

Replacement of Fisher™ CE 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 CE 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 1996. The CE was a globe-style, single-port valve with stem guiding, quick-change trim, separable flanges, and clamped-in seat ring. The CE valve is an obsolete product and the 10-year guarantee of recommended spare parts availability for obsolete products ended in 2006.

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 CE, Class 150 and Class 300 control valves. These comparisons are intended to help end users complete MOC approval documents to understand the similarities and differences between GX and CE 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 ensure no issues will take place.
- 4** Q: Does the proposed modification change process flows?
A: Possibly. Review capacity information to 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 CE valve, then pressure relief cases will require review. Pressure relief valve sizing is not considered when sizing and selecting Fisher control valves for end user applications. 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. These equipment items will require the same periodic predictive maintenance.
- 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. Emerson sales offices offer local training and support to help ensure operators, maintenance personnel, and instrument technicians are fully trained on the Fisher 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 CE valve.
- 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 CE and GX Control 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 primary replacement for the CE valve.

The tables and sections that follow 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 valve sizing software. The following tables provide the necessary catalog sizing and capacity information to compare the CE valve to the GX valve.

Type	NPS	Capacity (Unbalanced)							ΔP (bar) ¹						
		Full	Port Size	Cv - Flow Up	Cv - Flow Down	Reduced Port	Port Size	Cv - Flow Up	Full Port	Seat Type	delta P - Shutoff	Reduced Port	delta P - Shutoff		
CE	1	Equal Percentage	14.2mm (3/4 in)	10.9	12	Equal Percentage	4.8mm (3/16 in)	0.667	14.2mm	Metal Seat	51.7	4.8mm Micro-flat 4.8mm 6.4mm 9.5mm	51.7		
							6.4mm (1/4 in)	1.59							
							9.5mm (3/8 in)	3.5							
							12.7mm (1/2 in)	5.63							
		Linear	14.2mm (3/4 in)	11	12.2	Linear	4.8mm (3/16 in) Flat Angle: 0° 24'	0.008			51.7	Composition Seat	51.7	4.8mm Micro-flat 4.8mm 6.4mm 9.5mm 12.7mm	51.7
							4.8mm (3/16 in) Flat Angle: 1°	0.024							
							4.8mm (3/16 in) Flat Angle: 1° 8'	0.036							
							4.8mm (3/16 in) Flat Angle: 2° 15'	0.112							
							4.8mm (3/16 in) Flat Angle: 4° 39'	0.235							
							12.7mm (1/2 in)	5.79							
GX	1	Equal Percentage	22mm	13.7	n/a	Equal Percentage	9.5mm Reduced Port	1.65	22mm	Metal Seat	51.7	4.8mm 9.5mm 14mm	51.7		
							9.5mm	3.57							
							14mm	6.89							
		Linear	22mm	15.5	n/a	Linear	4.8mm	0.039							
							4.8mm	0.139							
							4.8mm	0.294							
							4.8mm	0.785							
							9.5mm	3.7							
							14.0mm	7.8							

1. For non-hard-faced trims, contact your local Emerson sales office. Values are the highest available for hard-faced trims.

Type	NPS	Capacity (Unbalanced)								ΔP (bar) ¹																		
		Full	Port Size	Cv - Flow Up	Cv - Flow Down	Reduced Port	Port Size	Cv - Flow Up	Cv - Flow Down	Full Port	Seat Type	delta P - Shutoff	Reduced Port	delta P - Shutoff														
CE	1 1/2	Equal Percentage	28.5mm (1 1/8 in)	25.2	25	Equal Percentage	4.8mm (3/16 in)	0.667	-	28.5mm	Metal Seat	51.7	4.8mm Micro-flat 4.8mm 6.4mm 9.5mm	51.7														
							6.4mm (1/4 in)	1.59	-																			
							9.5mm (3/8 in)	3.5	-																			
							12.7mm (1/2 in)	5.91	-																			
							14.2mm (3/4 in)	12.2	15.3																			
		Linear	28.5mm (1 1/8 in)	24.8	27.8	Linear	4.8mm (3/16 in) Flat Angle: 0° 24'	0.008	-			51.7	Composition Seat	51.7	4.8mm Micro-flat 4.8mm 6.4mm 9.5mm 12.7mm 14.2mm	51.7												
							4.8mm (3/16 in) Flat Angle: 1°	0.024	-																			
							4.8mm (3/16 in) Flat Angle: 1° 8'	0.036	-																			
							4.8mm (3/16 in) Flat Angle: 2° 15'	0.112	-																			
							4.8mm (3/16 in) Flat Angle: 4° 39'	0.235	-																			
							12.7mm (1/2 in)	6.08	-																			
							14.2mm (3/4 in)	12.5	15.1																			
							GX	1 1/2	Equal Percentage								36mm	27.2	n/a	Equal Percentage	14mm	6.87	n/a	36mm	Metal or PTFE	51.7	14mm 22mm	51.7
																					22mm	14.3	n/a					
Linear	36mm	32	n/a	Linear	14mm	8.25			n/a																			
					22mm	17.2			n/a																			

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Type	NPS	Capacity (Unbalanced)								ΔP (bar) ¹					
		Full	Port Size	Cv - Flow Up	Cv - Flow Down	Reduced Port	Port Size	Cv - Flow Up	Cv - Flow Down	Full Port	Seat Type	delta P - Shutoff (Flowing)	Reduced Port	delta P - Shutoff (Flowing)	
CE	2	Equal Percentage	38.1mm (1 1/2 in)	45.7	46.5	Equal Percentage	19.1mm	12	-	38.1mm	Metal Seat	51.7 (34.7)	19.1mm	51.7	
							28.5mm	25.5	28				28.5mm		
		Linear	38.1mm (1 1/2 in)	46.3	48.7	Linear	19.1mm	12.3	-				Composition Seat		28.5mm
							28.5mm	27.6	31.7						
GX	2	Equal Percentage	46mm	43.7	n/a	Equal Percentage	22mm	14.3	n/a	46mm	Metal or PTFE	51.7	22mm	51.7	
							36mm	28.6	n/a				36mm		
		Linear	46mm	48.6	n/a	Linear	22mm	17.2	n/a				Composition Seat		36mm
							36mm	33.9	n/a						

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Type	NPS	Capacity (Unbalanced)								ΔP (bar) ¹					
		Full	Port Size	Cv - Flow Up	Cv - Flow Down	Reduced Port	Port Size	Cv - Flow Up	Cv - Flow Down	Full Port	Seat Type	delta P - Shutoff (Flowing)	Reduced Port	delta P - Shutoff (Flowing)	
CE	3	Equal Percentage	63.5mm (2 1/2 in)	109	104	Equal Percentage	38.1mm (1 1/2 in)	47.8	51.8	63.5mm (2 1/2 in)	Metal Seat	51.7 (27.8)	38.1mm (1 1/2 in)	51.7 (34.7)	
		Linear	63.5mm (2 1/2 in)	111	114	Linear	38.1mm (1 1/2 in)	48.6	52.4		Composition Seat				
GX	3	Equal Percentage	70mm	95.1	n/a	Equal Percentage	36mm	28.6	n/a	70mm	Metal or PTFE	33.1	36mm	51.7	
							46mm	43.7	n/a				46mm		
		Linear	70mm	117	n/a	Linear	36mm	33.3	n/a				Composition Seat		46mm
							46mm	51.8	n/a						

1. For non-hard-faced trims, contact your local Emerson sales office. Values are the highest available for hard-faced trims.

Type	NPS	Capacity (Balanced)								ΔP (bar) ¹				
		Full	Port Size	Cv - Flow Up	Cv - Flow Down	Reduced Port	Port Size	Cv - Flow Up	Cv - Flow Down	Full Port	Seat Type	delta P - Shutoff	Reduced Port	delta P - Shutoff
GX	3	Equal Percentage	70mm	75.7	n/a	Equal Percentage	n/a	n/a	n/a	70mm	Metal	51.7	n/a	n/a
		Linear	70mm	102	n/a	Linear	n/a	n/a	n/a				n/a	n/a

1. For non-hard-faced trims, contact your local Emerson sales office. Values are the highest available for hard-faced trims.

Type	NPS	Capacity (Unbalanced)								ΔP (bar) ¹				
		Full	Port Size	Cv - Flow Up	Cv - Flow Down	Reduced Port	Port Size	Cv - Flow Up	Cv - Flow Down	Full Port	Seat Type	delta P - Shutoff (Flowing)	Reduced Port	delta P - Shutoff (Flowing)
CE	4	Equal Percentage	82.6 (3 1/4 in)	179	168	Equal Percentage	63.5mm (2 1/2 in)	117	118	82.6 (3 1/4 in)	Metal Seat	51.7 (17.4)	63.5mm (2 1/2 in)	51.7 (27.8)
		Linear	82.6 (3 1/4 in)	195	179	Linear	63.5mm (2 1/2 in)	128	132		Composition Seat			
GX	4	Equal Percentage	90mm	165	n/a	Equal Percentage	46mm	44	n/a	90mm	Metal or PTFE	20	46mm	48.4
							70mm	97.7	n/a					
		Linear	90mm	184	n/a	Linear	46mm	52.2	n/a				70mm	33.1
							70mm	128	n/a					

1. For non-hard-faced trims, contact your local Emerson sales office. Values are the highest available for hard-faced trims.

Type	NPS	Capacity (Balanced)								ΔP (bar) ¹				
		Full	Port Size	Cv - Flow Up	Cv - Flow Down	Reduced Port	Port Size	Cv - Flow Up	Cv - Flow Down	Full Port	Seat Type	delta P - Shutoff	Reduced Port	delta P - Shutoff
GX	4	Equal Percentage	90mm	128	n/a	Equal Percentage	90mm Restricted	68.5	n/a	90mm	Metal	51.7	90mm Restricted	51.7
		Linear	90mm	151	n/a	Linear	90mm Restricted	92.3	n/a				90mm Restricted	51.7

1. For non-hard-faced trims, contact your local Emerson sales office. Values are the highest available for hard-faced trims.

Table 1. Capabilities by Size

Type	NPS	Shutoff Class		
		IV	V	VI
CE	All	Standard	Optional for Metal Seat	Composition Seat
GX	1	Standard	Optional for Metal Seat	
	1.5–4	Standard	Optional for Metal Seat	Optional PTFE Seat

Table 2. Shutoff Class Availability

Alloy Material Comparison

Please see the table below for alloy materials. It is important to note the Fisher GX CN3MCu / CN7M (Alloy 20) valve body is only supplied with Hastelloy C trim.

Type	NPS	Body Material								
		CF3M	WCC	Alloy 20	MONEL	CW2M	CF3	N7M	LCC	CD3MN
CE	All	X	X	X	X	X	X	X		
GX	All	X	X	X	X	X	X	X	X	X

Table 3. Material Availability

ISA Long Face-to-Face Dimension

The standard CE valve was an 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 4 below highlights the differences between CE and GX valves.

Type	NPS	Body Material							
		WCC	CF3M	CW2M	LCC	Alloy 20	MONEL	CF3	N7M
CE	1	X	X	X	X	X	X	X	X
GX	1	X	X	X	X				
CE	1.5	X	X	X	X	X	X	X	X
GX	1.5	X	X	X	X				
CE	2	X	X	X	X	X	X	X	X
GX	2	X	X	X	X				
CE	3	X	X	X	X	X	X	X	X
GX	3	X	X		X				
CE	4	X	X	X	X	X	X	X	X
GX	4	X	X		X				

Table 4. ISA Long Face-to-Face Availability by Material

Bellows Comparison

Please see the table below for 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 balanced or reduced port trim options.

Type	NPS	Body Material					
	Size	CF3M	WCC	CN7M	MONEL	CW2M	LCC
CE	1-4	Inconel 625	Inconel 625	Inconel 625	Inconel 625	Inconel 625	-
		Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C	-
GX	1-4	SST	SST	-	-	Hastelloy C	SST
		Hastelloy C	Hastelloy C	-	-		Hastelloy C

Table 5. Bellows Availability

Valve and Actuator Features

The Fisher CE and GX valves share many standard features as described in Table 6 below. One design difference between the CE valve and the GX valve is the bonnet. The GX bonnet is clamped between the valve body and actuator yoke. This reduces complexity, size, and weight from the bolted bonnet design of the CE valve.

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

Tables 6 and 7 showcase the valve features and actuator features, respectively.

Valve	CE	GX
Body	CL150, CL300, CL600 ISA Long F-F (See Table 4)	CL150, CL300 ISA Long F-F Option (See Table 4)
Plug Design	Unbalanced Only – Stem Guided	Balanced and Unbalanced – Port Guided
Seat Ring	Clamped	Threaded
Packing	ENVIRO-SEAL™ Optional	ENVIRO-SEAL Standard
Cv Capacities	See Table 1	See Table 1
Pressure Drop	See Table 1	See Table 1
Shutoff Class	See Table 2	See Table 2
Flow Direction	Up Standard, Down Optional	Up
Flow Characteristics	Equal Percentage and Linear	Equal Percentage and Linear
Trim Materials	316L Standard, Optional Hard Facing, Alloy Matches Body	316L Standard, Optional Hard Facing, Alloy Matches Body (CN3MCu/CN7M Body with N06022 Trim)
Temperature Capabilities	-196° to 427°C (-325° to 800°F)	-196° to 371°C (- 325° to 700°F) ⁽¹⁾

1. 371°C (700°F) is the temperature limit of the Fisher GX ENVIRO-SEAL™ Graphite ULF packing system.

Table 6. Valve Features

Actuator	CE (585, 585R, 657, 667)	GX
Operating Pressure	0–18 6–30 Higher for 585 Piston Actuators	4 bar (60psi) Standard 3 bar (45psi) Optional 2 bar (30psi) Optional
Bench Set	Requires Spring Selection, Sizing, and Bench Set	No Adjustment or Sizing Required
Actuator Fail Action	Actuator Model Dependent	Both Available Field Reversible
Instrument Availability	Standard Bracket Mount	Integral FIELDVUE Instrument Mounting. Pneumatics Available with Standard Bracket Mount.
Sizes	Actuator Model Specific	2 Sizes (225 & 750)
Cycle Life	Spring Selection Specific	Tested to 1,000,000 cycles

Table 7. Actuator Features

Conclusion

The 1996 obsolescence of the Fisher CE valve ended spare parts availability in 2006. The Fisher GX control valve offers compatible sizes, features, and materials to cover the wide range of customer application needs and is the recommended replacement for the Fisher CE control valve. Please contact your Emerson local business partner or sales office for additional details or questions regarding the Fisher GX control valve.

Additional Resources

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

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



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