

A background image of a warehouse filled with tall metal shelving units. The shelves are stocked with various industrial valve components, including large flanges and smaller fittings. Some shelves have white labels with letters like 'B', 'C', 'D', and 'E'. Signs on the shelves read 'NO STORAGE ABOVE TOP OF THIS BEAM'.

DFT Valves

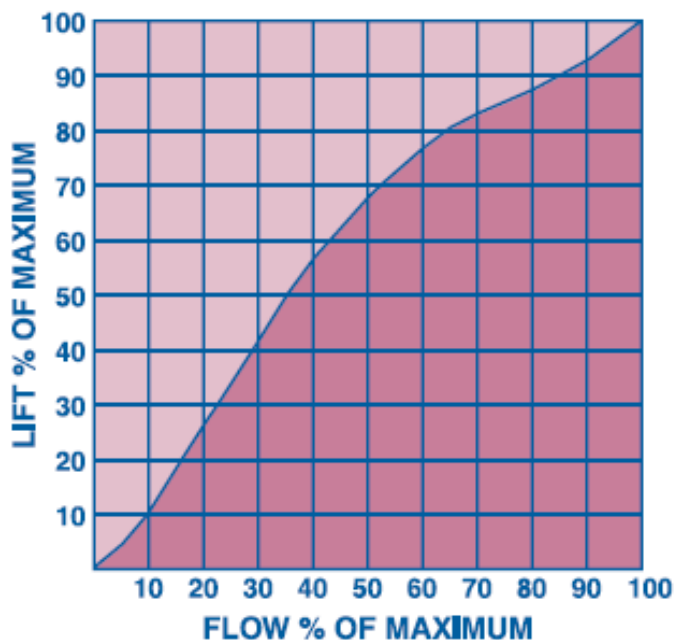
Control and Block Valves

REQUEST A QUOTE
sales@dkamans.com

SCHEDULE SERVICES
562-529-8400

WWW.DKAMANS.COM

Flow Characteristic Curve



PRECISE CONTROLLABILITY

The near linear flow characteristic of the DFT[®] control valve has been established by standard flow testing across the entire flow range. This characteristic coupled with the factors below results in capabilities that meet the most stringent process control requirements.

Five factors contribute to the remarkable controllability:

- Positive positioning of the ball throughout the stroke.
- Long Valve Stroke.
- Ability to control in the first 5% of travel.
- High Flow Capacity.
- High Rangeability – 200:1 turndown ratio.

GENERAL SPECIFICATIONS:

1. End Connection Sizes: 1/2" through 16"
2. Service Ratings: ANSI B16.34 Class 150 to 4500. Higher service pressure available.
3. Temperatures: -425°F to 1800 F
4. Face to Face: ANSI B16.5 or per customer specification
5. End Connections: ANSI Flanged, Weld End or per customer specification

WHY SHOULD YOU USE DFT®?

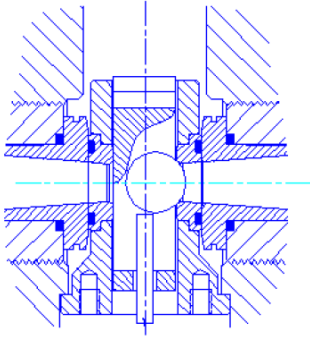
- Straight-thru Design- solves your performance problems
 1. **Eliminates Damage:** Our unique nozzle design smooths turbulence thereby eliminating body, trim and piping damage caused by high velocity fluid impingement in your system.
 2. **Handles Greater Flow:** Since we have no tortuous path through our valve, our valves have a higher Cv than that of the same size valve made by competitors, often saving you money.
 3. **Precision Modulation & Control:** Our 200:1 turndown ratio and linear flow characteristic gives you precise control over the entire operating range.
- Unique Trim Design – lowers your cost of ownership
 1. **In-Line Repair:** All styles can be repaired in-line without the need for expensive special tools saving you time and money.
 2. **Long Life:** Our trim design uses wear components at the critical places along the flow path maximizing design life for the application.
 3. **Low Replacement Costs:** Our unique ball, cage and wear bushing design allows you the flexibility to replace only the worn parts, lowering your cost of repair significantly when compared to our competition.
- Wide Application Range- can be used in nearly any service
 1. **ANSI 150 to 4500:** Handles all ANSI applications, pressures up to 16,000psi and temperatures from cryogenic to 1600 degrees F.
 2. **Liquid, Gas, Steam, Slurry:** Our non tortuous path design handles liquids, gases, steam (including mixed phase flow), abrasives and many slurry applications.
 3. **Materials:** Standard body materials are Carbon, Alloy and Stainless Steel. High nickel and exotic alloys are also available – any weldable alloy that is available as a forged material can be used.
- Venturi Nozzle Design – reduces turbulence in your piping system
 1. **Cavitation Control:** Our nozzle design controls cavitation and reduces the associated noise and vibration.
 2. **Particulate and Mixed Phase Flow:** Our nozzle design moves particles and water droplets to the middle of the flowstream avoiding costly damage.
 3. **Prevents Erosion:** Our nozzle design smooths the flow and reduces the potential for valve body and pipe erosion.
- Class V Shutoff
- Actuation – The actuator (Linear: pneumatic, hydraulic, electric etc.) and accessories (positioners, limit switches, manual over-rides, etc.) of your choice can be mounted on the valve.

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DFT® Control Valve Operation

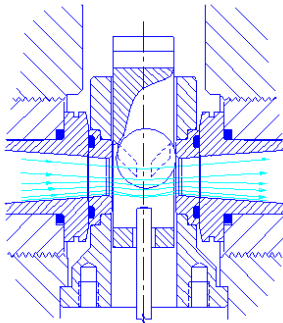
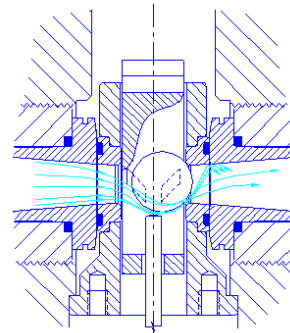


Closed Position

In the closed position, pressure moves the ball into the conical seating surface and holds it in place. Line contact between the ball and the seat results in high surface loads between the seat and the ball producing tight closure. As pressure increases, the seat load increases improving the seal. During each valve stroke, the ball rotates and repositions itself presenting a new sealing surface to the seat, prolonging the tight shutoff capability. Temperature changes do not affect the tight shutoff since there is freedom of movement between the ball and the seat. The ball cannot become wedged into the seat. The guide pin is used to set the valve position. During normal operation, it has no function.

Close Throttling Position

As the valve opens, it operates in the close throttling position. In this position, the ball is supported by the two forward inclined pads on the cage and the seat surface which oppose the pressure differential force caused by the Bernoulli effect. The ball is supported and stable throughout the valve stroke and does not pinwheel or chatter.

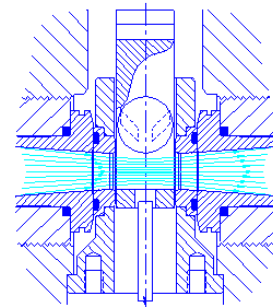


Intermediate Throttling Position

In the intermediate throttling position, the ball rests on the four cage pads and is opposed by the same differential pressure force. The stable suspension of the ball throughout the valve stroke permits extremely close and repeatable control throughout the entire valve stroke.

Full Open Position

In the full open position a Straight-thru flowpath exists and the valve operates with the inherently high flow capacity of a venturi. The ball is firmly held out of the flow stream by four inclined pads on the cage which oppose the pressure differential force. The Bernoulli pressure differential moves the suspended particles towards the center of the fluid stream, preventing them from settling out into the body. This keeps the valve clean and free of material deposits in all positions during the valve stroke.



Bernoulli

Energy per unit volume at inlet = Energy per unit volume at outlet

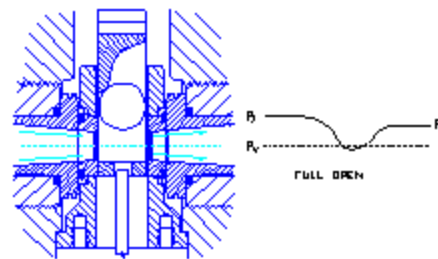
$$P_1 + 1/2\rho v_1^2 + \rho gh_1 = P_2 + 1/2\rho v_2^2 + \rho gh_2$$

Where:

P = Pressure Energy ; $1/2\rho v^2$ = Kinetic Energy; ρgh_1 = Potential Energy

The best example of the Bernoulli Principle is often called the “Bernoulli Effect” which states that fluid pressure decreases as fluid velocity increases.

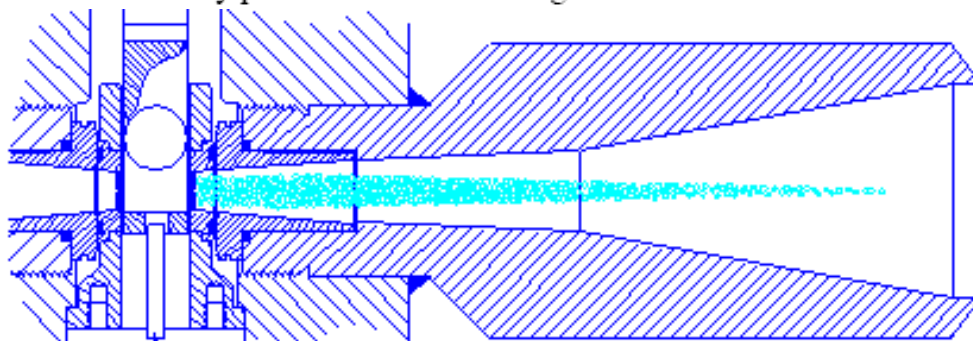
This illustration shows the typical change in pressure as the fluid moves through the valve. At the inlet, pressure is P_1 . Velocity increases through the valve to a maximum as it moves through the valve port. At the valve port, the pressure drops to P_{vc} (Pressure at the vena contracta, which is the lowest pressure in the valve). You may note that the P_{vc} has dropped below the vapor pressure (P_v). As the fluid exits the valve, pressure recovers to P_2 which is lower than P_1 .



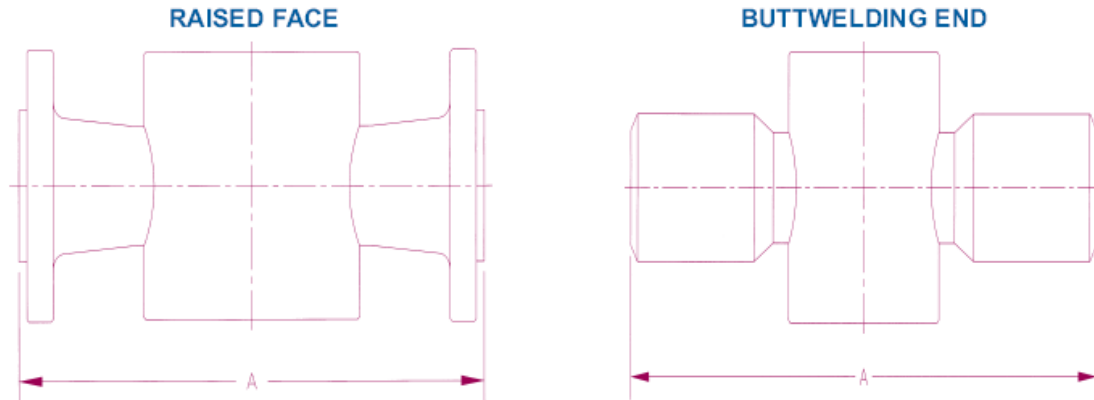
Cavitation Control

Using the illustration above, at P_1 , the fluid stream is all liquid. Liquid flashes when the pressure drops below the vapor pressure (P_v) of the liquid. As the pressure recovers to P_2 , vapor bubbles collapse. This is known as the potentially damaging phenomena called cavitation.

Our control valves manage cavitation. Bubbles form at the lowest pressure (highest velocity) which is at the center of the fluid stream. Subsequent collapse is within the hydraulic barrier, not on metal surfaces. As shown below, our valve nozzle design encourages a smooth recovery prior to the fluid exiting the valve.



Face to Face Dimensions & Flow Capacity



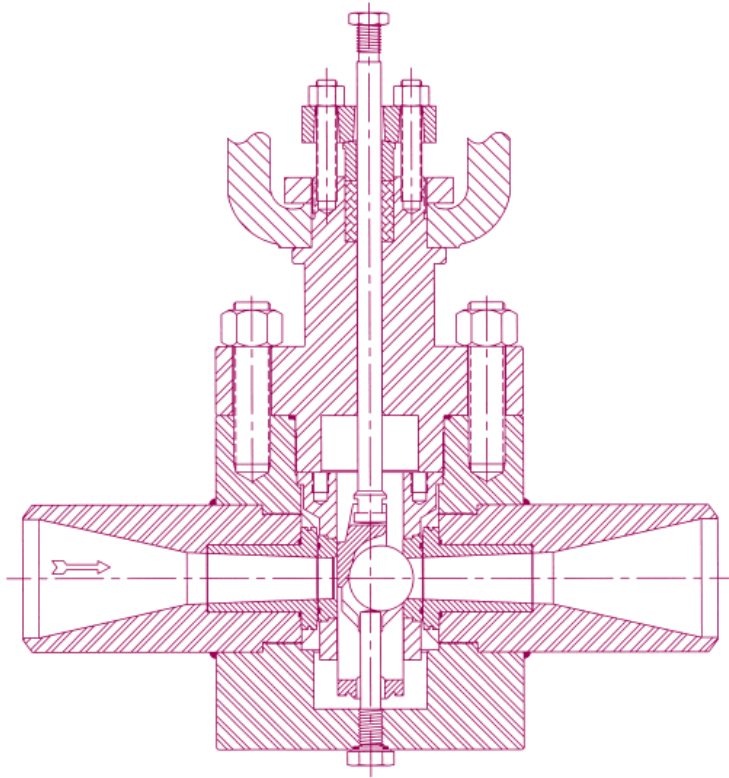
Nominal Valve Size	Face to Face Dimensions*					
	150	300	600	900	1500	2500
1/4	4.00					
3/8	4.00					
1/2	4.25	6.00	6.50		8.50	10.38
3/4	4.62	7.00	7.50	9.00	9.00	10.75
1	5.00	8.00	8.50	10.00	10.00	12.12
1 1/4	5.50	8.50	9.00	11.00	11.00	13.75
1 1/2	6.50	9.00	9.50	12.00	12.00	15.12
2	8.00	10.50	11.50	14.50	14.50	17.75
2 1/2	8.50	11.50	13.00	16.50	16.50	20.00
3	9.50	12.50	14.00	15.00	18.50	22.75
4	11.50	14.00	17.00	18.00	21.50	26.50
6	16.00	17.50	22.00	24.00	27.75	36.00
8	19.50	22.00	26.00	29.00	32.75	40.25
* Dimensions per ANSI B16.10. Valves can be supplied to meet end user requirements Class 4500 and higher pressure valves are supplied to meet end user requirements						

Maximum Valve Flow Coefficient							
Size	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2
Cv	1	2.5	4.5	10	20	31	45
Size	2	2 1/2	3	4	6	8	
Cv	80	125	180	320	720	1280	

DFT® HI-100™

Features:

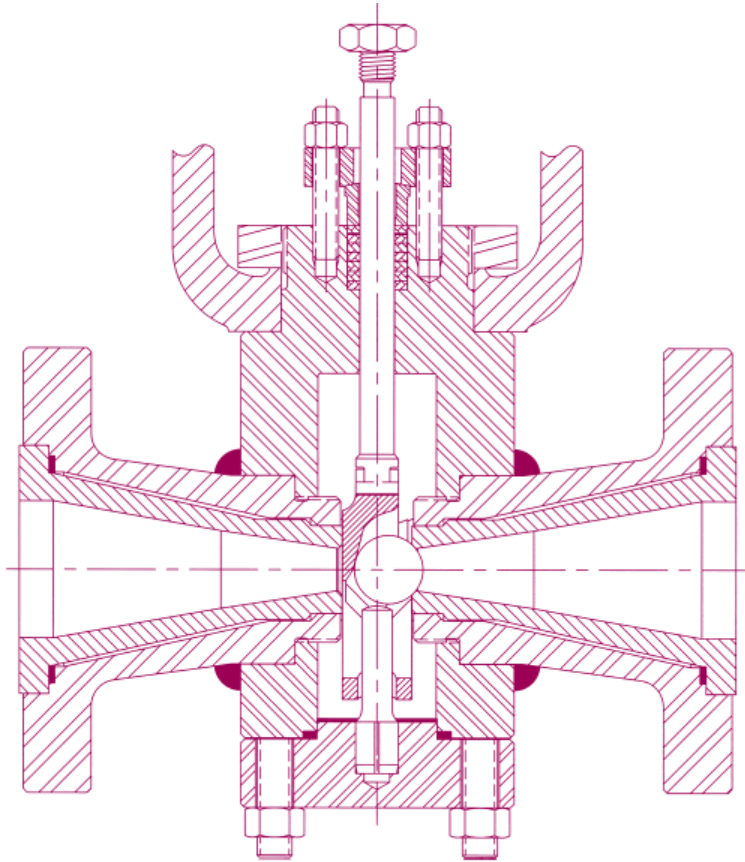
- Straight-thru design
- ¼" to 8"
- ANSI 150 to 4500 and special High Pressure
- Carbon Steel, Alloy Steel, Stainless and High Alloys
- Weld End, Flanged, or Custom End Prep
- Temperatures: -425 F to 1900 F
- In-line Repair
- Quick Change Trim
- Top or Bottom Entry
- Low Operating Thrust
- Manual, Pneumatic, Electric or Hydraulic Actuation



The HI-100™ features an in-line *Straight-thru* venturi flow design. The seating element, a spherical ball, is contained by a cage that positions it relative to the downstream seat by means of linear stem travel. There are no close clearances between the moving parts (i.e. cage, ball and seat). These features enable the valve to operate smoothly and efficiently at high or low temperatures and/or in fluids carrying suspended particles such as slurries. The *Quick Change Trim* feature permits in-line replacement of the internal trim (ball, stem, cage, seats, seat retainer cartridge and wear bushings). *Interchangeability* of the upstream and downstream seats and wear bushings extends the life of the valve at no extra cost.

DFT® ULTRA-TROL™

(Available as Flanged End Only)

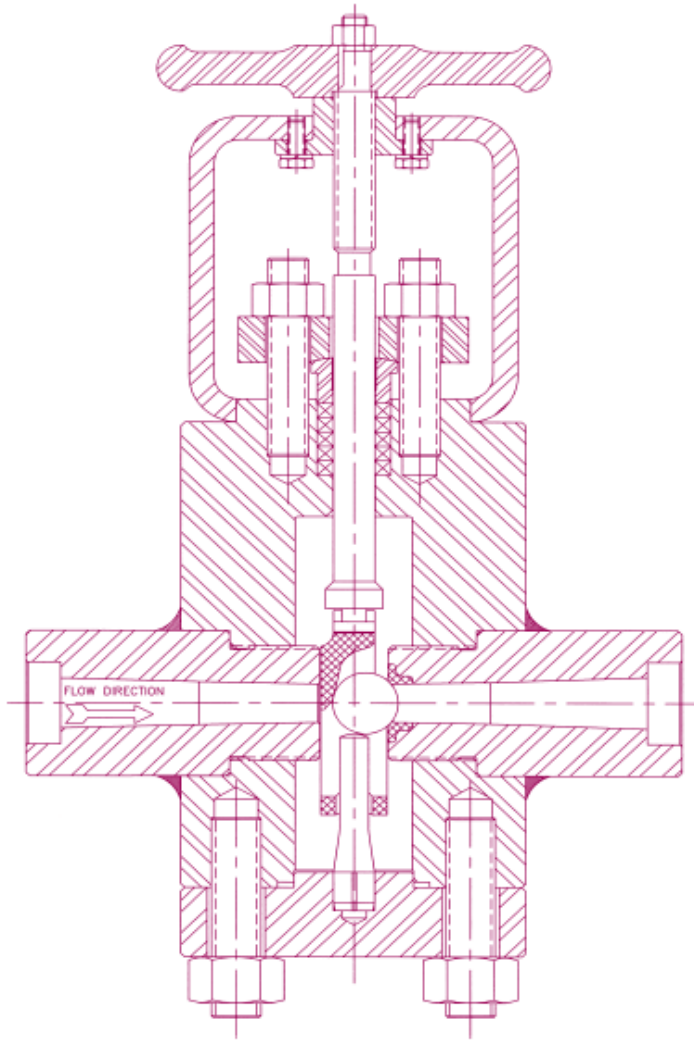


Features:

- Straight-thru design
- ¼" to 8"
- ANSI 150 to 2500
- Carbon Steel, Alloy Steel, Stainless and High Alloys
- ANSI, DIN or JIS Flanged
- Temperatures: -425 F to 1000 F
- In-line Repair - Trim
- Top or Bottom Entry
- Low Operating Thrust
- Manual, Pneumatic, Electric or Hydraulic Actuation

The ULTRA-TROL™ is designed for lined pipe applications requiring flanged end connections. The internal design features are similar to the HI-100™. They include the in-line through ported venturi flow shape and the contained spherical ball. These basic features enable the valve to operate smoothly and efficiently at high or low temperatures and in slurries. The ball, cage and stem can be easily replaced in-line without removing the valve from the line. The downstream seat is end loaded for quick replacement.

DFT® UNIFLO™



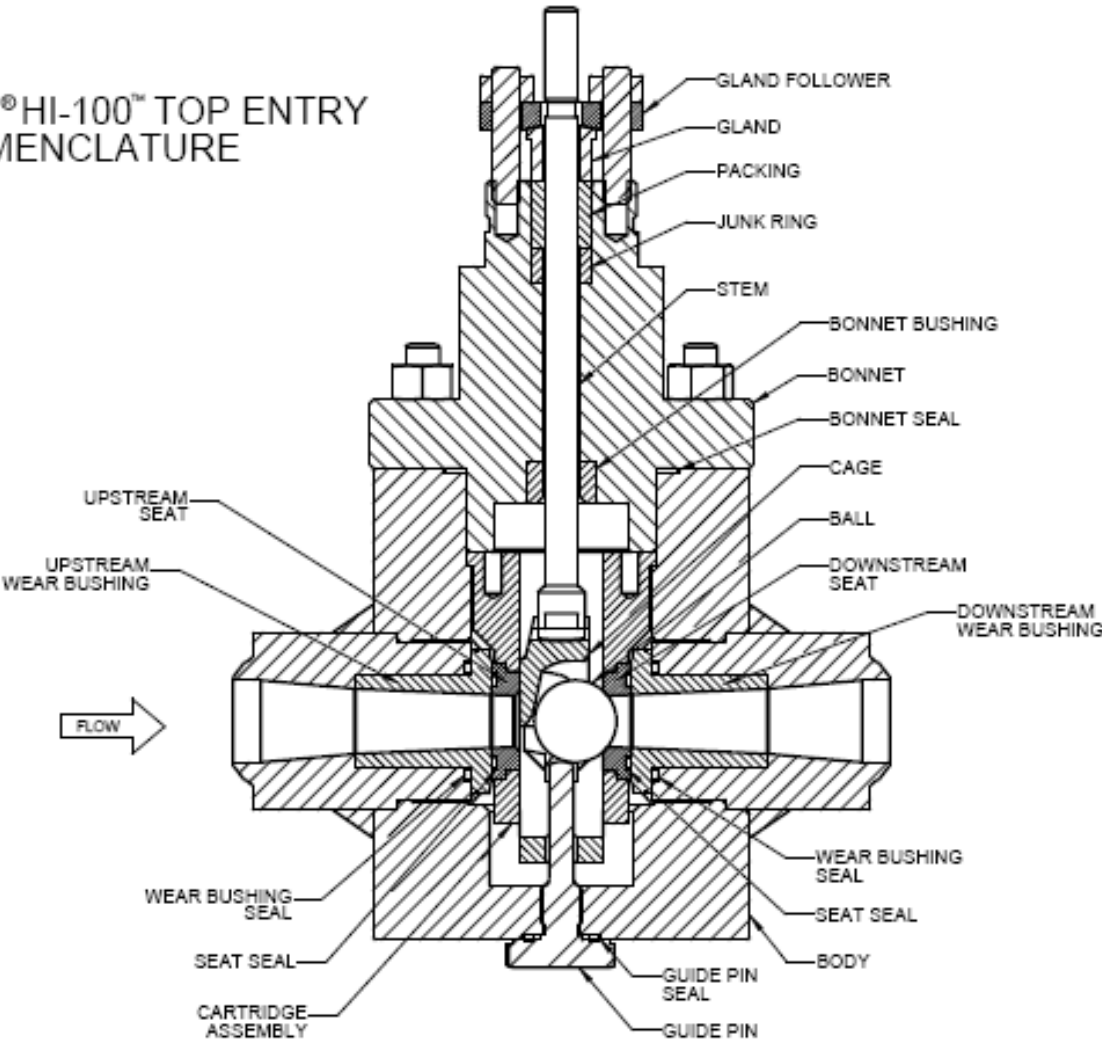
Features:

- Straight-thru design
- ¼" to 8"
- ANSI 150 to 4500 and special High Pressure
- Carbon Steel, Alloy Steel, Stainless and High Alloys
- Weld End , Flanged, or Custom End Prep
- Temperatures: -425° F to 1900° F
- In-line Repair - Trim
- Bottom Entry
- Low Operating Thrust
- Manual, Pneumatic, Electric or Hydraulic Actuation

The UNIFLO™ is designed for less aggressive applications where seat erosion is not anticipated. The internal design features are similar to the ULTRA-TROL™ and the HI™-100. They include the in-line through ported venturi flow shape and the contained spherical ball. These basic features enable the valve to operate smoothly and efficiently at high or low temperatures. The ball, cage and stem can be easily replaced in-line through the bottom cover without removing the valve from the line. The UNIFLO™ meets API 598 seat leakage requirements.

Nomenclature

DFT® HI-100™ TOP ENTRY NOMENCLATURE



Materials of Construction

COMPONENT	CARBON STEEL	ALLOY STEEL	STAINLESS STEEL
Body	A105	A182 F22 or F11	A479 316
Bonnet/Bottom Cover	A105	A182 F22 or F11	A479 316
Stem	410SS Heat Treated & Hardened		17-4PH
Cage - 1/4" to 2"	Stellite® #6		
2-1/2" & Larger	Valve Body Base Material w/ Stellite® #6 Hardfacing		
*Cartridge	316 SS		
Guide Pin	A193 B7		A193 B8M
Gland	303 SS		
Follower	Carbon Steel		316 SS
TRIM STYLE			
	Standard	Feedwater	Steam
Ball - 1/4" to 4"	440C	Ultra-Loy™ Ceramic	Stellite®
6" & Larger	Stellite®		
*Seat - 1/4" to 2"	422SS Heat Treated & Hardened		Stellite®
2-1/2" & Larger			316ss/Stellite
*Wear Bushing	422SS Heat Treated & Hardened		17-4PH
**Seat Liner	Compatible with Application		
SEALS			
	Low Temperature (<350 deg F)		350 - 1000 deg F
Packing	Teflon CVH Style		Graphite
Bonnet or Bottom Cover and Guide Pin Seal	Aflas® O-Ring		Spiral Wound Gasket 304/Graphite
Seat Seal	Spiral Wound Gasket 304/Graphite		
*Wear Bushing Seal or			
**Seat Liner Seal			
MANUAL VALVES			
Yoke	Carbon Steel		Stainless Steel
Handwheel	Cast Iron		
Stem Nut	Bronze		

* HI-100 Only™

** ULTRA-TROL™ Only

The following accessories are available for the DFT® Control Valves			
ACTUATORS	ACTUATOR ACCESSORIES	PACKING	SPECIAL TRIM
Pneumatic Diaphragm	Air Filter Regulator	Graphite	Feedwater
Pneumatic Piston	Air Set	Teflon (CVH)	Steam
Electric	Limit Switches	Live Loaded	Catalyst
Electro-Hydraulic	Manual Override	Emission Compliant	Slurry
Hydraulic	Positioner		
Manual	Solenoid		
	Transducer		

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Industries and Applications

- Aerospace
 - Air
 - Fuel Oil
 - Gas
 - High Pressure Water with fines
 - Methane Vapor
- Chemical
 - Abrasive Slurry Control
 - Hot Hydrogen Gas
 - Pitch Blend Control
 - Powerhouse Applications
 - Super critical water oxidation
- Government/Military Test
 - Air
 - Cryogenic
 - Nitrogen Gas
 - Steam
- Power
 - Bottom Ash
 - Condensate Drain
 - Drum Emergency Blowdown
 - Drum Level Control
 - Feedwater Bypass
 - Feedwater Control
 - Feedwater Recirculation
 - Fuel Oil Control
 - Geothermal Water Injection
 - Nuclear Turbine Bypass
 - Power Operated Relief
 - Soot Blower Control
 - Spray Control (Attemperator, Reheat/Superheat)
 - Steam PRV
 - Superheater Bypass
 - Thermal Drain
 - Turbine Steam Extraction



Industries and Applications

- Refinery
 - Abrasive Slurry Control
 - Amine Service
 - Butadiene
 - DEA
 - Desulfurization Sour Water
 - H₂S, NH₃, Hydrocarbon
 - Hydrocarbon Sluicing
 - Level Control
 - Pitch Blending Control
 - Platinum Catalyst Slurry
 - Quench Water to Coker
 - Sour Water
 - Sulfur Recovery
 - Throttling Valve
- Pipeline
 - Gas Plant Pigging
 - Pipeline Control
- Petrochemical
 - Heavy Oil Upgrading
- Pulp & Paper
 - Powerhouse
 - Steam Control
- Steel
 - Powerhouse



Codes and Standards

Codes and Standards

ANSI B16.5 – Pipe Flanges & Flanged Fittings

ANSI B16.10 – Face to Face & End to End Dimensions of Valves

ANSI B16.34 – Valves – Flanged, Threaded & Welding Ends

ANSI/FCI 70-2 – Control Valve Seat Leakage – **HI-100™** & **ULTRA-TROL™** seat test

ANSI/ISA 75.01 – Flow Equations for Sizing Control Valves

API 598 – Valve Inspection & Testing – **UNIFLO™** seat test

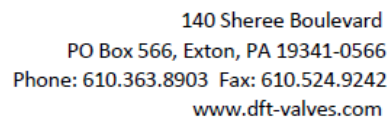
MSS-SP 25 – Standard Marking System for Valves, Fittings, Flanges & Unions



Sizing DFT® Control Valves

DFT® control valves are sized using standard ISA sizing formulae for liquid, gas and steam applications.

Please complete the Application Data Sheet on page 15 so that we can specify the proper valve for your application. Additional information concerning any valve that is being replaced by our valve such as the Cv of that valve and the original data sheet can be used to effectively specify the proper valve as well.



DFT Rep:

DFT Quote #:

CUSTOMER:

ADDRESS:

CONTACT:

EMAIL:

CUSTOMER REFERENCE #:

RESPONSE DUE DATE**REQUIRED DELIVERY:****PHONE:****FAX:**

Process Data

18	Fluid (water/steam etc)	Operating Conditions			
		Min	Normal	Max	Units
19	Inlet Pressure				
20	Outlet Pressure				
21	Flow Rate				
22	Temperature				

	Fluid properties (if known)				Units
23	Specific Volume				
24	Specific Gravity				
25	Density				
26	Specific Gravity				
27	Vapor Pressure				
28	Viscosity				

<u>Valve Design Conditions</u>		Units
29	Pressure	
30	Temperature	
31	Max Differential Press.	
<u>Process Notes</u>		
32	Service Type	Modulating; On/Off
33	Cycles per day	

<u>Actuator Accessories</u>			
34	Manual Override		Top; Side; * special
35	Positioner		Digital/EP/Type
	Signal		3-15 psig; 4-20 mA
36	Failure Mode		Open/Close/In Place
37	Solenoid		Type/Model/Voltage
38	Limitswitch		Quantity/Location
	*Notes		Type/Model/Voltage
39	Air Filter Regulator		
40	Gages		
41	Special		Add to notes

Notes

Prepared By:

Date:

Warranty

Each DFT® Inc. product is warranted against defects in material and workmanship for a period of one year after being placed in service, but not exceeding 18 months after shipment, when these products are properly installed, maintained and used within the service and temperature and pressure ranges for which they were designed and manufactured, and provided they have not been subject to accident, negligence, alteration, abuse, misuse or the like. This warranty extends to the first purchaser only. All defective material must be returned to the person from whom you purchased the product, transportation prepaid, free of any liens or encumbrances and if found to be defective will be repaired free of charge or replaced, at the warrantor's or DFT's option.

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