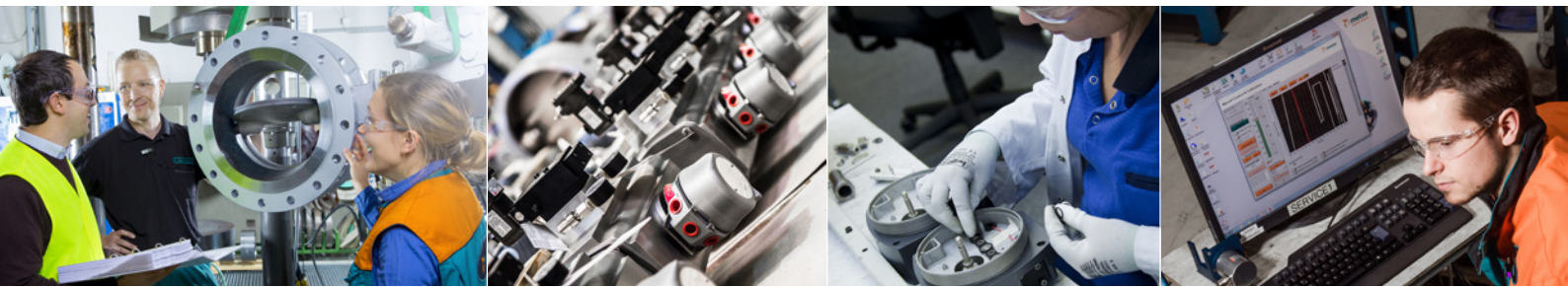


Neles  
Flow control solutions



A solution  
for each and  
every process  
challenge





## Neles Flow control solutions

To help you optimize your process performance and reliability, Metso approaches each process and application as a specific challenge. Our control, on-off and ESD valves, accessories, intelligent devices and software products are engineered to meet these challenges. They provide innovative, fundamentally simple construction, operation and maintenance features to optimize process performance at the lowest cost.

### Designed to make the big difference

The selection of the right valves and accessories in demanding and often critical applications in oil and gas, pulp and paper or energy industry applications is often a matter of both business performance and the efficiency, safety and reliability of process itself. Metso's valves and all related products and services are always created with the customer's process and business in mind. We design and deliver solutions that enhance performance and ensure process safety and reliability. Each Metso device and solution is based on our extensive industry experience and knowhow. Our dedicated people, from sales to services, are committed to delivering the results our customers expect from us, and more.

### Testing capabilities

Metso has an extensive quality assurance program covering all manufacturing activities. All components or valve units are tested before delivery. For modulating control valves the testing includes control

performance for the verification of every delivered valve unit. Basic testing includes hydrostatic, seat leakage and functional testing. Advanced computer-based test rigs have been provided for these valve testing activities. A special feature in Metso test facilities is our high-pressure gas test and top-of-range industrial cryogenic laboratory.

### Simplifying service solutions

We are committed to helping energy and hydrocarbon, and pulp and paper customers improve process performance and reduce operating costs. Our leading edge technological solutions and skilled customer support personnel get the job done with a goal of making your work life easier.

Our services encompass the entire product life cycle, from the time of installation all the way through to planned replacement. At every step, our goal is to reduce your cost of doing business and enhancing your overall profitability. Metso applies a vast amount of industry, process, application and product knowledge into every customer relationship. Our technicians work in partnership with you to develop programs and provide services that meet your specific requirements.

### Nelprof®

Nelprof control-, on/off- and safety valve sizing and selection software allows you to select the right valve for your application. Nelprof has an inbuilt expert system that guides you through the selection process with notes and warnings. You can analyze and compare control valve performance before installation and choose the right valve size and type to reduce process variability and ensure the best process performance. On/off module enables the selection of all intelligent Metso metal- and soft-seated on/ off- and emergency valves. The SIL module is the first safety integrity level tool on the market. It enables safety integrity level evaluation

for the whole valve assembly, including valve, actuator, positioner and one to several pneumatic components when needed.

### Ensuring process safety and reliability

In addition to our robust and reliable valves, we offer a range of products and services designed to ensure the desired performance of critical valves across their entire life cycle. For instance, the Neles ValvGuard intelligent safety solenoid and PST system helps monitor and ensure the full functionality of critical, yet often idle, emergency shutdown (ESD) and venting valves.

### Valve Controls

Metso offers a unique range of reliable and easy-to-use solutions to control your valves. With the help of Metso's products you can fulfill end user requirements for control, emergency shutdown and on/off valve applications. Metso's products will ensure best possible valve performance and compliance with environmental regulations. Metso's offering ranges from limit switches to high performance intelligent valve controllers such as the Neles NDX & ND9000, with third generation diagnostics. Our competitive valve control solutions allow you to get the best possible performance from your valves (Brochure reference: CB058 & CB059).

# Control valves

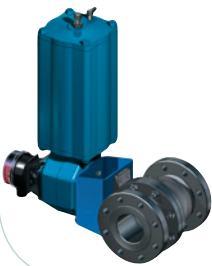
	Series	Design	Size range	Pressure classes	Temp. range	Standard body materials	Leakage rate	Service	Options	Bulletin reference
V-port segment valves										
	RA, RE	Wafer, flanged	DN 25 - 800 / 1" - 32	PN 10 - 40 / ASME 150 - 300	-52 ... +425 °C / -60 ... +797 °F	CF8M, WCB, CG8M Titanium, Hastelloy C	Class IV, 10x ISO Rate D/class IV, optionally ISO rate D/class V (min. 20 bar Δp)	General, Demanding/ Erosive	Reduced Cv trims, Q-Trims	3R21, 3R24, 7ND9021
Finetrol eccentric plug valves										
	FC, FL	Flanged, eccentric rotary plug valve	DN 25 - 250 / 1" - 10"	PN 10 - 100 / ASME 150 - 600	-200 ... +425 °C / -320 ... +797 °F	CF8M, WCC	Class IV Class VI	General, severe	Reduced Cv trims, Q-Trims, Cryogenic	5FT20, 5FT22, 7ND9021
High performance triple eccentric disc valves										
	L12, L6, LW & LG, L1 & L2 BW BWX	Wafer, lugged, double flanged	DN 80 - 2000 / 3" - 80"	ASME 150 - 2500, PN 10 - 400	-200 ... +1400 °C / -320 ... +2500 °F	CF8M, WCB, CG8M, LCC, 254SMO, 5A	Class III - VI	General, severe	Heat traced, S-Disc, Cryogenic, live-loaded packing	2L121, 2L1220, 2LW20, 2L621, 2BW20, 2BW20, 7ND9021
Neles RotaryGlobe										
	ZX	Flanged, Rotary globe control valve	1/2" - 4" / DN 15 - 100	ASME 150 - 1500 / PN 10 - 100	-80 ... +425 °C / -110 ... +797 °F	CF8M, WCC	Class III - IV	General, severe	Balanced anti-cavitation and low noise, different CV and LIN/ EQ% trims	1RG20, 7ND9021
Top 5 top entry rotary valves										
	T5	Reduced port, flanged, weldends	DN 25 - 400 / 1" - 16"	PN 10 - 100 / ASME 150 - 600	-200 ... +600 °C / -320 ... +1110 °F	CF8M, WCB	Class V - VI	Heavy duty	Q-Trim, Q2-Trim, different Cv-trims, Cryogenic	1T520, 7ND9021
E series ceramic valves										
	E2 & E6	Reduced port, wafer, lugged	DN 25 - 200 / 1" - 8"	PN 10 - 40 / ASME 150 - 300	-40 ... +425 °C / -40 ... +800 °F	Stainless steel/ Magnesia, Partially stabilized Zirconia (Mg-PS2)	ISO rate D, Class V	Erosive applications	Different Cv-trims	1E220, 7ND9021

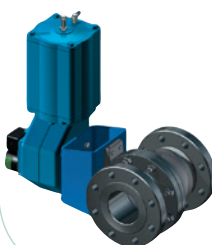
# Globe control valves


	Series	Design	Size range*	Pressure classes*	Temp. range	Standard body materials	Leakage rate	Trim material	Bulletin reference
Series GU, globe unbalanced, top guided type									
	GU	Single seated, Top guided- Flanged, Butt & Socket weld	1/2"-6"	ASME 150 - 600	-196 ... +593 °C / -321 ... +1053 °F	WCB, CF8M	ANSI Class IV ~ VI	410 SS, 316 SS, 630 SS, Alloy steel, Hard facing	4GV21
Series GB, globe balanced, cage guided type									
	GB	High capacity and heavy duty balanced, cage guided Flanged, Butt & Socket weld	2"-24"	ASME 150 - 2500	-196 ... +593 °C / -321 ... +1053 °F	WCB, CF8M	ANSI Class III ~ V	410 SS, 316 SS, 630 SS, Alloy steel, Hard facing	4GV25
Series GM, globe Omega trim, multi-stage type									
	GM	Flanged, Butt weld & Socket weld	2"-24"	ASME 150 - 2500	-196 ... +593 °C / -321 ... +1053 °F	WCB, CF8M	ANSI Class III ~ VI	420 SS, 630 SS, Solid Carbide Tungsten, Inconel, Alloy steel, Hard facing	4GV20
Series AU / AB / AM, angle pattern valves									
	A	Flanged, Butt & Socket weld	1"-48"	ASME 150 - 2500	-196 ... +593 °C / -321 ... +1053 °F	WCB, CF8M	ANSI Class IV ~ VI	410 SS, 316 SS, 630 SS, Alloy steel, Hard facing	4GV23
Series GW, globe 3-Way, diverting / mixing type									
	GW	Flanged, Butt & Socket weld	1"-10"	ASME 150 - 600	-29 ... +260 °C / -20 ... +500 °F	WCB, CF8M	ANSI Class II ~ IV	410 SS, 316 SS, 630 SS, Alloy steel, Hard facing	4GV24

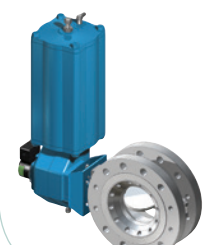
\* Consult factory for sizes & pressure classes outside the standard range.

# On-off valves

	Series	Design	Size range	Pressure classes	Temperature range	Standard body materials	Leakage rate	Service	Options
X series ball valves									
	XA, XB, XC, XU, XT - seat supported, XG, XM, XH - trunnion mounted	Full or reduced bore, Metal and soft seats	DN 25 - 600 / 1" - 24"	PN 10 - 160 / ASME 150 - 900	-200 ... +600 °C / -330 ... +1110 °F	CF8M, WCB, C5	Class V or VI	General	Steam jacket, Cryogenic & high temperature, Catalyst handling, Coal gasification, Polymer service, Oxygen service, Q-Trim, Q2-Trim
	Bulletin reference: 1X22, 1X23, 1X26, 1X27, 1XH20, 6B20, CB058								

	Series	Design	Size range	Pressure classes	Temperature range	Standard body materials	Leakage rate	Service	Options
M series ball valves									
	M1, M2 - seat supported and trunnion mounted	Full bore, Metal and soft seats	DN 25 - 400 / 1" - 16"	PN 10 - 40 / ASME 150 - 300	-50...+250 °C / -60...+480 °F	CF8M, CG8M	ISO rate D metal seats, Bubble tight with soft seats	General in P&P industry	Black and green liquor applications
	Bulletin reference: 1M120, 1M220, 6B20, CB058								

	Series	Design	Size range	Pressure classes	Temperature range	Standard body materials	Leakage rate	Service	Options
D series ball valve									
	D2C, D2D, D1F	Full or reduced port, Stemball construction	D1F: DN50 - 600 2" - 28" D2: DN100 - 900 4" - 36"	PN 10 - 100 / ASME 150 - 600	-200 ... +600 °C / -320 ... +1110 °F	CF8M, WCB, LCC	Class V - VI	Demanding application	Steam jacket, Cryogenic & high temperature, Catalyst handling, Q-Trim, Q2-Trim
	Bulletin reference: 1D21, 6B20, CB058								

	Series	Design	Size range	Pressure classes	Temperature range	Standard body materials	Leakage rate	Service	Options
High performance triple eccentric disc valves									
	L12, L6, LW & LG, L1 & L2 BW BWX	Wafer, lugged, double flanged, weld-end	DN 80 - 2000 / 3" - 80"	ASME 150 - 2500, PN 10 - 400	-200 ... +1000 °C / -320 ... +1800 °F	CF8M, WCB, CG8M, LCC, 254SMO, 5A	ISO Rate A, ISO Rate B, API 598	General, moderate	High tightness, Erosion resistant version, Cryogenic & high temperature, High cycling, Top entry
	Bulletin reference: 2L121, 2L1220, 2LW20, 2L621, 2BW20, 2BW20, 6B20, CB058								

# ESD valves


	Series	Design	Size range	Pressure classes	Temperature range	Standard body materials	Leakage rate	Service	Options
X series ball valves									
	XA, XB, XC, XU, XT - seat supported, XG, XM, XH - trunnion mounted	Full or reduced bore, Metal seats	DN 25 - 600 / 1" - 24"	PN 10 - 160 / ASME 150 - 900	-200 ... +600 °C / -330 ... +1110 °F	CF8M, WCB, C5	Class V - VI	High MTBF, SIL 3 certified	Cryogenic, high temperature
	Bulletin reference: 1X22, 1X23, 1X26, 1X27, 1XH20, 9VG921, CB058								
D series ball valves									
	D2C, D2D, D1F	Full or reduced port, Stemball construction	D1F DN 50 - 700 / 2" - 28", D2 DN 100 - 900 / 4" - 36"	PN 10 - 100 / ASME 150 - 600	-196 ... +600 °C / -320 ... +1110 °F	CF8M, WCB, LCC	Class V - VI	High MTBF, SIL 3 certified	Cryogenic, high temperature
	Bulletin reference: 1D21, 9VG921, CB058								
Top entry rotary valves									
	T5	Reduced or full port, flanged, weldends	DN 25 - 400 / 1" - 16"	PN 10 - 40 / ASME 150 - 600	-200 ... +600 °C / -320 ... +1110 °F	CF8M, WCB	Class V - VI	High MTBF, SIL 3 certified	Cryogenic, high temperature
	Bulletin reference: 1T520, 9VG921, CB058								
High performance triple eccentric disc valves									
	L6, LW & LG, L1 & L2 BW BWX	Wafer, lugged, double flanged	DN 80 - 2000 / 3" - 80"	ASME 150 - 2500, PN 10 - 400	-200 ... +1000 °C / -320 ... +1800 °F	CF8M, WCB, CG8M, LCC, 254SMO, 5A	ISO Rate A, ISO Rate B, API 598	High MTBF SIL 3 certified	High tightness, Cryogenic, high temp.
	Bulletin reference: 2L121, 2L621, 2LW20, 2BW20,								


# Engineered valve solutions


	Size and pressure range	Materials	Temperature range	Application
Type BH Lever valves				
	NPS 8 - NPS 100 CL 150	Carbon Steel	-29 ... +250 °C / -20 ... +482 °F	Valve opens at precise pressure differential without use of separate monitoring. Air separation, chemical plants, cement and steel, industry, safety valve
Type BWX Cryogenic butterfly valves				
	NPS 4 - NPS 24 / DN 100 - DN 600 ASME Class 150, 300, 600 PN10 / 16 / 25 / 40 / 63	Stainless Steel Special material	-270 ... +200 °C / -454 ... +392 °F	Cryogenic and LNG applications, air separation, nitrogen, helium and hydrogen
Bulletin reference: 2BWX20				
Type BO High performance butterfly valves for pressure swing adsorption plants				
	NPS 3 - NPS 40 CL 150	Ductile iron steel	-10 ... +200 °C / 14 ... +392 °F	Pressure swing adsorption plants for low pressure oxygen and nitrogen in up to 2 million cycles with opening and closing time <1 s
Bulletin reference: 2BO20				
Type BN Soft seated butterfly valves				
	NPS 3 - NPS 100 CL 150	Carbon Steel Stainless Steel Duplex SS	-16 ... +200 °C / -10 ... +400 °F	Standard butterfly valves with: EPDM, VITON, PTFE and metal seating for general application
Type BW Engineered metal seated butterfly valves				
	NPS 3 - NPS 100 CL 150, 300, 600, 900, 1500, 2500	Carbon Steel Stainless Steel Duplex SS Special Materials	-270 ... +850 °C / -454 ... +1562 °F	High pressure/temperature applications in power plants, ethylene plants, refineries, aero engines, chemical plants, slurries, polymerizing fluids, styrene, acrylic acid, natural gas
Bulletin reference: 2BW20				





# Smart products

Series	Type	Supply power	Supply pressure	Temperature range	Communication	
Neles NDX						
	NDX - standard, intrinsically safe, explosion proof	Intelligent valve controller	Taken from the 4...20 mA, control signal	1.4 – 8.0 bar / 20 – 115 psi	-40 ... +85 °C / -40 ... +185 °F	HART
Bulletin reference: 7NDX21, CB058, CB059						

Series	Type	Input	Supply power	Supply pressure	Temperature range	Communication	
Neles ND9100, ND9200, ND9300 & ND9400							
	ND9100 - standard, ND9400 - stainless steel intrinsically safe ND9200 - explosion proof ND9300 - stainless steel enclosure intrinsically safe and explosion proof	Intelligent valve controller	4 - 20 mA or 0 - 100 %	Taken from the 4...20 mA, control signal or fieldbus powered	1.4 - 8 bar / 20 - 115 psi	-40 ... + 85 °C / -40 ... +185 °F	HART, Profibus PA, FOUNDATION fieldbus
Bulletin reference: 7ND9021, CB058							

Series	Type	Input	Supply pressure	Temperature range	Communication	
Neles ValvGuard™ VG9000						
	VG9200 - standard epoxy coated anodised aluminium alloy enclosure, intrinsically safe and explosion proof VG9300 - full 316 stainless steel enclosure, intrinsically safe and explosion proof	Intelligent safety solenoid for FOUNDATION fieldbus and HART. TÜV SIL 3 approved partial stroke testing system for emergency shutdown valves.	FOUNDATION fieldbus: FF + 0/24 VDC HART: 0/24 VDC with RC19H or 4 - 20 mA	3.0 - 7.5 bar / 44 - 109 psi	-40 ... +85 °C / -40 ... +185 °F	FOUNDATION fieldbus, HART
Bulletin reference: 9VG921, CB058						

Series	Type	Input	Supply pressure	Temperature range	Communication	
Neles ValvGuard™ VG9PST						
	VG9200 - standard epoxy coated anodised aluminium alloy enclosure, intrinsically safe and explosion proof VG9300 - full 316 stainless steel enclosure, intrinsically safe and explosion proof	Partial stroke testing device used with additional solenoid valve.	8 - 20 mA	3.0 - 7.5 bar / 44 - 109 psi	-40 ... +85 °C / -40 ... +185 °F	HART
Bulletin reference: 9VG921, CB058						



Series	Service	Switch type	Temperature range	Communication	
Axiom®					
	AN, AX	On/off valve controller with integral solenoid for rotary valves / actuators. General purpose, nonincendive, intrinsically safe, explosion proof. Available with Wireless Link	Inductive proximity, VCT	-40 ... +80 °C / -40 ... +176 °F	FOUNDATION FIELDBUS, AS-INTERFACE, HART. DEVICENET
Bulletin reference: CB058, 7AN20, 7AM21, 7AX21					





# Pneumatic actuators

	Series	Type	Action	Pressure input	Torque output	Temperature range	Options	Bulletin reference
B1 series								
	B1C & B1J	Pneumatic rotary cylinder actuator	B1C - double action, B1J - spring return	2.8 - 10 bar / 40 - 140 psi	28 - 100000 Nm, 21 - 73800 ft-lbs	-55 ... +120 °C / -67 ... +250 °F	Manual and hydraulic overdrives, lockout devices, high-cycle, Fire protection	6B20, CB058
Quadra-Powr X								
	Quadra-Powr X	Spring-diaphragm rotary actuator	Spring return	1.3 - 7 bar / 20 - 100 psi	15 to 796 Nm / 11 to 587 lb-ft	-29 ... +66 °C / -20 ... +150 °F	Mechanical lockout, 100 % adjustable stop, Wet conditions (Tropicalization) kit, Fusible plug	QPX21
	Series	Type	Action	Pressure input	Thrust output	Temperature range	Options	Bulletin reference
Series VD								
	VD	Pneumatic diaphragm actuator for linear valves	Spring return	3.0 - 4.2 bar / 44 - 60 psi	1890 - 22800 N / 424 - 5125 lb.f	-53 ... +85 °C / -63.4 ... +185 °F	Handwheel for manual operation Volume tank	6VD20
Series VC								
	VC	Pneumatic cylinder actuator for linear valves	Double acting	4.0 - 10 bar / 60 psi - 145 psi	27480 - 264860 N / 6177 - 59542 lb.f	-53 ... +85 °C / -63.4 ... +185 °F	Handwheel for manual operation Volume tank or built-in volume chamber	6CA20

# Electric actuators

	Series	Type	Service	Torque output	Temperature range	Bulletin reference
V-series actuators						
	V-series	Electric actuator	Control configurations from on/off, to automatic cycling and analog modulating	17 to 339 Nm / 12 to 250 lb-ft	-40 ... +66 °C / -40 ... +150 °F	A200-1, CB058
ADC-series actuators						
	ADC series	Electric actuator	Both on/off and modulating control	17 to 339 Nm / 12 to 250 lb-ft	-40 ... +55 °C / -40 ... +130 °F	A201-1, CB058




# Analog positioners

	Series	Type	Input	Split range	Ambient temperature	Vibration effect	Bulletin reference
Pneumatic positioner							
	NP 700	Pneumatic positioner	0.2 - 1 bar, 20 - 200 kPa, 3 - 15 psi	0.2 - 0.6 bar, 0.6 bar - 1 bar, 3 - 9 psig, 9 - 15 psig	-40 ... +90 °C / -40 ... +200 °F	< 1%	7NENP20
Electropneumatic positioner							
	NE 700	Electropneumatic positioner	4 - 20 mA, 0 - 20 mA	4 - 12 mA, 12 - 20 mA	-25 ... +85 °C / -15 ... +185 °F	< 1%	7NENP20

# Limit switches

	Series	Service	Switch type	Temperature range	Communication	Bulletin reference
Quartz®						
	QX, QN, QG	Valve position feedback for rotary valves / actuators. General purpose, nonincendive, intrinsically safe, explosion proof	Solid state proximity, reed, mechanical micro, VCT	-40 ... +80 °C / -40 ... +176 °F	Foundation fieldbus, AS-Interface	CB058, 7QZ22
Eclipse®						
	EN, EG	Valve position feedback for rotary valves / actuators. General purpose, nonincendive, intrinsically safe	Solid state proximity, VCT	-40 ... +80 °C / -40 ... +176 °F	DeviceNet, AS-Interface	CB058, 7ECL21
Prism®						
	PI	On/off valve controller with integral solenoid for sanitary diaphragm and angle valves. General purpose, nonincendive, intrinsically safe. Available with Wireless Link	Solid state proximity sensors	-20 ... +60 °C / -4 ... +140 °F	DeviceNet, AS-Interface	CB058, 7PI21
Hawkeye®						
	HK, HX	Valve position feedback for linear valves / actuators. General purpose, nonincendive, intrinsically safe, explosion proof.	SST solid state sensors	-40 ... +80 °C / -40 ... +176 °F		CB058, 7HK21, 7HX21

# Application based products

	Series	Design	Size range	Pressure classes	Temperature range	Body materials	Service	Options	Bulletin reference
Capping valve									
	PZ	Capping valve	DN 500 - 750 / 20" - 30"	PN 16 & ASME 150	max. +200 °C / +390 °F	CF8M	For digester chip fill	Pressure switches for safety interlocks, Water flushing for ball surface	8PZ20
nelesACE basis weight control valve									
		V-port segment valve together with, high resolution stepping motor	DN 50-500 / 2"-20"	PN 25/40, ASME 150/300	-40 ... +250 °C / -40 ... +480 °F	CF8M	Basis weight control unit		8ACE21
Pocket feeder valve									
	M1, M2	Pocket feeder construction	DN 150 - 200 / 6" - 8"	PN 10 - 40 ASME 150, 300	-50 ... +250 °C / -60 ... +480 °F	CF8M	For separator service		8PF20

# Valve options

Type	Size range	Pressure classes	Materials	Options		
Q-Ball						
	Low noise and anti-cavitation trim for ball, segment and eccentric plug valves	DN 50... 900 / 2" ... 36"	ASME 150 - 1500, PN 10 - 100	CF8M, WCB	Q2 trim for extended aerodynamic noise attenuation for gas service Diffuser	
	Bulletin reference: 8Q20, 8Q220, CB041, CB049					
Type	Size range	Pressure classes	Cv-range	Materials		
S-Disc						
	Flow balancing trim for triple eccentric disc valves	DN 80... 1500 / 3" ... 60"	ASME 150 - 600 PN10 - 100	150 - 43800	CF8M, WCB, CG8M, LCC, 254SMO, 5A	
	Bulletin reference: 2SL120					
Type	Size range	Pressure classes	Cv-range	Materials	Options	
A-plate						
	Noise attenuator plate for noise reduction.	DN 25 - 1000 / 1" - 40"	ASME 150, 300, 600, PN 10 ... 100	7 - 4480	CF8M, WCB	Option 1 threaded directly into a Finetrol® or T5 valve body. Option2 wafer style. Can be mounted between flanges.
	Bulletin reference: 8ATT20					
Q2-plate						
	2 stage noise attenuation plate for gas applications	DN 50-600 2"-24"	ASME 150, 300, 600, PN 10 ... 100	22 - 13108	Stainless steel	Wafer style. Mounted between flanges.
	Bulletin reference: 8Q220, CB049					



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