IMI CCI

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DRAG® Control Valves

Engineering GREAT Solutions

Control valves for general applications

IMI Critical Engineering

The founder of multi-stage disk stack technology

The World Leader in Critical Service Control Valves:

IMI CCI designed, built and patented the world's first multi-stage control valve in 1967 as DRAG® technology. For more than 50 years our team has worked with industry professionals across the world, in a wide range of applications, to refine the designs and establish sound engineering rules for velocity control.
This application insight led to the industry accepting guidelines on velocity and fluid kinetic energy control and creating multi-stage design principles that many companies follow today.

When it is a critical service application, there is only one proven choice: ***DRAG® control valves.***

Key features

Velocity Control:

As a fluids pressure drops across a control valve its velocity will increase across the valves control element. Controlling these fluid velocities is a primary design consideration in selecting the proper control valve technology.
High fluid velocities can produce cavitation, vibration and erosion; which can quickly destroy the valve and damage the associated piping system. Unlike traditional control valves, the DRAG® multi-stage, multi-turn technology divides the pressure reduction into many smaller stages. The number of turns, or stages, is selected to ensure a specific fluid discharge velocity is achieved at the exit of the control element.

Addressing cavitation like no other:

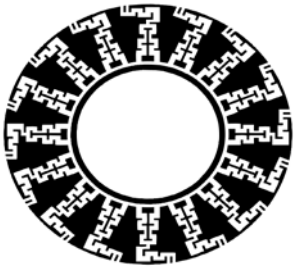
When a liquid passes through the reduced area of the valve control element it accelerates, resulting in local pressure reduction. If the fluid pressure falls below the vapor pressure, flashing and bubble formation will occur. As the fluid moves out of the control element its pressure recovers. When the recovery pressure exceeds the fluids vapor pressure, collapse or implosion of the just-formed bubbles occurs, resulting in cavitation. Pitting damage on the valve components, poor process control and noise are a few of the symptoms from cavitation. The DRAG® control design addresses the velocity increase, which removes the potential for cavitation.

The solution for noise and vibration:

Excessive fluid velocities can lead to uncontrolled noise and pipe motion which results in failure of the valve and process components. Besides the potential for system trip shutdowns, noise and vibration are health hazards for plant personnel and their surroundings.

Only IMI CCI has the engineering experience to design the right number/ geometry of passages and stages to control the fluid velocity, frequency to properly address the resulting noise and vibration.

Seat ring damage caused by cavitation results in leakage that can harm downstream equipment.



IMI CCI's multi-path, multi-stage trim designs are characterized to provide optimal performance

Engineering ***GREAT*** *Solutions*

Designing out erosion:

Erosion of the valve trim can be caused by either the washing action of a fluid or abrasion from entrained particles. The effect is most severe at high pressures and/or concentrations of entrained material and the rate of erosion increases with higher fluid velocity; which makes velocity control critical for erosion prevention.

Leakage — uncontrolled velocity:

Leakage through control valves can be caused by seat wear, undersized actuation or poor seal material. As valve trim erodes, the valve's capacity changes and flow becomes difficult to control, inducing symptoms like increased vibration and amplifying noise levels.

DRAG® technology limits the velocity of the fluid as it enters the seating area and minimizes the erosive forces that would otherwise compromise the valve's ability to effectively control leakage. In addition to controlling destructive fluid velocities, IMI CCI utilizes both high actuation forces and uniquely designed seals and seating to maintain repeatable tight shutoff.

By combining the advantages of DRAG® with IMI CCI's advanced actuation, sealing and seating technology, IMI CCI's control valves provide repeatable, tight shutoff and reliable operation to assure customers that the costs associated with system leakage are truly being controlled.

Customized characteristics for the application:

Unique to DRAG® technology is the ability to maintain control performance and velocity from low to full flow. Every DRAG® control element is customized for each specific application based on the desired performance, and can be linear or characterized to provide a single, high-rangeability valve in lieu of a more costly two-valve solution.

IMI CCI has more experience in multi-stage, multi-turn control valves than any other supplier. Our team of engineers have designed, built, installed and supported more customers in more applications than any other manufacturer; and the DRAG® control valves have repeatedly proven their value in critical service like no other.

Erosion damage to a competitor's valve plug caused by high fluid velocity results in poor shutoff.

DRAG® control valves are available in a wide range of sizes, pressure classes, materials and configurations; typical ranges include:

Velocity Controlling Stages	Up to 60, special designs available
Sizes	1/4 in. to 48 in. (6 mm. to 1220 mm.)
Pressure Ratings	ASME B16.34 150 to 4500; PED CL 300 to CL4500; API 15,000
Fluid Temperature Range	-350°F to 1100°F (-196°C to 590°C)
Body Style	Globe, angle, "Z" body and custom designs to meet almost any pipe
Connection Type	ASME B16.10 buttwelds; ASME B16.11 socket welds; Flanged to ASME B16.5 MSS SP-44 and API 605; Specials available
Seat Design	Metallic or soft seat
Bonnet Style	Bolted bonnet, metal, gasket seal body-to-bonnet joint, or pressure seal
Guiding	Disk stack
Plug Design	Unbalanced, balanced, pressurized seat
Characteristic	Linear, equal %, quick open or custom design
Rangeability	Designed to meet application needs; minimum of 30:1; over 300:1 for larger valves
Body Material	Carbon steel, chrome-moly steel, stainless steel, duplex stainless steel Bolting: Ferritic, austenitic
Trim Material	Disk Stack: 410, 316, or 316L stainless; Inconel 718; chrome-moly alloy steel; duplex stainless steel; or tungsten carbide Plug/Seat Ring: 410, 316, or 316L stainless steel; Inconel 718; 17-4PH; chrome-moly alloy steel; duplex stainless steel; or tungsten carbide (hardfaced when required) Packing/Seals: teflon, graphite, Inconel Gaskets: graphite/stainless
Shutoff Capabilities	Unbalanced Plug: Soft Seat- ASME Class VI, Metal Seat- ASME Class V, MSS-SP-61 Balanced Plug: Soft Seat- ASME Class VI, Metal Seat- ASME Class IV or V Pressurized Seat Plug: Metal Seat - MSS-SP-61

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