

Ensuring control valve reliability

Control valve solutions
for severe service



Control valves are a critical element in achieving reliability and accuracy in process control. A full understanding of how the control valve interacts with the process plays a key role in the enhancement of control performance.



Valmet solutions for severe service

For over 50 years, our control valves have proven to provide optimum performance in severe service valve installations. Today's control valve portfolio includes a variety of rotary and linear valve trims for demanding applications, such as noise, cavitation, flashing and erosive conditions.

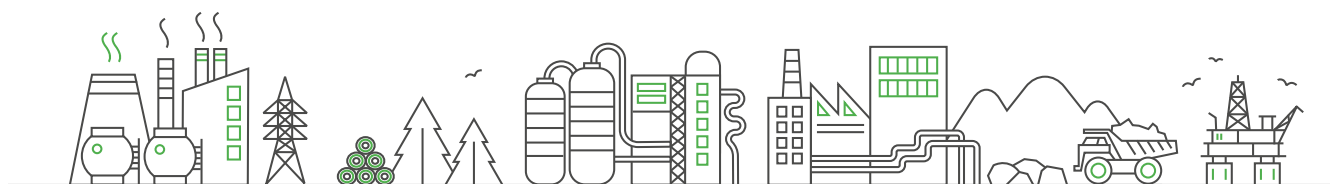
Control valve development

- 1970's**
 - Neles™ Q-Trim™ low-noise anti-cavitation for rotary control ball valves
 - Nelsize™ sizing program
- 1980's**
 - Segment valves with Neles Q-Trim
 - Neles™ S-Disc™ for butterfly valves
- 1990's**
 - Full ceramic control valve for extreme erosion
 - Neles™ Finetrol™ eccentric plug with Neles Q-Trim
- 2000's**
 - Rotary globe with balanced low-noise anti-cavitation trim
 - Neles globe valve introduced with Tendril™ and Omega™ low-noise anti-cavitation trims
 - Neles™ Q2-Trim™ for enhanced noise attenuation
 - Neles™ Q-Disc™ flow balancing and noise attenuation trim
 - Nelprof™, browser-based valve sizing and selection software

Operation and maintenance costs make up the bulk of the lifetime cost of a valve. Careful consideration of valve selection based on application challenges increases process and valve uptime, while delivering considerable saving.

Planned maintenance reduces lifecycle costs

It is particularly important in demanding applications to recognize maintenance needs that help extend device lifecycle. Based on process and device criticality, a maintenance plan should always be created to secure the functionality, reliability and safety of the planned process. The maintenance plan along with high-quality execution ensures that the lifecycle cost of valves remains at the desired level.



→ Chemical → Energy → Refining → Industrial gas → Pulp, paper & bioproducts → Gas processing and LNG → Pipeline

Addressing common challenges for valves in severe service

Eliminating cavitation



High noise, heavy vibration, material and mechanical damages are common difficulties

seen in control valves in cavitative conditions. If heavy cavitation is disregarded, severe damages in valve and trim may occur in a fairly short time frame. Controlling the velocity and the pressure in the trim is an effective method to eliminate cavitation and minimize damages. The division of flow into multiple small streams further enhances cavitation resistance and reduces the intensity of noise and vibration.

Managing flashing



Flashing flow may cause erosion and vibration, but unlike cavitation, the reason is the

impingement of high velocity liquid droplets to valve body and trim parts. Flashing phenomenon can not be avoided with the valve selection, but damages can be mitigated by carefully considering the valve design, materials, process conditions and valve installations.

Noise attenuation



Excessive valve noise in gas applications is an indication of high pressure losses. In addition to

health risks, this can cause vibration and mechanical damages in valves, instrumentation or pipeline. Noise abatement by using source treatment methods such as low noise trims are generally preferable as preventing excessive noise generation is the best way to ensure operational reliability. Path treatment methods such as thermal insulation may sometimes provide an alternative method to dampen excessive noise emission from valve to environment but mechanical integrity needs to be confirmed against acoustically induced vibration.

Extending valve lifetime in erosive services



Erosion is largely dependent on flow velocity. It is also strongly related to the properties of the

materials being used. Trim style and material selection should be done carefully in applications where erosive particles with high velocities exist. Typically hardened valve trims and/or hard body materials are used to protect from valve failures in erosive services.

Meeting today's safety and environmental requirements



Certified live-loaded low emission gland packings are standard characteristics for Neles

valves which provide full compliance with the strictest environmental regulations. Long-lasting tight shut-off and fire-tested options are also available in our extensive valve portfolio. These features, rarely available in modulating control valves, have gained the attention of the world's most advanced hydrocarbon processing companies.

Valve service



Our intelligent positioner provides market leading diagnostic features which allows

the creation of the most efficient maintenance strategy. By using the online condition monitoring features overhaul actions can be planned and executed at the correct time. We have a global service team available to support customers with all of their service activities.

Easy selection with Nelprof™

An easy tool designed to help you to select the correct control, automated on/off and emergency valves from our portfolio.

Performance analysis can be used to study valve controllability in a closed control loop. The module also includes multiphase flow sizing as well as noise and cavitation prediction analysis.





Rotary control valves

Available with Q-Trim™, Q-Disc™, S-Disc™ and Q2-Trim™ for severe service

Intelligent valve controller with on line diagnostic capabilities

- Neles™ NDX™
- Neles™ ND9000™

Certified emission performance

Robust and reliable actuator

- QP-series diaphragm actuator
- B1-series pneumatic cylinder actuator

Wide range of valve types

- Wide range of Neles control valves
- Easy selection with Nelprof sizing and selection software



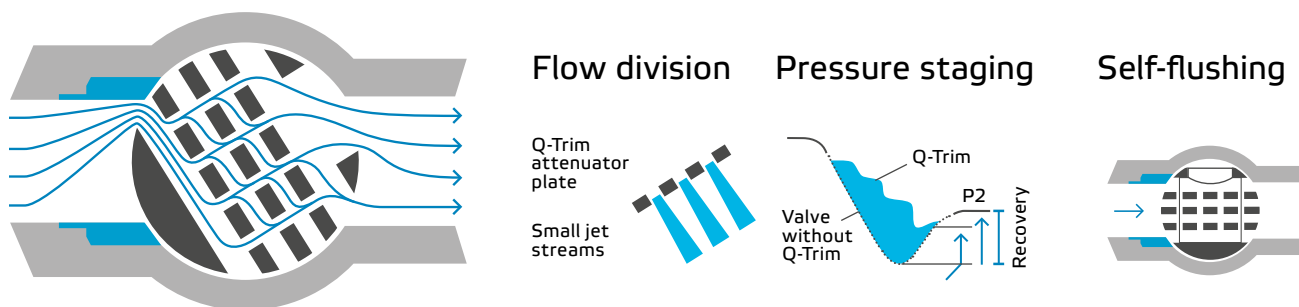
Setting the standard for rotary control valves

- Designed and manufactured by Valmet
- Single source responsibility
- Fully tested performance

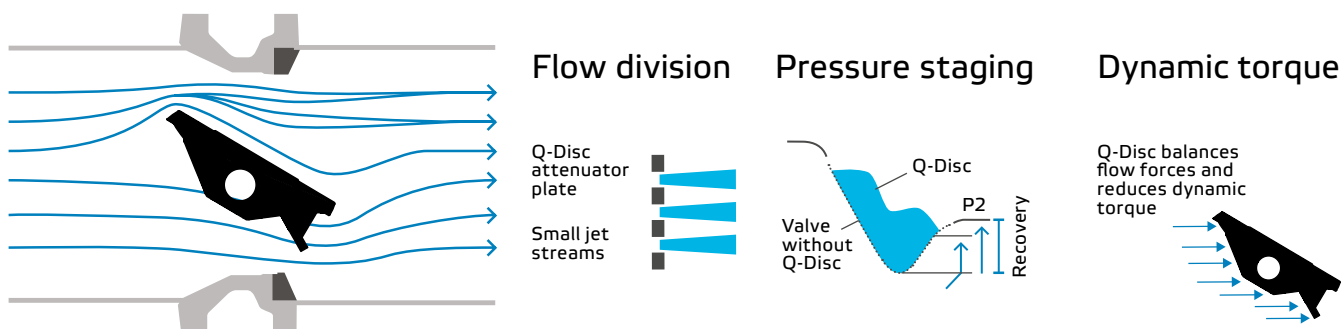
Rotary control valves combine superior controllability and wide rangeability with optional top-notch cavitation and noise abatement. High capacity provides an ideal solution for debottlenecking, and a smaller body size requires less piping support. Versatility in terms of installation direction saves space on site. Our rotary control valves offer excellent long-lasting fugitive emission control and suitability for dirty, erosive and extreme temperatures as standard.

Field proven results in severe applications

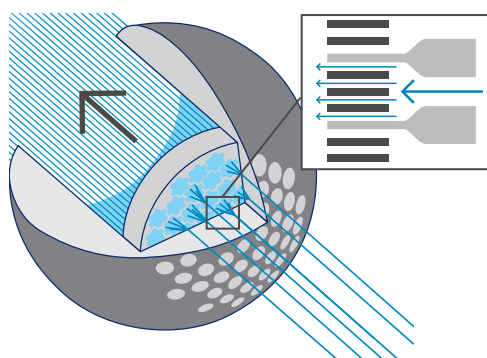
Neles Q-Trim – Multistaged pressure control with wide control range



Neles Q-Disc flow balancing trim



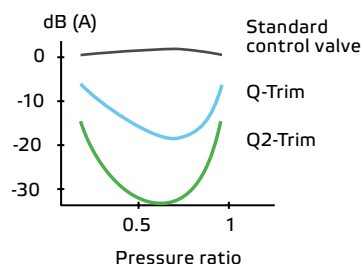
Neles Q2-Trim – Perfecting rotary valve noise reduction



Neles Q2-Trim takes the patented Q-Trim technology to a new level. The technology combines various techniques:

- Pressure staging
- Flow division
- Peak frequency shifting
- Velocity control

Noise reduction



Linear control valves

Available with Tendril™ and Omega™ trims for severe service

Actuator

- Field reversible diaphragm actuator – VD-series
- Spring return and double acting pneumatic linear cylinder actuator – VB-series
- Fail safe pneumatic linear cylinder actuator – VC-series

Certified emission performance

- Extension bonnet
- Bellows extension bonnet

Intelligent valve controller with on line diagnostic capabilities

- Neles NDX
- Neles ND9000

Wide range of valve options

- Various trim constructions
- Hardened and corrosion resistant trim materials



New generation globe and angle valves

- Innovative and fundamentally simple construction
- Smart technology seamlessly integrated
- Specially designed for process industry needs

Linear control valves combine modern, innovative design to the traditional strong points of the linear control valve construction. Fundamentally simple design makes the valve robust, and integration to the latest generation smart control valve positioners makes it easy to use. It is also easy to adapt the unit to different applications. Even in the toughest process conditions, there are solutions that ensure maximum reliability and performance.

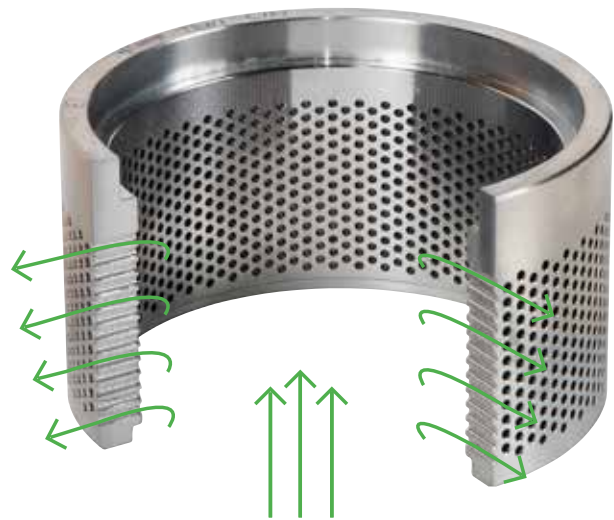


Effective noise and cavitation control for demanding applications

Tendril

Multihole trim

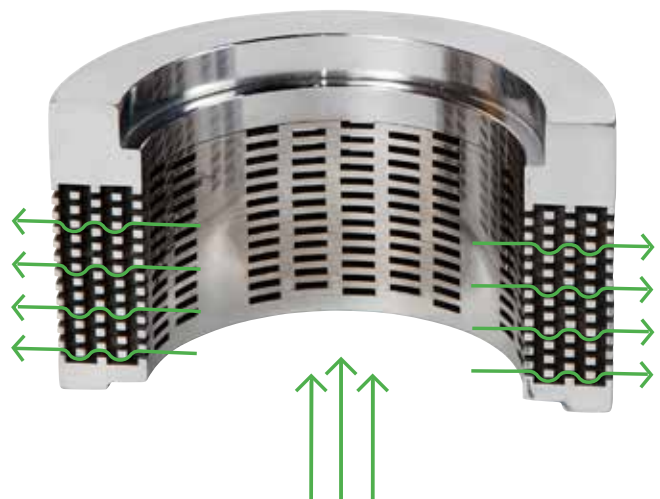
- Multihole for both balanced and unbalanced models
- Flow division by multihole flow channels
- Velocity and pressure control by individual flow paths
- Preventing exit jet interaction



Omega

Multistage, multiturn trim

- Multistage, multiturn construction
- Controlling trim velocity by multistaged, multiturn 2- or 3-dimensional flow passage
- Flow division by multiple flow channels
- Sudden expansion and contraction in individual flow path
- Preventing exit jet interaction
- Enhancing noise and cavitation reduction by optimising the number of turns in the trim



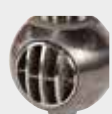
Severe service solutions

Better product designs and speedy design process

Digital simulations in product development enable us to cut down the number of laboratory tests, while increasing performance, safety and reliability without compromising on product quality. We utilize virtual modelling, simulations and tests that are especially helpful during the early design phase, allowing us to quickly identify optimized design combinations.



Noise and cavitation control for rotary valves

Noise and cavitation control for rotary valves					
Product	Design	Available for	Specifications	Service	Bulletin
Neles S-Disc™ 	Flow balancing trim	Butterfly valves: L-series	Sizes: 3" – 80" Pressure: ASME 150 – 600 Temperature: -200 to +600 °C	Gas and liquid services, moderate dP and wide temperature range, large sizes	2 SL1 20
Neles Q-Disc™ 	Flow balancing and noise attenuating trim	Butterfly valves: L-series	Sizes: 3" - 12" Pressure: ASME 150 - 300 Temperature: -200 to +600 °C	Gas and liquid services, moderate dP and wide temperature range	8QD20
Neles Q-Trim™ 	Versatile rotary	V-port segment valves: R-series Ball valves: X, T and M -series Eccentric rotary plug valves: F-series	Sizes: 2" – 36" Pressure: ASME 150 – 600 Temperature: -200 to +600 °C	Gas and liquid services, clean and dirty fluids, wide dP and temperature range	8 Q 20
Neles QLM-Trim™ 	Enhanced cavitation elimination	Ball valves: D-series	Sizes: 2" – 36" Pressure: ASME 150 – 1500 Temperature: -200 to +600 °C	Gas and liquid service, clean and dirty fluids, wide dP and temperature range	8 Q 20
Neles Q2-Trim™ 	Enhanced noise elimination	Ball valves: X and T -series	Sizes: 2" – 16" Pressure: ASME 150 – 600 Temperature: -200 to +600 °C	Gas services clean fluids, wide dP and temperature range	8 Q2 20
Neles balanced trim 	Balanced trim for high pressure difference and noise reduction	Rotary globe: ZX-series	Sizes: ½" – 4" Pressure: ASME 150 – 1500 Temperature: -80 to +425 °C	Gas and liquid services, wide temperature and dP range, clean services, small sizes, low Cv	1 RG 20

Noise and cavitation control for linear valves

Noise and cavitation control for linear valves					
Product	Design	Available for	Specifications	Service	Bulletin
Tendril version 1 	Multihole	Globe valves: GU and GB -series	Sizes: ½" – 24" Pressure: ASME 150 – 2500 Temperature: -196 to +593 °C	Gas and liquid services, clean fluids, very wide dP and temperature range	4 GV 21 4 GV 25
		Angle valves: AU and AB -series	Sizes: ½" – 48" Pressure: ASME 150 – 2500 Temperature: -196 to +593 °C	Gas and liquid services, clean fluids, very wide dP and temperature range	4 GV 23
Tendril version 2 	Multihole	Globe valves: GB-series	Sizes: ½" – 48" Pressure: ASME 150 – 2500 Temperature: -196 to +593 °C	Gas and liquid services, clean fluids, very wide dP and temperature range	4 GV 21 4 GV 25
Omega 	Multistage, multiturn	Globe valves: GM-series	Sizes: 1" – 24" Pressure: ASME 150 – 2500 Temperature: -196 to +593 °C	Gas and liquid services, very wide temperature and dP range, clean fluids	4 GV 20
		Angle valves: AM-series	Sizes: 1" – 48" Pressure: ASME 150 – 2500 Temperature: -196 to +593 °C	Gas and liquid services, very wide temperature and dP range, clean fluids	4 GV 23

Noise and cavitation control for rotary/linear valves

Noise and cavitation control for rotary/linear valves					
Product	Design	Available for	Specifications	Service	Bulletin
Fixed resistors 	Multi- and single hole plates, attenuators diffusers	All valve types	Sizes: 1" – 36" Pressure: ASME 150 – 600 Temperature: -196 to +593 °C	Gas and liquid services	8 Q 220 8 ATT 20

Erosion and flashing control for valves

Erosion and flashing control for valves					
Product	Design	Available for	Specifications	Service	Bulletin
Flow reverse 	Balanced eccentric plug	Eccentric rotary plug valves: F-series	Sizes: 1" – 12" Pressure: ASME 150 – 600 Temperature: -200 to +425 °C	Flashing and erosive services, wide temperature and dP range, moderately severe	5 FT 20
Segment 	Erosion construction	V-port segment valves: R-series	Sizes: 1" – 32" Pressure: ASME 150 – 600 Temperature: -80 to +425 °C	Flashing and erosive non-tight service, medium temperature and dP range, moderately severe	3 R 21 3 R 24
Ceramic, HIP* 	Severe erosive	Ball valves: X and E-series	Sizes: 1" – 8" / 1" – 16" Pressure: ASME 150 – 600 Temperature: -50 to +450 °C	Very erosive services, wide temperature and dP range	CB075 1 E 220
Linear angle 	Severe angle Flow down	Angle valves: AU, AB and AM -series	Sizes: ½" – 48" Pressure: ASME 150 – 2500 Temperature: -196 to +593 °C	Very erosive and severe flashing services, very wide temperature and dP range	4 GV 23

* Wear and erosion resistant valves manufactured by using Hot Isostatic Pressing technology (HIP)



Valmet's professionals around the world work close to our customers and are committed to moving our customers' performance forward – every day.

Valmet Flow Control Oy

Vanha Porvoontie 229
01380 Vantaa, Finland
flowcontrol@valmet.com
+358 10 417 5000
valmet.com/flowcontrol

