

Replacement of CP Valves with Fisher™ GX Control Valves

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Management of Change

Management of Change (MOC) is a procedure used to proactively manage changes that have the potential to impact safety or the process within a plant. Evaluating new techniques for improving MOC approval procedures can have an impact on plant efficiency. Historically, upgrading obsolete products or replacing existing process control equipment had been delayed or abandoned due to the extensive paperwork involved in completing a complex MOC approval sheet.

Background

The Fisher CP valve was developed to meet the specific requirements of the chemical industry and was the primary offering for the industrial process application segment of the chemical industry until 2005. The CP was a globe-style, single-port valve with integral flanges, stem guiding, and a clamped-in seat ring. The CP valve is an obsolete Fisher product and spare parts support for it will end in 2015.

The Fisher GX is a compact, multi-spring actuator and globe valve system that can meet the requirements of the chemical market. The GX valve is rugged, reliable, and easy to select. It requires no actuator sizing—the actuator selection is automatic once the valve body construction and available plant air supply pressure are selected. A key feature of the GX valve is the ability to integrally mount the FIELDVUE™ DVC2000 or DVC6200 digital valve controller for linkage-less position feedback. With a global installed base of nearly 100,000 units, the GX is a proven and reliable control valve solution for a wide array of applications across a broad range of industries.

Contained in the following sections are design comparisons between the current Fisher GX control valve and obsolete Fisher CP control valve. These comparisons are intended to help end users complete MOC approval documents to understand the similarities and differences between GX and CP valves to effectively transition to the GX valve.

Question & Answer Checklist

- 1 Q:** Does the proposed modification cause any changes to the piping and instrumentation diagram (P&ID)?

A: No.
- 2 Q:** Does the proposed modification change process chemistry, technology, or operating and control philosophies?

A: No.

- 3** Q: Does the proposed modification change how the existing plant is operated?
A: Possibly. Review capacity information to help ensure no issues will take place.
- 4** Q: Does the proposed modification change process flows?
A: Possibly. Review capacity information to help ensure no issues will take place.
- 5** Q: Does the proposed modification change existing pressure relief cases?
A: Possibly. If the GX replacement selection exceeds the maximum rated Cv of the existing CP valve, then pressure relief cases will require review. Pressure relief valve sizing when sizing and selecting Fisher control valves for end user applications is not considered. If the control valve is determined to affect upstream or downstream safety relief cases, review by the end user or third party is recommended.
- 6** Q: Does the proposed modification change the process description?
A: No.
- 7** Q: Have the codes and standards to which the new equipment was designed changed?
A: No.
- 8** Q: Does the proposed modification change the materials of construction, such as a change in material form (cast, forged, or alloy)?
A: No.
- 9** Q: Does the proposed modification introduce new equipment items that require periodic predictive maintenance?
A: No. The new equipment items will require the same periodic maintenance as required by the previous equipment items.
- 10** Q: Does the proposed modification change existing operator training requirements?
A: No.

- 11 Q:** Does the proposed modification introduce new equipment items that require spare parts, training manuals, maintenance procedures or training to teach the maintenance department how to maintain them?
- A:** Yes. The Emerson local business partners and sales offices offer local training and support to help ensure operators, maintenance personnel, and instrument technicians are trained on the GX control valve.
- 12 Q:** Does the proposed modification introduce new equipment items that require spares or obsolete spares for existing equipment?
- A:** Yes. New spares will be required for the Fisher GX valve, which are not compatible with the CP valve. Spare trim parts will continue to be available for the CP valve until the end of 2015.
- 13 Q:** Does the proposed modification permanently remove the spares for existing pieces of equipment?
- A:** Yes. The spare parts of the existing equipment items should be removed from the plant.
- 14 Q:** Does the proposed modification change the inspection scope or inspection interval?
- A:** No.

Fisher CP Valve and GX Valve Comparison

The Fisher GX valve is capable of being used in a broad range of industries and applications. It has been designed as the direct replacement for the CP valve.

The tables and sections below describe the similarities and differences between these two products.

Capabilities by Size

Due to differences in flow geometry and small variations in sizing coefficients, each valve should be reviewed to help ensure the appropriate GX valve is selected for the application. This sizing review should be completed using current Fisher sizing software. The table below provides the necessary catalog sizing and capacity information to compare the CP valve to the GX valve.

Type	NPS Size	Capacity (Unbalanced)						ΔP (bar)				Shutoff Class		
		Full	Port size	Cv	Reduced	Port Size	Cv	Full Port	delta P	Reduced Port	delta P	IV	V	VI
CP	1	=%	19mm	10.9	=%	4.8mm	0.667	20mm	51.7	4.8mm	51.7	Standard	Optional Metal Seats	Optional Composition Seats
						6.4mm	1.59			6.4mm				
						9.5mm	3.50			9.5mm				
						12.7mm	5.63			12.7mm				
		Linear	19mm	11.00	Linear	9.5mm	3.30			9.5mm				
						12.7mm	5.79			12.7mm				
GX	1	=%	22mm	13.7	=%	9.5mm	1.65	22mm	51.7	4.8mm	51.7	Standard	Optional Metal Trims	Optional PTFE Seats
						9.5mm	3.57			4.8mm				
						14mm	6.89			4.8mm				
		Linear	22mm	15.5	Linear	4.8mm	0.039			4.8mm				
						4.8mm	0.139			4.8mm				
						4.8mm	0.294			4.8mm				
						4.8mm	0.785			9.5mm				
						9.5mm	3.7			14mm				
						14.0mm	7.8							
CP	1.5	=%	28.6mm	25.2	=%	12.7mm	5.91	28.6mm	51.7	12.7mm	51.7	Standard	Optional Metal Seats	Optional Composition Seats
						19mm	12.2			19mm				
		Linear	28.6mm	24.8	Linear	12.7mm	6.08			19mm				
						19mm	12.5							
GX	1.5	=%	36mm	27.2	=%	14mm	6.87	36mm	51.7	14mm	51.7	Standard	Optional Metal Trims	Optional PTFE Seats
						22mm	14.3			22mm				
		Linear	36mm	32.0	Linear	14mm	8.25							
						22mm	17.2							
CP	2	=%	38.1mm	45.7	=%	19mm	12.0	38.1mm	51.7	19mm	51.7	Standard	Optional Metal Seats	Optional Composition Seats
						28.6mm	25.6			28.6mm				
		Linear	38.1mm	46.3	Linear	19mm	12.3							
						28.6mm	27.6							
GX	2	=%	46mm	43.7	=%	22mm	14.3	46mm	51.7	22mm	51.7	Standard	Optional Metal Trims	Optional PTFE Seats
						36mm	28.6			36mm				
		Linear	46mm	48.6	Linear	22mm	17.2							
						36mm	33.9							
CP	3	=%	64mm	109	=%	28.6mm	25.5	64mm	51.7	28.6mm	51.7	Standard	Optional Metal Seats	Optional Composition Seats
						47.6mm	69.9			47.6mm				
		Linear	64mm	111	Linear	28.6mm	27.6							
						47.6mm	74.4							
GX	3	=%	70mm	95.1	=%	36mm	28.6	70mm	33.1	36mm	51.7	Standard	Optional Metal Trims	Optional PTFE Seats
						46mm	43.7			46mm				
		Linear	70mm	117	Linear	36mm	33.3							
						46mm	51.8			48.4				

Type	NPS Size	Capacity (Balanced) - Only Used for Bellows						ΔP (bar)				Shutoff Class	
		Full	Port size	Cv	Restricted	Port Size	Cv	Full Port	delta P	Restricted	delta P	II	IV
GX	3	=%	70mm	75.7	=%	n/a	n/a	70mm	51.7	70mm	51.7	Graphite Piston Ring	PTFE Seal Ring
		Linear	70mm	102	Linear	n/a	n/a						

Type	NPS Size	Capacity (Unbalanced)						ΔP (bar)				Shutoff Class		
		Full	Port size	Cv	Reduced	Port Size	Cv	Full Port	delta P	Reduced Port	delta P	IV	V	VI
CP	4	=%	83mm	179	=%	38mm	47.8	83mm	51.7	38mm 64mm	51.7	Standard	Optional Metal Seats	Optional Composition Seats
						64mm	117							
		Linear	83mm	195	Linear	38mm	48.6							
						64mm	128							
GX	4	=%	90mm	165	=%	46mm	44.0	90mm	20	46mm 70mm	48.4 33.1	Standard	Optional Metal Trims	Optional PTFE Seats
						70mm	97.7							
		Linear	90mm	184	Linear	46mm	52.2							
						70mm	128							

Type	NPS Size	Capacity (Balanced) - Only Used for Bellows						ΔP (bar)				Shutoff Class	
		Full	Port size	Cv	Restricted	Port Size	Cv	Full Port	delta P	Restricted	delta P	II	IV
GX	4	=%	90mm	128	=%	90mm	68.5	90mm	51.7	90mm	51.7	Graphite Piston Ring	PTFE Seal Ring
		Linear	90mm	151	Linear	90mm	92.3						

Table 1. Capabilities by Size

Alloy Material Comparison

Please see the table below for alloy materials. It is important to note the Fisher GX CN7M valve body is only supplied with Hastelloy C trim.

Type	NPS Size	Body Material								
		CF3M	WCC	CN7M	MONEL	CW2M	CF3	N7M	LCC	CD3MN
CP	All	X	X	X	X	X	X	X	X	
GX	All	X	X	X	X	X	X	X	X	X

Table 2. Material Availability

ISA Long Face-to-Face Dimension

The CP valve offered an optional ISA long face-to-face dimension valve body. While the use of spool pieces or concentric reducers could be used to make up the difference between ISA long and ANSI standard face to face dimensions, the GX valve is also offered in ISA long configurations in specific standard and alloy materials. Table 3 below highlights the differences between CP and GX valves.

Type	NPS Size	Body Material							
		WCC	CF3M	CW2M	LCC	CN7M	MONEL	CF3	N7M
CP	1	X	X	X	X	X	X	X	X
GX	1	X	X	X	X				
CP	1.5	X	X	X	X	X	X	X	X

Type	NPS Size	Body Material							
		WCC	CF3M	CW2M	LCC	CN7M	MONEL	CF3	N7M
GX	1.5	X	X	X	X				
CP	2	X	X	X	X	X	X	X	X
GX	2	X	X	X	X				
CP	3	X	X	X	X	X	X	X	X
GX	3	X	X		X				
CP	4	X	X	X	X	X	X	X	X
GX	4	X	X		X				

Table 3. ISA Long Face-to-Face Availability by Material

Bellows Comparison

Please see the below table of bellow material options. It is important to note the NPS 3 and NPS 4 GX valves are limited to 20mm travel. In some scenarios this will restrict your balanced or reduced port trim options.

Type	NPS Size	Body Material	CF3M	WCC	CW2M	LCC
CP	1-2	Bellows Material	Inconel	Inconel	Hastelloy C	n/a
GX	1-2		SST Hastelloy C	SST Hastelloy C	Hastelloy C	SST Hastelloy C
CP	3-4	Bellows Material	Inconel	Inconel	Hastelloy C	n/a
GX	3-4		SST Hastelloy C	SST Hastelloy C	Hastelloy C	SST Hastelloy C

Table 4. Bellows Availability

Valve and Actuator Features

The Fisher CP and GX valves share many standard features as described in Table 5 below. One design difference between the CP valve and the GX valve is the bonnet. The GX bonnet is clamped between the valve body and actuator yoke. This provides reduced complexity, size, and weight from the traditional bolted-on bonnet design of the CP valve.

The GX valve also shares a number of parts across valve sizes. These include plug/ stem assemblies, actuator stems and stem connectors, actuator seals and bushings, and packing components for reduced complexity of spare parts inventory.

Tables 5 and 6 showcase the valve features and actuator features, respectively.

Valve	CP	GX
Body	CL150, CL300 ISA Long F-F Option (see Table 2)	CL150, CL300 ISA Long F-F Option (see Table 2)
Plug Design	Unbalanced only – Post Guided	Balanced & Unbalanced – Port Guided
Seat Ring	Clamped	Threaded
Packing	ENVIRO-SEAL™ Standard	ENVIRO-SEAL Standard
Cv Capacities	See Table 1	See Table 1

Pressure Drop	See Table 1	See Table 1
Shutoff Class	See Table 1	See Table 1
Flow Direction	Up or Down	Up
Flow Characteristics	Equal Percentage and Linear	Equal Percentage and Linear
Trim Materials	316L Standard Alloy matches body	316L standard Alloy matches body (CN7M body w/ N06022 trim)
Temperature Capabilities	-325° to 800°F	- 325° to 700°F ¹
1. 700°F is the Fisher GX ENVIRO-SEAL Graphite ULF packing system temperature limit.		

Table 5. Valve Features

ACTUATOR	CP (657, 667)	GX
Operating Pressure	0-18 6-30	4 bar (60 psi) standard 3 bar (45 psi) optional 2 bar (30 psi) optional
Bench Set	Requires spring selection, sizing, and bench set	No adjustment or sizing required
Actuator Fail Action	Up (657) or Down (667)	Both available Field-reversible
Instrument Availability	Standard bracket mount	Integral FIELDVUE instrument mounting. Pneumatics available with standard bracket mount.
Sizes	30, 34, 40, and 45	2 Sizes (225 and 750)
Cycle Life	Spring selection specific	1,000,000 cycles

Table 6. Actuator Features

Conclusion

The 2005 obsolescence of the Fisher CP valve will end spare parts availability at the end of 2015. The Fisher GX control valve offers compatible sizes, features, and materials to cover the wide range of customer application needs and is the direct replacement for the Fisher CP control valve.

Additional Resources

See the resources below or contact your [local Emerson sales office](#) for additional details or questions regarding the Fisher GX control valve.

[GX Product Bulletin \(D103171X012\)](#)

[GX Instruction Manual \(D103175X012\)](#)

[GX Product Webpage](#)



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