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Advanced Solutions
Demand for advanced solutions.
These advanced production techniques and pipeline processes are creating a new way of operating—with demand for new types of equipment and valves to better handle severe service conditions, such as:
- High pressure differentials
- Excessive noise and vibration
- Cavitation or flashing potential
- Limitations of rangeability

Challenges of traditional designs.
Process plants have increased through-put, causing operating pressures and temperatures to increase as well—making traditional control valves unstable and less reliable. This could lead to problematic plant conditions, such as:
- Safety concerns
- Valve failures before planned outages
- Process shut-downs
- Increased maintenance
- Decreased profitability
The innovative solution.
Designed specifically for the demands of severe service conditions, FlexStream® rotary control technology is custom engineered for individual applications to provide:

- Superior velocity control
- Variable characterization
- Exceptionally high rangeability
- Precision modulation

This patented FlexStream® technology expands upon the proven strengths of MOGAS quarter-turn ball valves to offer:

- Application-specific trim engineered for high ΔP applications
- Replaceable control element design
- Greater Cv per inch compared to competition
- Smaller dimensional envelope than a traditional control valve
- Dependable emissions control
Design Principles
FlexStream® control technology.
The internal control elements (or trim) use flow paths of various configurations to control flow and pressure drop. This compact trim configuration, located downstream of the seat, consists of a diffusion element and a control element.

1. The **diffusion element** splits and aligns the flow through an arrangement of straight paths.

2. The **control element** reduces the flow velocity through an arrangement of tortuous flow paths and open area.

The variable characterization of the control element allows **precise pressure letdown** and **superior velocity control** tailored to specific process conditions.
Variable characterization.
Flexstream® technology offers you precise flow control through a combination of variable characterization methods available in the control element.

1 Path characterization
Varies the number of turns, or letdown stages, in the passageways (straight-through or up to 24 turns).

2 Fill characterization
Varies the amount of control area within the bore (from 30 to 100 percent).

3 Pattern characterization
Varies the quantity, style, size and arrangement of passageways that fill the control area.
Path characterization for velocity control.
Pressure can be reduced by directing fluid flow through a right angle, which absorbs kinetic energy and controls velocity. By cascading pressure over a series of right angle turns—the tortuous flow path—the pressure drop at each stage is evenly distributed. The tortuous flow path expands at each right angle turn to allow for volumetric expansion, ensuring velocity will not be increased.

The larger the pressure drop, the more turns are required to control velocity. Path characterization varies the number of turns, or letdown stages, in the passageways. Up to 24 turns can be used to customize solutions for high-pressure differential applications, providing better control of:

- Velocity
- Noise
- Vibration
- Erosion
- Cavitation
### Design Principles

**Fill characterization for high rangeability.**

The control element consists of a **control area (1)** with multi-stage tortuous paths, and an **open area (2)** for unrestricted flow. **Fill characterization** varies the amount of control area within the bore from 30 to 100 percent, depending on flow conditions, pressure drop, noise level and outlet velocity required.

The combination of control area and open area provides exceptional flow control for applications that require **high rangeability**. The control area is used for higher pressure drop, lower flow conditions, while the open area provides lower pressure drop, higher flow coverage and uninterrupted flow capacity required in many applications.
**Pattern characterization for precision modulation.**

To further provide precise control at every stage of valve opening, **pattern characterization** varies the quantity, style, size and arrangement of passageways that fill the control area. Some passageways can be small with several stages of letdown, while other passageways progressively increase in size while reducing pressure letdown.

These combinations of variable characterization allow application-specific designs that provide ideal performance and extended valve life.
Benefits
Benefits

**High rangeability means better process control.**
Maintaining control between high- and low-flow extremes can be a challenge for conventional valves, which often require split-range configurations to accommodate the wide range of flow requirements. With its unique control element, FlexStream® offers a rangeability that’s almost unlimited, which means you can replace two or more valves with one valve that can do it all.
Benefits

**High rangeability means fewer valves.**

Valves using FlexStream® technology excel in applications where a main valve and bypass valve are required, since the exceptionally high rangeability allows you to replace both valves with a single valve, as shown in this example.

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**TYPICAL CONTROL VALVE CONFIGURATION**

ANTI-SURGE RECYCLE

COMPRESSOR

HOT GAS BYPASS

**SIMPLIFIED FLEXSTREAM CONFIGURATION**

ANTI-SURGE RECYCLE

COMPRESSOR

HOT GAS BYPASS
Benefits

Simplified configuration means less infrastructure.
Thanks to the improved rangeability and characterization, the need for additional valves and bypass configurations is eliminated. Compare this to a conventional rising-stem globe valve, which requires multiple pipe turns and lengthy pipe runs, or sideways mounting, to accommodate valve installation.

Simplified configuration means:
• Reduced material and infrastructure costs
• Less weight
• Less piping support
• Greater installation flexibility
• Reduced spare parts inventory
**Benefits**

**Smaller envelope means cost savings.**

With FlexStream® technology, big control comes in a smaller package. Variable characterization offers reduced bore and valve sizes, resulting in a smaller overall dimensional envelope than conventional rising-stem globe valves. The more compact design allows for cost savings that can be repurposed for other plant needs.

A smaller overall dimensional envelope means:
- Smaller bore
- Smaller valve body
- Less weight
- Reduced height
- Reduced pipe size and supporting hardware

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**SMALLER ENVELOPE WITH EQUIVALENT Cv**

- **14-inch FlexStream**
  - Cv = 6000

- **24-inch Rising-stem Globe**
  - Cv = 6050
Technical Specifications

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- Advanced Solutions
- Design Principles
- Benefits

Technical Specifications

Applications

Success Stories

The MOGAS Difference
Technical Specifications

**Design parameters**
ASME / ANSI B16.34 and B16.10

**Sealing design**
Uni-directional or bi-directional

**Operating design**
Floating ball or trunnion ball design

**Body design**
2 or 3-piece forged body

**Pressure class**
ASME Class 150 – 4500

**Temperature range**
–238 to 1650° F (–150 to 900° C)

**Size range**
2 to 42+ inches (50 to 1050+ DN)

**Materials**
Application specific from advanced metallurgy

**Coatings**
Application specific from proprietary and patented coatings

**End connections**
Welded / Flanged / Clamped / Custom

**Actuation**
Pneumatic / Hydraulic / Electro-hydraulic / Electric
## Technical Specifications

### Standards and certifications

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Applications
Applications

Oil & Gas
Exploration & Production
- High Pressure Separator Letdown
- Water and Gas Injection
- Pump Recirculation
- Choke and Gas Lift
- Compressor Recycle

Oil & Gas
Production & Handling
- Compressor Recycle and Anti-surge
- Compressor Hot Gas Bypass
- Feed Gas Regulation
- Depressurization (Modulating and On/Off)
- Pressure Control

Oil & Gas
Transportation & Storage
- Tank/Cavern Fill and Withdraw
- Pump Recirculation
- Metering Flow Control
- Pressure Control
- Pipeline Fill

Oil & Gas
Floating LNG / FPSO
- Compressor Recycle and Anti-surge
- Compressor Hot Gas Bypass
- Depressurization (Modulating and On/Off)
- Pressure Control
Applications

Oil & Gas

SAGD
- Feed Gas Regulation
- HP Steam Separator
- Boiler Blowdown
- Steam Header
- Steam Injection

Refining
- Emergency Depressurization
- Compressor Anti-surge/Recycle (Wet Gas Compressor)
- Hydrocarbon Gas-to-Flare
- Coke Drum Blowdown
- Feed Gas Regulation

Chemical / Petrochemical
- Compressor Recycle and Anti-surge
- Blowdown to Flare
- Vent Discharge
- Depressurization
- Pressure Control

Power Generation
- Main Feedpump Recirculation
- Condensate Recovery/Pump Recirculation
- Feed Water Regulation
- Deaerator Level Control
- Flashtank Level Control

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Applications

Success Stories

The MOGAS Difference
Cutting POx depressurization time in half.
An autoclave plant needed a depressurization valve for its POx (Gold) process. FlexStream offered unprecedented rangeability in excess of 300:1. With tortuous-path technology, our installed customized control valve cut depressurization time in half compared to its linear predecessor—all while staying well within strict noise, velocity and thermal-shock limits.

One feed-gas valve doing the job of two.
For a feed-gas process, an LNG plant needed a control valve with extreme rangeability—nearly 800:1. With its unique trim design, FlexStream was the clear choice. Our rotary control valve also offered a more compact footprint, with a single 24-inch valve able to do the job of two 36-inch linear globe valves. Reduced size and weight made installation safer, with virtually no overshoot. The flexible design also meant fast opening and closing.

Saving space on an anti-surge application.
Our customer needed a solution for a compressor recycle and anti-surge application. Due to the extremely high rangeability of FlexStream, we successfully replaced two 60-inch conventional globe valves with one 40-inch valve using FlexStream technology, saving the additional pipe, support and weight for a lower installed cost.
The MOGAS Difference
The MOGAS Difference

Our expertise...

**EXPERIENCE**
We only build valves for the severe service market—and always have.

**SUPPORT**
Anytime. Anywhere. Servicing what we build helps us make better valves.

**KNOWLEDGE**
Advanced solutions prompted by client partnerships.

**INNOVATION**
Application-specific designs born from investigative analysis.

Your confidence...

**QUALITY**
Quality processes ensure our valves are built to last.

**SAFETY**
Safe environments are a priority—in your workplace and ours.

**VALUE**
Lower cost of ownership is an investment for the long term.

**RESULTS**
Our valves perform in demanding conditions—we guarantee it.
The MOGAS Difference

Our valves perform in demanding conditions …we guarantee it.

Continuous years of research and development, design innovation, advanced manufacturing techniques and field experience allow us to offer an application-specific PERFORMANCE GUARANTEE on our isolation and control valves…plus a lifetime warranty on materials and workmanship.
The MOGAS Difference

For more information, visit us online at www.mogas.com