estimated Bellows Cycle Life at Bellows Maximum Allowable Pressure and 232 °C (450 °F)

VALVE SIZE	STEM SIZE	BELLOWS MATERIAL	PLYS	MAXIMUM ALLOWABLE BELLOWS PRESSURE <sup>(1)</sup>	PROCESS TEMPERATURE		ESTIMATED CYCLE LIFE (50% Stroke [25-75% travel])
					°C	°F	
DN15-50 (NPS 1/2 to 2)	10mm	1.4571 (316Ti)	2	29.8 bar (430 psig)	232	450	410,000
		N10276	3	47.2 bar (685 psig)	232	450	560,000
DN80-100 (NPS 3 to 4)	14mm	1.4571 (316Ti)	2	33.5 bar (485 psig)	232	450	390,000
		N10276	2	47.2 bar (685 psig)	232	450	550,000

1. Valve maximum allowable pressure drop may be limited by size and material. See GX bulletin 51.1:GX(S1) for additional information.

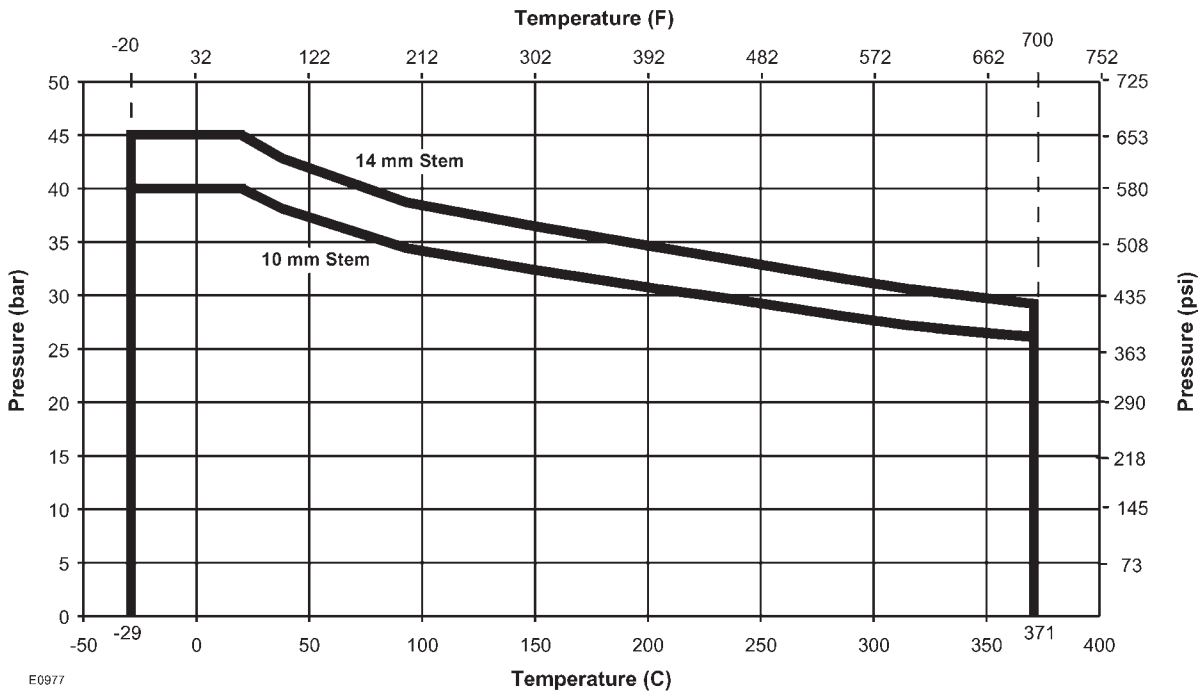
Table 16. Estimated Bellows Cycle Life at Bellows Maximum Allowable Pressure and 371 °C (700 °F)

VALVE SIZE	STEM SIZE	BELLOWS MATERIAL	PLYS	MAXIMUM ALLOWABLE BELLOWS PRESSURE	PROCESS TEMPERATURE		ESTIMATED CYCLE LIFE (50% Stroke [25-75% travel])
					°C	°F	
DN15-50 (NPS 1/2 to 2)	10mm	1.4571 (316Ti)	2	26.1 bar (380 psig)	371	700	250,000
		N10276	3	39.3 bar (570 psig)	371	700	430,000
DN80-100 (NPS 3 to 4)	14mm	1.4571 (316Ti)	2	29.3 bar (425 psig)	371	700	240,000
		N10276	2	39.3 bar (570 psig)	371	700	430,000

**Bellows Pressure - Temperature Ratings**

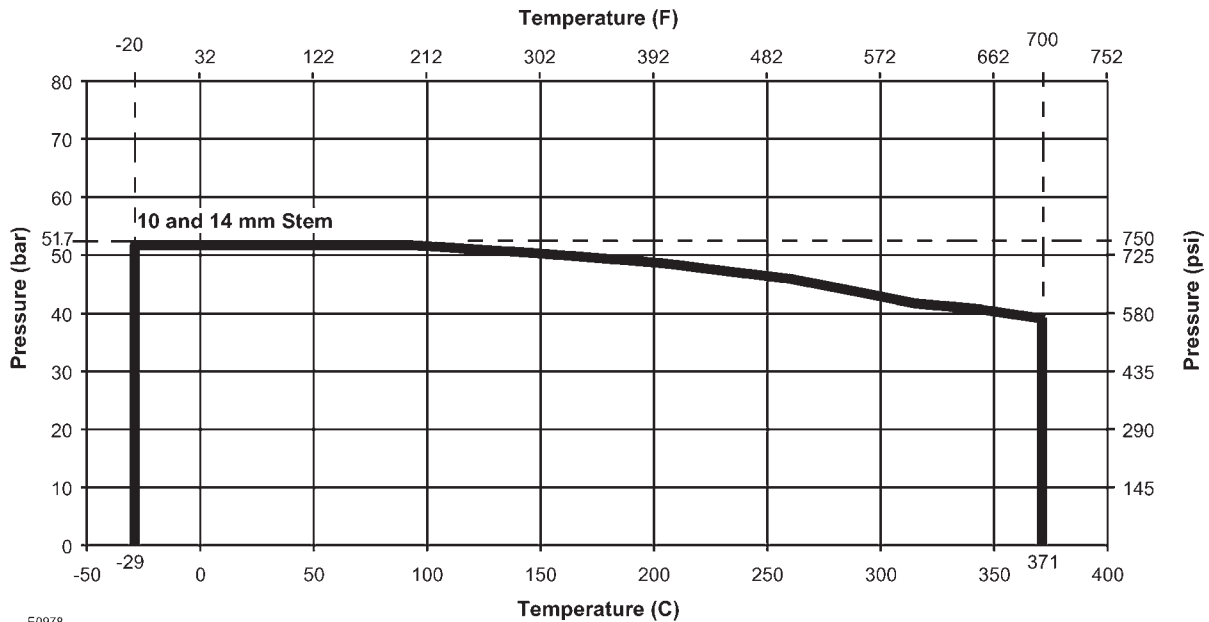
See figure 14.

**Pressure - Temperature Ratings for 1.4571 (316Ti) Bellows**



E0977

**Pressure-Temperature Ratings for N10276 Bellows**



E0978

Figure 14. Bellows Pressure - Temperature Ratings

# GX Control Valve and Actuator

## Valve-Actuator Dimensions and Weights

See figure 15 and table 17.

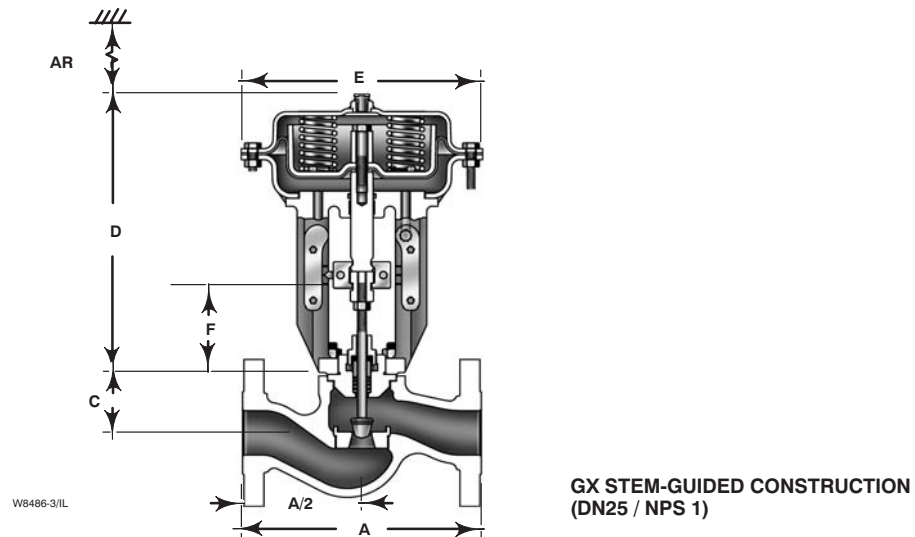


Figure 15. Fisher® GX Dimensions (also see table 17)

Table 17. Fisher® GX Dimensions and Weights

VALVE SIZE	PORT DIA	ACTUATOR SIZE	A			C		D		E Casing Dia	F (AR) Removal Height <sup>(3)</sup>	TOTAL WEIGHT	
			PN10/16 & PN25/40	CL150	CL300	Std Bonnet	Extension or Bellows Bonnet	Actuator Height (Standard Bonnet)	Actuator Height (Extension or Bellows Bonnet)			With Standard Bonnet	With Extension or Bellows Bonnet
			mm	mm	mm	mm	mm	mm	mm			kg	kg
DN 15/ NPS 1/2	4.8	225	130	184	190	66	304	313	313	270	115	21	25
	9.5	225	130	184	190	66	304	313	313	270	115	21	25
DN 20/ NPS 3/4	4.8	225	150	184	194	66	304	313	313	270	115	22	26
	9.5	225	150	184	194	66	304	313	313	270	115	22	26
	14	225	150	184	194	66	304	313	313	270	115	22	26
DN 25/ NPS 1	4.8	225	160	184	197	58	296	313	313	270	115	22	26
	9.5	225	160	184	197	58	296	313	313	270	115	22	26
	14	225	160	184	197	58	296	313	313	270	115	22	26
	22	225	160	184	197	58	296	313	313	270	115	22	26
DN 40/ NPS 1-1/2	14	225	200	222	235	62	300	313	313	270	115	25	29
	22	225	200	222	235	62	300	313	313	270	115	25	29
	36	750	200	222	235	62	300	342	342	430	115	52	56
DN 50/ NPS 2	22	225	230	254	267	68	306	313	313	270	115	29	33
	36	750	230	254	267	68	306	342	342	430	115	56	60
	46	750	230	254	267	68	306	342	342	430	115	56	60
DN 80/ NPS 3	36	750	310	298	318	105	373	375	375	430	125	79	88
	46	750	310	298	318	105	373	375	375	430	125	79	88
	70 <sup>(1)</sup>	750	310	298	318	105	373 <sup>(4)</sup>	375	375	430	125	81	90
	70	750	310	298	318	105	373	395	395	430	125	83	92
DN 100/ NPS 4	46	750	350	352	368	121	393	379	375	430	130	98	109
	70	750	350	352	368	121	393	399	395	430	130	101	111
	90 <sup>(2)</sup>	750	350	352	368	121	393 <sup>(4)</sup>	379	375	430	130	105	115
	90 <sup>(1)</sup>	750	350	352	368	121	393 <sup>(4)</sup>	379	375	430	130	105	115
	90	750	350	352	368	121	393	399	395	430	130	101	111
DN 150/ NPS 6	136	1200	480	451	473	189	---	559	---	566	224	235	---
	136 <sup>(1)</sup>	1200	480	451	473	200	---	559	---	566	210	247	---
	136 <sup>(5)</sup>	1200	480	451	473	230	---	589	---	566	240	247	---

1. Balanced trim design.  
 2. Balanced trim with reduced-capacity plug.  
 3. Clearance required for removing actuator from installed valve body.  
 4. Bellows bonnets are available for these constructions. However, extension bonnets are not available with balanced trim due to temperature limitations of the trim seals.  
 5. Severe service.

## Product Bulletin

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# GX Control Valve and Actuator

Table 18. Positioner Selection Guidelines

Type	Digital I/P <sup>(1)</sup>	I/P <sup>(2)</sup>	P/P <sup>(3)</sup>	Intrinsic Safety <sup>(4)</sup>	Flameproof / Explosionproof <sup>(4)</sup>	Non- Incendive <sup>(4)</sup>
DVC2000	X			X		X
DVC6030	X			X	X	X
3661		X		X		X
3660			X			

1. Digital I/P - microprocessor based electro-pneumatic with HART communication.  
 2. I/P - electro-pneumatic  
 3. P/P - pneumatic  
 4. Refer to Fisher bulletin 9.2:001 for instrument hazardous area classification details.

## Fisher® GX Actuator Accessories

The GX is available with a variety of pneumatic (P/P), electro-pneumatic (I/P), and digital valve positioners, as well as limit switches and solenoids. Table 18 provides the basic features of the positioners offered with the GX actuator.



W8755

Figure 16. Fisher® FIELDVUE® DVC2000 Series Digital Valve Controller

## The Fisher® FIELDVUE® DVC2000 Series Digital Valve Controller

The DVC2000 Series digital valve controller (figure 16) is simple to use, compact, and designed for the GX control valve. It converts a 4-20mA input signal into a pneumatic output signal, which feeds the control valve actuator. Instrument setup is performed with a pushbutton and liquid crystal display (LCD) interface. This interface is protected from the environment within an IP66 enclosure. Multiple languages are supported with the local interface including German, French, Italian, Spanish, Chinese, Japanese, Portuguese, Russian, Polish, Czech, Arabic, and English. Additionally, HART® communication is supported over the 4-20mA loop wiring.

The DVC2000 is designed to be integrally mounted to the GX actuator, avoiding the need for mounting brackets. The DVC2000 mounts directly to an interface pad on the actuator yoke leg with a secure 3-point mounting. An internal passage inside the yoke leg transmits the pneumatic signal to the actuator casing, eliminating the need for external tubing (in the air-to-open configuration).

The high-performance linkage-less position feedback system eliminates physical contact between the valve stem and the positioner. There are no wearing parts so cycle life is maximized. Additionally, the elimination of levers and linkages reduces the number of mounting parts and the mounting complexity. Positioner replacement and maintenance is simplified because the feedback parts stay connected to the actuator.

The DVC2000 Series is available with an optional module which includes two (2) integral limit switches and a stem position transmitter. The limit switches are configurable for open and closed valve indication. The position transmitter provides a 4-20mA signal for valve position feedback verification. As an integral component to the instrument, this option module avoids the need for difficult-to-mount external switches and transmitters.

Designed to meet intrinsic safety and non-incendive requirements, this instrument delivers scalable functionality and high performance in a small package.

# GX Control Valve and Actuator

## Optional Positioners and Instruments

### Fisher 3660 and 3661 Valve Positioners

The 3660 pneumatic and 3661 electro-pneumatic positioners are rugged, accurate, and feature low steady-state air consumption. Designed to meet intrinsic safety requirements, these positioners offer simple functionality in a small package. (See figure 17 and table 18.)



W8590/IL

Figure 17. Fisher® GX Valve with 3660 or 3661 Positioner, NAMUR Mounting (IEC 60534-6-1)

### Fisher FIELDVUE DVC6030 Digital Valve Controller

The DVC6030 digital valve controller is a communicating, microprocessor-based positioner. Using HART or FOUNDATION™ fieldbus communication protocol, access to critical instrument, valve, and process conditions is provided. When used with AMS® ValveLink® Software, valve diagnostic tests can be run while the valve is in service to advise you of the performance of the entire control valve assembly. Designed to meet a broad range of hazardous area classifications, this positioner offers maximum functionality to improve your process performance. (See figure 18 and table 18.)



W7963-1/IL

Figure 18. Fisher® FIELDVUE® DVC6030 Digital Valve Controller



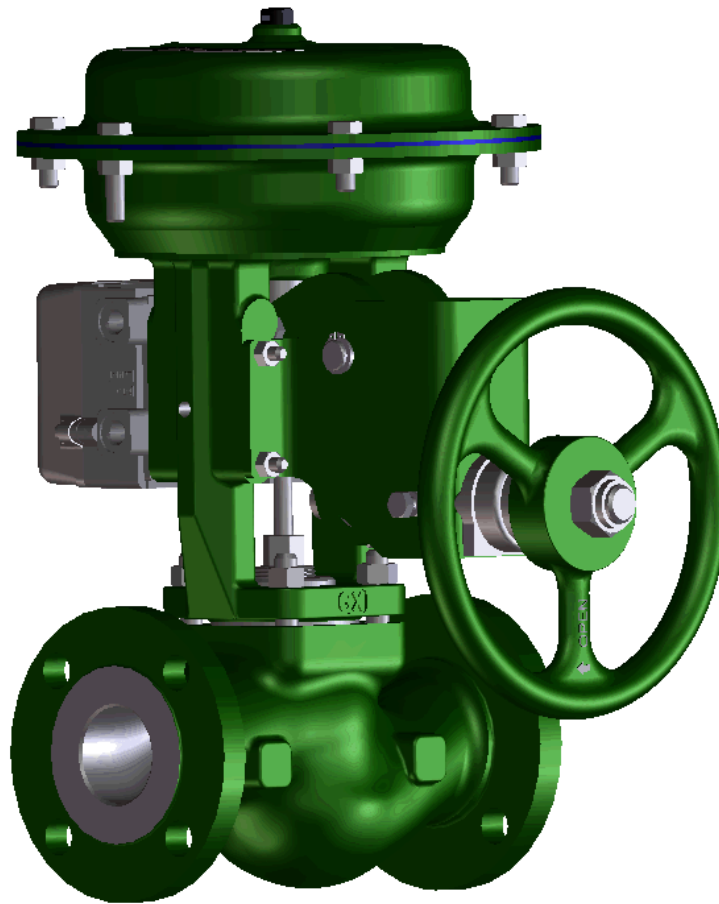
## Manual Handwheels

The GX is available with an optional, side-mounted manual handwheel (see figure 19). These handwheels provide a robust method of manually operating the valve in an emergency or upon loss of instrument air.

The GX handwheel will stroke the valve up to 20mm travel, and is available on the size 225 and 750

actuators. Dimensions are provided in figure 20 and table 19.

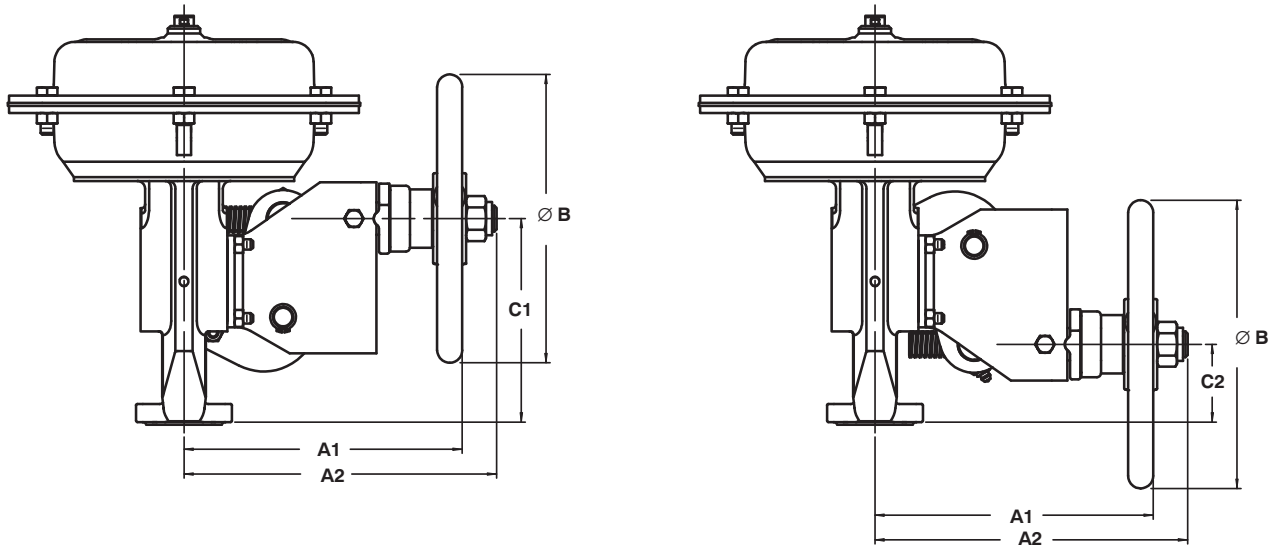
When mounted to a fail-up actuator, rotating the handwheel clockwise moves the stem downwards. When mounted to a fail-down actuator, turning the handwheel in the clockwise direction causes the stem to move upwards. Disengagement of the handwheel to allow automatic operation is accomplished by simply rewinding the handwheel.



W9025

Figure 19. Fisher® GX Control Valve and Actuator System with Manual Handwheel

# GX Control Valve and Actuator



E0975

Figure 20. Fisher® GX with Handwheel Dimensions (also see table 19)

Table 19. Fisher® GX with Handwheel Dimensions and Weights

VALVE SIZE		ACTUATOR SIZE	VALVE TRAVEL	HANDWHEEL WEIGHT	A1	A2	B	C1 <sup>(1)</sup>	C2 <sup>(2)</sup>
EN	ASME NPS								
			mm	kg	mm	mm	mm	mm	mm
DN 15	1/2	225	20	5.6	215	242	223	159	60
DN 20	3/4	225	20	5.6	215	242	223	159	60
DN 25	1	225	20	5.6	215	242	223	159	60
DN 40	1-1/2	225	20	5.6	215	242	223	159	60
		750	20	12.2	293	317	356	159	60
DN 50	2	225	20	5.6	215	242	223	159	60
		750	20	12.2	293	317	356	159	60
DN 80	3	750	20	12.2	293	317	356	169	70
DN 100	4	750	20	12.2	293	317	356	173	74
DN 150	6	1200	Contact your Emerson Process Management sales office for information.						

1. C1 is fail-down.  
2. C2 is fail-up.

Coefficients

Table 20. Fisher® GX, Equal Percentage Valve Plug, Flow Up Through the Port

Equal Percentage - Flow Up													Equal Percentage Characteristic	
Valve Size	Port Diameter	Maximum Travel	Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
	mm	mm		10	20	30	40	50	60	70	80	90	100	
DN 15 (NPS 1/2)	9.5	20	C <sub>V</sub>	0.118	0.191	0.309	0.457	0.607	0.941	1.39	2.00	2.77	3.34	0.98
			K <sub>V</sub>	0.102	0.166	0.267	0.396	0.525	0.814	1.20	1.73	2.40	2.89	---
			X <sub>T</sub>	0.67	0.59	0.58	0.56	0.57	0.55	0.57	0.57	0.61	0.69	---
			F <sub>d</sub>	0.11	0.13	0.16	0.19	0.22	0.28	0.34	0.44	0.58	0.80	---
	9.5 <sup>(2)</sup>	20	C <sub>V</sub>	0.089	0.109	0.153	0.213	0.289	0.393	0.552	0.754	1.03	1.43	0.99
			K <sub>V</sub>	0.077	0.094	0.132	0.185	0.250	0.340	0.478	0.652	0.891	1.24	---
			X <sub>T</sub>	0.72	0.65	0.61	0.59	0.57	0.54	0.53	0.55	0.55	0.59	---
			F <sub>d</sub>	0.09	0.09	0.09	0.11	0.13	0.14	0.20	0.24	0.28	0.35	---
DN 20 (NPS 3/4)	14	20	C <sub>V</sub>	0.154	0.192	0.311	0.505	0.763	1.18	1.91	3.05	4.93	6.41	0.98
			K <sub>V</sub>	0.133	0.166	0.269	0.437	0.660	1.02	1.65	2.64	4.27	5.55	---
			X <sub>T</sub>	0.62	0.60	0.58	0.59	0.52	0.54	0.54	0.62	0.71	0.77	---
			F <sub>d</sub>	0.08	0.08	0.10	0.13	0.16	0.20	0.26	0.33	0.47	0.59	---
	9.5	20	C <sub>V</sub>	0.128	0.206	0.325	0.479	0.629	0.984	1.46	2.14	3.06	3.75	0.95
			K <sub>V</sub>	0.111	0.178	0.281	0.415	0.544	0.851	1.27	1.85	2.65	3.25	---
			X <sub>T</sub>	0.65	0.66	0.62	0.61	0.62	0.65	0.64	0.63	0.65	0.62	---
			F <sub>d</sub>	0.11	0.13	0.16	0.19	0.22	0.28	0.34	0.44	0.58	0.80	---
	9.5 <sup>(2)</sup>	20	C <sub>V</sub>	0.127	0.149	0.176	0.222	0.311	0.440	0.599	0.828	1.14	1.65	0.97
			K <sub>V</sub>	0.110	0.129	0.153	0.192	0.269	0.381	0.518	0.716	0.985	1.43	---
			X <sub>T</sub>	0.69	0.77	0.68	0.81	0.76	0.71	0.72	0.67	0.75	0.79	---
			F <sub>d</sub>	0.09	0.09	0.09	0.11	0.13	0.14	0.20	0.24	0.28	0.35	---

1. At 100% travel.  
2. Restricted trim.  
3. Balanced trim.  
4. Balanced, restricted trim.

-continued-

# GX Control Valve and Actuator

Table 20. Fisher® GX, Equal Percentage Valve Plug, Flow Up Through the Port (continued)

Equal Percentage - Flow Up													Equal Percentage Characteristic	
Valve Size	Port Diameter mm	Maximum Travel mm	Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
				10	20	30	40	50	60	70	80	90	100	
DN 25 (NPS 1)	22	20	C <sub>V</sub>	0.673	0.937	1.32	1.89	2.25	3.13	5.05	7.39	10.5	13.7	0.93
			K <sub>V</sub>	0.582	0.810	1.14	1.63	1.94	2.71	4.36	6.39	9.05	11.9	---
			X <sub>T</sub>	0.61	0.59	0.58	0.57	0.74	0.82	0.64	0.58	0.68	0.77	---
			F <sub>d</sub>	0.09	0.11	0.13	0.15	0.18	0.21	0.25	0.31	0.39	0.49	---
	14	20	C <sub>V</sub>	0.139	0.186	0.315	0.511	0.776	1.23	1.97	3.28	5.35	6.89	0.97
			K <sub>V</sub>	0.120	0.161	0.272	0.442	0.671	1.07	1.70	2.84	4.63	5.96	---
			X <sub>T</sub>	0.78	0.71	0.59	0.59	0.58	0.51	0.57	0.51	0.67	0.81	---
			F <sub>d</sub>	0.08	0.08	0.10	0.13	0.16	0.20	0.26	0.33	0.47	0.59	---
	9.5	20	C <sub>V</sub>	0.133	0.222	0.347	0.501	0.699	1.04	1.50	2.15	2.98	3.57	0.95
			K <sub>V</sub>	0.115	0.192	0.300	0.433	0.605	0.900	1.29	1.86	2.58	3.09	---
			X <sub>T</sub>	0.77	0.68	0.65	0.61	0.55	0.55	0.58	0.55	0.59	0.68	---
			F <sub>d</sub>	0.11	0.13	0.16	0.19	0.22	0.28	0.34	0.44	0.58	0.80	---
	9.5 <sup>(2)</sup>	20	C <sub>V</sub>	0.127	0.149	0.176	0.222	0.311	0.440	0.599	0.828	1.14	1.65	0.95
			K <sub>V</sub>	0.110	0.129	0.152	0.192	0.269	0.381	0.518	0.716	0.986	1.43	---
			X <sub>T</sub>	0.311	0.892	0.755	0.681	0.641	0.618	0.595	0.576	0.582	0.543	---
			F <sub>d</sub>	0.09	0.09	0.09	0.11	0.13	0.14	0.20	0.24	0.28	0.35	---
DN 40 (NPS 1-1/2)	36	20	C <sub>V</sub>	1.01	1.91	2.74	4.24	6.13	8.25	11.5	16.7	22.0	27.2	0.94
			K <sub>V</sub>	0.874	1.65	2.37	3.67	5.30	7.14	9.95	14.4	19.0	23.5	---
			X <sub>T</sub>	0.87	0.93	0.91	0.80	0.89	0.86	0.76	0.79	0.82	0.78	---
			F <sub>d</sub>	0.64	0.80	0.87	0.54	0.55	0.50	0.41	0.40	0.43	0.45	---
	22	20	C <sub>V</sub>	0.591	0.850	1.20	1.79	2.51	3.50	4.93	7.07	11.0	14.3	0.93
			K <sub>V</sub>	0.511	0.735	1.04	1.55	2.17	3.03	4.26	6.12	9.52	12.4	---
			X <sub>T</sub>	0.53	0.51	0.53	0.45	0.45	0.49	0.42	0.47	0.57	0.71	---
			F <sub>d</sub>	0.09	0.11	0.13	0.15	0.18	0.21	0.25	0.31	0.39	0.49	---
	14	20	C <sub>V</sub>	0.103	0.141	0.254	0.440	0.689	1.11	1.84	3.12	5.12	6.87	0.97
			K <sub>V</sub>	0.0891	0.122	0.220	0.381	0.596	0.960	1.59	2.70	4.43	5.94	---
			X <sub>T</sub>	1.00	0.80	0.68	0.67	0.60	0.54	0.55	0.52	0.64	0.77	---
			F <sub>d</sub>	0.08	0.08	0.10	0.13	0.16	0.20	0.26	0.33	0.47	0.59	---
DN 50 (NPS 2)	46	20	C <sub>V</sub>	1.08	1.75	3.75	6.04	9.5	14.9	21.8	30.9	37.7	43.7	0.91
			K <sub>V</sub>	0.931	1.51	3.24	5.22	8.20	12.9	18.9	26.7	32.6	37.8	---
			X <sub>T</sub>	0.73	0.70	0.79	0.81	0.78	0.81	0.76	0.71	0.82	0.85	---
			F <sub>d</sub>	0.70	0.84	0.47	0.48	0.40	0.36	0.37	0.40	0.43	0.45	---
	36	20	C <sub>V</sub>	1.08	2.01	2.80	4.26	6.31	8.38	11.6	17.2	23.1	28.6	0.93
			K <sub>V</sub>	0.931	1.74	2.42	3.69	5.45	7.25	10.0	14.9	20.0	24.7	---
			X <sub>T</sub>	0.71	0.79	0.86	0.81	0.79	0.79	0.73	0.69	0.75	0.75	---
			F <sub>d</sub>	0.64	0.80	0.87	0.54	0.55	0.50	0.41	0.40	0.43	0.45	---
	22	20	C <sub>V</sub>	0.591	0.850	1.20	1.79	2.51	3.50	4.93	7.07	11.0	14.3	0.96
			K <sub>V</sub>	0.511	0.735	1.04	1.55	2.17	3.03	4.26	6.12	9.52	12.4	---
			X <sub>T</sub>	0.71	0.68	0.61	0.62	0.60	0.60	0.57	0.45	0.60	0.71	---
			F <sub>d</sub>	0.09	0.11	0.13	0.15	0.18	0.21	0.25	0.31	0.39	0.49	---

1. At 100% travel.  
 2. Restricted trim.  
 3. Balanced trim.  
 4. Balanced, restricted trim.

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Table 20. Fisher® GX, Equal Percentage Valve Plug, Flow Up Through the Port (continued)

Equal Percentage - Flow Up													Equal Percentage Characteristic	
Valve Size	Port Diameter mm	Maximum Travel mm	Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
				10	20	30	40	50	60	70	80	90	100	
DN 80 (NPS 3)	70	40	C <sub>V</sub>	2.38	6.92	11.5	16.4	22.4	31.9	46.5	63.6	80.6	95.1	0.94
			K <sub>V</sub>	2.06	5.99	9.95	14.2	19.4	27.6	40.2	55.0	69.7	82.3	---
			X <sub>T</sub>	0.83	0.81	0.85	0.83	0.80	0.76	0.72	0.75	0.77	0.80	---
			F <sub>d</sub>	0.82	0.50	0.53	0.53	0.47	0.42	0.40	0.40	0.43	0.45	---
	70 <sup>(3)</sup>	20	C <sub>V</sub>	2.71	4.63	7.60	11.3	17.1	23.7	35.3	50.4	61.6	75.7	0.89
			K <sub>V</sub>	2.34	4.00	6.57	9.79	14.7	20.5	30.5	43.6	53.3	65.5	---
			X <sub>T</sub>	0.54	0.50	0.49	0.51	0.51	0.57	0.51	0.50	0.64	0.68	---
			F <sub>d</sub>	0.06	0.07	0.10	0.12	0.15	0.18	0.22	0.26	0.30	0.34	---
	46	20	C <sub>V</sub>	0.873	1.66	3.41	5.66	8.75	13.8	20.7	30.5	37.1	43.7	0.97
			K <sub>V</sub>	0.755	1.44	2.95	4.90	7.57	11.9	17.9	26.4	32.1	37.8	---
			X <sub>T</sub>	0.75	0.82	0.75	0.82	0.77	0.73	0.78	0.70	0.85	0.88	---
			F <sub>d</sub>	0.70	0.84	0.47	0.48	0.40	0.36	0.37	0.40	0.43	0.45	---
	36	20	C <sub>V</sub>	1.08	2.01	2.80	4.26	6.31	8.38	11.6	17.2	23.1	28.6	0.96
			K <sub>V</sub>	0.934	1.74	2.42	3.68	5.46	7.25	10.0	14.9	20.0	24.7	---
			X <sub>T</sub>	0.84	0.86	0.88	0.84	0.83	0.88	0.79	0.72	0.76	0.85	---
			F <sub>d</sub>	0.64	0.80	0.87	0.54	0.55	0.50	0.41	0.40	0.43	0.45	---
DN 100 (NPS 4)	90	40	C <sub>V</sub>	5.56	13.6	21.1	29.1	40.8	55.8	77.5	117	145	165	0.90
			K <sub>V</sub>	4.81	11.7	18.3	25.1	35.3	48.3	67.0	101	126	143	---
			X <sub>T</sub>	0.93	0.93	0.94	0.90	0.85	0.82	0.82	0.75	0.78	0.80	---
			F <sub>d</sub>	0.39	0.49	0.52	0.48	0.45	0.44	0.33	0.36	0.39	0.41	---
	90 <sup>(3)</sup>	20	C <sub>V</sub>	5.88	9.43	13.1	17.5	27.3	42.4	63.4	85.5	107	128	0.87
			K <sub>V</sub>	5.09	8.16	11.3	15.1	23.6	36.7	54.8	74.0	92.6	111	---
			X <sub>T</sub>	0.55	0.54	0.54	0.55	0.43	0.52	0.57	0.58	0.63	0.67	---
			F <sub>d</sub>	0.07	0.08	0.10	0.11	0.13	0.18	0.22	0.26	0.30	0.34	---
	90 <sup>(4)</sup>	20	C <sub>V</sub>	2.38	3.65	5.64	8.42	12.0	17.4	24.8	36.7	53.0	68.5	0.90
			K <sub>V</sub>	2.06	3.16	4.88	7.28	10.4	15.1	21.5	31.7	45.8	59.3	---
			X <sub>T</sub>	0.68	0.61	0.57	0.55	0.55	0.55	0.56	0.48	0.50	0.58	---
			F <sub>d</sub>	0.04	0.05	0.06	0.08	0.09	0.11	0.14	0.16	0.20	0.24	---
	70	40	C <sub>V</sub>	2.04	5.78	10.6	15.3	20.8	29.8	43.3	61.9	80.6	97.7	0.92
			K <sub>V</sub>	1.76	5.00	9.17	13.2	18.0	25.8	37.5	53.5	69.7	84.5	---
			X <sub>T</sub>	0.79	0.83	0.85	0.85	0.82	0.77	0.73	0.73	0.75	0.76	---
			F <sub>d</sub>	0.82	0.50	0.53	0.53	0.47	0.42	0.40	0.40	0.43	0.45	---
	46	20	C <sub>V</sub>	1.02	1.76	3.58	5.76	8.85	14.1	21.4	30.6	37.9	44.0	0.94
			K <sub>V</sub>	0.88	1.52	3.10	4.98	7.66	12.2	18.5	26.5	32.8	38.1	---
			X <sub>T</sub>	0.69	0.77	0.68	0.81	0.76	0.71	0.72	0.67	0.75	0.79	---
			F <sub>d</sub>	0.70	0.84	0.47	0.48	0.40	0.36	0.37	0.40	0.43	0.45	---

1. At 100% travel.  
 2. Restricted trim.  
 3. Balanced trim.  
 4. Balanced, restricted trim.

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# GX Control Valve and Actuator

Table 20. Fisher® GX, Equal Percentage Valve Plug, Flow Up Through the Port (continued)

Equal Percentage - Flow Up													Equal Percentage Characteristic	
Valve Size	Port Diameter mm	Maximum Travel mm	Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
				10	20	30	40	50	60	70	80	90	100	
DN 150 (NPS 6)	136	60	C <sub>v</sub>	13.8	25.0	40.0	60.0	90.0	139	201	271	344	401	0.88
			K <sub>v</sub>	11.9	21.6	34.6	51.9	77.9	120	174	234	298	347	---
			X <sub>T</sub>	0.73	0.82	0.82	0.81	0.79	0.70	0.67	0.67	0.54	0.71	---
			F <sub>d</sub>	0.45	0.39	0.33	0.28	0.24	0.22	0.20	0.18	0.17	0.16	---
	136 <sup>(3)</sup>	60	C <sub>v</sub>	19.5	35.0	49.0	65.0	92.0	133	194	252	322	374	0.90
			K <sub>v</sub>	16.9	30.3	42.4	56.2	79.6	115	168	218	279	324	---
			X <sub>T</sub>	0.58	0.51	0.55	0.56	0.58	0.55	0.53	0.66	0.72	0.76	---
			F <sub>d</sub>	0.09	0.10	0.11	0.13	0.16	0.19	0.22	0.27	0.32	0.37	---
	90 <sup>(2)</sup>	40	C <sub>v</sub>	7.90	16.0	23.0	33.0	45.0	60.0	81.0	126	159	192	0.95
			K <sub>v</sub>	6.83	13.8	19.9	28.5	38.9	51.9	70.1	109	138	166	---
			X <sub>T</sub>	0.68	0.80	0.85	0.77	0.78	0.78	0.83	0.70	0.76	0.75	---
			F <sub>d</sub>	0.39	0.49	0.52	0.48	0.45	0.44	0.33	0.36	0.39	0.41	---

1. At 100% travel.  
 2. Restricted trim.  
 3. Balanced trim.  
 4. Balanced, restricted trim.



Table 21. Fisher® GX, Linear Valve Plug, Flow Up Through the Port

Linear - Flow Up													Linear Characteristic	
Valve Size	Port Diameter mm	Maximum Travel mm	Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
				10	20	30	40	50	60	70	80	90	100	
DN 15 (NPS 1/2)	9.5	20	C <sub>V</sub>	0.179	0.415	0.713	1.03	1.35	1.70	2.09	2.53	3.01	3.45	0.93
			K <sub>V</sub>	0.155	0.359	0.617	0.891	1.17	1.47	1.81	2.19	2.60	2.98	---
			X <sub>T</sub>	0.55	0.57	0.64	0.63	0.67	0.68	0.71	0.67	0.71	0.71	---
			F <sub>d</sub>	0.12	0.18	0.24	0.29	0.34	0.39	0.45	0.53	0.65	0.80	---
	4.8 <sup>(4)</sup> 9°30'	20	C <sub>V</sub>	0.0360	0.0880	0.160	0.246	0.341	0.436	0.524	0.618	0.726	0.785	0.94
			K <sub>V</sub>	0.0311	0.0761	0.138	0.213	0.295	0.377	0.453	0.535	0.628	0.679	---
			X <sub>T</sub>	0.52	0.55	0.50	0.50	0.53	0.50	0.52	0.53	0.49	0.55	---
			F <sub>d</sub>	0.09	0.09	0.09	0.11	0.13	0.14	0.20	0.24	0.28	0.35	---
	4.8 <sup>(4)</sup> 4°39'	20	C <sub>V</sub>	0.0356	0.0524	0.0736	0.0984	0.127	0.158	0.191	0.224	0.257	0.294	0.93
			K <sub>V</sub>	0.0308	0.0453	0.0637	0.0851	0.110	0.137	0.165	0.194	0.222	0.254	---
			X <sub>T</sub>	0.55	0.54	0.57	0.58	0.57	0.55	0.55	0.56	0.57	0.55	---
			F <sub>d</sub>	0.08	0.10	0.13	0.15	0.17	0.19	0.22	0.24	0.26	0.28	---
	4.8 <sup>(4)</sup> 2°15'	20	C <sub>V</sub>	0.0437	0.0512	0.0597	0.0694	0.0806	0.0929	0.105	0.116	0.126	0.139	0.86
			K <sub>V</sub>	0.0378	0.0443	0.0516	0.0600	0.0697	0.0804	0.0908	0.100	0.109	0.120	---
			X <sub>T</sub>	0.54	0.54	0.54	0.54	0.54	0.53	0.54	0.56	0.57	0.56	---
			F <sub>d</sub>	0.08	0.08	0.09	0.11	0.12	0.13	0.14	0.15	0.16	0.17	---
	4.8 <sup>(4)</sup> 1°8'	20	C <sub>V</sub>	0.0037	0.0055	0.0085	0.0121	0.0163	0.0205	0.0246	0.0284	0.0326	0.0389	0.97
			K <sub>V</sub>	0.0032	0.0047	0.0073	0.0105	0.0141	0.0177	0.0213	0.0246	0.0282	0.0336	---
			X <sub>T</sub>	1.00	0.94	0.81	0.76	0.69	0.64	0.60	0.59	0.60	0.58	---
			F <sub>d</sub>	0.05	0.06	0.06	0.07	0.07	0.08	0.09	0.09	0.10	0.11	---
DN 20 (NPS 3/4)	14	20	C <sub>V</sub>	0.775	1.57	2.38	3.10	3.79	4.51	5.34	6.23	7.05	7.58	0.97
			K <sub>V</sub>	0.670	1.36	2.06	2.68	3.28	3.90	4.62	5.39	6.10	6.55	---
			X <sub>T</sub>	0.62	0.59	0.62	0.61	0.62	0.64	0.65	0.70	0.73	0.72	---
			F <sub>d</sub>	0.16	0.24	0.30	0.35	0.39	0.45	0.52	0.60	0.71	0.79	---
	9.5	20	C <sub>V</sub>	0.219	0.488	0.794	1.13	1.48	1.85	2.31	2.85	3.43	3.84	0.95
			K <sub>V</sub>	0.190	0.422	0.687	0.981	1.28	1.60	2.00	2.47	2.96	3.33	---
			X <sub>T</sub>	0.57	0.59	0.57	0.57	0.54	0.55	0.54	0.52	0.58	0.59	---
			F <sub>d</sub>	0.12	0.18	0.24	0.29	0.34	0.39	0.45	0.53	0.65	0.80	---
	4.8 <sup>(4)</sup> 9°30'	20	C <sub>V</sub>	0.0360	0.0880	0.160	0.246	0.341	0.436	0.524	0.618	0.726	0.785	0.94
			K <sub>V</sub>	0.0311	0.0761	0.138	0.213	0.295	0.377	0.453	0.535	0.628	0.679	---
			X <sub>T</sub>	0.52	0.55	0.50	0.50	0.53	0.50	0.52	0.53	0.49	0.55	---
			F <sub>d</sub>	0.10	0.15	0.19	0.24	0.29	0.33	0.38	0.42	0.47	0.51	---
	4.8 <sup>(4)</sup> 4°39'	20	C <sub>V</sub>	0.0356	0.0524	0.0736	0.0984	0.127	0.158	0.191	0.224	0.257	0.294	0.93
			K <sub>V</sub>	0.0308	0.0453	0.0637	0.0851	0.110	0.137	0.165	0.194	0.222	0.254	---
			X <sub>T</sub>	0.55	0.54	0.57	0.58	0.57	0.55	0.55	0.56	0.57	0.55	---
			F <sub>d</sub>	0.08	0.10	0.13	0.15	0.17	0.19	0.22	0.24	0.26	0.28	---
	4.8 <sup>(4)</sup> 2°15'	20	C <sub>V</sub>	0.0437	0.0512	0.0597	0.0694	0.0806	0.0929	0.105	0.116	0.126	0.139	0.86
			K <sub>V</sub>	0.0378	0.0443	0.0516	0.0600	0.0697	0.0804	0.0908	0.100	0.109	0.120	---
			X <sub>T</sub>	0.54	0.54	0.54	0.54	0.54	0.53	0.54	0.56	0.57	0.56	---
			F <sub>d</sub>	0.08	0.08	0.09	0.11	0.12	0.13	0.14	0.15	0.16	0.17	---
4.8 <sup>(4)</sup> 1°8'	20	C <sub>V</sub>	0.0037	0.0055	0.0085	0.0121	0.0163	0.0205	0.0246	0.0284	0.0326	0.0389	0.97	
		K <sub>V</sub>	0.0032	0.0047	0.0073	0.0105	0.0141	0.0177	0.0213	0.0246	0.0282	0.0336	---	
		X <sub>T</sub>	1.00	0.94	0.81	0.76	0.69	0.64	0.60	0.59	0.60	0.58	---	
		F <sub>d</sub>	0.05	0.06	0.06	0.07	0.07	0.08	0.09	0.09	0.10	0.11	---	

1. At 100% travel.  
2. Balanced trim.  
3. Balanced, restricted trim.  
4. Micro-Flow trim.

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# GX Control Valve and Actuator

Table 21. Fisher® GX, Linear Valve Plug, Flow Up Through the Port (continued)

Linear - Flow Up													Linear Characteristic	
Valve Size	Port Diameter mm	Maximum Travel mm	Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
				10	20	30	40	50	60	70	80	90	100	
DN 25 (NPS 1)	22	20	C <sub>V</sub>	1.72	3.06	4.50	7.04	8.52	9.74	11.1	12.7	14.6	15.5	0.94
			K <sub>V</sub>	1.49	2.64	3.90	6.09	7.37	8.43	9.58	10.9	12.6	13.4	---
			X <sub>T</sub>	0.51	0.58	0.60	0.44	0.47	0.52	0.56	0.68	0.74	0.80	---
			F <sub>d</sub>	0.14	0.19	0.24	0.29	0.33	0.37	0.42	0.46	0.53	0.61	---
	14	20	C <sub>V</sub>	0.685	1.46	2.28	3.05	3.81	4.56	5.42	6.34	7.21	7.80	0.96
			K <sub>V</sub>	0.592	1.26	1.97	2.64	3.29	3.95	4.69	5.48	6.24	6.75	---
			X <sub>T</sub>	0.73	0.64	0.62	0.60	0.59	0.59	0.60	0.63	0.67	0.66	---
			F <sub>d</sub>	0.16	0.24	0.30	0.35	0.39	0.45	0.52	0.60	0.71	0.79	---
	9.5	20	C <sub>V</sub>	0.187	0.453	0.769	1.10	1.42	1.79	2.22	2.73	3.29	3.70	0.94
			K <sub>V</sub>	0.161	0.392	0.665	0.952	1.23	1.55	1.92	2.36	2.85	3.20	---
			X <sub>T</sub>	0.59	0.56	0.55	0.53	0.58	0.57	0.60	0.58	0.63	0.63	---
			F <sub>d</sub>	0.12	0.18	0.24	0.29	0.34	0.39	0.45	0.53	0.65	0.80	---
	4.8 <sup>(4)</sup> 9°30'	20	C <sub>V</sub>	0.0360	0.0880	0.160	0.246	0.341	0.436	0.524	0.618	0.726	0.785	0.94
			K <sub>V</sub>	0.0311	0.0761	0.138	0.213	0.295	0.377	0.453	0.535	0.628	0.679	---
			X <sub>T</sub>	0.52	0.55	0.50	0.50	0.53	0.50	0.52	0.53	0.49	0.55	---
			F <sub>d</sub>	0.10	0.15	0.19	0.24	0.29	0.33	0.38	0.42	0.47	0.51	---
	4.8 <sup>(4)</sup> 4°39'	20	C <sub>V</sub>	0.0356	0.0524	0.0736	0.0984	0.127	0.158	0.191	0.224	0.257	0.294	0.93
			K <sub>V</sub>	0.0308	0.0453	0.0637	0.0851	0.110	0.137	0.165	0.194	0.222	0.254	---
			X <sub>T</sub>	0.55	0.54	0.57	0.58	0.57	0.55	0.55	0.56	0.57	0.55	---
			F <sub>d</sub>	0.08	0.10	0.13	0.15	0.17	0.19	0.22	0.24	0.26	0.28	---
	4.8 <sup>(4)</sup> 2°15'	20	C <sub>V</sub>	0.0437	0.0512	0.0597	0.0694	0.0806	0.0929	0.105	0.116	0.126	0.139	0.86
			K <sub>V</sub>	0.0378	0.0443	0.0516	0.0600	0.0697	0.0804	0.0908	0.100	0.109	0.120	---
			X <sub>T</sub>	0.54	0.54	0.54	0.54	0.54	0.53	0.54	0.56	0.57	0.56	---
			F <sub>d</sub>	0.08	0.08	0.09	0.11	0.12	0.13	0.14	0.15	0.16	0.17	---
4.8 <sup>(4)</sup> 1°8'	20	C <sub>V</sub>	0.0037	0.0055	0.0085	0.0121	0.0163	0.0205	0.0246	0.0284	0.0326	0.0389	0.97	
		K <sub>V</sub>	0.0032	0.0047	0.0073	0.0105	0.0141	0.0177	0.0213	0.0246	0.0282	0.0336	---	
		X <sub>T</sub>	1.00	0.94	0.81	0.76	0.69	0.64	0.60	0.59	0.60	0.58	---	
		F <sub>d</sub>	0.05	0.06	0.06	0.07	0.07	0.08	0.09	0.09	0.10	0.11	---	
DN 40 (NPS 1-1/2)	36	20	C <sub>V</sub>	1.18	4.50	7.46	11.0	14.1	16.8	20.3	24.4	28.8	32.0	0.93
			K <sub>V</sub>	1.02	3.89	6.45	9.5	12.2	14.5	17.6	21.1	24.9	27.7	---
			X <sub>T</sub>	0.88	0.75	0.88	0.82	0.80	0.88	0.85	0.80	0.78	0.78	---
			F <sub>d</sub>	0.30	0.42	0.47	0.49	0.51	0.52	0.50	0.48	0.47	0.48	---
	22	20	C <sub>V</sub>	1.41	2.76	4.20	5.76	7.32	8.85	10.5	12.9	15.1	17.2	0.95
			K <sub>V</sub>	1.22	2.39	3.63	4.98	6.33	7.66	9.08	11.2	13.1	14.9	---
			X <sub>T</sub>	0.68	0.58	0.58	0.59	0.58	0.59	0.65	0.60	0.68	0.75	---
			F <sub>d</sub>	0.08	0.10	0.13	0.15	0.17	0.19	0.22	0.24	0.26	0.28	---
	14	20	C <sub>V</sub>	0.676	1.55	2.27	3.03	3.77	4.55	5.44	6.47	7.36	8.25	0.96
			K <sub>V</sub>	0.585	1.34	1.96	2.62	3.26	3.94	4.71	5.60	6.37	7.14	---
			X <sub>T</sub>	0.58	0.50	0.59	0.62	0.59	0.58	0.60	0.63	0.67	0.64	---
			F <sub>d</sub>	0.08	0.08	0.09	0.11	0.12	0.13	0.14	0.15	0.16	0.17	---

1. At 100% travel.  
 2. Balanced trim.  
 3. Balanced, restricted trim.  
 4. Micro-Flow trim.

-continued-

Table 21. Fisher® GX, Linear Valve Plug, Flow Up Through the Port (continued)

Linear - Flow Up														Linear Characteristic
Valve Size	Port Diameter mm	Maximum Travel mm	Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
				10	20	30	40	50	60	70	80	90	100	
DN 50 (NPS 2)	46	20	C <sub>V</sub>	2.90	7.53	12.6	17.5	22.1	27.8	34.1	41.6	45.7	48.6	0.91
			K <sub>V</sub>	2.51	6.51	10.9	15.1	19.1	24.0	29.5	36.0	39.5	42.0	---
			X <sub>T</sub>	0.71	0.87	0.81	0.87	0.85	0.82	0.79	0.82	0.85	0.84	---
			F <sub>d</sub>	0.25	0.36	0.42	0.46	0.47	0.46	0.46	0.47	0.48	0.50	---
	36	20	C <sub>V</sub>	1.69	5.05	8.37	11.6	14.8	17.9	20.9	24.7	29.2	33.9	0.93
			K <sub>V</sub>	1.47	4.37	7.24	10.0	12.8	15.5	18.0	21.3	25.3	29.3	---
			X <sub>T</sub>	0.73	0.76	0.84	0.81	0.82	0.84	0.87	0.85	0.84	0.82	---
			F <sub>d</sub>	0.30	0.42	0.47	0.49	0.51	0.52	0.50	0.48	0.47	0.48	---
	22	20	C <sub>V</sub>	1.58	3.01	4.51	6.02	7.63	9.10	10.9	13.1	15.1	17.2	0.93
			K <sub>V</sub>	1.37	2.60	3.90	5.21	6.60	7.87	9.40	11.3	13.0	14.9	---
			X <sub>T</sub>	0.66	0.62	0.62	0.61	0.61	0.60	0.58	0.55	0.62	0.68	---
			F <sub>d</sub>	0.08	0.10	0.13	0.15	0.17	0.19	0.22	0.24	0.26	0.28	---
DN 80 (NPS 3)	70	40	C <sub>V</sub>	9.74	20.9	32.9	46.2	59.6	74.3	87.5	97.2	109	117	0.89
			K <sub>V</sub>	8.43	18.1	28.5	40.0	51.6	64.3	75.7	84.1	94.3	101	---
			X <sub>T</sub>	0.62	0.85	0.83	0.81	0.81	0.81	0.81	0.85	0.80	0.77	---
			F <sub>d</sub>	0.33	0.43	0.47	0.48	0.49	0.50	0.50	0.51	0.51	0.51	---
	70 <sup>(2)</sup>	20	C <sub>V</sub>	10.6	21.3	31.9	42.7	53.6	63.8	74.1	85.0	94.4	102	0.85
			K <sub>V</sub>	9.17	18.4	27.6	36.9	46.4	55.2	64.1	73.5	81.7	88.2	---
			X <sub>T</sub>	0.67	0.68	0.66	0.65	0.64	0.67	0.66	0.63	0.63	0.65	---
			F <sub>d</sub>	0.12	0.17	0.21	0.25	0.28	0.31	0.34	0.36	0.39	0.41	---
	46	20	C <sub>V</sub>	2.09	7.74	12.0	16.5	21.2	26.6	33.0	40.6	46.5	51.8	0.97
			K <sub>V</sub>	1.81	6.70	10.4	14.3	18.3	23.0	28.5	35.1	40.2	44.8	---
			X <sub>T</sub>	0.65	0.62	0.79	0.85	0.88	0.85	0.88	0.83	0.88	0.90	---
			F <sub>d</sub>	0.25	0.36	0.42	0.46	0.47	0.46	0.46	0.47	0.48	0.50	---
36	20	C <sub>V</sub>	1.17	4.87	7.76	11.1	14.3	17.3	19.3	23.2	27.8	33.3	0.97	
		K <sub>V</sub>	1.01	4.21	6.71	9.58	12.4	14.9	16.7	20.1	24.1	28.8	---	
		X <sub>T</sub>	0.74	0.59	0.81	0.80	0.82	0.83	0.94	0.96	0.93	0.87	---	
		F <sub>d</sub>	0.30	0.42	0.47	0.49	0.51	0.52	0.50	0.48	0.47	0.48	---	
DN 100 (NPS 4)	90	40	C <sub>V</sub>	18.2	39.6	59.0	82.4	104	124	141	156	171	184	0.91
			K <sub>V</sub>	15.8	34.3	51.0	71.3	90.0	108	122	135	147	159	---
			X <sub>T</sub>	0.78	0.84	0.90	0.85	0.86	0.91	0.91	0.90	0.85	0.82	---
			F <sub>d</sub>	0.26	0.36	0.41	0.43	0.45	0.46	0.47	0.48	0.48	0.48	---
	90 <sup>(2)</sup>	20	C <sub>V</sub>	12.3	28.5	44.6	60.2	77.6	95.4	112	130	143	151	0.82
			K <sub>V</sub>	10.6	24.7	38.6	52.1	67.1	82.5	96.9	112	124	131	---
			X <sub>T</sub>	0.71	0.65	0.58	0.67	0.59	0.57	0.58	0.61	0.59	0.64	---
			F <sub>d</sub>	0.11	0.16	0.20	0.23	0.27	0.29	0.31	0.34	0.36	0.39	---
	90 <sup>(3)</sup>	20	C <sub>V</sub>	5.99	13.6	22.3	31.5	40.4	49.6	59.2	69.0	79.6	92.3	0.82
			K <sub>V</sub>	5.18	11.8	19.3	27.2	34.9	42.9	51.2	59.7	68.9	79.8	---
			X <sub>T</sub>	0.60	0.59	0.61	0.58	0.59	0.62	0.59	0.58	0.57	0.52	---
			F <sub>d</sub>	0.07	0.11	0.14	0.16	0.18	0.20	0.22	0.24	0.25	0.27	---
70	40	C <sub>V</sub>	9.04	22.1	33.8	47.0	60.8	76.9	92.0	107	119	128	0.94	
		K <sub>V</sub>	7.82	19.1	29.2	40.7	52.6	66.5	79.6	92.6	103	111	---	
		X <sub>T</sub>	0.80	0.82	0.84	0.83	0.81	0.80	0.79	0.81	0.81	0.82	---	
		F <sub>d</sub>	0.33	0.43	0.47	0.48	0.49	0.50	0.50	0.51	0.51	0.51	---	
46	20	C <sub>V</sub>	2.37	7.98	13.1	17.3	21.9	27.1	33.2	40.3	46.8	52.2	0.96	
		K <sub>V</sub>	2.05	6.90	11.3	15.0	19.0	23.5	28.7	34.8	40.5	45.2	---	
		X <sub>T</sub>	0.70	0.70	0.78	0.88	0.90	0.88	0.85	0.83	0.83	0.83	---	
		F <sub>d</sub>	0.25	0.36	0.42	0.46	0.47	0.46	0.46	0.47	0.48	0.50	---	

1. At 100% travel.  
2. Balanced trim.  
3. Balanced, restricted trim.  
4. Micro-Flow trim.

-continued-

Table 21. Fisher® GX, Linear Valve Plug, Flow Up Through the Port (continued)

Linear - Flow Up														Linear Characteristic
Valve Size	Port Diameter mm	Maximum Travel mm	Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
				10	20	30	40	50	60	70	80	90	100	
DN 150 (NPS 6)	136	60	C <sub>V</sub>	48.9	83.0	114	144	179	212	248	308	370	413	0.87
			K <sub>V</sub>	42.3	71.8	98.6	125	155	183	215	266	320	357	---
			X <sub>T</sub>	0.69	0.79	0.82	0.81	0.70	0.70	0.71	0.65	0.65	0.70	---
			F <sub>d</sub>	0.29	0.27	0.24	0.22	0.20	0.19	0.17	0.16	0.15	0.14	---
	136 <sup>(2)</sup>	60	C <sub>V</sub>	59.0	105	153	203	249	301	334	362	375	391	0.90
			K <sub>V</sub>	51.0	90.8	132	176	215	260	289	313	324	338	---
			X <sub>T</sub>	0.55	0.64	0.63	0.63	0.65	0.66	0.72	0.72	0.78	0.80	---
			F <sub>d</sub>	0.13	0.19	0.23	0.27	0.32	0.36	0.40	0.43	0.47	0.50	---
	90 <sup>(3)</sup>	40	C <sub>V</sub>	22.1	46.0	65.0	88.0	111	136	160	187	209	233	0.91
			K <sub>V</sub>	19.1	39.8	56.2	76.1	96.0	118	138	162	181	202	---
			X <sub>T</sub>	0.67	0.72	0.85	0.84	0.85	0.84	0.85	0.81	0.82	0.83	---
			F <sub>d</sub>	0.26	0.36	0.41	0.43	0.45	0.46	0.47	0.48	0.48	0.48	---

1. At 100% travel.  
 2. Balanced trim.  
 3. Restricted trim.  
 4. Micro-Flow trim.

Table 22. Fisher® GX, Whisper Trim® III, Flow Up Through the Port

Whisper Trim III- Flow Up														Linear Characteristic
Valve Size	Port Diameter mm	Maximum Travel mm	Flow Coefficient	Valve Opening—Percent of Total Travel										F <sub>L</sub> <sup>(1)</sup>
				10	20	30	40	50	60	70	80	90	100	
DN 80 (NPS 3) Level A1	70	40	C <sub>V</sub>	2.2	11.2	22.4	31.6	40.4	51.2	60.2	68.5	76.9	85.5	0.818
			K <sub>V</sub>	1.9	9.7	19.4	27.3	34.9	44.3	52.1	59.3	66.5	74.0	---
			X <sub>T</sub>	0.861	0.714	0.584	0.600	0.589	0.572	0.590	0.616	0.637	0.646	---
			F <sub>d</sub>	0.431	0.176	0.131	0.110	0.096	0.085	0.078	0.072	0.067	0.063	---
DN 100 (NPS 4) Level A1	90	40	C <sub>V</sub>	2.6	14.0	29.1	41.5	53.6	67.9	81.3	93.8	107	119	0.785
			K <sub>V</sub>	2.2	12.1	25.2	35.9	46.4	58.7	70.3	81.1	92.6	103	---
			X <sub>T</sub>	0.870	0.726	0.573	0.561	0.558	0.533	0.537	0.548	0.581	0.602	---
			F <sub>d</sub>	0.379	0.155	0.115	0.097	0.084	0.075	0.069	0.063	0.059	0.055	---
	70 <sup>(2)</sup>	40	C <sub>V</sub>	2.2	11.2	22.4	31.6	40.4	51.2	60.2	68.5	76.9	85.5	0.818
			K <sub>V</sub>	1.9	9.7	19.4	27.3	34.9	44.3	52.1	59.3	66.5	74.0	---
			X <sub>T</sub>	0.861	0.714	0.584	0.600	0.589	0.572	0.590	0.616	0.637	0.646	---
			F <sub>d</sub>	0.431	0.176	0.131	0.110	0.096	0.085	0.078	0.072	0.067	0.063	---
DN 150 (NPS 6) Level A1	136	60	C <sub>V</sub>	53.8	89	124	166	201	233	263	296	315	324	0.809
			K <sub>V</sub>	46.5	77	107	144	174	202	227	256	272	280	---
			X <sub>T</sub>	0.540	0.559	0.557	0.517	0.534	0.550	0.566	0.564	0.594	0.659	---
			F <sub>d</sub>	0.134	0.087	0.070	0.060	0.053	0.048	0.044	0.041	0.039	0.037	---
	90 <sup>(2)</sup>	40	C <sub>V</sub>	2.6	14.0	29.1	41.5	53.6	67.9	81.3	93.8	107	119	0.785
			K <sub>V</sub>	2.2	12.1	25.2	35.9	46.4	58.7	70.3	81.1	92.6	103	---
			X <sub>T</sub>	0.870	0.726	0.573	0.561	0.558	0.533	0.537	0.548	0.581	0.602	---
			F <sub>d</sub>	0.379	0.155	0.115	0.097	0.084	0.075	0.069	0.063	0.059	0.055	---

1. At 100% travel.  
 2. Unbalanced, restricted trim.

Table 23. Fisher® GX, Cavitrol® III, Flow Down Through the Port

<b>Cavitrol® III, Flow Down</b>															Linear Characteristic	
Trim Stage	Valve Size	Port Diameter	Maximum Travel	Flow Coeffi- cient	Minimum Throttling $C_V^{(1)}$	Valve Opening—Percent of Total Travel										$F_L^{(2)}$
		mm	mm			10	20	30	40	50	60	70	80	90	100	
One Stage	DN 25 (NPS 1)	22	20	$C_V$	0.4	0.4	1.1	2.0	2.9	3.7	4.6	5.2	5.9	6.5	7.1	0.97
				$K_V$	0.346	0.346	0.952	1.73	2.51	3.20	3.98	4.50	5.10	5.62	6.14	---
	DN 40 (NPS 1-1/2)	36	20	$C_V$	1.1	0.4	1.7	4.2	6.6	9.2	11.2	13.6	15.6	17.5	19.4	0.97
				$K_V$	0.952	0.346	1.47	3.63	5.71	7.96	9.69	11.8	13.5	15.1	16.8	---
	DN 50 (NPS 2)	46	20	$C_V$	2.0	0.8	3.2	5.9	9.1	12.6	15.3	17.8	20.4	22.8	25.2	0.95
				$K_V$	1.73	0.692	2.77	5.10	7.87	10.9	13.2	15.4	17.6	19.7	21.8	---

1. Valves should not be required to throttle at a  $C_V$  less than the specified minimum  $C_V$  for an extended period. Erosion damage to the valve seats may result.  
2. At 100% travel.

## Note

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