CELEROS™ FLOW TECHNOLOGY

CVK GLOBE CONTROL VALVE

COPES VULCAN®

RELIABLE, EFFICIENT FLOW CONTROL FOR GENERAL SERVICE APPLICATIONS

CELEROS FLOW TECHNOLOGY - AN INTRODUCTION

Celeros Flow Technology (Celeros FT) is a full lifecycle partner for sustainable flow technology solutions, from initial design and installation of equipment to after sales support. Celeros FT's products and technologies support many different industries including power generation, oil & gas, defence, water, chemical processing and energy transition. The company's innovative product portfolio, containing many energy efficient products, includes valves, pumps and closures.

CVK GLOBE CONTROL VALVE

PRODUCT INFORMATION

The Copes-Vulcan CVK globe control valve has been developed to provide a cost-effective solution to the "final control element" in modern industrial plants. It can be used to stop, start, and regulate the flow of liquids and gases in many flow control applications, including pipelines for water, steam, or chemical processing systems. With its proven design and high capacity, the CVK globe control valve offers outstanding efficiency and reliability, coupled with excellent control performance.

PERFORMANCE BENEFITS:

- Outstanding efficiency - high capacity-to-body size ratio delivers optimal performance in a compact design.
- Optimized flow - streamlined flow passages deliver superior capacity, reducing energy losses and improving system efficiency.
- Lighter weight - a high capacity-to-valve weight ratio saves space and makes installation and handling easier.
- High precision - excellent flow control rangeability enables greater accuracy.

DESIGN HIGHLIGHTS:

- Modular construction - different valve bodies, connection types, and trims are combined to meet application requirements.
- Tailored flow characteristics - using equal percentage, linear, quick opening, or modified-parabolic plug designs.
- Material versatility – body and trim material options available to meet specific operational parameters.
- Noise reduction - supplementary noise control features are available to achieve quieter operation and reduce vibration.
- Robust and reliable - our bonnet and packing designs handle diverse temperatures and fluid types with ease.
- Simplified maintenance – all trim components are easily removable from the top, reducing downtime and simplifying servicing.

SPECIFICATIONS:

Valve Type	Pneumatic Globe Control Valve										
Valve Model	CVK Globe Valve										
Trim Type	Balanced, Unbalanced, Anti-Cavitation, Low-Noise, Optional Special Trim										
Valve Size (inch)	1/2	3/4	1	1.1/2	2	2.1/2	3	4	5	6	8
(mm)	15	20	25	40	50	65	80	100	125	150	200
Pressure Rating	ANSI 150 ~ 600 (PN ratings available)										
End Connection	RF, FF, SW, BW, RTJ										
Body Materials	WCB, WCC, WC6, WC9, CF8										
Bonnet Type	Standard (-17°C to 230°C), Extended (-45°C to -17°C, over 230°C)										
Packing	Graphite, Carbon Fiber, PTFE										
Gasket	Spiral Wound Metal Gasket										
Guiding	Top / Cage										
Seat Type	Metal / Soft										
Plug Characteristic	Equal Percentage / Linear / Modified-Parabolic / Quick Opening										
Trim Materials	316 SS, 410 Alloy Steel, Stellite Overlays										

FEATURES

Design Integrity:

- Heavy duty top guiding with no bottom guide to obstruct seat bore and potentially trap debris
- Large diameter stems
- Clamped bonnet and seat ring gaskets are fully confined for secure sealing

Quality Assurance:

- Rigorously tested to ensure specified performance on site
- Quality system in accordance with ISO 9001
- Optional full NACE MR-01-75 certification

Scope of Design:

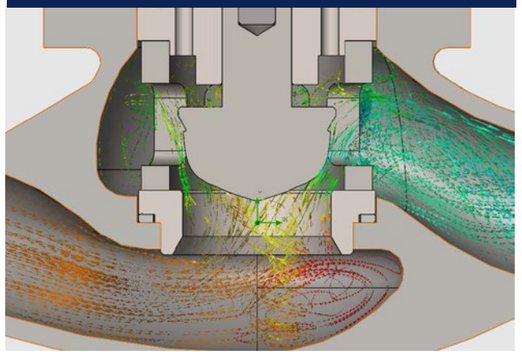
End connection sizes: 1/2" to 8" (15mm to 200mm)

End Connection Styles:

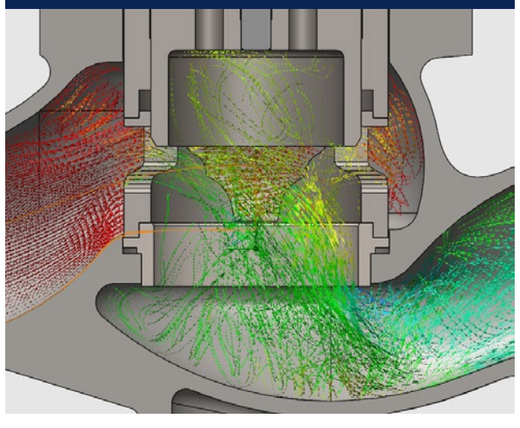
- ANSI, RF, FF, RTJ (and other grooved designs)
- Welded profiles including butt weld, socket, etc.

Other requirements available on request

Unbalanced Contoured Single Port (CVK-U)



Balanced Cage Single Port (CVK-B)

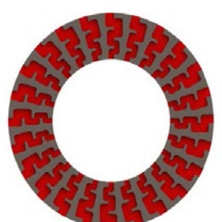


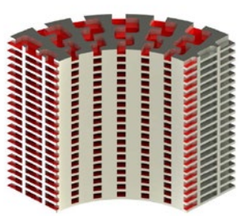
ADDITIONAL TRIM TYPES

ANTI-CAVITATION

CVK-H

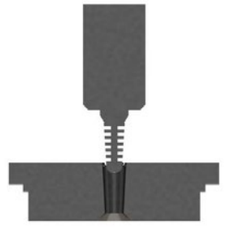
NOISE ATTENUATION





CVK-R

SMALL FLOW CAVITATION



CVK-C

PARTICLES

CVK-S

DESIGN OPTIONS

Valve Body Ratings:

ANSI 150 to ANSI 600. Other requirements are available on request.

Design standards:

ANSI B16.34 and ASME section VIII (for body/bonnet bolting)

Trim Design Options:

Full and reduced trim, unbalanced and balanced are available as standard. Multi hole cages, attenuator and silencers are available for specific applications.

Inherent Characteristics:

Equal percentage, linear, modified parabolic or quick open.

Material Combinations:

A wide range of body/bonnet and trim materials are available.

Plug Design Options:

Unbalanced with metal/metal or resilient seating plus balanced with metal/metal seating and metallic or resilient piston rings.

Bonnet Options:

Standard and extended bonnet design options available.

Actuator:

Various types of actuators are available including: pneumatic diaphragm, electric, electro-hydraulic and hydraulic operated.

Sizing/Noise Prediction:

Sizing/Noise predictions are based on industry standards.

TRIM OPTIONS

Trim Material
The valve trim is in direct contact with the fluid, so material selection is very important. The CVK Globe Control valve uses 410SS material as standard, but this can be altered to match customer specifications.

We offer a variety of severe service trims. The CVK Globe Control Valve can be specified with two different trim types:

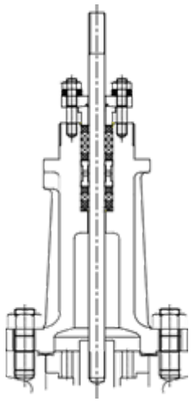
Balanced Trim
For applications with high pressure drops or where precise control is critical, we offer a balanced trim. It features a pressure-balanced cage port and has a diameter of 4" or above as standard. Smaller diameters are available on request. Where it is necessary to meet ANSI Class VI 'Bubble-Tight' shutoff and fire safe design, a soft seat is incorporated. This consists of an elastomer sandwiched between two metal pieces and is inserted between the cage and the metal seat.

Unbalanced Trim
For applications with lower pressure drops, we offer a single contoured unbalanced trim. The port is up to 4" in diameter and features a heavy-duty guide to ensure accurate operation. Although it may require a larger actuator, an unbalanced trim is a cost-efficient option for standard fluid control applications.

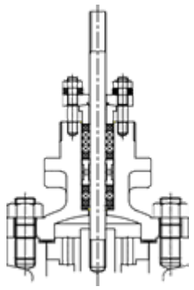
BONNET OPTIONS

For optimal valve performance, it is important to select bonnet materials that meet the application criteria and the nature of the fluid being controlled. Material selection should take into account fluid type, operating temperature, and operating pressure. Once a suitable material has been selected, the most appropriate bolts for the valve operating conditions can be identified.

Bonnet Design
An extended bonnet is recommended if the valve's operating environment involves extreme high or low temperatures or if the valve is underground or submerged. An extended bonnet helps protect the valve's packing and stem seals from damage caused by temperature fluctuations and allows for easier maintenance and operation in challenging locations.



Extended Bonnet



Standard Bonnet

Bonnet Type	Standard Bonnet	Extended Bonnet
Allowable Temperature	-25°C ~ 230°C	Over 230°C -25°C ~ -45°C

Nuts and Bolts
Low temperatures can cause weakness and brittleness in steel bolts. Our bolts are heat-treated to improve strength characteristics, in accordance with ASTM standards.

Packing options:
Packing materials such as carbon fiber and PTFE are used to insulate large columns to prevent them from shrinking due to outgassing.

DESIGN CV TABLES

Contoured Cv values (Unbalanced)

TRIM SIZE (inch)	Stroke (mm)	EQ%	Linear
1/2"	15	5.2	5.2
3/4"	15	9	9
1"	15	14	14
1.1/4"	20	24	24
1.1/2"	20	32	32
2"	25	52	52
2.1/2"	25	78	78
3"	38	116	116
4"	38	195	195

Cage Cv values (Balanced)

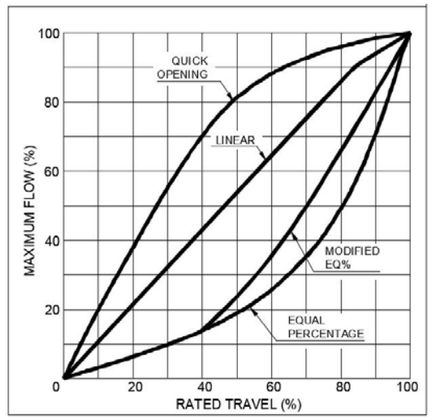
TRIM SIZE (inch)	Stroke (mm)	EQ%	Linear
3/4"	15	7.3	7.3
1"	20	12.7	12.7
1.1/2"	20	27	27
2"	30	48	48
2.1/2"	38	75	75
3"	38	125	135
4"	50	210	211
5"	50	276	294
6"	50	424	438
8"	100	675	690

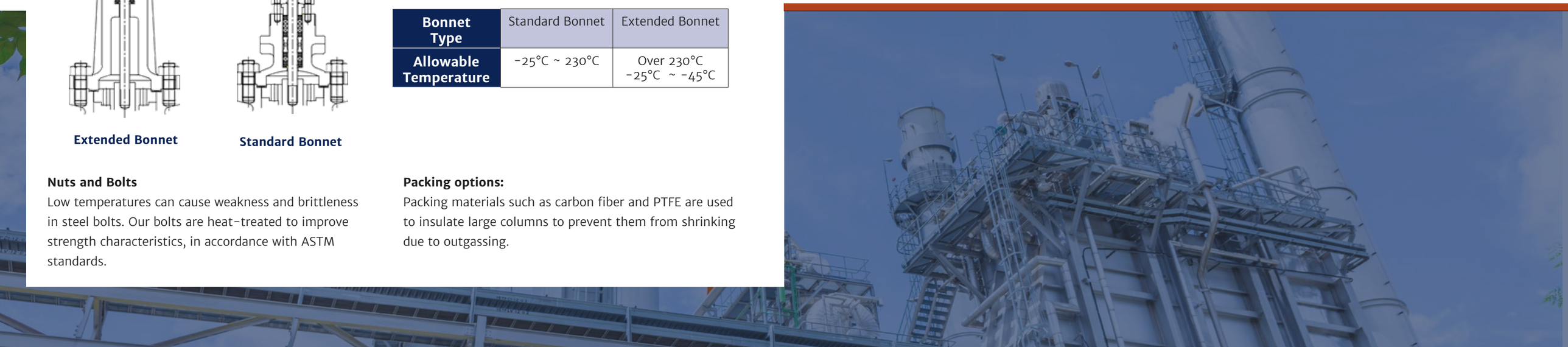
CHARACTERISTIC CURVES

The inherent flow characteristic of a control valve is the relationship between the flow and the lift of the plug at constant pressure drop.

Definitions:

- **Linear -** Flow is directly proportional to valve lift
- **Equal % -** Flow changes by a constant percentage of its instantaneous value for each unit of valve lift.
- **Quick Opening -** Flow increases rapidly with initial travel reaching near its maximum at a low lift.
- **Modified-Parabolic -** Provides fine throttling action at low valve lift and approximately a linear characteristic for upper portions of travel.





VELOCITY LIMITATIONS

Fluid velocity is a key consideration during valve selection. High velocity could lead to operational problems, including erosion, excessive vibration, and instability. The following tables indicate the maximum recommended velocity values for liquid and gas/vapor services

Recommended Maximum Velocities for Liquid Service

Valve Size		Maximum Velocity			
		Carbon Steel		Alloy Steel	
in	mm	ft/s	m/s	ft/s	m/s
0.5 - 2	15 – 50	41	12.5	41	14
3 - 6	80 – 150	34	10.4	34	10.4
8	200	29	8.9	29	8.9

Recommended Maximum Velocities for Gas / Vapor Services

Valve Size		Maximum inlet velocity		Maximum outlet velocity		Max. outlet mach number for required noise level		
in	mm	ft/s	m/s	ft/s	m/s	>95 dBA	<95 dBA	<85 dBA
0.5 - 2	15 – 50	340	104	830	253	0.65	0.5	0.3
3 - 6	80 – 150	294	90					
8	200	265	81					

INHERENT RANGEABILITY

The inherent rangeability of a control valve is the ratio between maximum and minimum flow within the working characteristic at constant pressure drop.

Rangeability Values

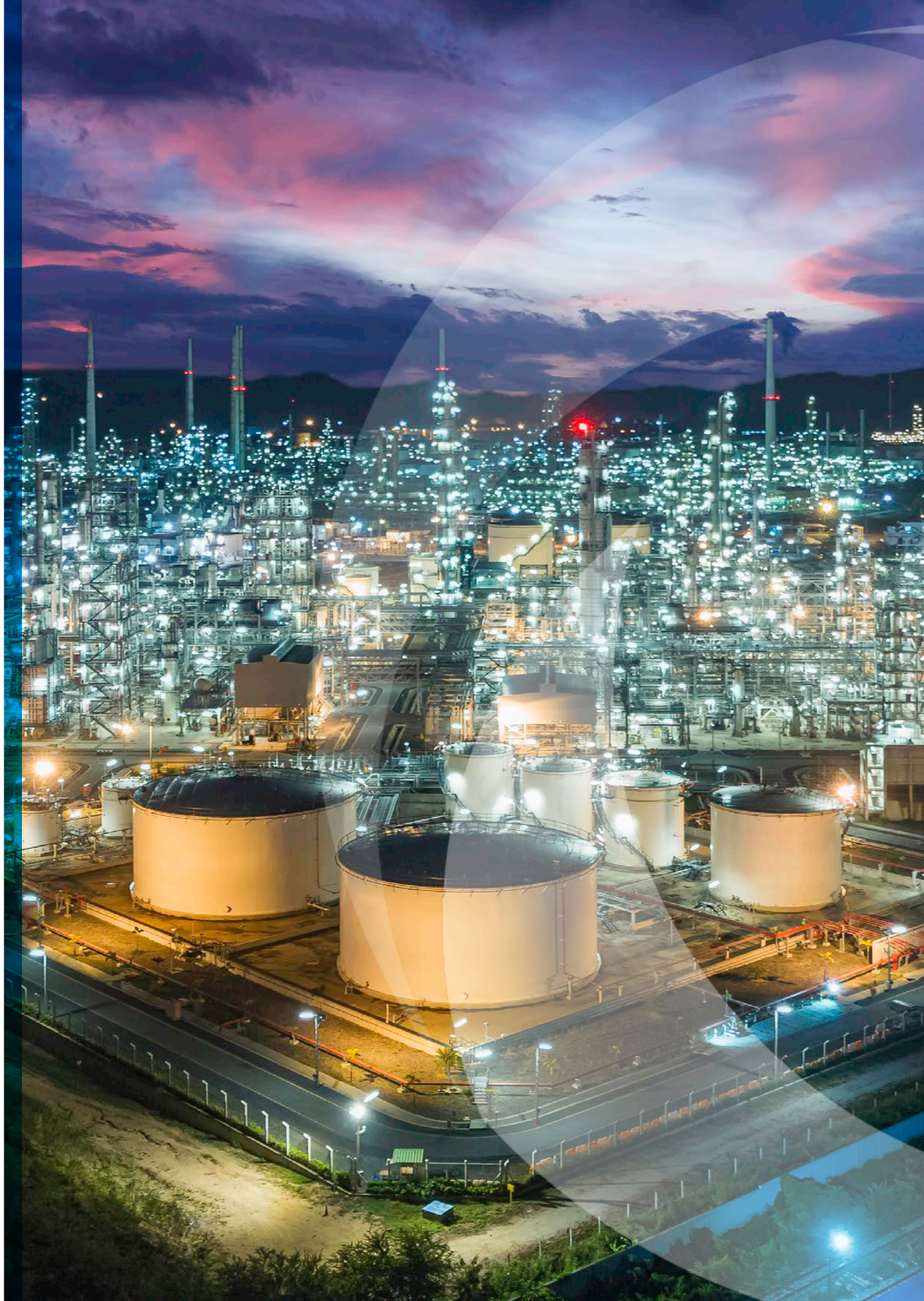
Trim Size (in)	Rangeability	
1/2”	50:1	* Over
3/4”- 8”	50:1	* Over

* Special option

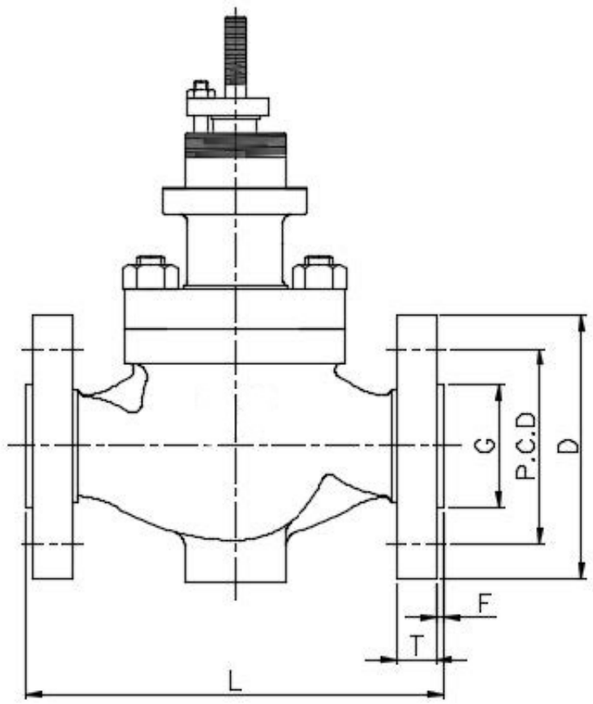
MAXIMUM LEAKAGE RATES

Leakage rates are normally measured in accordance with the ANSI / FCI 70-2 specification using the class designation. The following table defines the achievable leakage class for each available plug design.

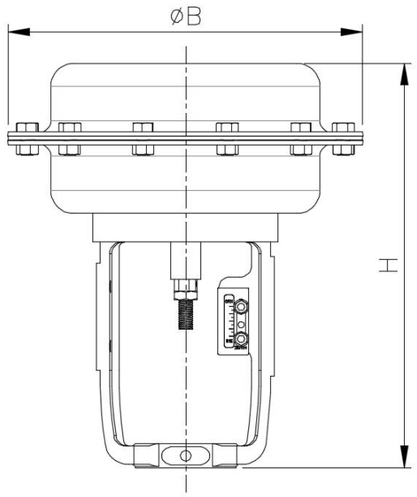
Plug Design	Seating Style	Achievable Leakage Class
Unbalanced	Metal/Metal (standard)	IV
Unbalanced	Metal/Metal (special)	V
Unbalanced	Metal/PTFE (standard)	VI
Balanced	Metal/Metal (standard)	IV
Balanced	Metal/Metal (special)	V
Balanced	Metal/PTFE (standard)	VI



DIMENSION LIST



Actuator Size	B	H
CVK T-1	257	332.4
CVK T-2	298	340.5
CVK T-3S	348	473
CVK T-3	348	493
CVK T-4	414	502.5
CVK T-5	526	691
CVK T-5L	526	738



ANSI 150

Valve Size	L*	T	F	I.D	G	P.C.D	D	Diameter of Bolt Holes, in.	Number of Bolts	Diameter of Bolts, in
3/4”	184	11.2	2	19.1	42.9	69.9.	100	5/8	4	1/2
1”	184	12.7	2	25.4	50.8	79.4	110	5/8	4	1/2
1.1/2”	222	15.9	2	38.1	73	98.4	125	5/8	4	1/2
2”	254	17.5	2	50.8	92.1	120.7	150	3/4	4	5/8
2.1/2”	276	20.7	2	63.5	104.8	139.7	180	3/4	4	5/8
3”	298	22.3	2	76.2	127	152.4	190	3/4	4	5/8
4”	352	22.3	2	101.6	157.2	190.5	230	3/4	8	5/8
5”	403	22.3	2	127	185.7	215.9	255	7/8	8	3/4
6”	451	23.9	2	152.4	215.9	241.3	280	7/8	8	3/4
8”	543	27	2	203.2	269.9	298.5	345	7/8	8	3/4

ANSI 300

Valve Size	L*	T	F	I.D	G	P.C.D	D	Diameter of Bolt Holes, in.	Number of Bolts	Diameter of Bolts, in
3/4”	194	14.3	2	19.1	42.9	82.6	115	3/4	4	5/8
1”	197	15.9	2	25.4	50.8	88.9	125	3/4	4	5/8
1.1/2”	235	19.1	2	38.1	73	114.3	155	7/8	4	3/4
2”	267	20.7	2	50.8	92.1	127	165	3/4	8	5/8
2.1/2”	292	23.9	2	63.5	104.8	149.2	190	7/8	8	3/4
3”	318	27	2	76.2	127	168.3	210	7/8	8	3/4
4”	368	30.2	2	101.6	157.2	200	255	7/8	8	3/4
5”	425	33.4	2	127	185.7	235	280	7/8	8	3/4
6”	473	35	2	152.4	215.9	269.9	320	7/8	12	3/4
8”	568	39.7	2	203.2	269.9	330.2	380	1	12	7/8

ANSI 600

Valve Size	L*	T	F	I.D	G	P.C.D	D	Diameter of Bolt Holes, in.	Number of Bolts	Diameter of Bolts, in
3/4”	206	15.9	7	19.1	42.9	82.6	115	3/4	4	5/8
1”	210	17.5	7	25.4	50.8	88.9	125	3/4	4	5/8
1.1/2”	251	22.3	7	38.1	73	114.3	155	7/8	4	3/4
2”	286	25.4	7	50.8	92.1	127	165	3/4	8	5/8
2.1/2”	311	28.6	7	63.5	104.8	149.2	190	7/8	8	3/4
3”	337	31.8	7	76.2	127	168.3	210	7/8	8	3/4
4”	394	38.1	7	101.6	157.2	215.9	275	1	8	7/8
5”	457	44.5	7	127	185.7	266.7	330	1 1/8	8	1
6”	508	47.7	7	152.4	215.9	292.1	355	1 1/8	12	1
8”	610	55.6	7	199.9	269.9	349.2	420	1 1/4	12	1 1/8

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CVK GLOBE CONTROL VALVE

SPEED
EXCELLENCE
PARTNERSHIP

COPES VULCAN®

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