DRAG® 800D Control Valves for Severe Service Applications

Series 800D DRAG® control valves: proven DRAG® technology in a standard line of valves.

Figure 1: 800D Control Valve with Diaphragm Actuator

Specifications

Valve Size	1 in.Through 8 in.
Rating	ANSI Class 150, 300, 600 (DIN and JIS available)
End Connections	Raised Face Flanged, Weld Ends (BW & SW)
Materials	See Table 3
Temperature	-20 to 450 F (-29 to 232 C)
Flow Characteristic	Linear or Characterized to Suit the Application
Flow Coefficient	See Table 4 for C_v
Rangeability	From 30:1 to 100:1
Seat Leakage	Standard ANSI Class IV, Option ANSI Class VI
Dimensions	See Tables 3 and 4
Selection	Use CCI's VALSIZ™Sizing Computer Program

DRAG® Velocity Control Solves Problems

DRAG® Velocity Control trim has long been an industry preference for solving valve problems. Whether problems are due to cavitation damage, noise, poor control, or vibration, this valve will help. The 800D makes it easier to bring DRAG® technology solutions to you.

Our proven technology, in this pre-engineered package, allows your plant to receive the benefits that have traditionally come only with a custom designed valve. Configured with either flow-to-open or flow-to-close trims, the valve is well suited to steam, gas or liquid flow. Flow-to-close is typically used for liquid service, and flow to open for steam and gas.

Standard materials allow compliance with NACE MR0175 and are also suitable for power plant and refinery applications. The soft seat option meets FCI 70-2 Class VI seat leakage.

Use CCI's VALSIZ™ computer program for ease of sizing and selection of your application.

Standard Dimensions for Easy Installation

The flanged body design is configured to meet ISA S75.03 face to face dimensions. Weld end body configurations are available with socket weld ends through 2 in. (50 mm) size and buttweld ends through 8 in. (200 mm).

Multi-spring Diaphragm Actuators

The CCI MSD-II actuator, standard for 800D control valves, is a multi-spring diaphragm unit pre-selected by valve size. Built in reverse (spring close) or direct (spring open) acting configurations, this unit provides control and seat loading in line with typical industry values. Refer to the MSD-II catalog for more information.

Quality Assurance/Quality Control

CCI series 800D valves meet the ANSI B16.34 standard. Hydrostatic tests are performed in accordance with ANSI requirements, and seat leakage testing is performed per the ANSI/FCI 70-2 standard. Operability tests are run on every valve. Special tests are readily available to meet specific project needs, including non-destructive testing of valve components and performance testing of the actuator controls.

Designed with multi-stage pressure reduction.

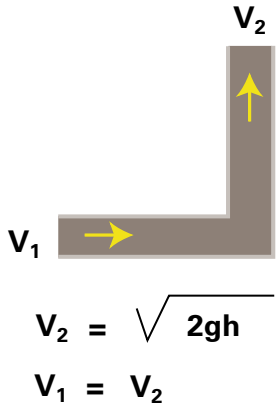


Figure 2: Single-stage Pressure Reduction

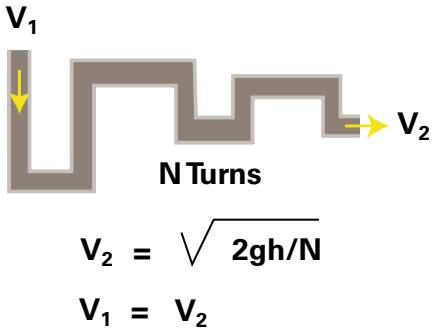


Figure 3: Multi-stage Pressure Reduction

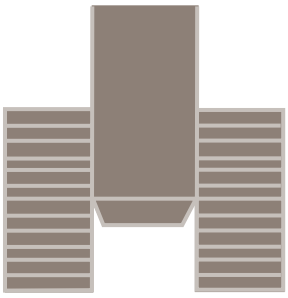


Figure 4: DRAG® Disk Stack

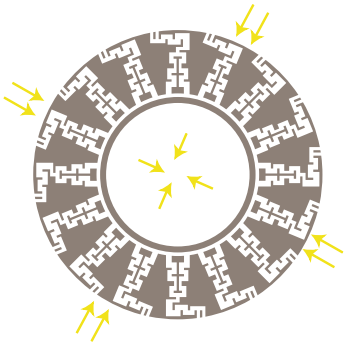


Figure 5: Multi-path, Multi-stage Disk

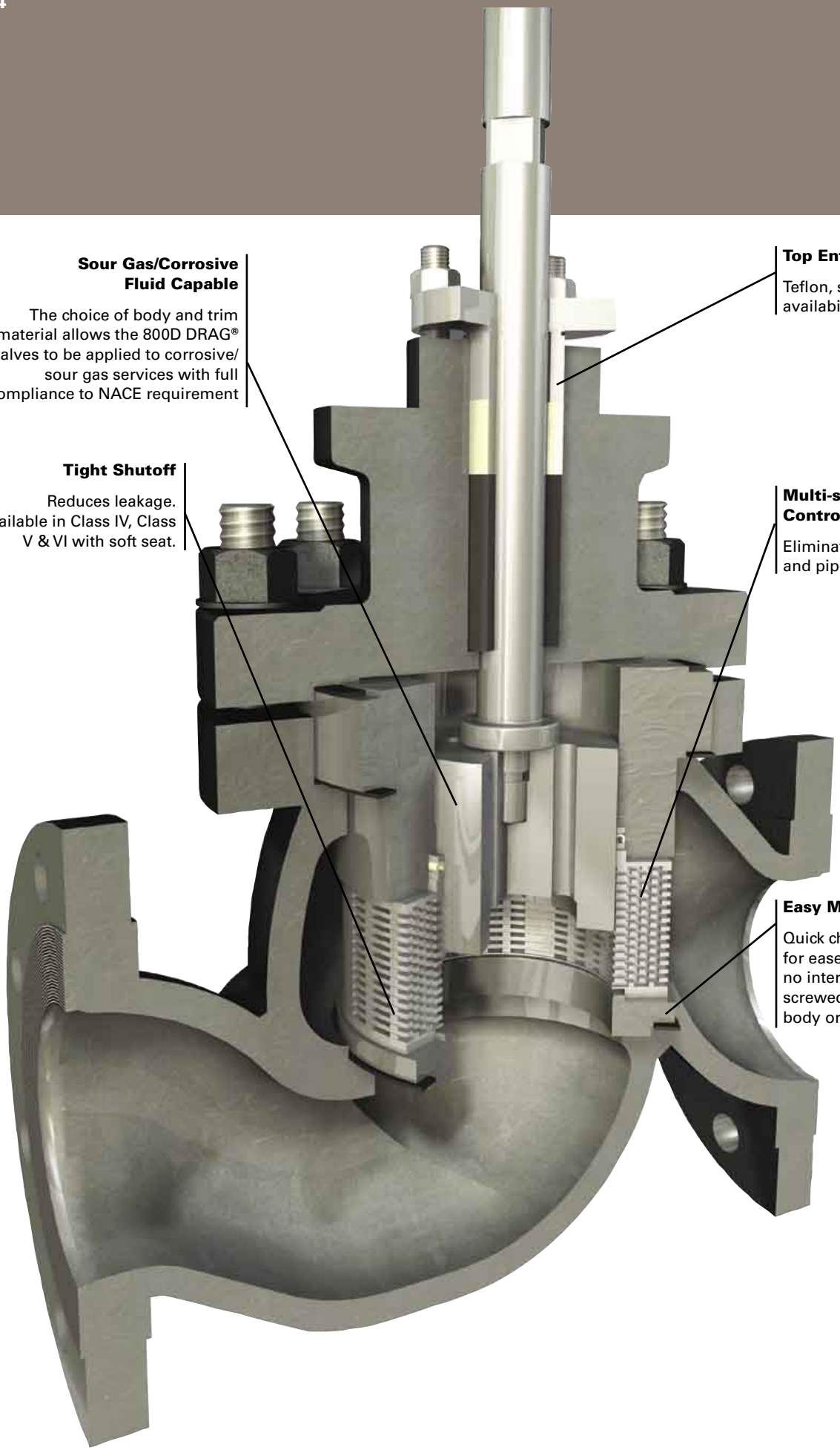
Why Velocity Control Works

DRAG® valves prevent the development of high fluid velocities at all settings. At the same time, they satisfy the true purpose of a final control element: to effectively control system pressure and flow rate over the valve's full stroke.

Here's how the DRAG® valve accomplishes what the others can only approach:

- The DRAG® trim divides flow into many parallel streams. Each flow passage consists of a specific number of right angle turns — a tortuous path (Figure 2) where each turn reduces the pressure of the flowing medium by more than one velocity head.
- The number of turns, N, needed to dissipate the maximum expected differential head across the trim is found in Figure 3 by changing the equation from V orifice = $\sqrt{2gh}$ to a new equation:

  V DRAG® element = $\sqrt{2gh/N}$.
- Applying this principle to the DRAG® valve's disk stack and plug as shown in Figure 4, means that velocity is fully controlled in each passage on every disk in the stack and that the valve can operate at controlled, predetermined velocity over its full service range as in Figure 5.
- In the DRAG® trim, the resistance, number and area of the individual flow passages is matched to your specific application and exit velocities are kept low to eliminate cavitation of liquids and erosion/noise in gas service.



Sour Gas/Corrosive Fluid Capable

The choice of body and trim material allows the 800D DRAG® valves to be applied to corrosive/ sour gas services with full compliance to NACE requirement

Top Entry Design

Teflon, seals and packing availability

Tight Shutoff

Reduces leakage. Available in Class IV, Class V & VI with soft seat.

Multi-stage DRAG® Control Element

Elimination of erosion, noise and pipe vibration.

Easy Maintenance

Quick change trim allows for ease of maintenance, no internal components are screwed or welded into valve body or bonnet.

Use this checklist to evaluate the benefits of the DRAG® 800D control valve design.

	Benefits	800D	Competition
1	Velocity control prevents cavitation and erosion damage. DRAG® trim limits exit velocities to 100 ft/sec (30 m/sec), or less.	✓	
2	Trim characteristics, linear with 2 to 8 stages is standard.	✓	
3	High shutoff capability Class IV, Class V & Class VI with soft seat.	✓	
4	Trim materials, disk stack & spindle manufactured from 316SS giving long trim life even under severe service conditions.	✓	
5	Standard design allows fast turnaround of orders while maintaining CCI's multi-stage trim to meet individual operating conditions.	✓	
6	Trim sizes to cover a full range of applications. Available in 0.84, 1.25, 1.5, 2.5, 3.5, 5 and 6 inch port sizes.	✓	
7	Globe configuration to meet customer piping requirements. Flanged, socket or buttweld end configurations available from 1-8 inches (25-200 mm).	✓	
8	Disk stack trim not sensitive to venturi effects.	✓	

A custom solution based on 40 years of experience.

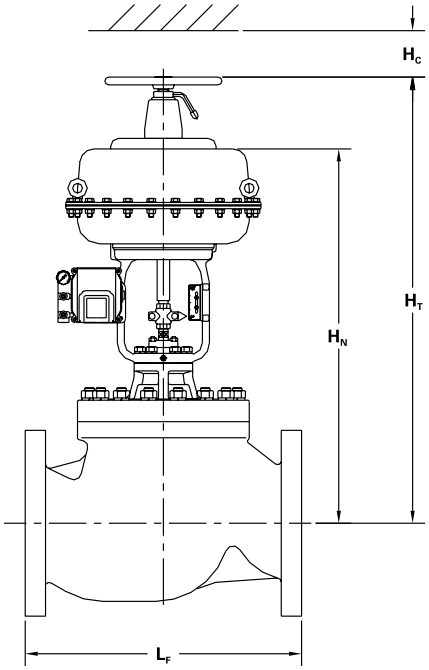


Table 1: Valve Face to Face Dimensions (up to 8 in. shown) **Unit: Inch (mm)**

Valve Size		L_F (Flanged End)			L_W (Welding End)		
Inch	(mm)	ANSI 150	ANSI 300	ANSI 600	ANSI 150	ANSI 300	ANSI 600
1	25	7.25 (184)	7.75 (197)	8.25 (210)	8.25 (210)	8.25 (210)	8.25 (210)
1 1/2	40	8.75 (222)	9.25 (235)	9.88 (251)	9.88 (251)	9.88 (251)	9.88 (251)
2	50	10.00 (254)	10.50 (267)	11.25 (286)	11.25 (286)	11.25 (286)	11.25 (286)
3	80	11.75 (298)	12.50 (318)	13.25 (337)	12.50 (318)	12.50 (318)	13.25 (337)
4	100	13.88 (352)	14.50 (368)	15.50 (394)	14.50 (368)	14.50 (368)	15.50 (394)
6	150	17.75 (451)	18.62 (473)	20.00 (508)	18.62 (473)	18.62 (473)	20.00 (508)
8	200	21.38 (543)	22.38 (568)	24.00 (610)	22.38 (568)	22.38 (568)	24.00 (610)

Note: 1) All dimensions are for reference only
2) Flanged Body Face to Face dimensions per ISA S75.03
3) Welding End: A) 1 in. - 2 in. = Socket Weld B) 1 in. - 8 in. = Buttweld

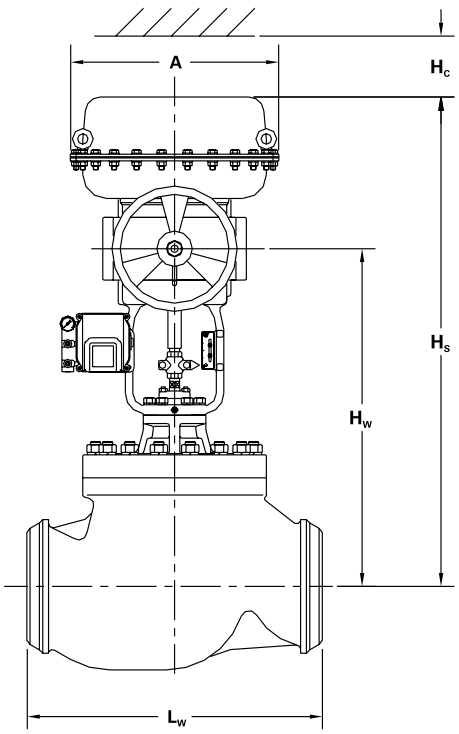


Table 2: Summary of Valve Heights (up to 8 in. shown) **Unit: Inch (mm)**

Valve Size	Actu-ator Size	Dimensions Inch (mm)					
		A	H_N	H_T	H_S	H_W	H_C
1 (25)	340	13.4 (340)	21.0 (533)	30.0 (762)	N/A	N/A	4.8 (120)
1.5 (40)	340	13.4 (340)	22.0 (559)	31.0 (787)	N/A	N/A	4.8 (120)
2 (50)	340	13.4 (340)	22.5 (572)	31.5 (800)	N/A	N/A	4.8 (120)
3 (80)	400	15.8 (400)	27.5 (699)	39.0 (990)	37.0 (940)	22.6 (574)	4.8 (120)
4 (100)	500	19.7 (500)	34.0 (864)	47.0 (1192)	46.5 (1180)	27.1 (688)	4.8 (120)
6 (150)	500	19.7 (500)	36.0 (914)	49.0 (1245)	48.0 (1220)	28.8 (732)	4.8 (120)
8 (200)	650	25.6 (650)	45.0 (1143)	69.0 (1750)	61.0 (1550)	34.4 (874)	6.7 (170)

Technical specifications and materials.

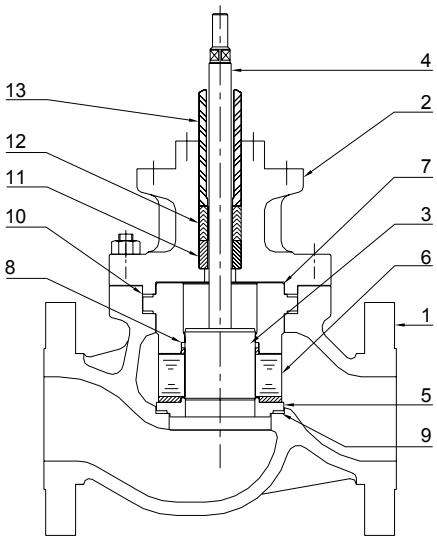


Table 3: Combination of 800D Body Assembly Materials

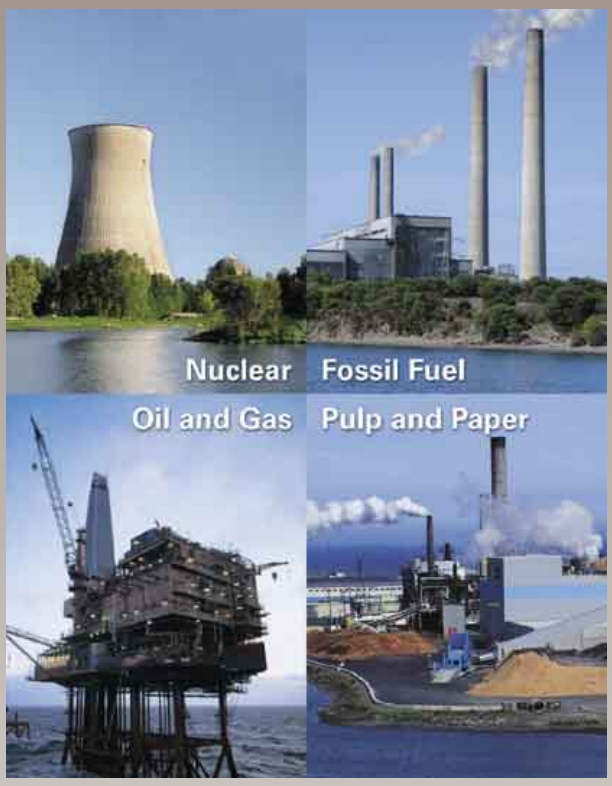
No.	Part Name	Material
1 2	Body Bonnet	A 216 WCB A 351 CF8M
3	Plug	316 SS / Chrome Plated 316 SS Stellited
4	Stem	316 SS
5	Seat	316 SS 316 SS Stellited 316 SS / TFE
6	Disk Stack	316 SS
7	Balance Cylinder	316 SS
8	Balance Seal	316 SS / Teflon
9	Seat Gasket	TFE (Filler) & SS
10	Body / Bonnet Gaskets	
11	Packing Spacer	316 SS
12	Packing Set	Glass-Filled TFE
13	Packing Follower	316 SS

Table 4: Flow Coefficient, C_v and Tortuous Path Turns, Linear Characteristic (up to 8 in. shown)

Inch (mm)			Min. C_v	Maximum C_v									
				Flow to Close					Flow to Open				
Valve Size	Port Size	Stroke		Number of Turns					Number of Turns				
				0	2	4	6	8	0	2	4	6	8
1 (25)	0.84 (21)	1.2 (30)	0.15	6.1	6.1	5.5	4.9	4.4	6.1	7.4	6.8	6.2	5.6
1.5 (40)	1.25 (32)	1.2 (30)	0.25	17.4	17.4	14.2	11.8	10.0	17.4	18.2	17.3	14.9	14.2
2 (50)	1.5 (38)	1.2 (30)	0.30	23.8	23.8	19.1	15.9	13.3	23.8	24.4	21.8	18.3	17.3
3 (80)	2.5 (65)	1.6 (40)	0.7	71.8	56.3	43.8	35.7	29.5	71.8	55.9	48.5	41.7	39.3
4 (100)	3.5 (89)	2.0 (50)	1.6	126	93	71	57	47	126	100	86	70	61
6 (150)	5.0 (125)	2.8 (70)	3.3	285	214	165	134	110	285	216	187	153	143
8 (200)	6.0 (150)	3.9 (100)	4.3	404	302	233	188	155	404	321	279	229	215

Note: Designs characterized to suit your system requirements are available, C_v to be defined on a case by case basis

Throughout the world, companies rely on CCI to solve their severe service control valve problems. CCI has provided custom solutions for these and other industry applications for more than 40 years.



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