

Reliability and performance under pressure

Flow control solutions for
industrial gas applications





Your partner in industrial gas

We are an industry leader with decades of experience in delivering valves to a wide range of industrial gas applications around the world. We regularly partner with major players in industrial gas. We are committed to providing our customers with a valve portfolio that meets their evolving needs.

Reliable performance

We provide reliable, high-performance industrial gas flow control solutions. Since the 1970s, we have provided more than 30,000 valves and accessories that meet the industry's most difficult process challenges across the entire range of industrial gas processes; cryogenic, adsorption, and other technologies.

Our complete range of control, automated on/off and switching valves, and accessories answer the needs for accurate control, tight shut-off, high reliability, and low maintenance. We know how to

ensure long-term performance, as we have the experience of servicing more than 1000 plants worldwide.

In addition to our flow control solutions for industrial gas, Valmet is also a full-control automation supplier for the industry.

In-depth understanding

We understand and address the most common methods and separations technologies used in the production of industrial gases. This includes air separation and temperature, pressure and vacuum swing absorption.

We also understand the risks involved with unstable compounds such as oxygen and hydrogen, which our products are designed to handle.

Since industrial gases are an important part of the successful production of many industrial products, the most critical challenge regarding the process operation is reliability. An interrupted gas supply will stop production and lead to a plant shutdown or disturb the bulk gas deliveries. This means ensuring maximized uptime and continuous, uninterrupted gas supply.

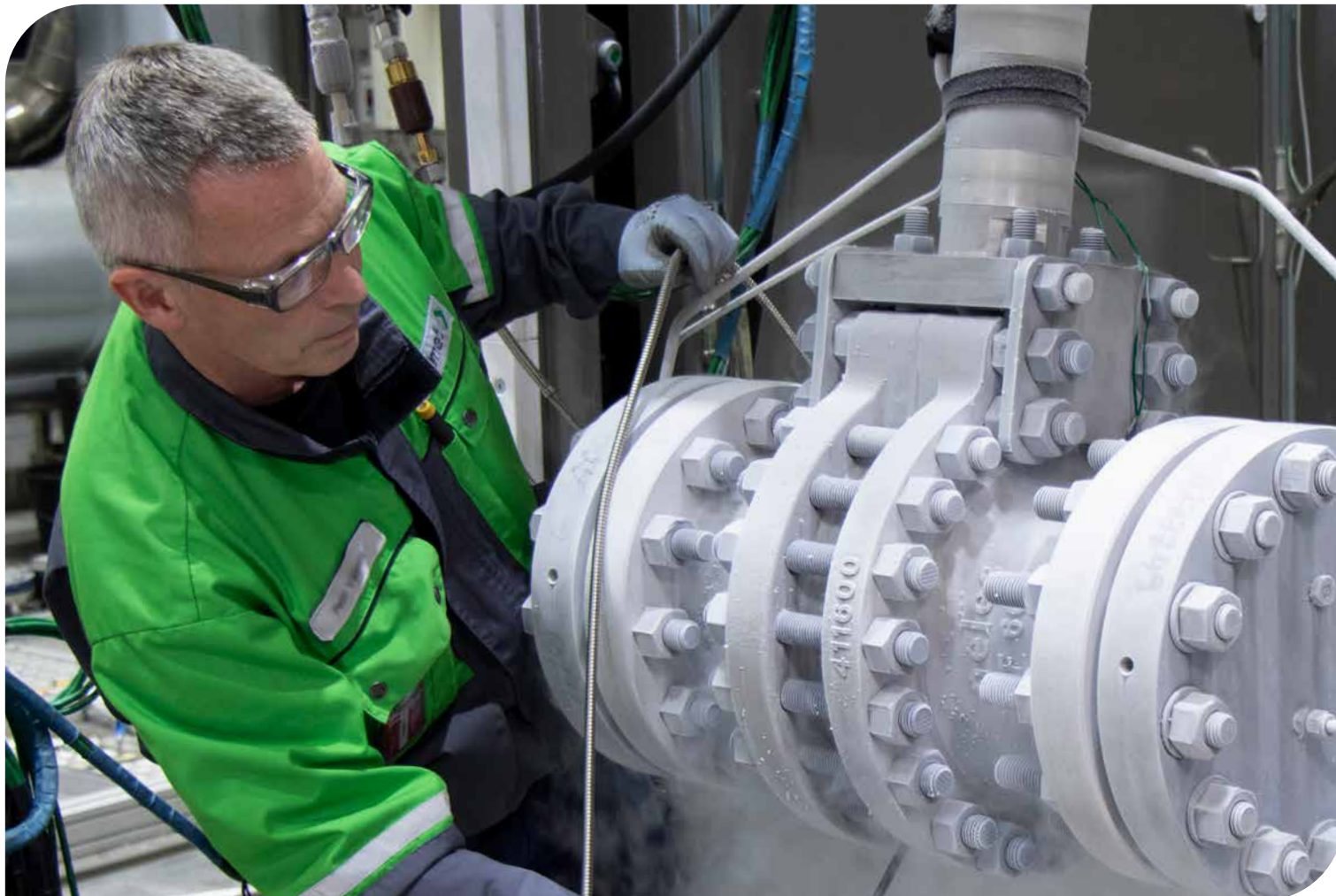


Global single source responsibility

Operational reliability combined with single source responsibility means that our customers can rest assured that their valves will serve well for many years under the severe conditions of industrial gas applications.

Thanks to our network of global service centers, valves can also be completely rebuilt and brought back into use in as-good-as-new condition. Our service personnel are trained to maintain, diagnose and troubleshoot industrial gas valves and installations.





Air separation processes

Our portfolio is suited for the entire industrial gas range with valves for different process conditions from utilities, general service and specific cryogenic and oxygen applications to extremely demanding high cycling applications.

Demanding conditions

Extreme operational and environmental requirements such as very low temperatures and an oxygen-enriched atmosphere, which require correct material selection and control of fugitive emissions, are the major challenges. Valve designs have to provide long-lasting safe tight shutoff operations to avoid health hazards and production interruptions.

Cryogenic knowhow

Our products and experience cover the entire Air Separation Unit (ASU) process from the compressor and purification through the cold box to tank loading and distribution. Safety and material selection are particularly

critical in oxygen service. Our industry-leading metal and soft seating technology is ideally fitted for specific cold box requirements – the core of the air separation process.

In addition to product quality, we bring value through our in-depth understanding of the importance of the needed cleaning procedures for different media and applications. We have designated top-of-the-line clean rooms at our facilities in both USA and China. In order to comply with ever-changing safety standards, we offer compliance with BAM/WHA requirements. The proven high reliability and productivity make Valmet a world leader in cryogenic valves.

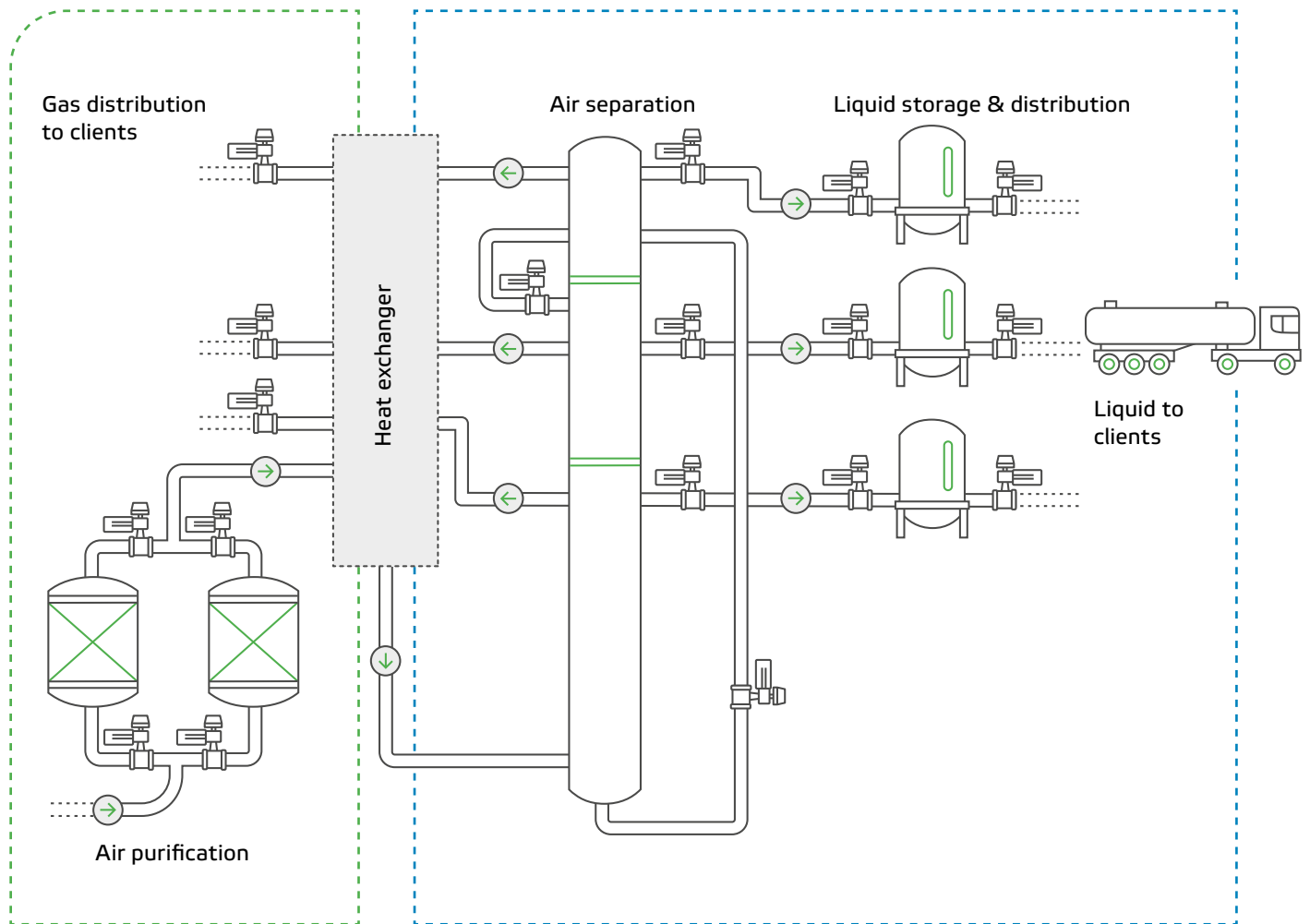
Advanced valve testing

For the valves in the cold area, our cryogenic testing facilities allow a thorough evaluation of the valve. The performance can be verified accurately in extreme conditions fulfilling the needs of international and customized standards. Our cryogenic testing laboratories are the largest and most advanced of any dedicated valve test facility in the world. The computer-controlled testing system assures cryogenic valve performance during commissioning and subsequent operation.

Air separation unit diagram

Warm area

Cryogenic area



Air purification:

- Challenges include cycling valves, humidity, molecular sieve protection, temperature swings (ambient to 300°C)
- Specifically designed 3-lever valves that only allow opening at low delta pressure (dP) to ensure the protection of the molecular sieve adsorbers

Air separation and liquid storage & distribution:

- Cryogenic valves with extended shaft design and possibility for horizontal shaft mounting installation
- Valves allowing maintenance of internals on welded valves of the cold box
- Valve design providing long-lasting safe tight shutoff and excellent controllability in operation avoiding hazards and production interruptions
- Our portfolio is suited for use in cryogenic environments and complies with oxygen requirements
- With our unique smart products and embedded diagnostics capabilities reliability can be improved even further. They allow us to monitor valve condition.





Swing adsorption processes

Swing adsorption processes are used to separate or purify gases to produce industrial applicable products.

Optimizing performance

Everything else comes second to safety and reliability. Gas flow interruptions that cause high consequential costs call for operational safety and reliable continuous supply. Therefore, the speed and ease of service as well as the predictions of problems are of extreme importance. Serviceability is one of the most important design features when it comes to reducing downtime and flow interruptions.

Whether the units are swinging between adsorption and regeneration, working through vacuum induced conditions, or being subjected to various temperature changes, our valves are built to sustain the necessary application steps. Switching between

adsorption and desorption is a very challenging application for valves. With the potential of seeing 2-4 cycles per minute, on/off cycle times of less than 1 second and even millions of cycles during their operational lifetime, the selection of the valve design and construction is crucial. High cycling, fast stroking and continuous tight shutoff are just some of the key challenges to overcome during the operational lifetime of the units.

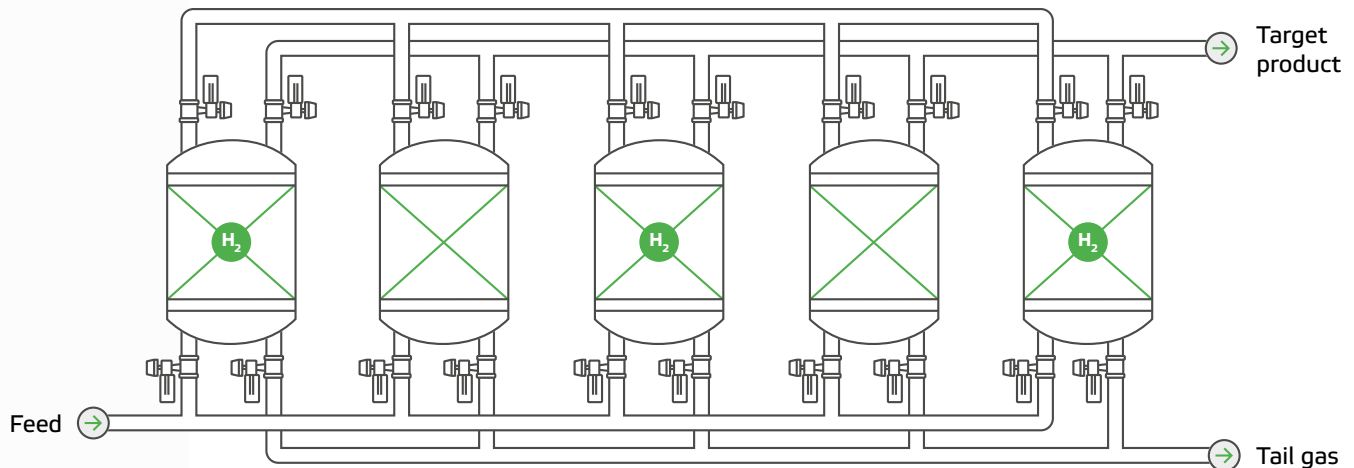
Developing together

The requirements for valves in industrial gas applications are getting more strict as units expand in size and pressures increase to values unseen before. Valmet's

leading innovations are helping prevent interruptions to operations all over the world.

To meet the needs and expectations of one of the most demanding valve applications, Valmet has been working in close cooperation with its customers for many years. Through joint efforts and collaboration, we have been able to show that the ideal valve solutions utilize our high cycle construction assemblies. Newly improved diagnostics and designs for our smart products further help the implementation of strategic maintenance plans.

Swing adsorption process diagram



Addressing the challenges of demanding processes:

PSA (H_2 , CO_2 , N_2):

- High pressure swings (stronger stem materials may be required)
- Potential NACE requirements, depending on feed gas/media
- Low emissions ratings & tight seat leakage shutoff
- Controllability, operated by a smart controller
- Low maintenance/downtime for service
- Quick operating & high cycling

VPSA (O_2):

- Low pressure vacuum swings and conditions
- Quick acting and high vibration
- Low emissions ratings & tight seat leakage shutoff
- Larger diameters required
- High cycle count (millions of cycles through the valves lifetime)
- Potential special cleaning requirements for oxygen or similar related services
- Low maintenance/downtime for service

TSA (CO_2):

- Temperature swings (low to high & vice-versa)
- Slower operation time due to thermal cycle
- Low emissions ratings & tight seat leakage shutoff
- Appropriate material selection for potential corrosive medias
- Low maintenance/downtime for service
- Thermal stress may vary materials choice based on pressure requirements and limitations

High-performance portfolio

We offer a unique portfolio of high-cycling butterfly valves from the Neles™ and Jamesbury™ brands. Our valve assemblies have been developed to perform millions of cycles with reliable tight shutoff.

With our unique smart products and embedded diagnostics capabilities the valve assembly's reliability can be improved further. Using these on-board diagnostics, we are able to monitor the valve assemblies condition and utilize trends to apply preventative maintenance schedules.

Our valves, actuators and controllers are specifically designed for high cycling swing adsorption plants, featuring fast stroking times, repeatability of operations and high cycle capability combined with long-lasting tightness.





Green hydrogen production



Green hydrogen refers to H_2 and O_2 produced from water utilizing renewable energy by the process of electrolysis. Ammonia synthesis is used to produce ammonia from N and H.

Electrolysis

Our valves deliver superior performance in low-pressure electrolyzers as well as in those that are subject to high temperatures reaching up to $700^{\circ}C$. New electrolysis technologies are also creating the need for valves that can ensure both high capacity and low-pressure losses respectively. In addition to our Neles segment valves and the Jamesbury™ Wafer-Sphere™ 800-series butterfly valve, our Neles L-series butterfly

valves with their 2-shaft design are particularly strong performers in this area. We also have a strong offering in place for O_2 service.

Ammonia synthesis

Ammonia synthesis is used to produce ammonia from nitrogen and hydrogen. The produced ammonia can then be used for fertilizer production, as eFuel, or as a hydrogen carrier for transport or energy storage. Alternatively,

it can also be further processed into urea or nitric acid. The role of valves in the ammonia synthesis loop is to control the flow of synthesis gas into the converter and to ensure the recycling of the unreacted synthesis gas. Neles butterfly valves provide the optimal solution for ammonia synthesis loop isolation and control valves. Their wide design options make them suitable for all on-off/control applications in the ammonia synthesis loop.

Global knowhow

Our solutions are engineered to provide improvements in process performance while reducing costs, but the greatest added value often derives from our expertise managing projects and supporting at site in the long-term.

Service solution for industrial gas producers

We have developed service solutions to specifically address the needs and requirements of industrial gas producers. These solutions focus on the monitoring of valve and process performance, defining turnaround scope, reducing downtime during planned outages, eliminating unplanned valve failures, and optimizing inventory coverage.

Based on our 45 years service experience we have learned how to extend the valves lifetime by selecting the right spares and repair actions. Our service personnel receive documented training to ensure adherence to the detailed specifications and technical standards associated with equipment in industrial gas applications such as being certified to handle oxygen

valves repair or ATEX certified equipment. Experienced field technicians offer local support and are equipped with best-in-class tools and service facilities.

We are the valve technology and service partner for many of the major industrial gas companies worldwide, providing tailored solutions for PSA and VSA processes and ASU plants.

We have dedicated relationships with manufacturers and licensors to ensure continuous technological development.

Our highly skilled field service experts are never far away, as they are located in our 40 service centers worldwide. They are available to provide everything from warranty repairs to support during upgrades.

Locations around the world:



📍 Valve technology centers 📍 Service centers 📍 Authorized service partners



Project knowhow that delivers value

The experience and knowhow our project engineers bring to the table during the project and commissioning phases help expedite project completion and enable smooth process startup.

We help you select the optimal valve solutions for your planned process and provide a clear and defined chain of responsibility from sales to execution and a strong service presence thereafter.



Once the project is handed over to our services, we remain dedicated to offering our expertise in terms of both ensure process performance and ultimately improving it through process optimization, predictive maintenance and updates across the product lifecycle.

Our offering

Butterfly valves

Neles™ and Jamesbury™ butterfly valves						
Product	Series	Design	Specifications		Service	Bulletin
Neles high performance triple eccentric disc valves	LW & LG-series 	Wafer (WS) or lug (LG)	Size: DN80 – 1000 / 3" – 24" Temperature: -200 to +600 °C / -330 to +1110 °F Pressure: ASME 150 – 300 / PN 10 – 64		General on-off and control applications	2L121 2L1220 2LW20
	L6-series 	Double flanged	Size: DN100 – 2200 / 4" – 88" Temperature: -200 to +600 °C / -330 to +1110 °F Pressure: ASME 150 – 600 / PN 10 – 100			
Neles three lever valve for Air Separation Units (ASU)	BH-series 	Designed to air separation unit air inlet shut-off valve	Size: DN200 – 1600 / 8" – 64" Temperature: -29 to +280 °C / -20 to +536 °F Pressure: PN10 – 40, ASME 150 - 300		Air purification, molsieve 3-lever valves	2BH20
Neles full bore butterfly valve	BN-series 	Flanged, lug or wafer	Size: DN80 – 1600 / 3" – 64" Temperature: Max. +260 °C / +500 °F Pressure: PN10 – 40 / ASME 150 – 300		For high capacity applications	
Neles metal seated double eccentric disc valve	BW-series 	Flanged, lug or wafer, butt weld ends	Size: DN100 – 1600 / 4" – 64" Temperature: -200 to +470 °C / -320 to +880 °F Pressure: PN63 – 400 / ASME 600 – 2500		Critical applications such as high cycle, high temperature, cryogenic, oxygen and abrasive applications	2BW20
Neles high performance butterfly valves	BWX-series 	Wafer, lugged, double flanged	Size: DN100 – 600 / 4" – 24" Temperature: -200 to +470 °C / -320 to +880 °F Pressure: PN63 / ASME 600		Butterfly metal seated for cryogenic and general application	2BWX20
Jamesbury Wafer-Sphere™ high performance butterfly valves	815/830/835/860-series 	Wafer/lugged	Size: DN65 – 750 (2½" – 30") Temperature: Max +260 °C / +500 °F Pressure: ANSI 150, 300 & 600		For high cycle applications and standrad on-off & control valves	W104-1 W105-1 W101-6
	K815/K830/K860-series 	Wafer/lugged	Size: DN80 – 750 (3" – 30") Temperature: -196 to 38 °C / -320 to +100 °F Pressure: ANSI 150, 300 & 600			


Ball valves

Neles and Jamesbury ball valves					
Product	Series	Design	Specifications	Service	Bulletin
Neles X-series modular ball valves 	XA, XB, XC, XU & XT -series	Flanged, seat supported, full or reduced port	Size: DN25 – 600 / 1" – 24" Temperature: -200 to +600 °C / -320 to +1110 °F Pressure: PN10 – 160, ASME 150 – 900	Metal seated valves for ESD, on-off and control applications	1X22 1X23 1X26 1X27 1XH20
	XG, XM & XH -series	Flanged, trunnion mounted, full or reduced port			
Jamesbury flanged ball valves 	7000 -series	Standard port. Flanged	Size: DN15 – 500 / ½" – 20" Temperature: 260°C / 500°F Pressure: ANSI 150 & 300	Soft seated valves for ESD & on-off applications	B107-1 B107-3
	9000 -series	Full port	Size: DN15 – 600 / ½" – 24" Temperature: 260 °C / 500 °F Pressure: ANSI 150 & 300		B107-2 B107-4

Globe control valves

Neles globe control valves					
Product	Series	Design	Specifications	Service	Bulletin
Neles globe valves 	GU-series	Unbalanced, top-guided	Size: DN15 – 150 / ½" – 6" Temperature: -200 to +593 °C / -320 to +1053 °F Pressure: ASME 150 – 2500 / PN10 – 320 / JIS 10K – 20K	General, severe service control valves, cryogenic service	4GV21
	GB-series	Balanced, cage-guided	Size: DN50 – 600 / 2" – 24" Temperature: -200 to +593 °C / -320 to +1053 °F Pressure: ASME 150 – 2500 / PN10 – 320 / JIS 10K – 20K		4GV25
Neles angle pattern valves 	AU-series	Unbalanced, top-guided	Size: DN15 – 150 / ½" – 6" Temperature: -200 to +593 °C / -320 to +1053 °F Pressure: ASME 150 – 2500 / PN10 – 320	General, severe service control valves, cryogenic service	4GV23
	AB-series	Balanced, cage-guided	Size: DN50 – 600 / 2" – 24" Temperature: -196 °C to +593 °C Pressure: ASME 150 – 2500 / PN10 – 320		4GV23

Segment valves

Neles segment valves					
Product	Series	Design	Specifications	Service	Bulletin
Neles segment valves 	R-series	Flanged	Size: DN25 – 800 / 12" – 32" Temperature: -52 to +425 °C / -60 to +797 °F Pressure: ASME 150 – 600 / PN10 – 100	For general control applications	3R21 3R24



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

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