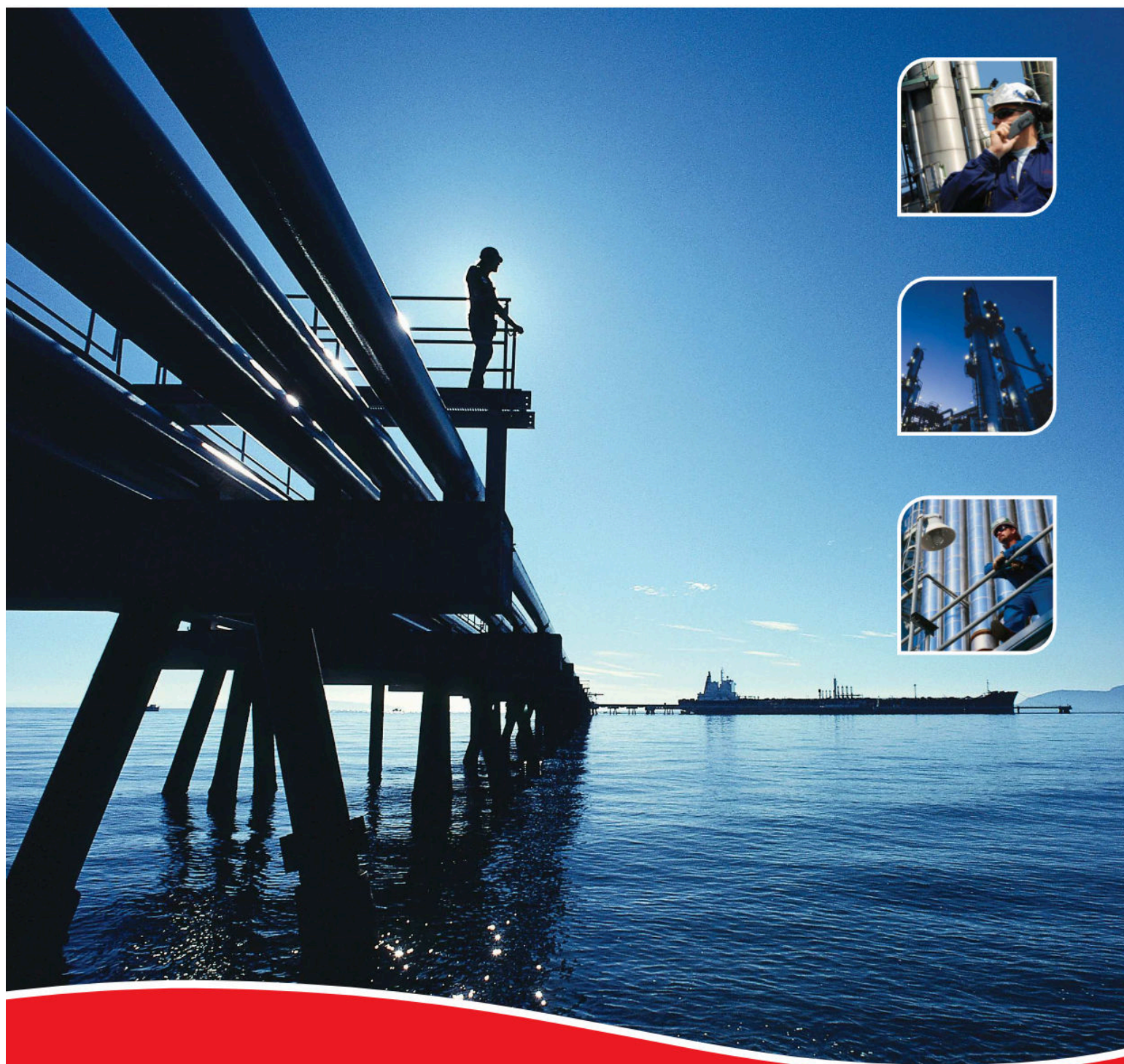




## *Control Valve Product Guide*



*Experience In Motion*

*Control valve solutions for all of your applications*



## 6 Performance!Nxt™

### Valve Sizing and Selection Suite

Performance!Nxt puts the power of on-demand control valve selection and sizing at your fingertips. It's the right tool for finding the right product, every time.

## 8 GENERAL SERVICE

Flowserve general service control valves combine platform standardization, high-performance, and simplified maintenance to deliver a lower total cost of ownership.

## 16 SEVERE SERVICE

Flowserve severe service products are engineered for durable functionality wherever harsh service conditions exist. From extreme temperature and pressure differentials, to cavitation, flashing, and beyond, our severe service solutions take the problem out of problematic applications.

## 24 CUSTOM ENGINEERED

Flowserve offers a comprehensive suite of custom-engineered solutions, as well as unique product designs that meet your exacting specifications.

## 30 POSITIONERS

Our portfolio of ultra-high precision positioners support a range of communication protocols and hazardous area classifications to help facilitate dramatic improvements in process uptime, reliability, and yield.

## 34 SALES AND SERVICE

Around the clock, around the world. Flowserve manufactures, sells, and services precision-quality pumps, control valves, seals, and automation equipment for a diverse range of industries.

Accord™

Anchor Darling™

Argus™

Atomac™

Automax™

Durco™

Edward™

Gestra™

Kämmer™

Limitorque™

Logix™

McCANNA/MARPAC™

NAF™

Nobel Alloy™

Norbro™

Nordstrom™

PMV™

Serck Audco™

Valbart™

Valtek™

Vogt™

Worcester Controls™



## ***Flowserve – Solutions to Keep You Moving***

Flowserve is one of the world's leading providers of fluid motion and control products and services. Globally, we produce engineered and industrial pumps, valves, seals, systems, and automation equipment, and provide a range of related flow management services. Our solutions move even the most volatile and corrosive fluids safely and securely through some of the most extreme temperatures, terrain, and challenging operating environments on the planet.

Flowserve markets are large, diverse, and worldwide. Our products and services are specified for use in a vast range of industries, including oil and gas, chemical, power generation, and various general industries.

*A broad offering of  
flow control products*



## ***Flow Control Industries***

### ***Global Reach, Local Presence***

Our global expertise, deep understanding of the flow control industry, and customer-centric focus, enable us to deliver targeted strategic solutions, products, and services that meet diverse application requirements worldwide.

We have the dedicated infrastructure and global workforce needed to partner with you on projects as routine as day-to-day operations and as challenging as spearheading new ventures in remote regions of the world. At Flowserve, our global reach provides a truly local presence when and where you need it most.

### ***Evolutionary Products***

The Flowserve industrial and highly engineered pumps, precision mechanical seals and systems, automated and manual quarter-turn valves, control valves, and valve actuators serve a constantly evolving set of applications. We continually leverage our engineering, application, and applied technology capabilities to design solutions that effectively and efficiently help you achieve your project goals and desired outcomes. Our product design, manufacturing and service capabilities ensure that we deliver the right product, at the right

time and right place, with dependable service. Flowserve also provides comprehensive life cycle management services and a full range of training and engineering solutions to optimize the performance and longevity of your operations around the globe.

### ***Move With Flowserve***

From Angola and Nigeria to the Sakhalin Islands, and from China to Latin America and beyond, rely on Flowserve fluid motion and control products, services, and solutions to move your industrial liquids point to point.

**Control valve solutions for all of your applications**



### **Oil And Gas Industry**

Upstream, downstream, and in between, Flowserve control valves exceed the performance demands required for harsh environments and difficult applications. Our products and services support a wide range of industry functions, including exploration, production, pipeline transmission, storage, and refining.

#### **Products**

- Linear and rotary control valves for general service and severe applications involving high pressure drops, cavitating or flashing services, or extreme temperatures
- Trunnion-mounted ball valves to support gaseous and liquid services
- Lubricated plug valves to accommodate zero-leakage applications

### **Power Generation**

Flowserve solutions – nuclear, fossil fuel, renewable, steam, and more – are at work in every phase of power generation. Flowserve provides on-the-spot availability, 24/7 technical support, and unmatched service wherever flow control is required.

#### **Products**

- Multi-turn gate and globe valves, and check valves to manage high temperature and high-pressure steam services
- Thermostatic steam traps and electronic controls for high efficiency boilers
- Heavy-duty electric actuators and controllers to support valve automation

### **Chemical Processing**

Flowserve control valves control the movement of some of the world's most hazardous and corrosive liquid chemicals via traditional synthesis and catalysis, as well as new age bio and cryogenic processing and reactor and separation technologies.

#### **Products**

- Rotary ball, plug, and butterfly valves designed for isolation of highly corrosive, erosive, or lethal processes
- Pneumatic valve actuation and automation solutions

### **General Industries**

Flowserve products are renowned for their quality and operational performance in a wide range of industries, including water, food and beverage, mining, pulp and paper, aerospace, agriculture, HVAC, and electronics.

#### **Products**

- Rotary ball, segment, and butterfly valves designed for isolation and control of slurry services
- All-welded ball valves for buried services
- Linear control valves for low-flow and cryogenic applications

## PERFORMANCE!NXT Valve Sizing and Selection Suite



### *Put the power of on-demand selection and sizing at your fingertips.*

Performance!Nxt Valve Sizing and Selection Suite is the right tool for finding the right product – the first time, every time. This comprehensive set of next generation engineering tools allow you to size and select Flowserve control valve products best suited to your applications and service conditions. In just seconds, you get the answers you need to ensure you make the right choice.

#### **Out With Risky Valve Selection Techniques**

Until now, selecting the right control valve for your application carried significant risk and ever-increasing engineering costs to ensure decision accuracy. Using existing sizing and selections tools required understanding the precise correlation between valve technology and its intended application, and entering volumes of application data in hopes of achieving precision sizing. Increasingly complicated sizing and selection software and diminished workforce experience further compounded matters.

Starting today, Performance!Nxt is the new paradigm in control valve selection. Now everyone can have the power of on-demand sizing and selection at their fingertips.

#### **PERFORMANCE!NXT is fast, flexible, and extremely user-friendly**

- Size, select and generate valve, actuator, and positioner specifications in seconds
- Enter and verify data
- Import and export valve specifications automatically from multiple data formats (InTools, Excel, and more)

*“The Flowserve VSG solution doesn’t raise the bar, it completely replaces the bar in terms of risk abatement, time to size and select, and delivers best-in-class solutions just the way I want them.”*

*Principal Control Valve Engineer at a large international oil company*



## Win With PERFORMANCE!NXT

### On-Demand Innovation

Performance!Nxt uses a Valve Selection Guide (VSG) to significantly reduce sizing and selection inaccuracies, providing the answers you need to improve decision accuracy in record time.

To speed up the sizing and selection process, the Performance!Nxt VSG requires minimal application data – expected flow, pressure, temperature, process media, and line size – to perform its function. Once entered, the VSG searches all available control valve alternatives to produce a prioritized list of valves that offer best-fit options for the application based on your desired level of controllability, reliability, and delivery.

Available worldwide exclusively from Flowserve, Performance!Nxt Valve Sizing and Selection Suite is changing the way entire industries size and select Flowserve control valves, actuators, and positioners for a full range of applications. For more information visit [www.flowserveperformance.com](http://www.flowserveperformance.com).



## GENERAL SERVICE APPLICATIONS



*Flowserve general service control valves combine platform standardization, high performance, and simplified maintenance to deliver a lower total cost of ownership.*

Flowserve delivers a broad range of general service control valves – linear and rotary – with pressure ratings of ANSI Class 150 to 4500/PN 10 to PN 640. These high-performance control valves offer greater reliability, precision control, and flow capacity, with

significantly reduced cavitation, flashing, and noise. Quality production ensures increased process yield and throughput.

Because Flowserve general service control valves are constructed on global platforms using standardized parts and components, up-front engineering is held to a minimum. Simplified operation, maintenance, and service further ensure lower total cost of ownership.

**GENERAL SERVICE** Quick Reference

Heritage Brand	Valve Type	Size	Pressure	Temperature	Product Type
Valtek	Linear Globe	DN 15 to DN 150 0.5" to 6"	Class 300 PN 10 to PN 40	-60°C to 400°C -76°F to 752°F	<b>GS</b> Page 10
Valtek	Linear Globe	DN 15 to DN 400 0.5" to 16"	Class 150 to 300 PN 10 to PN 40	-196°C to 538°C -321°F to 1000°F	<b>FlowTop</b> Page 10
Valtek	Linear Globe	DN 15 to DN 915 0.5" to 36"	Class 150 to 2500 PN 10 to PN 400	-196°C to 815°C -320°F to 1500°F	<b>Mark One</b> Page 10
Valtek	Linear Globe	DN 150 to DN 750 6" to 30"	Class 150 to 600 PN 10 to PN 63	-196°C to 815°C -320°F to 1500°F	<b>Mark 100</b> Page 11
Valtek	Linear Globe	DN 50 to DN 400 2" to 16"	Class 900 to 2500 PN 160 to PN 400	-196°C to 815°C -320°F to 1500°F	<b>Mark 200</b> Page 11
Kämmer	Linear Globe	DN 150 to DN 2500 0.5" to 6"	PN 10 to PN 40	-196°C to 650°C -321°F to 1202°F	<b>TotalFlow 035000</b> Page 11
Valtek	Rotary	DN 25 to DN 300 1" to 12"	Class 150, 300, 600 DN PN 10, 16, 25, 40, and 63	-100°C to 400°C -148°F to 750°F	<b>MaxFlo 4</b> Page 12
Valtek	Rotary	DN 25 to DN 500 1" to 20"	Class 150, 300, 600 PN 10 to PN 40	-46°C to 316°C -50°F to 600°F	<b>ShearStream</b> Page 12
Valtek	Rotary	DN 75 to DN 1400 3" to 56"	Class 150-2500 API 2000-15000 PN 10 to PN 400	-196°C to 450°C -320°F to 842°F	<b>TMCBV</b> Page 12
Valtek	Rotary	2" to 30"	Class 150-2500	-29°C to 649°C -20°F to 1200°F	<b>Valdisk</b> Page 13
Valtek	Rotary	3" to 24"	Class 150 to 1500	-196°C to 820°C -320°F to 1500°F	<b>Valdisk TX3</b> Page 13
Valtek	Rotary	DN 50 to 900 2" to 36"	Class 150 to 300 PN 10 to 40	-73°C to 538°C -100°F to 1000°F	<b>Valdisk BX</b> Page 13
NAF	Rotary	DN 80 to DN 700 3" to 28"	Class 150 to 300 PN 10 to PN 40	-30°C to 350°C -22°F to 662°F	<b>Torex</b> Page 14
NAF	Rotary	DN 25 to DN 500 1" to 20"	Class 150 to 300 PN 10 to PN 40	-30°C to 250°C -22°F to 482°F	<b>Setball</b> Page 14
NAF	Rotary	DN 25 to DN 400 1" to 16"	Class 150 to 300 PN 10 to PN 40	-30°C to 350°C -22°F to 662°F	<b>Duball</b> Page 15
NAF	Rotary	DN 150 to DN 800 6" to 32"	Class 150 to 300 PN 10 to PN 40	-30°C to 250°C -22°F to 482°F	<b>Trunball</b> Page 15

## GENERAL SERVICE APPLICATIONS

### Valtek GS *Valtek*

A general service valve coupled with a high-thrust FlowAct pneumatic diaphragm actuator.

#### Features

- Maximum  $C_v$  capacity minimizes valve size and cost
- Low cost, compact, lightweight
- High performance and reliability
- Ease of maintenance
- Wide range of general service applications

#### Specifications

- Valve Type: Linear Globe
- Size: DN 15 to DN 150; 0.5" to 6"
- Pressure: PN 16 to PN 40; Class 150 to 300
- Material: Carbon Steel; Stainless Steel
- Temperature: -60°C to 400°C; -76°F to 752°F

#### Solutions

High performance, reliable, low cost general service integrated control valve package. For use in chemical, petrochemical, oil and gas, refining, power, HVAC, and food industries. TA-Luft certified for fugitive emission leakage class greater than B,  $10^{-4}$  mg/s m.

*For more information see document number VLENBR0300*



### FlowTop *Valtek*

High performance, general application valve coupled with high-thrust FlowAct pneumatic diaphragm actuator.

#### Features

- Excellent control performance with precision machined plug contours and long stroke lengths
- Easy upgrade from standard trims to low noise or cavitation control trims
- Minimal vibration and wear of trim through sturdy plug design

#### Specifications

- Valve Type: Linear Globe
- Size: DN 15 to DN 400; 0.5" to 16"
- Pressure: PN 10 to PN 40; Class 150 to 300
- Material: Carbon Steel; Stainless Steel; Special Alloys
- Temperature: -196°C to 538°C; -320°F to 1000°F

#### Solutions

High performance control valve for use in chemical, refinery, power, HVAC, and food and beverage industries. Zero emissions application options through bellows seal solution. TA-Luft certified for fugitive emission leakage class greater than 10-8 mbar l/s.

*For more information see document number SAEEBRV740*



### Mark One *Valtek*

Superior performance in liquid and gaseous services, with easy, fast, and inexpensive maintenance.

#### Features

- Small, compact, lightweight body and actuator package
- Stiff and high-thrust cylinder actuator offers position accuracy, repeatability, assured response
- Broad solutions envelope with significant flexibility

#### Specifications

- Valve Type: Linear Globe
- Size: DN 15 to DN 915; 0.5" to 36"
- Pressure: PN 10 to PN 400; Class 150 to 2500
- Material: Carbon Steel; Stainless Steel; Special Alloys
- Temperature: -196°C to 815°C; -320°F to 1500°F

#### Solutions

The industry choice for a simple, reliable, tough globe valve. Handles a wide selection of process control applications for flow, pressure, and temperature, including corrosive fluids, cryogenics, steam, water, gases, multiphase, high temperatures, erosion, and high pressure drops. Valve sizes are medium to large including pressure classes of 150 through 600 (PN 10 to PN 63).

*For more information see document number VLENTB0001*



## GENERAL SERVICE APPLICATIONS

### Mark 100 *Valtek*

Large control valve design with features suited for maximum capacity  $C_v$  and severe application solutions.

#### Features

- Higher  $C_v$  capacity allows for smaller, more cost effective valve sizes
- Easy maintenance, multiple design options with clamped-in, self-aligning seat ring
- Wide variety of noise abatement and anti-cavitation trims

#### Specifications

- Valve Type: Linear Globe
- Size: DN 150 to DN 750; 6" to 30"
- Pressure: PN 10 to PN 63; Class 150 to 600
- Material: Carbon Steel; Stainless Steel
- Temperature: -196°C to 815°C; -320°F to 1500°F

#### Solutions

The industry choice for a simple, reliable, tough globe valve. Valve sizes are medium to large including pressure classes of 150 through 600 (PN10 to PN 63). Handles a wide selection of process control applications for flow, pressure, and temperature, including corrosive fluids, cryogenics, steam, water, gases, multiphase, high temperatures, erosion, and high pressure drops.

*For more information see document number VLATB0100*



### Mark 200 *Valtek*

Offers high-pressure classes and high flow capacity. Fast, easy maintenance in both gas and liquid control. Accommodates a broad spectrum of severe service trim solutions.

#### Features

- High pressure, high flow capacity with smaller and more cost effective valve sizes
- Competitive, economical choice among high pressure, high  $C_v$  globe control valves
- Wide variety of noise abatement and anti-cavitation trims

#### Specifications

- Valve Type: Linear Globe
- Size: DN 50 to DN 400; 2" to 16"
- Pressure: PN 160 to PN 400; Class 900 to 2500
- Material: Carbon Steel; Chrome Moly; Stainless Steel
- Temperature: -196°C to 815°C; -320°F to 1500°F

#### Solutions

The industry choice for a simple, reliable, tough globe valve. Valve sizes are small to large including pressure classes of 900 through 2500 (PN 160 to PN 400). Ideal for solutions requiring high pressure, high-pressure drops, high  $C_v$ , noise abatement, and cavitation control. Handles a wide selection of process control applications for flow, pressure and temperature applications in oil and gas and power industries.

*For more information see document number VLENTB0200*



### TotalFlow 035000 *Kämmer*

A flexible, versatile control valve with multiple options, including special material, higher pressure classes, and end connection variations.

#### Features

- Excellent performance in severe applications with a large degree of flexibility
- Anti-noise, anti-cavitation, hardened trim options
- Bellows seal, TA-Luft packing

#### Specifications

- Valve Type: Linear Globe
- Size: DN 25 to DN150; 1" to 6"
- Pressure: PN 10 to PN 40
- Material: Carbon Steel; Stainless Steel; Special Alloys
- Temperature: -196°C to 650°C; -321°F to 1202°F

#### Solutions

A general service valve that provides a wide range of possibilities. Offers low noise trims, anti-cavitation inserts, high-pressure bellows seals and steam jacket or a low-emission packing system – SureGuard HP – in accordance with German TA-Luft requirements. Made with a special material, this valve becomes a solid solution for high-pressure applications.

*For more information see document number KMENBR3520*



## GENERAL SERVICE APPLICATIONS

### MaxFlo 4 *Valtek*

High-performance, safety-focused, feature-rich eccentric rotary plug control valve.

#### Features

- High  $C_v$  capacity allows use of smaller envelope
- Low breakout torque, excellent control
- Lifts immediately off the seat, decreases seat wear

#### Specifications

- Valve Type: Rotary
- Size: DN 25 to DN 300; 1" to 12"
- Pressure: DN PN 10, 16, 25, 40, and 63; Class 150, 300, 600
- Material: Carbon Steel; Stainless Steel
- Temperature: -100°C to 400°C; -148°F to 750°F

#### Solutions

High-performance general service control valve designed for applications demanding higher rangeability, precision control and higher flow capacity.

*For more information see document number VLENBR0064 and VLENTB0064*



### ShearStream *Valtek*

Rugged segmented ball valve solves long-standing traditional ball valve issues such as low rangeability due to limited orifice characterization and piping forces unevenly loading the seal.

#### Features

- High capacity and large turndown
- Easily handles abrasive, erosive, and corrosive fluids
- Heavy duty seat provides tight shut-off and reliability for applications requiring high pressure drops

#### Specifications

- Valve Type: Rotary
- Size: DN 25 to DN 500; 1" to 20"
- Pressure: Class 150, 300, 600; PN 10 to PN 40
- Material: Carbon Steel; Stainless Steel; Other Alloys
- Temperature: -46°C to 316°C; -50°F to 600°F

#### Solutions

Robust design overcomes the problems of harsh, particle-entrained processes in applications such as power, chemical, and petrochemical.

*For more information see document numbers VLENTB4152-01 and VLATB027*



### Trunnion Mounted Control Ball Valve (TMCBV) *Valtek*

This valve offers greater capacity than comparable globe valves, allowing you to achieve the same flow with a smaller TMCBV that costs less, weighs less, and requires less space.

#### Features

- Wide range of trim designs based on industry proven technologies – MegaStream (up to 30 dBA reduction) and Z-Trim (up to 23 dBA reduction) for noise control and CavControl and ChannelStream for cavitation control
- Excellent flow capacity per body size
- Very high rangeability: > 300:1

#### Specifications

- Valve Type: TMCBV
- Size: DN 75 to DN 1400; 3" to 56"
- Pressure: PN 10 to PN 400; Class ANSI 150-2500, API 2000-15000
- Material: Carbon Steel; Stainless Steel; Nickel Alloys
- Temperature: -196°C to 450°C; -320°F to 842°F

#### Solutions

Loading arms, gas storage fill and withdrawal, compressor anti-surge, recycle, gas processing, natural gas regulation, and fuel gas regulation.

*For more information see document number VLENTB0068*



## GENERAL SERVICE APPLICATIONS

### Valdisk *Valtek*

Rotary control, heavy-duty double offset butterfly valve designed for high capacity and low-pressure loss.

#### Features

- High-thrust cylinder actuator coupled with eccentric-cammed disc allows for high performance throttling, even in large pressure drops close to the seat
- Low breakout torque assures accurate throttling, even close to the seat
- Disc lifts out of the seat immediately upon actuation, avoids seat and disc wear and reduces leakage and parts replacement

#### Specifications

- Valve Type: Rotary
- Size: 2" to 30"
- Pressure: Class 150 to 2500
- Material: Carbon Steel; Stainless Steel; Special Alloys
- Temperature: -29°C to 649°C; -20°F to 1200°F

#### Solutions

Handles a wide selection of oil and gas industry process control applications for flow, pressure, and temperature applications. Best for fibrous slurries, liquids, gas and steam applications requiring outstanding performance under extreme pressures and temperatures.

*For more information see document number VLATB031*



### Valdisk TX3 *Valtek*

High performance triple offset butterfly control valve capable of closing with API 598 rated zero leakage. This design provides repeatable long lasting zero leakage shutoff.

#### Features

- Tested to the industry's most stringent seat leak test requirements including API 598, MSS SP-68, ISO 5208 (EN 12266), ANSI/FCI 70-2
- Standard laminated seal ring or solid metal seal ring available to meet a wide range of application requirements.
- Valve body styles available as wafer, lug, double flanged short or long (ASME B16.10), butt-weld, cryogenic

#### Specifications

- Valve Type: Rotary
- Size: 3" to 24"
- Pressure: Class 150 to 1500
- Material: Carbon Steel; Stainless Steel; Special Alloys
- Temperature: -196°C to 820°C; -320°F to 1500°F

#### Solutions

Handles a wide selection of oil and gas industry process control applications. Most suited for medium to large pipelines when shutoff is critical, including end-of-line service.



### Valdisk BX *Valtek*

High performance double offset butterfly control valve available in a wide range of materials, superior stem packing options, and soft, metal and dual seats for a wide range of applications.

#### Features

- Increased capacity and superior flow control from the use of a low profile disc
- Variety of packing options contains fugitive process media emissions regulated by Clean Air Act, including vacuum service supported by PTFE cup and cone style packing
- Easy maintenance due to the disc being attached to the shaft by Gibb key

#### Specifications

- Valve Type: Rotary
- Size: DN 50 to 900; 2" to 36"
- Pressure: Class 150 to 1500; PN 10 to 40
- Material: Carbon Steel; Stainless Steel; Special Alloys
- Temperature: -73°C to 538°C; -100°F to 1000°F

#### Solutions

Handles a wide selection of oil and gas industry process control applications. Ideal choice for precise throttling control or on-off service with lighter weight piping systems and when space is limited and weight is a concern



## GENERAL SERVICE APPLICATIONS

### Torex *NAF*

High performance, triple offset, metal or soft seated butterfly valve. Frequently used for isolation or on-off applications but equally suitable for control, especially on high-flow, low-pressure applications.

#### Features

- Triple offset design minimizes seat wear
- Bidirectional, tight shut-off
- Low torque and smooth control

#### Specifications

- Valve Type: Rotary
- Size: DN 80 to DN 700; 3" to 28"
- Pressure: PN 10 to PN 40; Class 150 to 300
- Material: Carbon Steel; Stainless Steel; Special Alloys
- Temperature: -30°C to 350°C; -22°F to 662°F

#### Solutions

Technically and financially strong alternative to other valve types, especially larger valves. High tightness class in combination with a short face-to-face makes it suitable for many applications within pulp and paper, chemical and petrochemical, oil and gas, power plants, and steel works.

*For more information see document number Fk41.42*



### Setball *NAF*

#### Features

Excellent rangeability and high flow capacity. Team with a direct-mounted Turnex actuator for a compact rotary control valve package with exceptional characteristics and performance.

- Compact rotary control valve package
- High flow capacity allows use of smaller valve
- V-shaped port for high rangeability

#### Specifications

- Valve Type: Rotary
- Size: DN 25 to DN 500; 1" to 20"
- Pressure: PN 10 to PN 40; Class 150 to 300
- Material: Carbon Steel; Stainless Steel; Special Alloys
- Temperature: -30°C to 250°C; -22°F to 482°F

#### Solutions

Technically and financially strong alternative to linear control valves. Optional Z-trim for cavitation control and noise reduction. Suitable for applications within pulp and paper, chemical and petrochemical, oil and gas, power plants, and steel works.

*For more information see document number Fk41.51*



## GENERAL SERVICE APPLICATIONS

### Duball *NAF*

Full port, floating ball valve design suitable for control, on-off, or isolation. Available with metal or soft seats. The Z-trim option can eliminate cavitation and decrease noise when the valve is used for control.

#### Features

- Full port results in a high flow capacity
- Bidirectional, tight shut-off
- Compact rotary control valve package

#### Specifications

- Valve Type: Rotary
- Size: DN 25 to DN 400; 1" to 16"
- Pressure: PN 10 to PN 40; Class 150 to 300
- Material: Carbon Steel; Stainless Steel; Special Alloys
- Temperature: -30°C to 350°C; -22°F to 482°F

#### Solutions

Excellent characteristics are beneficial under the most arduous operating conditions where difficult media and demanding pressure conditions make severe demands on the design, materials and performance. Suitable for applications within pulp and paper, chemical and petrochemical, oil and gas, power plants, and steel works.

*For more information see document number Fk41.61 and Fk41.67*



### Trunnball *NAF*

Full port, trunnion-mounted ball valve design suitable for control, on-off, or isolation. Low torque and smooth, precise control.

#### Features

- Full port results in a high flow capacity
- Bidirectional, tight shut-off
- Low torque and smooth control

#### Specifications

- Valve Type: Rotary
- Size: DN 150 to DN 800; 6" to 32"
- Pressure: PN 10 to PN 40; Class 150 to 300
- Material: Stainless Steel; Special Alloys
- Temperature: -30°C to 250°C; -22°F to 482°F

#### Solutions

Team with Duball for a complete range of full port ball valves: 1"/DN25 up to 32"/DN800. With the Z-trim option it's an excellent control valve for cavitation control or noise reduction.

*For more information see document number Fk41.66*



## SEVERE SERVICE APPLICATIONS



*Flowserve severe service products are engineered for durable functionality wherever harsh service conditions exist.*

Flowserve utilizes a suite of precision engineering solutions and services to generate top-rated severe service applications with pressure ratings of ANSI 150 to 4500/PN 10 to PN 640. Our severe service product portfolio provides durable functionality and solid

stability with a comprehensive range of solutions to neutralize continuous cavitation, flashing, and noise, increasing process yield and uptime.

Flowserve severe service products are constructed on physically optimized global platforms using standardized parts and components to ensure performance stability and longevity – under even the harshest conditions and for years to come.

**SEVERE SERVICE APPLICATIONS** Quick Reference

Heritage Brand	Valve Type	Size	Pressure	Severe Service Trim Options	Product Type
Valtek	Linear Globe	DN 15 to DN 915 0.5" to 36"	Class 150 to 2500 PN 10 to PN 400	CavControl, TigerTooth, ChannelStream, DiamondBack <i>(Pages 18-19)</i>	<b>Mark One</b> Page 10
Valtek	Linear Globe	DN 150 to DN 750 6" to 30"	Class 150 to 600 PN 10 to PN 63	SilentPac, Multi-Stream, MegaStream, Stealth <i>(Pages 20-21)</i>	<b>Mark 100</b> Page 11
Valtek	Linear Globe	DN 50 to DN 400 2" to 16"	Class 900 to 2500 PN 160 to PN 400	Type I, II, and III <i>(Page 22)</i>	<b>Mark 200</b> Page 11
Valtek	Linear Globe	DN 15 to DN 400 0.5" to 16"	Class 150 to 300 PN 10 to PN 40	Multi-Z <i>(Page 26)</i>	<b>FlowTop</b> Page 10
Kämmer	Linear Globe	DN 25 to DN 150 1" to 6"	PN 10 to PN 400	C1, Z2, N2 <i>(Page 23)</i>	<b>TotalFlow 035000</b> Page 11
Kämmer	Linear Globe	DN 25 to DN 250 1" to 10"	PN 40 to PN 400 CL 300 to CL 2500		<b>Multi-Z</b> Page 26
Valtek	Rotary	DN 75 to DN 1400 3" to 56"	Class 150-2500 API 2000-15000 PN 10 to PN 400		<b>TMCBV</b> Page 12
NAF	Rotary	DN 25 to DN 500 1" to 20"	Class 150 to 300 PN 10 to PN 40		<b>Setball</b> Page 14
NAF	Rotary	DN 25 to DN 400 1" to 16"	Class 150 to 300 PN 10 to PN 40	Z-Trim <i>(Page 22)</i>	<b>Duball</b> Page 15
NAF	Rotary	DN 150 to DN 800 6" to 32"	Class 150 to 300 PN 10 to PN 40		<b>Trunball</b> Page 15

## SEVERE SERVICE APPLICATIONS

### Mark and Flow Families

#### Trim Options



#### CavControl

Contains the cavitating bubbles in the center of the retainer, away from the metal surfaces of the valve – a simple but very effective method of controlling cavitation in low to mild conditions.

##### Features

- Directs cavitation bubbles away from metal surfaces and into opposing streams
- Impinging jets create a column of cavitation in the center of the retainer to remove the collapsing bubbles
- Increases product service life

##### Solutions

Works best in low-to mild-cavitation applications. Characterization available to cover a wide range of applications.

*For more information see document number FCENBR0068*



#### TigerTooth

One of the most effective cavitation elimination and noise reduction trims available, especially at high-pressure drops. Reduces sound pressure levels in gas applications and prevents the formation of gas bubbles, thereby eliminating cavitation in liquid applications.

##### Features

- Noise reduced through sudden expansion and contraction phenomenon that takes place as the flow passes over the teeth
- Pressure is gradually reduced without generating high velocities, which in turn reduces process line noise

##### Solutions

Reduces process velocities (which generate noise) at every point across the discs. As the fluid progresses through the stack, the expanding tooth pattern allows the pressure to be reduced in a series of successively smaller pressure drops without excursions below the vapor pressure – avoiding the formation of cavitation altogether.

*For more information see document number FCENBR0067 and FCENBR0068*



## SEVERE SERVICE APPLICATIONS

### Mark and Flow Families Trim Options



#### ChannelStream

The ChannelStream trim delivers effective cavitation elimination from decades of proven experience in severe cavitation applications.

##### Features

- Multiple staged pressure drop to eliminate cavitation
- Utilizes expansion, contraction, mutual impingement turbulent mixing and sudden turns to effectively manage and reduce fluid pressure without creating cavitation

##### Solutions

With the ChannelStream trim, staged pressure drops eliminate cavitation in difficult applications. It is well suited for moderate to severe cavitation applications.

*For more information see document number FCENBR0068*



#### DiamondBack

The DiamondBack trim offers the most technologically advanced anti-cavitation design, and works where other products have failed. The efficient, field-proven design reduces pressure by utilizing more energy control mechanisms than any other design in the industry.

##### Features

- Multiple staged pressure drop to eliminate cavitation
- Utilizes expansion, contraction, mutual impingement, turbulent mixing and sudden turns to effectively manage and reduce fluid pressure without creating cavitation
- Easy to clean stacked disc design
- Available in a variety of materials, including some ceramics

##### Solutions

With the DiamondBack trim, staged pressure drops eliminate cavitation in difficult applications. It is suited for moderate to severe cavitation applications. The product can pass slurries and particulates of small to moderate size.



## SEVERE SERVICE APPLICATIONS

### Mark and Flow Families Trim Options



#### SilentPac

Low noise baffles reduce noise generated by moderate pressure drops. Control of the process is through a standard contoured plug, yielding high turndown and excellent control.

##### Features

- Stainless steel attenuator is welded together to form a single robust part
- Process fluid diffuses through the cage with minimal noise generation to silence noise generated upstream

##### Solutions

Reduces noise for gas, steam, and liquid services. A cost effective solution for moderate noise reduction.

*For more information see document number FCENBR006*



#### MultiStream

Available with five stages. Eliminates noise in moderate to high-pressure drops. Drilled hole stages coupled with a contoured plug provide exceptional noise reduction and excellent turndown.

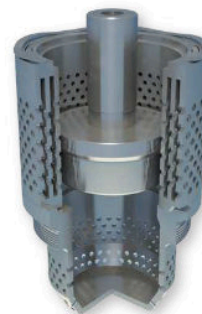
##### Features

- Small holes in each stage for frequency shifting produces lower noise levels while attenuating upstream noise

##### Solutions

Reduces noise for gas, steam, and liquid services. Eliminates noise in moderate to high-pressure drops

*For more information see document number FCENBR0067*



## SEVERE SERVICE APPLICATIONS

### Mark and Flow Families Trim Options



#### MegaStream

Decades of proven service make this heavy-duty, drilled-hole cage one of the most common and effective solutions to control valve noise.

##### Features

- Fluid expansion and velocity are controlled by increasing the flow areas of each subsequent stage
- Each stage takes a small pressure drop, avoiding the high velocities present in single throttle trims

##### Solutions

Effectively lowers sound pressure levels associated with turbulence generated within the valve, helping to avoid downstream turbulence that can vibrate relatively thin pipe walls and impact surrounding environs.

*For more information see document number FCENBR0067*



#### Stealth

The most sophisticated noise attenuation design available. Effectively reduces sound pressure levels in the most demanding applications.

##### Features

- Gradual reduction of pressure without generating high velocities reduces process line noise
- Small outlet holes leverage frequency shifting to raise the frequency and lower the noise

##### Solutions

Angled paths direct the flow to the valve exit to reduce exit turbulence, thereby lowering noise and increasing the flow capacity of the valve. Combines pressure reduction and velocity control features with noise elimination features to create the most advanced noise elimination technology available.

*For more information see document number FCENBR0067*



## SEVERE SERVICE APPLICATIONS

### TotalFlow Family Trim Options



#### Type I, II and III Trims

SoundControl, StreamControl, and CageControl are trim options for selected Kämmer Control Valve Series, including TotalFlow, ColdFlow, SmallFlow and HpFlow.

#### Features

- Cavitation protection and low noise trims and inserts with custom characterization possible

#### Solutions

##### Type I – SoundControl

For noise reduction only. Combines a standard parabolic plug with a 1- to 3-stage silencer as a non-guided cage around the plug. Retrofittable for applicable valve series.

##### Type II – StreamControl

Similar to Type I – SoundControl but with a multihole plug, which can be used for medium noise reduction for gases and as cavitation reduction for liquids. StreamControl with silencer cages are for gases with improved noise attenuation only.

##### Type III – CageControl

Heavy-duty noise and cavitation reduction. The solid cage guides the plug, which can be parabolic or multihole based on the application. Suitable for use in any version for gases and liquids.

*For more information see document number VLENTB0001*



Type I



Type II



Type III

### Setball, Duball and Trunnball Families

#### Trim Options



#### Z-Trim

Can be used in Setball, Duball and Trunnball valve types for cavitation control or noise applications.

#### Features

- Uses proven Z-trim technology to minimize noise and cavitation in rotary control valve application
- Decreases noise levels during control
- Self-cleaning

#### Solutions

A cost effective solution for eliminating common cavitation and noise problems in many applications. Retrofitfits into existing valves.

*For more information see document number FCENBR0067*



## SEVERE SERVICE APPLICATIONS

### Trunnion Mounted Control Ball Valve Trim Options



#### C1 Trim

Economical trim based on the CavControl design that minimizes cavitation damage. Controls the location and concentration of the cavitation vapor bubble implosion in an area away from the metal bubble.

##### Features

- Diametrically-opposed flow suppresses the effect of cavitation through collapsing vapor bubbles away from the metal parts
- Reduces hydrodynamic noise up to 20 dBA

##### Solutions

Works best in low to mild cavitation applications. Characterization available to cover a wide range of applications.

*For more information see document number VLENTB0068*



#### Z2 Trim

Z2 Trim, based on Flowserve Z-trim technology, is designed to minimize noise and cavitation in rotary control valve application.

##### Features

- Omni-directional trim for smooth transition without stair stepping in the characteristic curve
- Self-cleaning design with noise reductions up to 26 dBA

##### Solutions

A cost effective solution for eliminating common cavitation and noise problems in many applications.

*For more information see document number VLENTB0068*



#### N2 Trim

Multistage trim based on field proven MegaStream designs to minimize noise.

##### Features

- Staged pressure drop through curved plates with optimized holes for smooth flow characteristics
- Small pressure drop with each stage keeps velocity low, reduces cavitation and noise
- Self-cleaning design with noise reductions up to 30 dBA

##### Solutions

A cost effective method to eliminate control valve noise by dealing with gaseous pressure reduction across multiple stages.

*For more information see document number VLENTB0068*



## CUSTOM ENGINEERED



*Flowserve offers a comprehensive suite of custom-engineered solutions, as well as unique product designs that meet your exacting specifications.*

Flowserve's comprehensive suite of proven custom-engineered solutions delivers unmatched performance and fit for unique applications in the areas of cryogenics, ultra-high corrosion and erosion, tank drain, and sanitation. Our design engineers and

technicians are always available to help develop, manufacture, install, and maintain novel precision-quality solutions to meet the most demanding project requirements. Creating the right tool for the job at hand is our number one goal.

Starting today, Performance! is the new paradigm in control valve selection. Now everyone can have the power of on-demand sizing and selection at their fingertips.

## CUSTOM ENGINEERED Quick Reference

Heritage Brand	Valve Type	Size	Pressure	Temperature	Product Type
Kämmer	Linear	DN 25 to DN 250 1" to 10"	Class 300 to 2500 PN 40 to PN 400	-30°C to 650°C -22°F to 1202°F	<b>Multi-Z</b> Page 26
Kämmer	Low Flow/Micro Flow	DN 6 to DN 25 ¼" to 1"	Class 150 to 2500 PN 40 to PN 400	-200°C to 400°C -328°F to 752°F	<b>SmallFlow</b> Page 26
Valtek	Linear Globe	DN 15 to DN 300 0.5" to 12"	Class 150 to 4500 PN 10 to PN 640	Down to -218°C/-425°F	<b>Mark Six</b> Page 26
Valtek	Water Injection Spray Nozzle	Mounting Flange: 4" to 12" Cooling Water: 1" to 4"	Class 150 to 2500	-10°C to 530°C 14°F to 986°F	<b>VaporCool</b> Page 27
Valtek	Desuperheater	DN 150 to DN 1000; 6" to 40" Cooling water DN 25 & DN 40; 1" & 1.5"	Class 300 to 2500 PN 40 to PN 160	-10°C to 530°C 14°F to 986°F	<b>VariCool</b> Page 27
Kämmer	Low Temperature/ Cryogenic	DN 25 to DN 200 1" to 8"	Class 150 to 600 PN 10 to PN 63	Down to -196°C/-321°F	<b>ColdFlow 041000</b> Page 27
Kämmer	Low Temperature/ Cryogenic	DN 4 to DN 150 ⅛" to 6"	Class 150 to 600 PN 10 to PN 63	Down to -269°C/-452°F	<b>ColdFlow 241000</b> Page 28
Kämmer	High Pressure	IG NW 3 to 45; ¼"	PN 4000/60 000 psi ND 325 to ND 700	-30°C to 400°C -22°F to 752°F	<b>HPFlow</b> Page 28
Kämmer	Corrosive	DN 15 to DN 150 ½" to 6"	Class 150 PN 16	-10°C to 200°C 14°F to 392°F	<b>LinedFlow</b> Page 28
Kämmer	Sanitary/Aseptic	DN 10 to 100 0.38" to 4"	Class 150 PN 10 to PN 25	-25°C to 130°C -13°F to 266°F	<b>CleanFlow</b> Page 29
Kämmer	Tank Outlet	DN 15 to DN 150 ½" to 6"	Class 150 to 300 PN 10 to PN 40	-30°C to 250°C -22°F to 482°F	<b>DrainFlow</b> Page 29
Valtek	Linear Globe	DN 25 to DN 350 1" to 14"	Class 300 to 2500 PN 40 to PN 160	-10°C to 400°C 14°F to 752°F	<b>Survivor</b> Page 29

## CUSTOM ENGINEERED

### Multi-Z *Kämmer*

Handles high-pressure drop applications where entrained solids and cavitation are a problem. Designed for dirty service applications with excessive noise, cavitation, erosion, and high-pressure drops.

#### Features

- Trash tolerant design accommodates very high-pressure drops with precision control and durability
- High rangeability with balanced or unbalanced trim design
- Extremely durable due to seat being shielded from high velocities

#### Specifications

- Valve Type: Linear
- Size Range: DN 25 to DN 250; 1" to 10"
- Pressure: PN 40 to PN 400; Class 300 to 2500
- Body Materials: Carbon Steel; Stainless Steel; Special Alloys
- Temperature Range: -30°C to 650°C; -22°F to 1202°F

#### Solutions

Easy handling of solids in different sizes. Wear and tear can be minimized by selection of various trim designs and materials. Hardened stainless steel in different grades available, as well as full ceramic trim options. Custom design characteristics and calculations facilitate best solution and longest lifetime.

For more information see document number *KMEEBR1613*



### SmallFlow *Kämmer* 385000 and 080000

Tight precise control for ultra-low flow ranges. These products are widely used for applications in laboratories and industrial research departments, as well as industrial processes requiring high degrees of control accuracy.

#### Features

- Compact microflow control valves with  $C_v$  values from 0.000063 to 4.7
- Optional microflow control valves  $C_v$  values from 0.0000012 to 0.01
- Special end connections available

#### Specifications

- Valve Type: Low Flow/Micro Flow
- Size: DN 6 to DN 25; ¼" to 1"
- Pressure: PN 40 to PN 400; Class 150 to 2500
- Materials: Stainless Steel; Carbon Steel; Special Alloys
- Temperature: -200°C to 400°C; -328°F to 752°F

#### Solutions

Microflow is a special area for control valves. They typically contain small gaps and flow passages. Calculating laminar flow conditions requires significant expertise. Kämmer has calculated and manufactured low flow control valves and reproducible accurate trims for more than 40 years.

For more information see document number *KMEEBR8020*



### Mark Six *Valtek*

A globe-style, single-seat, top-entry control valve with bonnet extension for cryogenic applications down to -218°C/-425°F.

#### Features

- Design permits easy access and removal of the valve trim without breaking down the cold box
- Streamlined, lightweight body for reduced heat transfer

#### Specifications

- Valve Type: Linear Globe
- Size: DN 15 to DN 300; 0.5" to 12"
- Pressure: PN 10 to PN 640; Class 150 to 4500
- Material: Stainless Steels; Nickel; Bronze
- Temperature: Down to -218°C/-425°F

#### Solutions

During operation, a small amount of liquefied gas passes into the extension bonnet area where it vaporizes and insulates the packing from the liquefied gas temperature. Pressure resulting from the vaporization of the liquid prevents additional liquid from passing into the bonnet area.

For more information see document number *VLATB0006*



## CUSTOM ENGINEERED

### VariCool *Valtek*

Integrates the precision of a control valve with a desuperheater to attain maximum rangeability, responsiveness, and control.

#### Features

- Multi-stage design with ultra-fine atomization allows the valve to manage a wide spectrum of differential pressures (up to 90 bar/1305 psi) as it injects atomized cooling liquid directly into cool process steam
- Modular and compact design provides easy disassembly of the nozzle head, helps reduce maintenance costs

#### Specifications

- Valve Type: Desuperheater
- Steam line: DN 150 to DN 1000; 6" to 40"; Cooling water DN 25 and DN 40; 1" and 1.5"
- Pressure: PN 40 to PN 160; Class 300 to 2500
- Material: Carbon Steel; Stainless Steel
- Temperature: -10°C to 530°C; 14°F to 986°F

#### Solutions

Temperature reduction occurs as the atomized cooling liquid rapidly vaporizes in process steam. Perforated, flow-to-close plug and nozzle design maintain accurate control of varying process conditions through precise throttling of the cooling liquid in response to feedback from a controller and downstream temperature sensor.

*For more information see document number SAENBRV901 & VLASB101*



### VaporCool *Valtek*

The VaporCool fixed nozzle desuperheater cools process steam by injecting atomized cooling liquid directly into the stream.

#### Features

- Tight temperature control is maintained by optimizing the temperature, velocity, geometry, and droplet size of the cooling mist
- High cooling water flow rates and complete atomization are optimized for each application

#### Specifications

- Valve Type: Water Injection Spray Nozzle
- Size Range: Mounting Flange: 4" to 12"; Cooling Water: 1" to 4"
- Pressure: Class 150 to 2500
- Material: Carbon Steel; Chrome Moly; Stainless Steel
- Temperature: -10°C to 530°C; 14°F to 986°F

#### Solutions

Achieves accurate control of varying process conditions through precise throttling of the cooling liquid control valve in response to feedback from a controller and downstream temperature sensor.

*For more information see document number SAENBRV901 & VLASB101*



### ColdFlow

#### 041000 *Kämmer*

Able to operate at temperatures as low as -196°C.

#### Features

- Angle valve with flanged extension creates a low-density valve package
- Top-entry design with extended bonnet reduces maintenance costs

#### Specifications

- Valve Type: Low Temperature/ Cryogenic
- Size: DN 25 to DN 200; 1" to 8"
- Pressure: PN 10 to PN 63; Class 150 to 600
- Materials: Aluminum; Stainless Steel; Special Alloys
- Temperature: Down to -196°C/-321°F

#### Solutions

Predominantly used for specific demands of air separation units or LNG plants. By using different options, such as different extensions and/or accessories, this valve series becomes the valve of choice for liquid gases.

*For more information see document number KMEEBR4120*



## CUSTOM ENGINEERED

### ColdFlow 241000 *Kämmer*

The ColdFlow - 241000 Series can be used to operate as low as 4° Kelvin in liquid Helium service.

#### Features

- Top entry design with available bellows construction creates results in high performance, low leakage product suitable for ultra low temperature applications

#### Specifications

- Valve Type: Low Temperature/ Cryogenic
- Size: DN 4 to DN 150; ½" to 6"
- Pressure: PN 10 to PN 63; Class 150 to 600
- Materials: Stainless Steel
- Temperature: Down to -269°C/-452°F

#### Solutions

Ideal solution for extremely low temperatures. Flexible plugs and bellows seal options are suitable in solutions and features for cryogenic applications and challenges.

*For more information see document number KMEEBR4121*



### HPFlow 011000 and 015000 *Kämmer*

Based on decades of proven experience in ultra high-pressure control valves, with pressure classes up to PN4000/ ANSI - Class 4500 and above.

#### Features

- High pressure: Up to PN 4000/ANSI Class 4500 and above in split body designs; special alloys and high-pressure end connections available
- Ultra-low flow capability and high-pressure bellows seals available

#### Specifications

- Valve Type: High Pressure
- Size: IG NW 3 to 45; ¼" to 2"
- Pressure: Up to PN 4000/60 000 psi ND 325 to ND 700
- Materials: Stainless Steel; Special Alloys
- Temperature: -30°C to 400°C; -22°F to 752°F

#### Solutions

High pressure designs from 325 bar to 4000 bar for any kind of media and temperatures, including severe service conditions.

*For more information see document number KMEEBR1120*



### LinedFlow 132000 *Kämmer*

Offers a wide range of options for lined valves and is specifically designed for service in corrosive fluids, including gases and liquids.

#### Features

- Thicker, high quality PFA liners provide greater durability in highly corrosive service applications
- Standard PN 16 bellows seal coupled with anti-blowout stem design significantly increases safety and improves emissions

#### Specifications

- Valve Type: Corrosive
- Size: DN 15 to DN 150; ½" to 6"
- Pressure: PN 16; Class 150
- Materials: Lined PFA; Lined PFA Conductive
- Temperature: -10°C to 200°C; 14°F to 392°F

#### Solutions

Ideal for corrosive media where high alloys are typically used. The bellows seal design eliminates any limitations in sizing and selection for this valve. Improved lining procedures ensures a permanent connection between the lining surface and the base. Anti-blow-out stem design for maximum safety.

*For more information see document number KMEEBR3221*



## CUSTOM ENGINEERED

### CleanFlow 191000 *Kämmer*

Specifically designed for applications in the food and beverage industry as well as biotechnology, pharmaceutical, and other similar facilities where optimal cleanliness and sterile valves are required.

#### Features

- Meets USDA and 3A requirements and can be supplied for Clean In Place (CIP) and Steam In Place (SIP)
- One body with different bonnet and numerous end connection options for various applications

#### Specifications

- Valve Type: Sanitary/Aseptic
- Size: DN 10 to 100; 0.38" to 4"
- Pressure: PN 10 to PN 25; Class 150
- Materials: Stainless Steel
- Temperature: -25°C to 130°C; -13°F to 266°F

#### Solutions

Various end connection and bonnet options make this one of the most modular control valves – from beverage filling units to pharmaceutical production plants, and more. All module options meet current regulations and cleaning procedures.

*For more information see document number KMEEBR9123*



### DrainFlow 051000 *Kämmer*

The result of years of experience in developing special control valve features and application dedicated products. This valve meets exacting requirements for both on/off and control-on-tank drain applications.

#### Features

- Various designs and materials with extending or retracting plug designs
- High-pressure options available with or without bellows, steam jackets, and other options

#### Specifications

- Valve Type: Tank Outlet
- Size: DN 15 to DN 150; ½" to 6"
- Pressure: PN 10 to PN 40; Class 150 to 300
- Materials: Stainless Steel; Special Alloys
- Temperature: -30°C to 250°C; -22°F to 482°F

#### Solutions

Tank valves are typically specific to the vessel. The dynamic features of this valve allow it to be designed to exacting specifications to ensure a perfect fit and finish. Even special designs, such as a built-in temperature sensor or variant plug design in a mixing system vessel, are easily achieved.

*For more information see document number KMENBR5120*



### Survivor *Valtek*

Reliable solutions designed for use in the harshest conditions – erosion, corrosion, slurry, high velocity, and flashing applications.

#### Features

- Sweep angle design allows the process fluid to flow cleanly, without sharp turns or stagnant points
- Directs the energy of flashing process fluids away from critical equipment
- Valves are specifically targeted to each application; custom contours and materials are available
- Prevents particles suspended in fluids from entering the bonnet; reduces damage to guides and surfaces; minimizes packing wear and stem seizure

#### Specifications

- Valve Type: Linear Globe
- Size: DN 25 to DN 350; 1" to 14"
- Pressure: PN 40 to PN 160; Class 300 to 2500
- Material: Carbon Steel; Stainless Steel; Special Alloys
- Temperature: -10°C to 400°C; 14°F to 752°F

#### Solutions

Suitable for erosive applications, including abrasive slurry. Optional ceramic trim helps maximum product life cycle. Available in a wide range of materials, from stainless steel to titanium, for corrosive applications.

*For more information see document number VLENTB0036*



## POSITIONERS



*The Flowserve portfolio of ultra-high precision positioners supports a range of communication protocols and hazardous area classifications to help facilitate dramatic improvements in process uptime, reliability, and yield.*

Flowserve provides a comprehensive suite of ultra-high precision digital, analog, and pneumatic valve position controllers that accommodate a broad spectrum of communication protocols and prevailing hazardous area classifications and safety standards.

All models offer industry-leading embedded measurement, data reduction, and diagnostic functionality, while control system-independent user interfaces facilitate performance configuration, operation, and diagnosis with a single view. Flowserve positioners use advanced prognostic and diagnostic solutions to quickly diagnose field problems and expedite corrective actions that significantly reduce return-to-operation times.

Standardized platform architectures and software interfaces dramatically improve process uptime, reliability, and reduce costs.

## POSITIONERS Quick Reference

Heritage Brand	Operating Pressure	Temperature Range	Input Signal	Product Type
Logix	150 psi	-52°C to 85°C -61°F to 185°F	4-20 mA, HART communications versions 5 and 6 and Foundation™ Fieldbus	<b>3200MD/3400MD</b> Page 32
Logix	Single Acting 87 psi Double Acting 150 psi	-52°C to 85°C -61°F to 185°F	4-20 mA, HART communications versions 5, 6 and 7	<b>520MD+</b> Page 32
Logix	87 psi	-52°C to 85°C -61°F to 185°F	4-20 mA, HART communications versions 6 and 7	<b>Logix 420</b> Page 32
Logix	150 psi	-20°C to 75°C -4°F to 167°F	Modbus	<b>StarPac 3</b> Page 33
Logix	145 psi max	-29°C to 80°C -40°C option available -20°F to 176°F	3-15 psi, 6-30 psi, 4-20 mA	<b>XL/NT3000</b> Page 33

### Successful Flow Control Solutions

Flowserve puts fluids in motion. Recent successes include helping to restore the Florida Everglades, irrigating 13 million acres of farmland in Bangkok, Thailand, assisting with flood control in the Netherlands and ensuring that Las Vegas, Nevada has more than enough water to support their explosive population growth.



## POSITIONERS

### Logix 3200MD/3400MD *Logix*

Easiest calibration and configuration of any positioner available. Single push-button calibration, and DIP switch configuration allows the user to fully commission the positioner in a matter of minutes. 24/7 diagnostics with ValveSight Software DTM.

#### Features

- Best-in-class accuracy with dual stage piezo technology and inner loop control
- Explosion-proof aluminum or stainless steel housings work in virtually any hazardous location worldwide
- Balanced spool design provides flexibility to convert from 3-way to 4-way operation in the field
- Multiple mounting options are suitable for use with most linear and rotary actuator

#### Specifications

- Operating Pressure: 150 psi
- Temperature Range: -52°C to 85°C; -61°F to 185°F
- Certifications: FM/CSA/IECEX/ATEX, KOSHA, InMetro, GOST R explosion-proof, Non-incendive, Intrinsically Safe
- Input Signal: 4-20 mA, HART communications versions 5 and 6, and FOUNDATION™ Fieldbus

#### Solutions

Suitable for most applications that require precise, accurate control of valve packages. For use in hazardous locations worldwide. Linear and rotary applications for use in chemical, refining, food and beverage, and power industries.

*For more information see document number LGENIM0059, LGENIM3404*



### Logix 520MD+ *Logix*

The most advanced digital positioner from Flowserve. Increased flow rates, and added LCD display make it flexible enough for most applications. Performs basic configurations using available DIP switches, and more complex configurations using the LCD menu system. 24/7 diagnostics are available with ValveSight Software DTM.

#### Features

- Exceptional control with dual-stage piezo technology
- Multiple mounting options are suitable for use with both linear and rotary actuators
- Increased  $C_v$  allow quicker response without the need for flow boosters
- Single push-button calibration allows commissioning in a matter of minutes

#### Specifications

- Operating Pressure: Single Acting 87 psi, Double Acting 150 psi
- Temperature Range: -52°C to 85°C; -61°F to 185°F
- Certifications: FM/CSA/IECEX/ATEX Non-incendive, Intrinsically Safe
- Input Signal: 4-20 mA, HART communications versions 5, 6, and 7

#### Solutions

Suitable for most applications that require precise, accurate control of valve packages. Designed for use in non-incendive and intrinsically safe markets. Linear and rotary applications for chemical, refining, food and beverage, and power industries.

*For more information see document number LGENIM0105*



### Logix 420 *Logix*

The Logix 420 is the latest addition to the digital positioner family from Flowserve. When mounted to the Valtek GS control valves, Logix 420 provides the user with a cost competitive solution for the general service, explosion proof market.

#### Features

- Exceptional control with dual-stage piezo technology
- Integral FlowTop mounting eliminates the need for tubing
- Suitable for use with both linear and rotary single acting actuators
- Increased  $C_v$  allow quicker response without the need for flow boosters
- Single push-button calibration allows commissioning in a matter of seconds
- Optional backlit LCD

#### Specifications

- Operating Pressure: 87 psi
- Temperature Range: -52°C to 85°C; -61°F to 185°F
- Certifications: FM/IECEX/ATEX
- Explosion proof, Non-incendive, Intrinsically Safe
- Input Signal: 4-20 mA, HART communications versions 6, and 7

#### Solutions

Suitable for most single-acting applications that require cost competitive, precise and accurate control of valve packages. Designed for use in explosion proof, non-incendive and intrinsically safe markets. Linear and rotary applications for chemical, petro chemical, refining, food and beverage, and power industries.

*For more information see document number LGENIM0106*



## POSITIONERS

### StarPac 3 *Logix*

Simplified process measurement and control that fits in the space of a standard globe valve. Fully compensated pressure and temperature sensors on the valve provide accurate and reliable process readings.

#### Features

- Integrated pressure, flow, and temperature measurements
- Simplified installation – meter runs are not required through 4-inch globe valves
- Fast update, integrated PID controller
- High rangeability flow measurements
- Applications for both gas and liquid measurements

#### Specifications

- StarPac 3 Unit
- Operating Pressure: 150 psi
- Temperature range: -20°C to 75°C; -4°F to 167°F
- Certifications: FM/CSA Explosion-proof and Non-incendive
- Input Signal: Modbus and/or 4-20 mA
- Process Measurement
- Repeatability: Flow =  $\pm 0.25\%$  Full Scale, Pressure =  $\pm 0.1\%$  Full Scale, 0-6000 psi, Temperature  $\pm 1^\circ\text{C}$ , -195°C to 537°C

#### Solutions

Suitable for steam flow, industrial gasses, gas injection wells, and skid packages or any non-instrumented processes.

*For more information see document number VLENBR0066*



### XL/NT3000 *Logix*

The most sensitive and accurate analog positioner available. Modular design allows easy mounting on linear and rotary actuators. Available in 3-15 psi and 4-20 mA versions.

#### Features

- Dual-stage design allows 0.1% response to input signal
- Modular design allows customization for specific applications
- Additional end-of-travel switches or 4 mA to 20 mA feedback can be added in existing housing
- Linear and rotary VDI/VDE 3845 mounting options

#### Specifications

- Operating Pressure: 145 psi max
- Temperature Range: -29°C to 80°C, with -40°C option available; -20°F to 176°F
- Certifications: FM/CSA/IECEX/ATEX/InMetro/ANZEx Explosion-proof and Intrinsically Safe
- Input Signal: 3-15 psi, 6-30 psi, and 4-20

#### Solutions

Accurate, high-precision control for chemical, refining, and power industries. Global certifications allow use in most hazardous locations worldwide.

*For more information see document number VLAIM0047*



### ValveSight

Standalone or portable software and positioner system offers an integrated package to monitor valve package performance 24/7 with DCS or asset management tools that support FDT/DTM technology. Monitors and evaluates the condition of four key health indicators on any integrated control valve for enhanced user confidence when performing critical control valve operations. Degradations are displayed in simple, intuitive formats that draw attention and spark immediate actions.

#### Features

- Displays real-time evaluation of valve, actuator and positioner performance
- Deviations can be recognized and evaluated immediately to eliminate costly downtime
- Help screens offer probable causes and solutions to active alarm conditions
- Maximizes production uptime

#### Specifications

- Certified DTM
- Compatible with Yokogawa, Honeywell, DeltaV, Rockwell, Invensys
- FDT 1.2 certified

#### Solutions

Runs on any DCS system with certified FDT frame. Suitable for chemical, food and beverage, refining, power, and mining industries.

*For more information see document number VSENSF0003*



## SALES and SERVICE



### *Flowserve: Around the Clock, Around the World*

Flowserve manufactures, sells, and services precision-quality pumps, control valves, seals, and automation equipment to a diverse range of industries worldwide. We maintain strict quality control at all stages of manufacturing, assembly and testing. In-process inspections are routine, and all manufactured parts and valve assemblies are fully inspected and warranted prior to delivery.

#### ***Unparalleled Service***

Flowserve Quick Response Centers (QRCs) are equipped with thousands of commonly required parts, including OEM and Flowserve custom-built products. And each has the manpower and equipment to expedite time-sensitive repairs – large or small – including plant shutdowns.

Our service technicians can restore all types of control, manual-operated, or pressure relief valves to original quality. Should any valve – standard or nonstandard – prove unrepairable, Flowserve can usually replace the broken valve with a new valve, within the same time frame.



### ***Service When and Where You Need It Most***

Flowserve QRCs are strategically located around the world to ensure rapid response to your time-critical repair needs, routine maintenance, and product upgrades.

### ***Single Point of Contact***

Our QRCs serve as a local, single point of contact for the full inventory of Flowserve products and services, including the machinery to manufacture custom-built units. We offer better than 95% on-time performance for all repairs, and can turnaround new and custom-built units within 72 hours.

### ***Time-Critical Repairs***

To meet your time-critical repair needs, Flowserve offers 24-hour emergency repair, free pick-up and delivery within QRC service areas, and mobile and on-site repair. When a service technician is needed on-site, we can have one there within 24 hours anywhere in North America, and 48 hours outside of North America.



*To locate a Flowserve representative near you, visit [www.flowserve.com](http://www.flowserve.com)*



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*To find your local Flowserve representative:*

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