

## 72000 Series

### Large Mass Flow Energy Management Control Valves

#### Engineered better-fit solutions for severe service applications

Baker Hughes **Masoneilan™** 72000 Series energy management and low noise products are specifically designed for applications with large mass flow rates and high differential pressures. Typical installations may be found in compressor surge control, gas-to-flare, atmospheric vent, or other applications where the ratio of inlet/outlet pressures requires substantial levels of noise attenuation and large valve sizes. A variety of options and configurations are available to create effective solutions for our customers' specific applications.

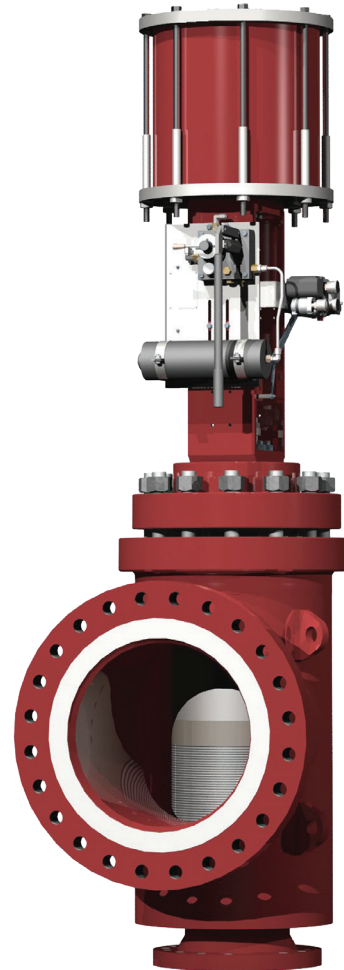
The 72000 Series valves are custom-engineered to fit your specific application. As such, the exact product configuration may differ from the general specifications, depending upon the application. For additional information contact your local Baker Hughes sales representative. The data within this fact sheet applies to typical configurations and does not include all potential design options.

The better-fit solution for severe service valve applications is part of our broad product portfolio and valve trim technologies that allow an uncompromising approach in addressing your needs. Therefore, each 72000 Series valve is engineered to meet your exact specifications and application conditions. This allows us to offer the most technically advanced and cost-effective solution to your energy management and noise control applications.

#### Features

##### Low noise trim

Baker Hughes better-fit approach allows for a wide range of noise attenuation options, providing the desired noise level at a low cost of ownership. These attenuation products range from single- and double-stage **Lo-dB™** trim up to as many as 40 stages of three-dimensional **V-LOG™** tortuous path trim. The selected trim option is always custom engineered to provide excellent results for each unique application.



Single- and double-stage Lo-dB trim is selected in most low- to moderate- pressure drop ratio applications. This technology is customized by modifying the size and spacing of each hole drilled into the cage to provide a minimal sound pressure level at the trim exit.

The three-dimensional tortuous path design of Masoneilan V-LOG trim controls pressure reduction through the management of the process fluid energy. This is accomplished by directing the gas through discrete flow channels that are designed with multiple stages consisting of 90-degree turns along with the intermediate contractions and expansions in the flow area. The enhanced flow geometry of the V-LOG trim creates a series of kinetic energy losses, followed by partial energy recoveries at each stage. This gradual letdown process is highly effective for noise attenuation due to the staged reduction of the fluid's pressure.

## Large pressure drop – energy management

Process applications that require the 72000 Series valve design often experience extremely high pressure drop ratios (P1/P2). These high ratios release large amounts of energy as the process fluid's pressure is reduced. This energy release can lead to excessive noise and vibration if not properly addressed in the valve design.

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The labyrinth flow path of the V-LOG trim subjects the gas to a high level of friction as it is redirected through each turn in the flow path. V-LOG trim's patented flow contractions produce the best possible flow resistance.

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Each stage of the V-LOG trim is designed with an expansion in flow area, which is essential for managing fluid velocity that otherwise would increase as the pressure is reduced across each stage. The expanding area is designed to compensate for the volumetric expansion of the gas, preventing any increase in the kinetic energy as the pressure is reduced.

Trim velocity control is important for maintaining low aerodynamic noise levels within the valve body and trim. High-velocity trim exit flow will yield high-magnitude sound waves, which lead to valve body vibration in high-pressure letdown applications.

As a gas experiences a large reduction in pressure, the volume of the gas expands. This phenomenon will yield a higher downstream velocity if the piping is designed without considering this volumetric expansion. Masoneilan 72000 Series is designed with expanded outlet areas to accommodate this expansion, and lessen the overall system noise level<sup>1</sup>.

1. Baker Hughes considers both outlet mach number and the outlet expansion ratio for system noise calculation, per the IEC International Noise Predication Standard (IEC-60534-8-3).

## High capacity

Baker Hughes has developed flexible, automated design tools for the 72000 Series line, allowing "ground up" fabrication of custom-engineered valve solutions in very short lead times. High capacities and custom Cvs are met through a wide range of valve plug diameters, stroke lengths, and body gallery diameters to suit any application within standard product lead times.

## Balanced plug

Balanced plug designs deliver stability with smaller actuator thrust requirements, as compared to unbalanced designs. Normally, the 72000 Series valves are installed in a flow-to-open configuration allowing radial expansion from the smaller diameter cage to the expanded area of the valve body. The free expansion of the fluid and precise separation of the trim exit flow jets greatly heightens trim noise attenuation and greatly lessens vibration within the valve body. For installations that require flow-to-close configurations, an auxiliary pilot plug may be supplied to reduce actuator thrust requirements.

## Ease of maintenance

Top entry trim allows easy access to the valve internals for lower life cycle costs and easier maintenance activity. Baker Hughes provides ample padeyes and tapped holes for standard lifting and handling equipment, eliminating the need for special fixtures or tooling. All trim components are cage guided, with ample clearance at the body, bonnet, and bridge regions for easy removal and replacement. The 72000 Series design employs a minimum number of gaskets and soft goods, making outage planning and stocking requirements easier.