Product Reference Guide

A Guide to the Clarke Valve Dilating Disk™ Valve Product Line (Metric)

Clarke Valve™ Dilating Disk™ Valve

The Clarke Valve Dilating Disk™ Valve design range is DN 8 to 300 sizes. The Dilating Disk™ Valve is an innovative, compact valve designed in accordance with ASME B16.34: Valves Flanged, Threaded, and Welding End and design approved under SIL3. The design provides precise flow control through the use of a three-petal design, conforms to ANSI/FCI 70-2 leakage specifications, and requires low operational torque. The unique, patented design has a greater flow capability than valves equal and larger in size, which makes it a good economical choice for new constructions. In addition, the lower weight of the design, when compared to legacy globe valves and rotary ball valves makes the Dilating Disk™ Valve an attractive solution. See below for Dilating Disk™ Valve Petal Reference Image.

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Table 1: Specifications

Feature	Description
Style	**Dilating Disk™ Valve**
Sizes (NPS)	**Dilating Disk™ Valve is offered in 0.25", 1", 1.5", 2", 3", 4", 6", 8", 10", 12" sizes. The 0.25" size valve is the smallest control valve ever made, able to fit in 0.25" pipelines for low flow applications. Special valve sizes available, please contact Clarke Valve.**
Pressure Classes	**Dilating Disk™ Valve is available in pressure ratings of PN20, 50, 100, 150, 250. For additional pressure ratings, please contact the Clarke Valve team.**
End Connections	**Dilating Disk™ Valve comes standard with flanged end connections but can be made with threaded end connections upon request.**
Face to Face	**Face to face dimensions of are available in accordance with ISA 75.08 and ANSI B16.10 for a seamless valve replacement. Customized face to face dimensions can be made available upon request.**
Trim Type	**Patented trim design consists of three interlocking petals, opening perpendicular to the flow of process fluids, with the closure member moving in a direction perpendicular to the plane of the seat.**
Seat Leakage	**In accordance with ANSI/FCI 70-2 standards Dilating Disk™ Valve comes standard Class IV, can also meet Class V and VI standards.**

Table 2: Features

Feature	Description
Full Bore	**Minimal pressure drops at full open, reduces fluid structure interactions from cavitation, very high rangeability.**
Quarter Turn	**All typical quarter turn actuators are used.**
Petal Design	**The three-petal design provides precise flow control and very high rangeability.**
Shutoff	**Design meets or exceeds requirements for seat leakage for control valves.**
Seat Leakage Classifications	**Dilating Disk™ Valve complies with Class IV, V, and VI shut off classification in accordance with ANSI/FCI 70-2. For more information, please contact Clarke Valve.**
Low Torque	**Design requires low torque to unseat, operate and shut off, reducing actuator size, reducing assembly weight, and reducing overall cost.**
Navy Applications	**Dilating Disk™ Valve is designed to meet the harsh requirements of shipboard service in accordance with MIL Spec-V-24509A, MIL Spec-DTL-32632.**
Coatings	**Components can be coated to withstand corrosive flow applications.**

Feature	Description
Materials of Construction	**Dilating Disk™ Valve can be manufactured in a variety of materials (see Table 3), please consult Clarke Valve for your application needs.**
Hazardous Applications	**Dilating Disk™ Valve is designed for hazardous applications, please contact Clarke Valve for more information.**
Maximum Working Pressure	**All constructions, consistent with applicable pressure/temperature ratings per ASME B16.34, are shown in Table 6 and Table 7 of this document. The pressure & temperature limits in this document, and any applicable code or standard limitation, should not be exceeded.**
Temperature Limits	**Standard temperature limits for the materials of construction in accordance with ASME B16.34. Temperature limits for materials should not exceed the limits within B16.34.**
Elastomers	**Elastomers are chosen to suit the application conditions. See Table 5.**
Flow Coefficients	**See tables 10 – 14.**
Maximum Shaft Rotation	**90 degrees/quarter-turn.**
Actuator Mounting	**Standard ISO 5211 actuator to valve interface.**
Face to Face Dimensions	**Standard face to face dimensions are available in accordance with ISA 75.08, in addition, customized face to face dimensions are available to meet the application requirement for displacing current valve installed.**

Table 3: Dilating Disk™ Valve Materials of Construction: Valve Body & Bonnet

Dilating Disk™ Valve Materials of Construction
304L
316L
WCB
WCC
CF3M
CF8M

(1) *Additional Materials Available by Customer Request*

Table 4: Dilating Disk™ Valve End Connection Types

Dilating Disk™ Valve End Connection Types
Raised Face Flange
RTJ Flange
NPT

Table 5: Examples of Materials for Nonmetallic Parts for Applications Shown

Material	Typical Temperature Range (°C)	Typical Application Fluids
EPDM	-51 to 149	Water, Methanol, Sea Water, Detergents
Viton	-25 to 230	Water, Petrochem, Sea Water, Detergents
Kalrez®	-20 to 275	Water, Methanol, Petrochem, Acids, Sea Water, Detergents
Buna N	-40 to 125	Water, Methanol, Petrochem, Sea Water, Detergents
PTFE	-73 to 204	Water, Methanol, Petrochem, Sea Water, Detergents
Accrolon® 1640	-240 to 260	Water, Steam, Methanol, Petrochem, Sea Water, Detergents, LNG (Cryogenic)

(1) Typical temperature ranges shown, specific application condition determines material.
(2) Consult Clarke Valve for specific application materials, other materials available.

Table 6: Maximum Allowable Pressure (Body Ratings) for WCB Other Group 1.1 Materials

Temperature Range	Pressure Class				
	PN20	PN50	PN100	PN160	PN250
°C	bar				
-29 to 38	19.6	51.1	102.1	153.2	255.3
50	19.2	50.1	100.2	150.4	250.6
100	17.7	46.6	93.2	139.8	233.0
150	15.8	45.1	90.2	135.2	225.4
200	13.8	43.8	87.6	131.4	219.0
250	12.1	41.9	83.9	125.8	209.7
300	10.2	39.8	79.6	119.5	199.1

(1) Values taken from ASME B16.34-Table 2-1.1

Table 7: Maximum Allowable Pressure (Body Ratings) for WCC and Other Group 1.2 Materials

Temperature Range	Pressure Class				
	PN20	PN50	PN100	PN160	PN250
°C	bar				
-29 to 38	19.8	51.7	103.4	155.1	258.6
50	19.5	51.7	103.4	155.1	258.6
100	17.7	51.5	103.0	154.6	257.6
150	15.8	50.2	100.3	150.5	250.8
200	13.8	48.6	97.2	145.8	243.2
250	12.1	46.3	92.7	139.0	231.8
300	10.2	42.9	85.7	128.6	214.4

(1) Values taken from ASME B16.34- Table VII-2-1.2

Table 8: Maximum Allowable Pressure (Body Rating) for CF3M, CF8M & Other Group 2.2 Materials

Temperature Range	Pressure Class				
	PN20	PN50	PN100	PN160	PN250
°C	bar				
-29 to 38	19.0	49.6	99.3	148.9	248.2
50	18.4	48.1	96.2	144.3	240.6
100	16.2	42.2	84.4	126.6	211.0
150	14.8	38.5	77.0	115.5	192.5
200	13.7	35.7	71.3	107.0	178.3
250	12.1	33.4	66.8	100.1	166.9
300	10.2	31.6	63.2	94.9	158.1

(1) Values taken from ASME B16.34- Table 2-2.2

Table 9: Maximum Allowable Pressure (Body Rating) for 304L & 316L and Other Group 2.3 Materials

Temperature Range	Pressure Class				
	PN20	PN50	PN100	PN160	PN250
°C	bar				
-29 to 38	15.9	41.4	82.7	124.1	206.8
50	15.3	40.0	80.0	120.1	200.1
100	13.3	34.8	69.6	104.4	173.9
150	12.0	31.4	62.8	94.2	157.0
200	11.2	29.2	58.3	87.5	145.8
250	10.5	27.5	54.9	82.4	137.3
300	10.0	26.1	52.1	78.2	130.3

(1) Values Taken from ASME B16.34 Table 2-2.3

Table 10: CV2 Valves – Flow Coefficients

% Open	C_V	K_V	F_L	X_T
10	0.00858	0.0074	0.99	0.63
20	0.0466	0.040	0.96	0.52
30	0.116	0.100	0.90	0.44
40	0.236	0.204	0.87	0.40
50	0.453	0.392	0.84	0.40
60	0.766	0.663	0.75	0.44
70	1.20	1.038	0.60	0.50
80	1.55	1.341	0.48	0.48
90	1.85	1.600	0.41	0.40
100	2.00	1.730	0.37	0.33

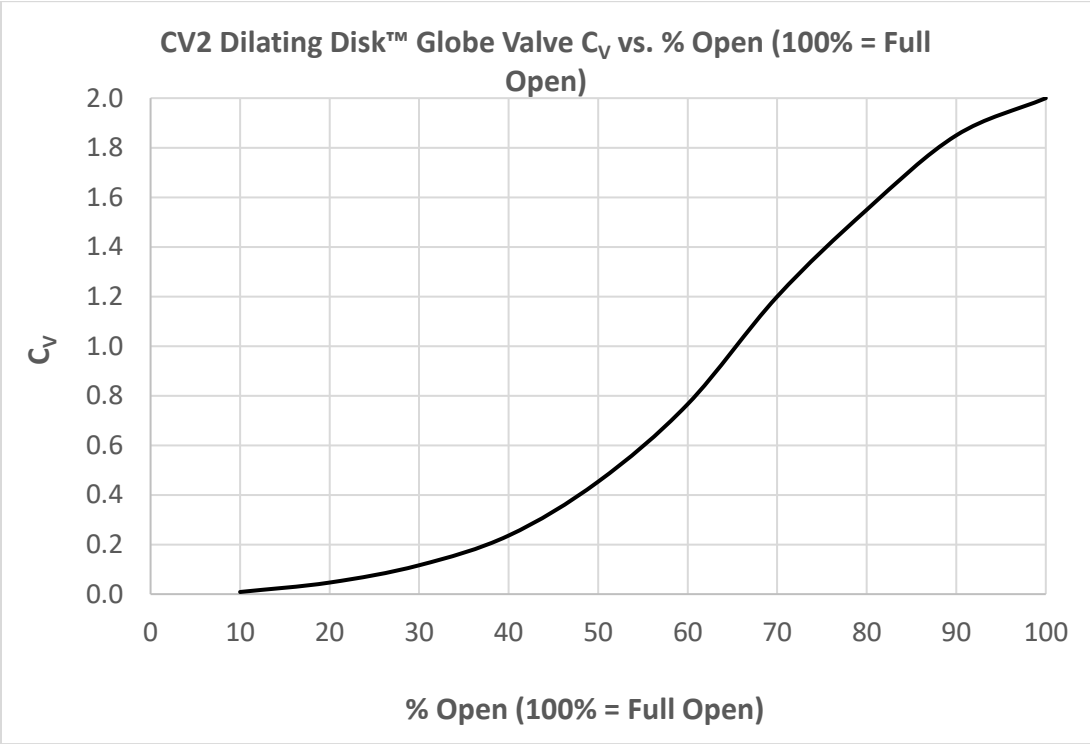


Table 11: CV20 Valves – Flow Coefficients

% Open	C_V	K_V	F_L	X_T
10	0.113	0.098	0.99	0.53
20	0.352	0.305	0.96	0.55
30	0.987	0.854	0.90	0.49
40	1.86	1.61	0.87	0.43
50	3.89	3.37	0.84	0.39
60	7.76	6.71	0.75	0.36
70	12.8	11.1	0.60	0.33
80	17.3	14.9	0.48	0.31
90	19.5	16.8	0.41	0.27
100	20.0	17.3	0.37	0.22

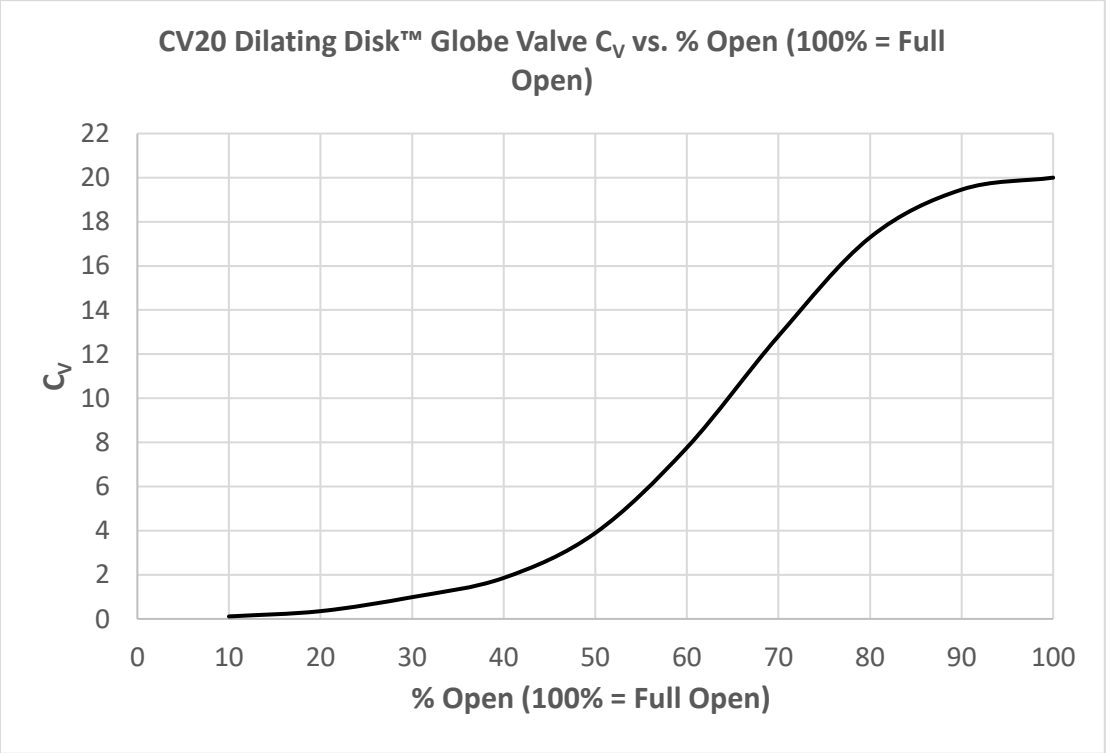


Table 12: CV71 Valves – Flow Coefficients

% Open	C_V	K_V	F_L	X_T
10	0.400	0.346	0.99	0.45
20	1.25	1.08	0.96	0.65
30	3.50	3.03	0.90	0.61
40	6.60	5.71	0.87	0.65
50	13.8	11.9	0.84	0.61
60	27.6	23.8	0.75	0.57
70	45.5	39.4	0.60	0.41
80	61.4	53.1	0.48	0.27
90	69.1	59.7	0.41	0.16
100	71.0	61.4	0.37	0.15

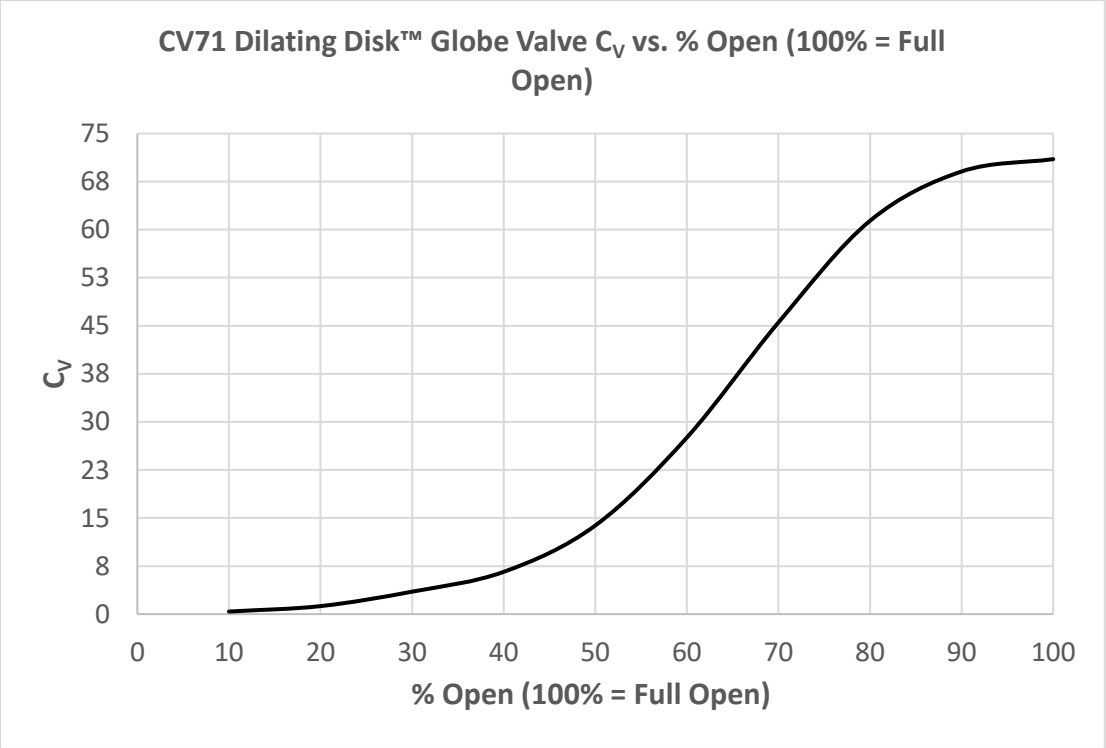


Table 13: CV308 Valves – Flow Coefficients

% Open	C_V	K_V	F_L	X_T
10	2.00	1.7	0.98	0.49
20	6.08	5.2	0.93	0.49
30	12.0	10.4	0.81	0.46
40	22.2	19.2	0.76	0.42
50	41.0	34.5	0.71	0.37
60	70.1	60.6	0.56	0.34
70	118	102	0.36	0.32
80	194	168	0.23	0.31
90	280	242	0.17	0.28
100	308	266	0.14	0.22

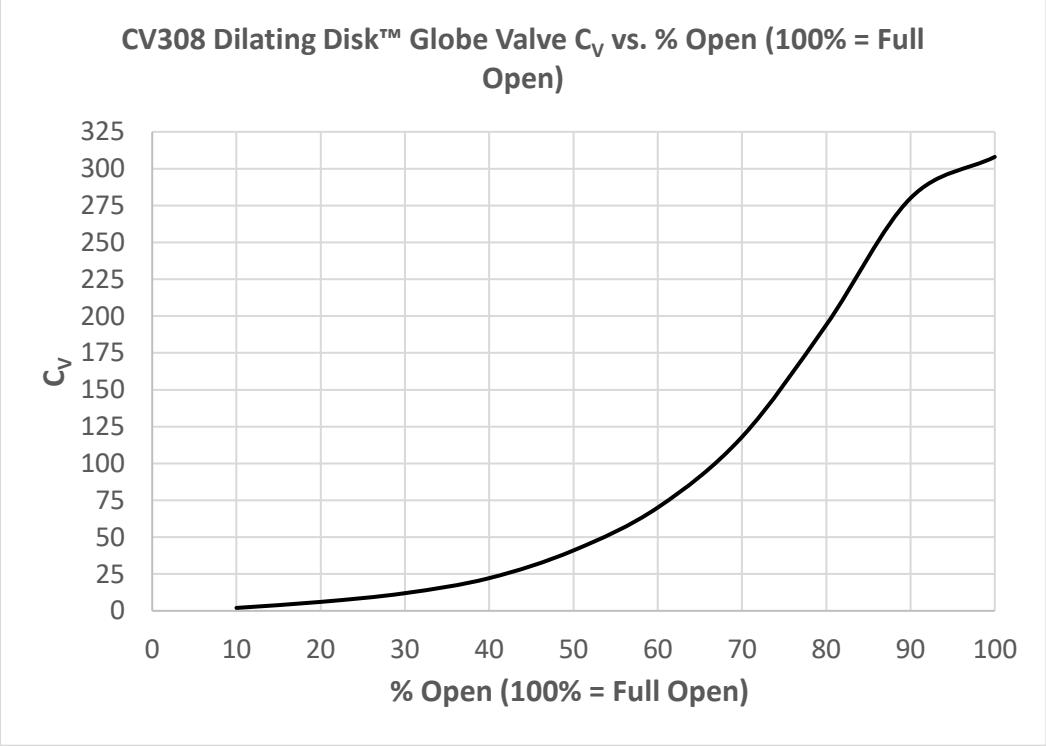


Table 14: CV1345 Valves – Flow Coefficients

% Open	C_V	K_V	F_L	X_T
10	9.00	7.79	0.98	0.52
20	26.0	22.5	0.93	0.49
30	53.0	45.8	0.81	0.42
40	97.0	83.9	0.76	0.36
50	181	156	0.71	0.32
60	303	262	0.56	0.28
70	515	445	0.36	0.24
80	844	731	0.23	0.19
90	1220	1060	0.17	0.17
100	1345	1160	0.14	0.14

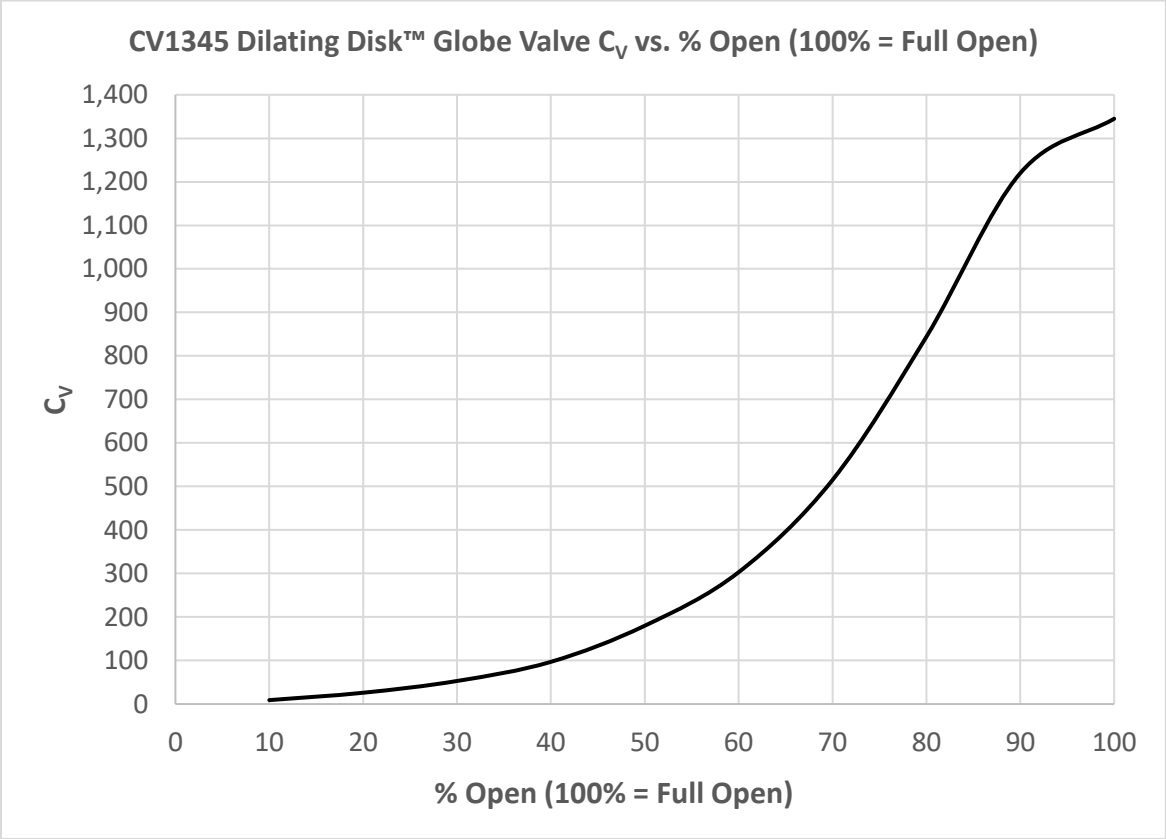
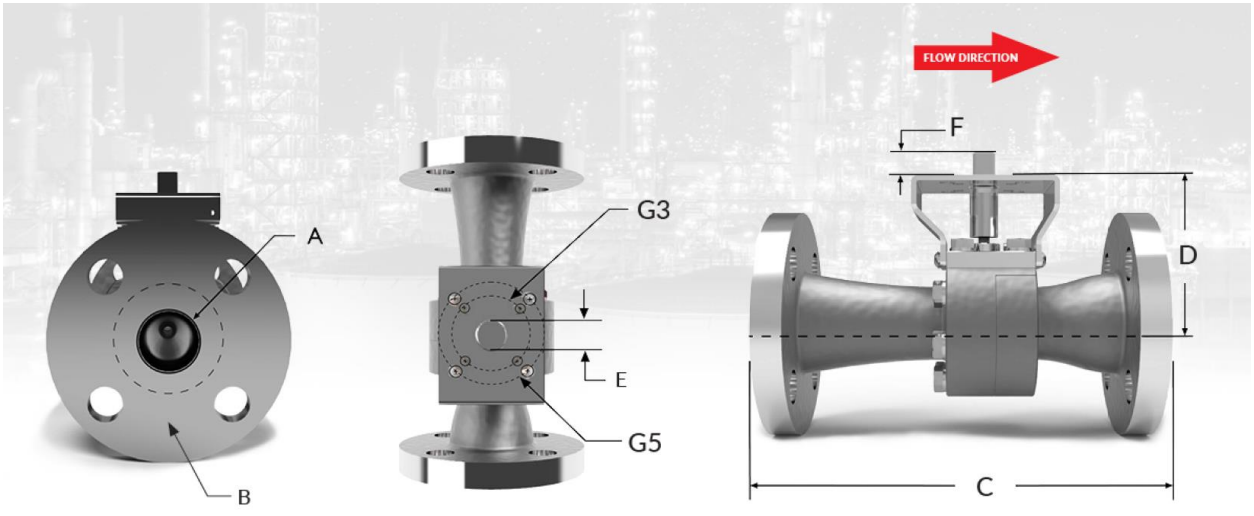


Table 15: CV2 Dilating Disk™ Valve Dimensions & Weight

A		B	C	D	E	F	G	H	I
ASME B16.5 [NPS]		PRESSURE NOMINAL	ISA 75.08 [mm]	[mm]	DRIVE SQUARE WIDTH [mm]	DRIVE SQUARE HEIGHT [mm]	ISO 5211 Yoke PATTERN [mm]	WEIGHT [kg]	MAST [Nm]
NPT Only	0.25”	PN110	80	69.3	11.00	17.37	F3 – 36 F3 – 50	2.27	7.57
	0.5”	PN260	80						
1”		PN20	184					4.08	
		PN50	197					5.44	
		PN110	210					5.90	
		PN260	292					11.3	



CV2 Reference Image

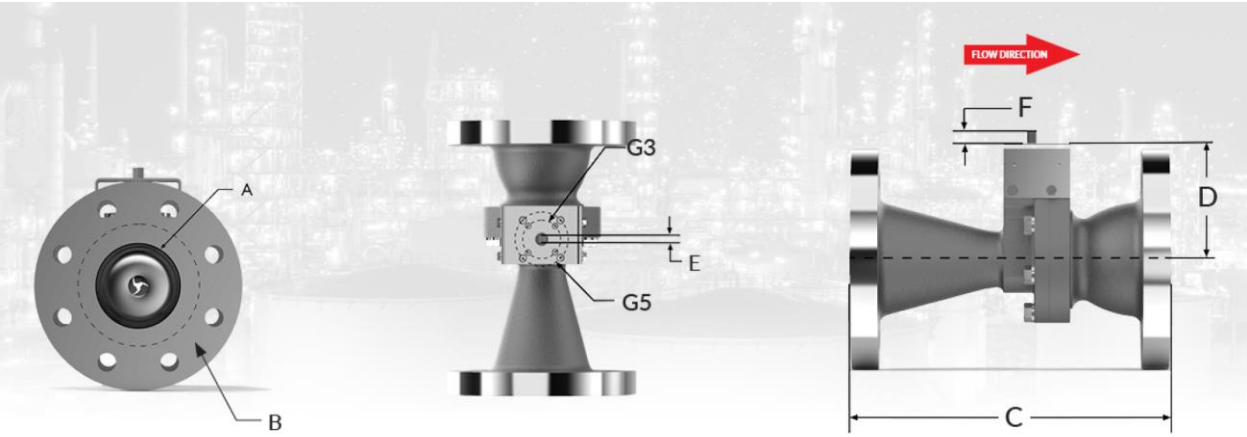
Table 16: CV20 Dilating Disk™ Valve Dimensions & Weight

A	B	C	D	E	F	G	H	I
ASME B16.5 [NPS]	PRESSURE NOMINAL	ISA 75.08 [mm]	[mm]	DRIVE SQUARE [mm]	DRIVE ENGAGEMENT [mm]	ISO 5211 YOKE PATTERN [mm]	WEIGHT [kg]	MAST [Nm]
0.5"	PN20	184	114.7	11.00	13.59	F5 - 50.0 F7 - 70.1	8.62	187.1
	PN50	191					9.07	
	PN110	203					9.53	
	PN150	273					19.1	
	PN260	273					19.1	
0.75"	PN20	184					9.07	
	PN50	194					9.98	
	PN110	206					10.4	
	PN150	273					20.4	
	PN260	273					20.4	
1"	PN20	184					9.53	
	PN50	197					10.9	
	PN110	210					11.3	
	PN150	273					22.7	
	PN260	273					22.7	
1.5"	PN20	222					11.8	
	PN50	235					14.1	
	PN110	251					15.0	
	PN150	311					38.1	
	PN260	311					38.1	
2"	PN20	254					14.5	
	PN50	267					16.3	
	PN110	286					17.7	
	PN150	375					38.1	
	PN260	375					38.1	
3"	PN20	298					20.4	
	PN50	318					24.0	
	PN110	337					26.8	
	PN150	441					47.6	
	PN260	460					58.5	

CV20 Reference Image

Table 17: CV71 Dilating Disk™ Valve Dimensions & Weight

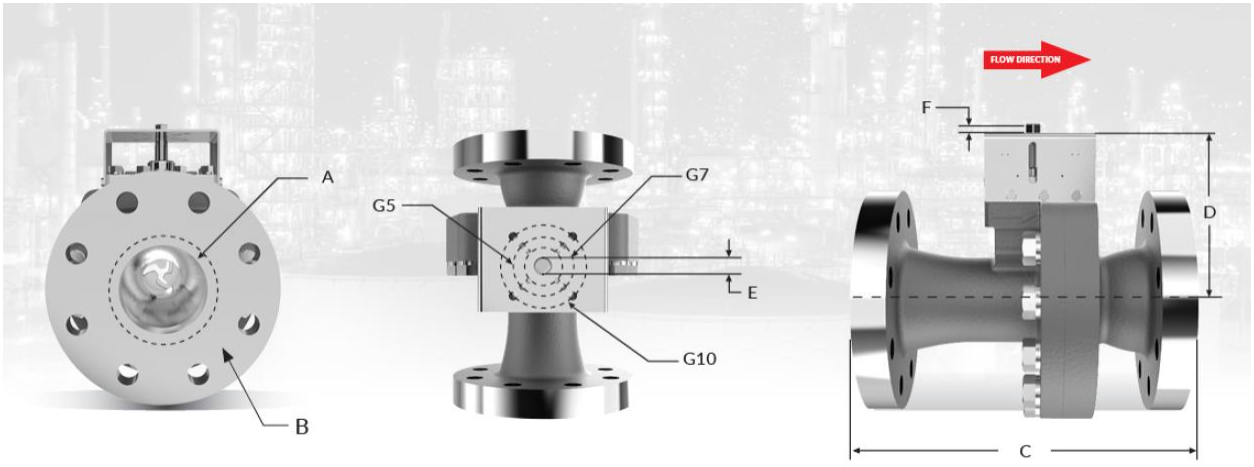
A	B	C	D	E	F	G	H	I
ASME B16.5 [NPS]	PRESSURE NOMINAL	ISA 75.08 [mm]	[mm]	DRIVE SQUARE WIDTH [mm]	DRIVE SQUARE HEIGHT [mm]	ISO 5211 YOKE PATTERN [mm]	WEIGHT [kg]	MAST [Nm]
1 1/2"	PN20	222	132.9	11.00	14.83	F5 - 50 F7 - 70	14.1	172
	PN50	235					16.3	
	PN110	251					20.9	
	PN150	333					36.7	
	PN260	333					36.7	
2"	PN20	254					15.9	
	PN50	267					17.7	
	PN110	286					23.6	
	PN150	375					46.7	
	PN260	375					46.7	
3"	PN20	298					21.8	
	PN50	318					25.9	
	PN110	337					33.1	
	PN150	441					46.7	
	PN260	460					67.6	
4"	PN20	353					28.1	
	PN50	368					36.3	
	PN110	394					53.1	
	PN150	511					66.7	
	PN260	530					93.0	
6"	PN50	473					58.1	



CV71 Reference Image

Table 18: CV308 Dilating Disk™ Valve Dimensions & Weight

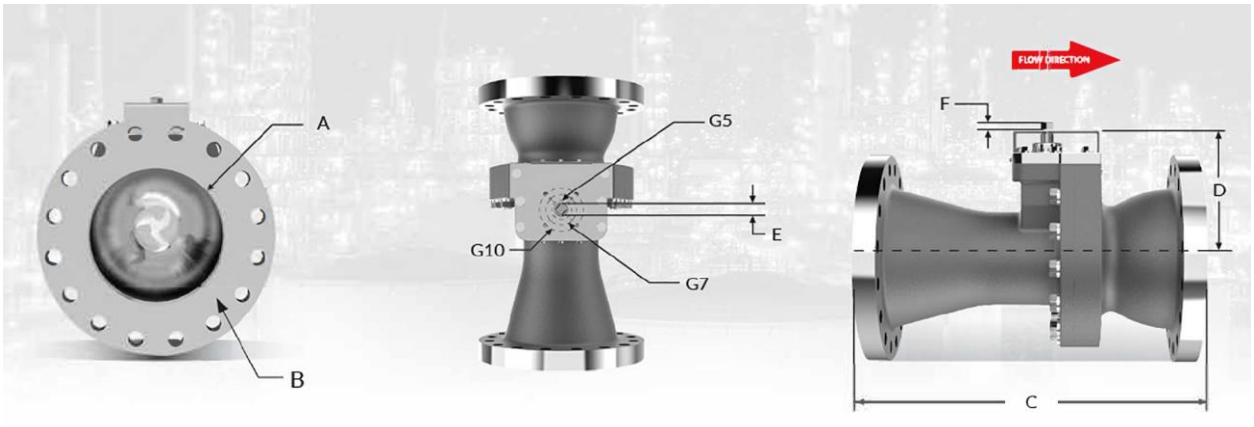
A	B	C	D	E	F	G	H	I
ASME B16.5 [NPS]	PRESSURE NOMINAL	ISA 75.08 [mm]	[mm]	DRIVE SQUARE WIDTH [mm]	DRIVE SQUARE HEIGHT [mm]	ISO 5211 YOKE PATTERN [mm]	WEIGHT [kg]	MAST [Nm]
3"	CL150	298	204	14.0	14.5	F5 - 50 F7 - 70 F10 - 102	39	290
	CL300	318					45	
	CL600	337					58	
4"	CL150	353					45	
	CL300	368					55	
	CL600	394					77	
6"	CL150	451					59	
	CL300	473					78	
	CL600	508					112	



CV308 Reference Image

Table 19: CV1345 Dilating Disk™ Valve Dimensions & Weight

A	B	C	D	E	F	G	H	I
ASME B16.5 [NPS]	PRESSURE NOMINAL	ISA 75.08 [mm]	[mm]	DRIVE SQUARE WIDTH [mm]	DRIVE SQUARE HEIGHT [mm]	ISO 5211 YOKE PATTERN [mm]	WEIGHT [kg]	MAST [Nm]
6	CL150	451	275.01	22.0	17.78	F5 - 50 F7 - 70 F10 - 102	142	976
	CL300	473					164	
	CL600	508					201	
8	CL150	543					168	
	CL300	568					200	
	CL600	610					243	
10	CL150	673					208	
	CL300	708					250	
	CL600	819					325	
12	CL150	737					246	
	CL300	775					302	
	CL600	819					371	



CV1345 Reference Image

For more information about Clarke Valve, please visit the company website at:

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