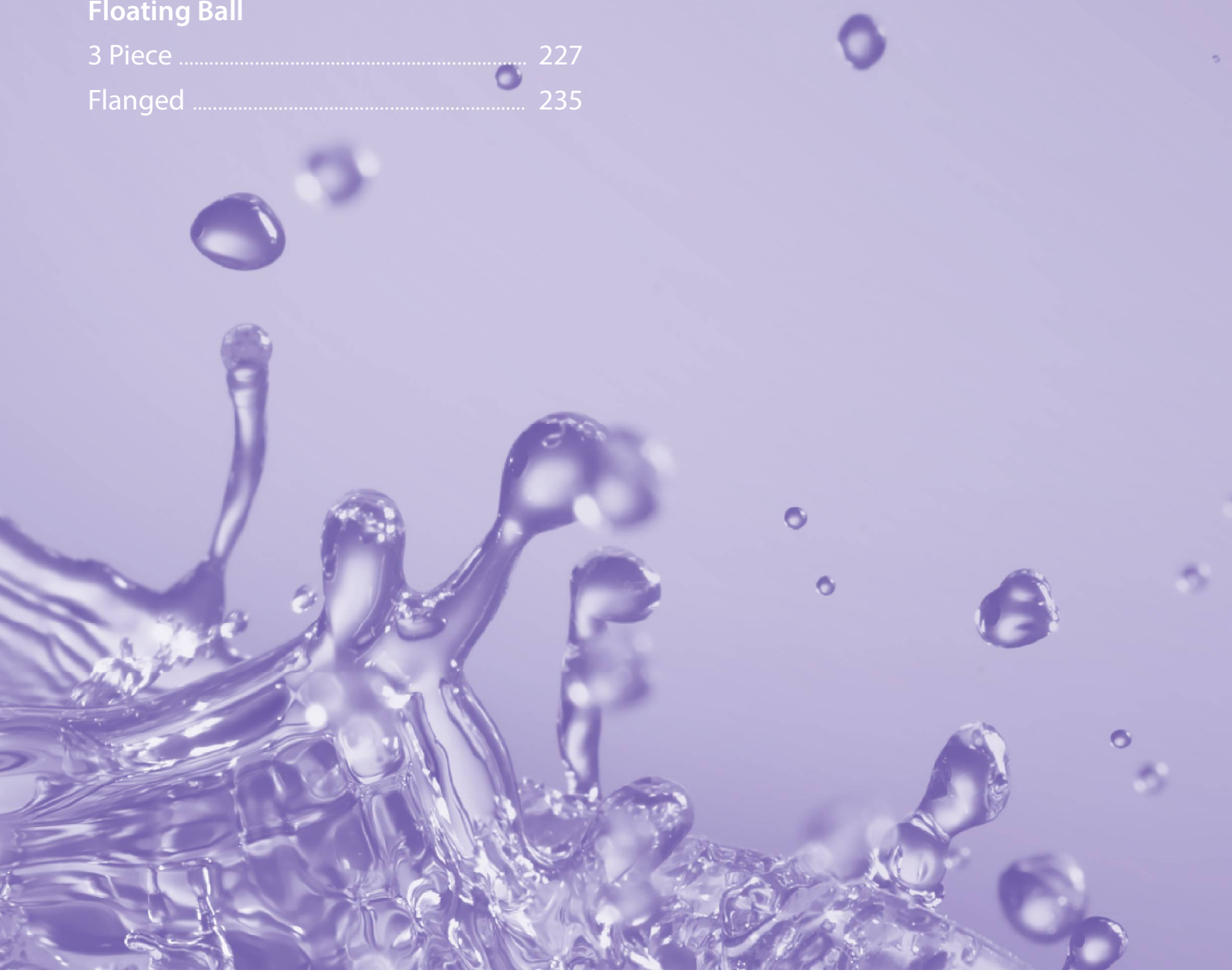




# CONTROL VALVES

General .....	212
HVS Software .....	224
<b>Floating Ball</b>	
3 Piece .....	227
Flanged .....	235



# CONTROL VALVES

## General



Habonim's Control product line valves are subject to the general Habonim valves design,

General chapter.



Habonim Control valves are equipped (in some series) with the Total HermetiX integrity package for superior sealing, safety and environmental care.

## Control Valve

Habonim control valves are designed for accurate, flexible, simple maintained and cost-effective flow control systems for the harshest environments. these offer a compact, lightweight, long-life solution with: step-less characterized pressure and flow control for fast response times, wide rangeability, and bubble-tight shutoff. Critical performance features include: high pressure drop capacity with straight-through flow, high Cv, and large exhaust capacity. Other design features ensure ease of maintenance and zero backlash.

## Features

### Design

- V-Ball or V-Port designs in multiple shapes.
- V-port with metal-Seat to ball down stream sealing.

### Materials

- Variety of surface treatments for durable operation.

### Reference standards

- Testing & acceptance criteria ANSI/FCI 70-2.

## Availability

Control features can be added to most of Habonim valves series.

This chapter describe the Industrial valves control series,yet similar capabilities can be added to some of the Cryogenic, High Pressure, High Temperature (metal seated) valves.



## Quick Selection Table

⊗ Total Hermetix™ | **Port:** ⊙ Standard Port ⊕ Full Port ○ Tube Size | **End Connections:** ⊕ Threaded ⊗ Flanged □ Welded  
⊙ Ordering Code

		Valve Size (Inches)																						
	Ball Valve	Design Type	OC	Series	TH	Port	End Con.	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16
Temperature: -60°C - +260°C (-76 °F - +500 °F)	Floating Ball	3 Piece	⊙	47	⊗	⊙	⊕	⊗	900										400					
		1 Piece	⊙	31	⊗	⊙		⊗	150															
		1 Piece	⊙	32	⊗	⊙		⊗	300															
		2 Piece	⊙	73	⊗		⊙	⊗	150															
			⊙	74	⊗		⊙	⊗	300															
			⊙	77	⊗		⊙	⊗											PN16					
			⊙	78	⊗		⊙	⊗											PN40					
ASME Class				150	300	600	900	1500	2500	6000														
Pressure Bar	-1	0	16	20	50	100	150	250	400	1000														
Pressure psi	-14	0	290	290	725	1450	2175	3600	5800	15000														

Note: Control features can be added to most of Habonim valves series - see Ordering Codes.

## Design features

Zero hysteresis 4-piston actuator

Calibrated and tested complete control package

Light weight, compact control unit with exceptional hydraulic performance

Zero backlash adaptor

Tight tolerance trim

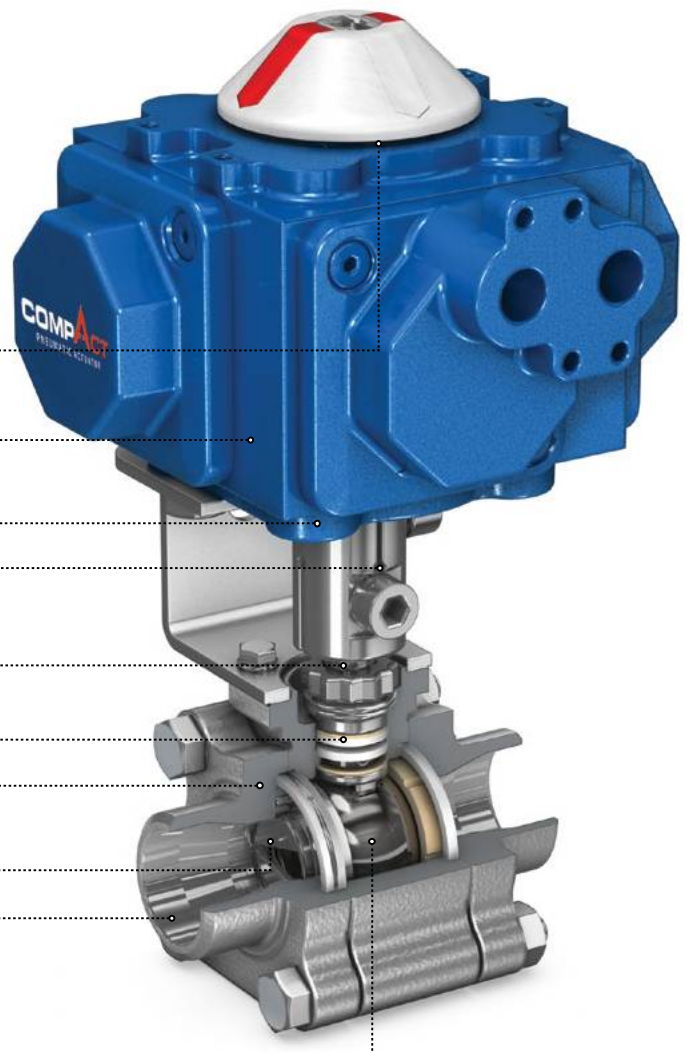
Hermetix™ stem seal certified to ISO 15848-1

Unique LTPN surface treatment of ball/seat set

Wide range of ball/seat set geometries for equal percentage, linear characteristics and modified flow solutions

Streamlined flow passage

Lapped ball/seat set perfect matching



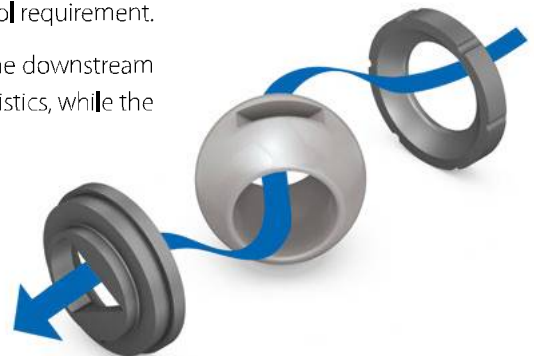
# CONTROL VALVES

## V-Port & V-Ball Valves

V-Port and V-Ball valves offer a viable alternative to other valve types including globe valves, which tend to be large, expensive and cannot always guarantee bubble-tight shut-off.

Habonim's V-design provides the high rangeability and precision throttling required for clean or dirty liquids and gases, as well as fibrous suspension applications. The streamlined flow passage allows for high recovery, maximum efficiency and excellent erosion resistance. Balls come in a variety of slot shapes and can be custom designed to meet any control requirement.

Superior control performance and accuracy is designed into the geometry of the downstream V-port. The precision laser cut 'V' shape enables equal percentage flow characteristics, while the 'slot' design provides linear flow characteristics downstream.



### V-Port

Extremely high performance is achieved with Habonim's V-Port valve assembly, comprised of a ball and laser cut metal seat, lapped together into a single seamless component. Both the ball and metal seat are surface treated and hard coated (LTPN-standard) to resist abrasion and galling. A nitride coating is applied as standard by a thermo-chemical diffusion process that transforms the outer base-metal layer of the ball and seat to a hard matrix. A standard profile seat located upstream maintains the preload of the floating ball and metal seat downstream. The end result is a superior control valve, with bubble-tight factory-tested shut-off, exceeding ANSI FCI 70-2 class VI. The V-Port design is applicable for rugged environments such as steam control with a maximum pressure drop of 20 bar (290 psi), high differential pressure maximum pressure drop of 35 bar (507 psi), and abrasive media. If control characteristics need to be modified, then changes are also made to the complete ball seat assembly (marked under the same part number).



### V-Ball

This control valve solution is suited for less demanding control applications, such as clear liquid at a maximum pressure drop of 6 bar (87 psi), or clean gas at a maximum pressure drop of 10 bar (145 psi), and temperatures of 120 °C (248 °F)max. The design, comprised of a floating characterized ball mounted between two seats, maintains a trim preload and bubble-tight shut-off. The V-Ball exerts low torque, making it suitable for smaller actuators that reduce weight and space and are more cost-efficient. V-Balls come in a variety of 'V' and 'slot' shapes, and can be custom designed to meet any control requirement. The V-Ball is available in a wide range of high-alloy materials and coatings for highly corrosive applications.



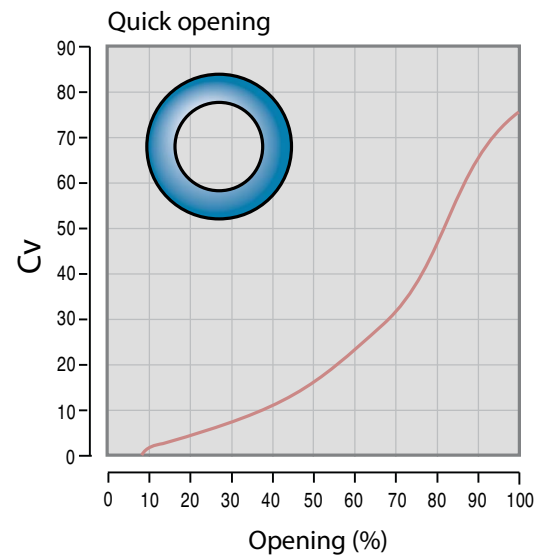
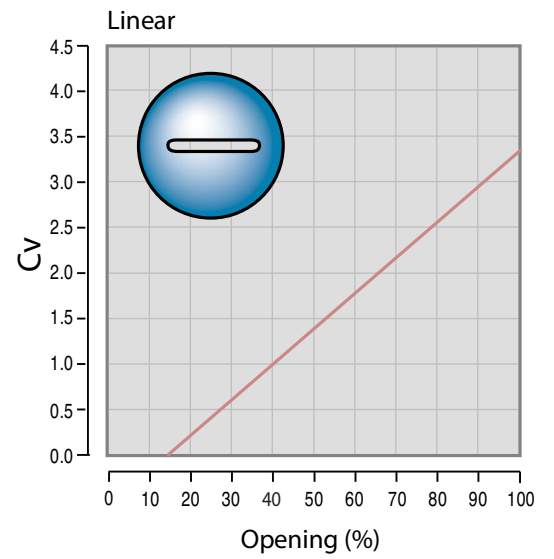
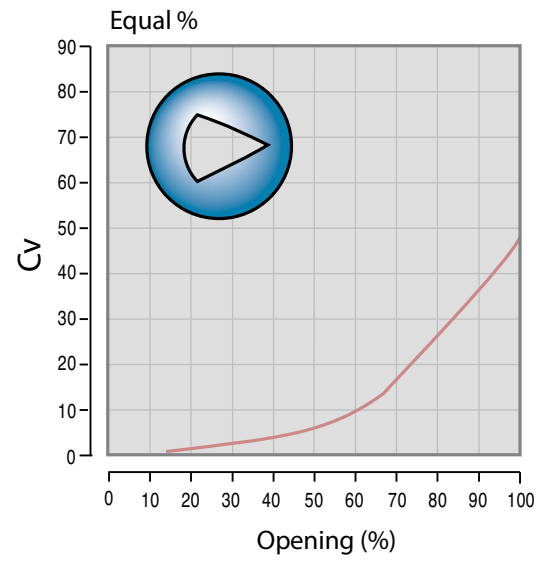
### Flow pattern



V-Port



V-Ball



Slot Port



Round Port

# CONTROL VALVES

## Design simplicity

Converting a standard Habonim quarter-turn ball valve into an accurate and efficient flow control V-ball valve is equivalent to a routine maintenance procedure. Habonim provides a conversion kit that adapts standard valves to flow control operations. The kit includes a V-Ball with a high tensile, tight tolerance stem and a , hard wearing stem seal and thrust bearing, plus seat and seal materials that are suitable for the most demanding flow control operations.

## Zero seat leakage

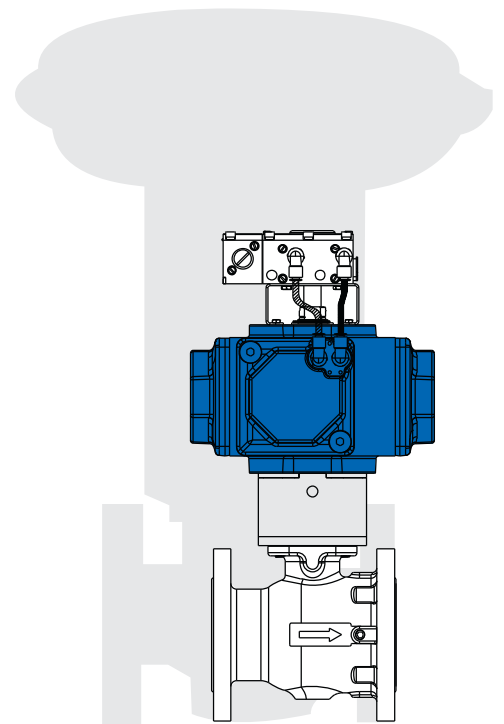
Habonim control valves undergo meticulous machining and stringent factory testing to ensure bubble-tight shut-off for zero leakage. Leak-tight operation is provided by one of two characterized flow control options. The V-Port option is comprised of a characterized metal seat lapped-in with the ball for a perfect fit, and aided by an upstream spring effect soft-seat, for positive preload. The V-Ball option uses a configuration of two soft-seats.

Both 'V' options ensure zero leakage in the most demanding applications and across a wide range of temperature and pressure requirements. Other valve types, such as globe valves, have been proven completely ineffective in providing bubble-tight shut off without a secondary shut-off valve assembly.

## Smaller size - less weight

Habonim's streamlined design dissipates less energy and hence has a higher flow coefficient (Cv) compared with other valve designs such as the tortuous globe valve design). This means that Habonim's smaller size ball valve can be used to handle the same flow as the larger size globe valve.

An entire flow system comprised of smaller valves doing the same job as larger ones will require less space on the line, will weigh less and will provide a more cost efficient and maintenance friendly solution.





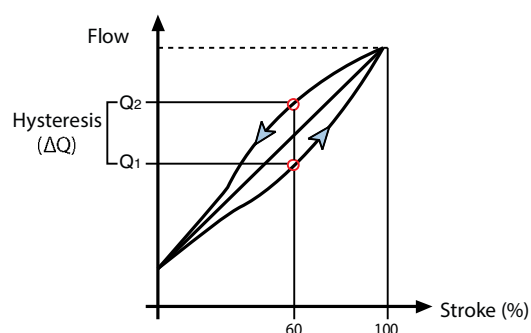
## Minimum hysteresis / outstanding repeatability

Optimum control loop performance often hinges on a few carefully designed moving parts within the valve assembly, and how well they work together. The most vulnerable areas in a standard quarter-turn valve are the torque transmission shaft between the positioner and the segmented ball (ball-stem, stem-adaptor, adaptor-actuator, actuator-positioner).

Considerable engineering expertise goes into the design and manufacture of these connecting surfaces to provide the tightest fit possible, which in turn provides uniform movement of all parts along the line of rotation.

Habonim carefully engineers all the adjoining parts to eliminate problems such as backlash, leakage and hysteresis. The result is that the overall control unit has a maximum tolerance of no more than 2%.

Test results measuring identical flow input from both directions illustrates the negligible difference between up- scale and down-scale load.

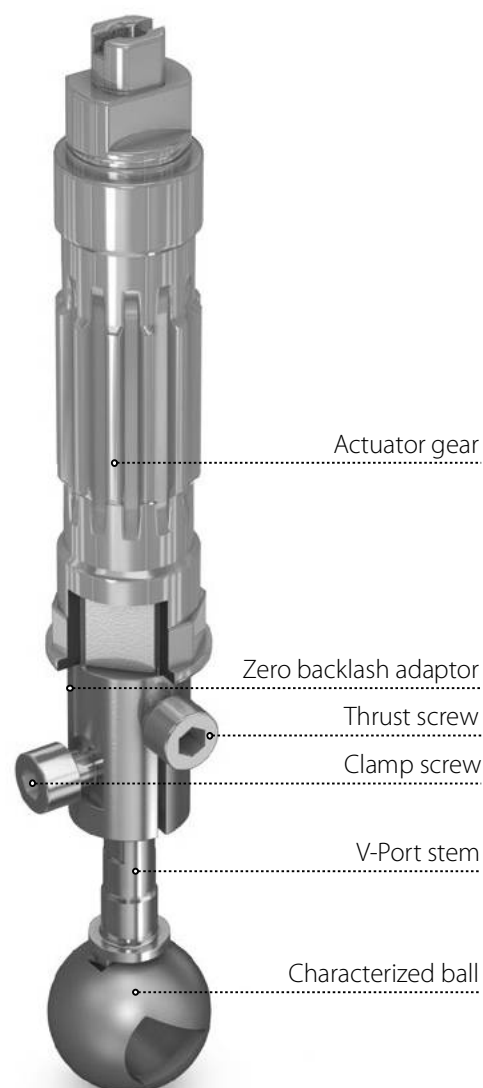
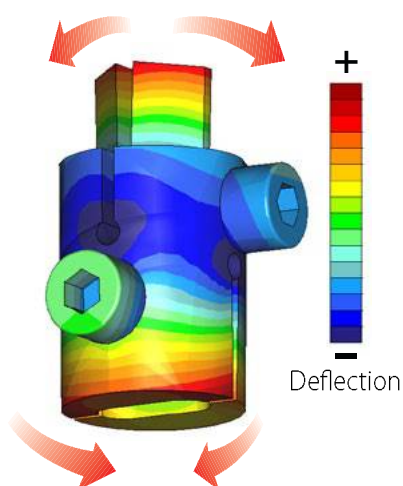


## Exclusive Habonim adaptor

Habonim's adaptor design is based on the inherent flexibility of stainless steel.

Two grooves allow the adaptor to clamp the valve stem on one side, while locking the actuator gear in place on the other side.

The adaptor ensures repeatability, zero backlash, and virtually no hysteresis for the complete control unit.



# CONTROL VALVES

## Less stem seal wear

The Habonim quarter-turn ball valve operation is far less prone to leakage due to resilient seat and seal designs that deliver tighter shut-off, and a stem sealing that requires less torque output from the actuator. This translates into longer lasting, continuous valve operation with minimum upkeep. The rotary movement of Habonim's valves make them safe and simple to automate and they are ideal for flow control operations. In contrast, linear-movement globe valves have a tendency to seize up, are susceptible to blockages, and require constant maintenance to deal with stem leakage problems.

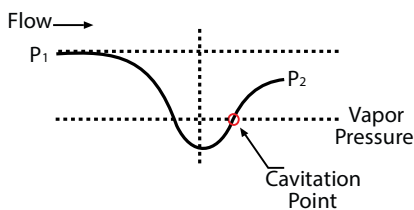
The Habonim valve is fitted with specially designed packing configurations. A variety of packing materials are available to meet the needs of demanding control applications including aggressive media, extreme temperature, and pressure conditions that range from deep vacuum to high pressure. The end result is a high-endurance control valve assembly that is more cost-effective and maintenance-friendly than any other type of actuated valve.

## Less cavitation damage

The Habonim valve offers a streamlined configuration that is less prone to cavitation damage. As liquid passes through the vena contracta velocity increases and pressure decreases. If the pressure in this area falls below the vapor pressure of the flowing liquid, vaporization (boiling) occurs. Vapor bubbles continue downstream where velocity decreases and pressure recovers. The vapor bubbles then collapse or implode.

Imploding vapor bubbles can cause serious cavitation damage, i.e., pitting of the valve metal surfaces. In globe valves this damage occurs inside the valve casing, causing an erosive effect that may eventually result in costly valve replacement. However, with a Habonim ball valve, no damage occurs to the valve itself in the event of cavitation, as it occurs downstream of the valve seat area and beyond the valve outlet.

Habonim R&D engineers have developed a new line of anti-cavitation trims for extreme applications. A grid of tubular holes facilitates linear or equal flow percentage characteristics that greatly reduce noise and vibration, as well as limiting cavitation damage. The grid is electro-eroded into the downstream metal seat and then lapped for a perfect match with the ball. The complete set is hardened to eliminate galling and increase erosion resistance.







## Wide rangeability and stability

Control valve rangeability is the ratio of maximum controllable flow to minimum controllable flow. The Habonim ball valve has an inherently high flow ratio of 1:50.

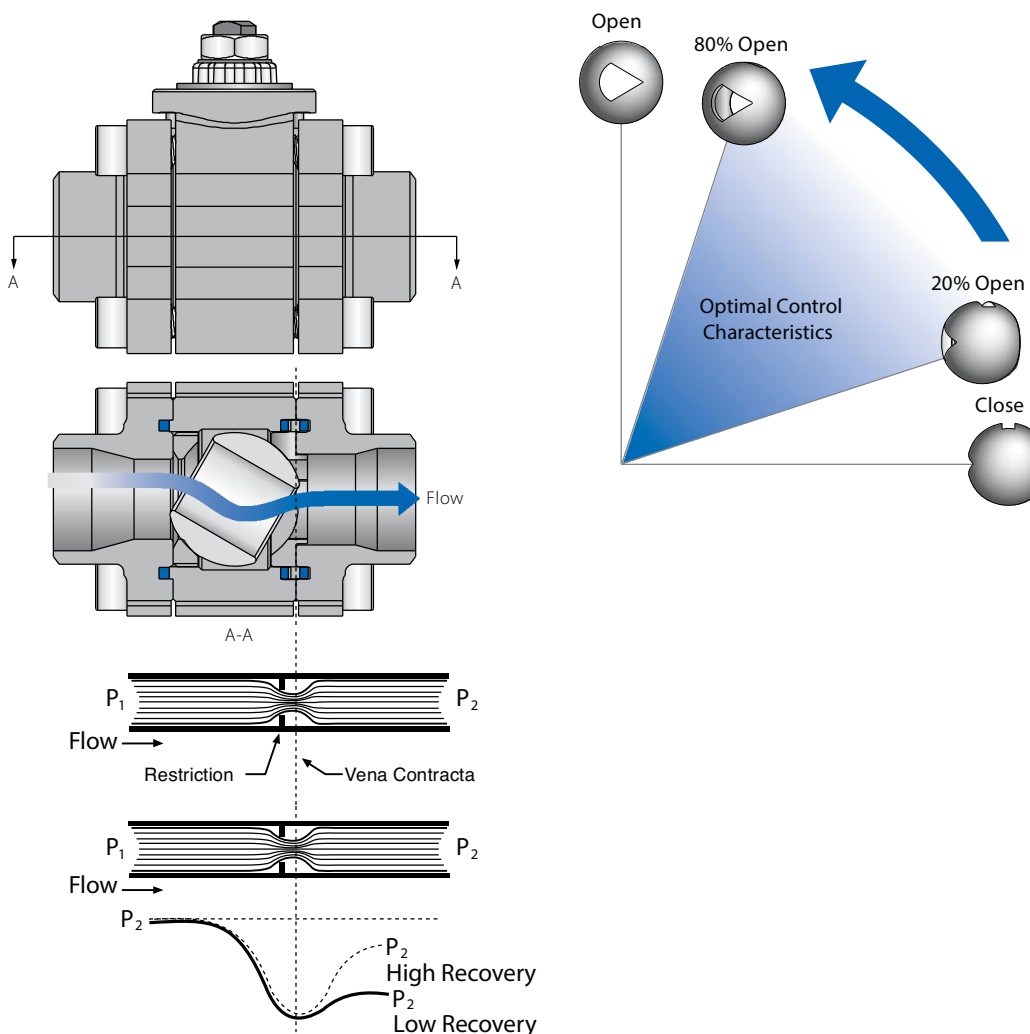
This unique advantage allows diverse process parameters with the same control unit. However, optimum flow control through the valve is achieved within the 20-80% range of rotation because the hydraulic flow curve is unstable outside the limits of this range.

The Habonim design offers exceptionally wide rangeability with maximum stability of process conditions.

## High recovery

A high recovery valve is designed with streamlined internal contours and minimal flow turbulence that dissipates relatively little flow stream energy. Therefore pressure downstream of the valve's vena contracta recovers to a high percentage of its inlet value.

The streamlined interior design of the Habonim valve dissipates little energy, resulting in higher recovery and a more cost efficient flow process, especially when compared with the



# CONTROL VALVES

## Calculations

Flow equation		
Fluid	Service condition	Equation
Liquid	Sub-critical condition $\Delta P < FL2 (P1-PV)$	$C_v = 1.17 \cdot Q_L \cdot \sqrt{\frac{G_L}{\Delta P}}$  $C_v = \frac{1.17 \cdot W_L}{\sqrt{\Delta P \cdot G_L}}$ <span style="float: right;">or</span>
	Critical condition $\Delta P < FL2 (P1-PV)$	$C_v = \frac{1.17 \cdot Q_L}{F_L} \cdot \sqrt{\frac{G_L}{(P1 - PV)}}$  $C_v = \frac{1.17 \cdot W_L}{F_L \cdot \sqrt{(P1 - PV) \cdot G_L}}$ <span style="float: right;">or</span>
Gas	$X < FK \cdot XT$	$C_v = \frac{Q_g}{387 \cdot P_1 \cdot Y} \cdot \sqrt{\frac{G_g \cdot T_1 \cdot Z}{X}}$  $C_v = \frac{W_g}{27.1 \cdot Y \cdot \sqrt{X \cdot P_1 \cdot \gamma_1}}$ <span style="float: right;">or</span>
	$X \Rightarrow FK \cdot XT$	$C_v = \frac{Q_g}{258 \cdot P_1} \cdot \sqrt{\frac{G_g \cdot T_1 \cdot Z}{FK \cdot XT}}$  $C_v = \frac{W_g}{18.1 \cdot \sqrt{FK \cdot XT \cdot P_1 \cdot \gamma_1}}$ <span style="float: right;">or</span>
Saturated steam	$X < FK \cdot XT$	$C_v = \frac{W_g}{19.3 \cdot P_1 \cdot Y \cdot \sqrt{X}}$
	$X \Rightarrow FK \cdot XT$	$C_v = \frac{W_g}{12.9 \cdot P_1 \cdot \sqrt{FK \cdot XT}}$
Superheated steam	$X < FK \cdot XT$	$C_v = \frac{W_g \cdot (1 + 0.00126 \cdot \Delta t)}{19.3 \cdot P_1 \cdot Y \cdot \sqrt{X}}$
	$X \Rightarrow FK \cdot XT$	$C_v = \frac{W_g \cdot (1 + 0.00126 \cdot \Delta t)}{12.9 \cdot P_1 \cdot \sqrt{FK \cdot XT}}$

## Glossary

<b>Cv:</b>	Valve flow coefficient
<b>FL:</b>	Liquid pressure recovery factor of a valve without attached fittings (dimensionless) - Refer to Table 1
<b>GL:</b>	
<b>P1:</b>	Upstream absolute static pressure (kgf/cm <sup>2</sup> A)
<b>P2:</b>	Downstream absolute static pressure (kgf/cm <sup>2</sup> A)
<b>Pv:</b>	Absolute vapour pressure of liquid at inlet temperature (kgf/cm <sup>2</sup> A) - Refer to Table 2
<b>ΔP:</b>	Differential pressure (P1-P2) (kgf/cm <sup>2</sup> )
<b>QL:</b>	Volumetric flow rate of liquid (m <sup>3</sup> /h)
<b>WL:</b>	Weight or mass flow rate of liquid (t/h)
<b>Gg:</b>	Gas specific gravity - Refer to Table 3
<b>Qg:</b>	Volumetric flow rate of gas (m <sup>3</sup> /h)
<b>X:</b>	Ratio of pressure drop (ΔP/P1)
<b>XT:</b>	Pressure drop ratio factor (dimensionless) - Refer to Table 1
<b>Wg:</b>	
<b>Y1:</b>	Specific gravity, upstream conditions (kg/m <sup>3</sup> ).
<b>FK:</b>	
<b>Y:</b>	Expansion factor = $1 - \frac{X}{3 \cdot FK \cdot XT}$
<b>T1:</b>	Absolute upstream temperature (K)
<b>Δt:</b>	Upstream superheated steam temperature (°C)
<b>Z:</b>	Compressibility factor, dimensionless = 1

Table 1

		Percent of valve rotation (degree of rotation)										
		0(0)	10(9)	20(18)	30(27)	40(36)	50(45)	60(54)	70(63)	80(72)	90(81)	100(90)
Equal %	FL	0.00	0.96	0.95	0.94	0.93	0.92	0.90	0.88	0.86	0.82	0.75
	XT	0.00	0.72	0.65	0.60	0.54	0.48	0.42	0.36	0.28	0.16	0.12
Round port	FL	0.00	0.92	0.91	0.91	0.90	0.86	0.80	0.72	0.61	0.61	0.50
	XT	0.00	0.78	0.74	0.71	0.67	0.62	0.56	0.49	0.38	0.26	0.15

Table 2

Pv factor		
Liquid	Formula	Pv
Acetone	C2H4	47.861
Acetic acid	C2H4O2	0.0273
Ammonia	NH3	0.7310
Benzene	C6H6	0.1621
Butane	C4H10	2.89
Carbon dioxide	CO2	58.420
Ethene	C2H6	47.861
Ethanol	C2H6O	0.1029
Ethylene glycol	C2H4(OH)2	69.58 e-6
Glycerin	C3H5(OH)3	110.50 e-9
Nitrogen	-	0.988
OIL WT32	-	205.48 e-6
OIL WT46	-	306.59 e-6
Sulfur dioxide	SO2	3.3929
Water	H2O	0.0238

Table 3

Gg and Fk factors			
Gas	Formula	Gg	Pk
Air	-	1.00	1.00
Ammonia	NH3	0.59	0.92
Argon	Ar	1.38	1.19
Carbon dioxide	CO2	1.52	0.91
Carbon monoxide	CO	0.97	1.01
Ethylene	C2H4	0.97	0.87
Chlorine	Cl2	2.49	0.96
Ethane	C2H6	1.05	0.87
Helium	He	0.14	1.19
Hydrogen	H2	0.07	1.00
Methane	CH4	0.55	0.90
Oxygen	O2	1.10	1.00
Nitrogen	N2	0.97	1.00
Saturated steam	H2O	-	0.94
Superheated steam	H2O	-	0.94

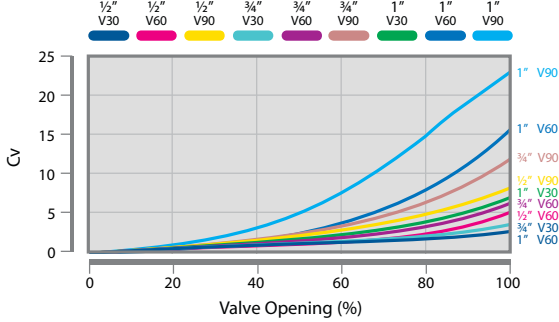
Habonim's valve sizing software (HVS) is available to download from Habonim website: [www.habonim.com](http://www.habonim.com), to support sizing



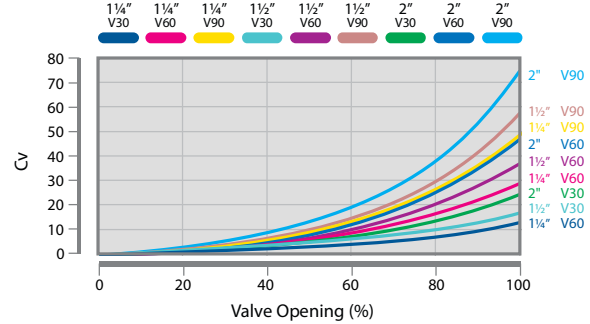
# Flow Coefficient - Cv

## Equal %

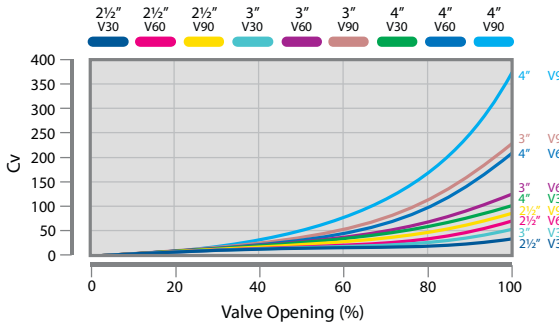
1/2" - 1"



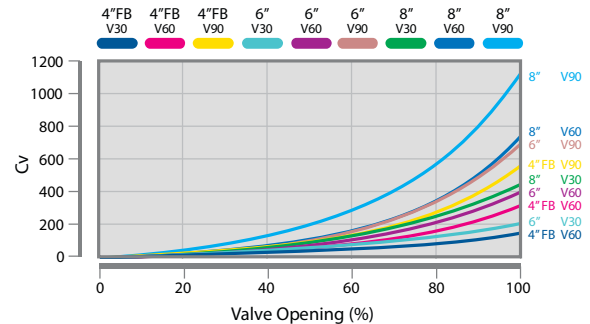
1 1/4" - 2"



2 1/2" - 4"



4"FB - 8"



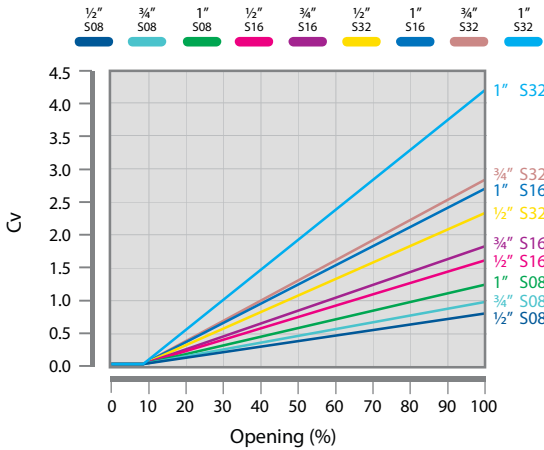
Valve size	V shape	Percent of valve rotation (degree of rotation)										
		0(0)	10(9)	20(18)	30(27)	40(36)	50(45)	60(54)	70(63)	80(72)	90(81)	100(90)
1/2"	V30	0.00	0.05	0.118	0.236	0.405	0.624	0.880	1.200	1.550	1.954	2.380
	V60	0.00	0.07	0.161	0.378	0.670	1.000	1.450	2.050	2.780	3.710	4.960
	V90	0.00	0.10	0.230	0.570	1.050	1.770	2.710	3.740	4.940	6.270	8.100
3/4"	V30	0.00	0.02	0.130	0.270	0.440	0.650	0.940	1.300	1.750	2.370	3.200
	V60	0.00	0.10	0.270	0.570	1.040	1.550	2.210	2.930	3.850	5.040	6.480
	V90	0.00	0.10	0.400	0.860	1.620	2.600	3.730	5.220	6.870	8.800	11.200
1"	V30	0.00	0.06	0.178	0.420	0.840	1.460	2.230	3.160	4.130	5.300	6.900
	V60	0.00	0.13	0.350	0.924	1.720	2.640	4.070	5.780	8.150	10.950	15.170
	V90	0.00	0.22	0.810	1.680	3.050	4.600	6.960	9.950	13.720	18.590	23.200
1 1/4"	V30	0.00	0.11	0.344	0.811	1.621	2.818	4.304	6.099	7.971	10.229	13.317
	V60	0.00	0.24	0.676	1.783	3.320	5.095	7.855	11.155	15.730	21.134	29.278
	V90	0.00	0.43	1.563	3.242	5.887	8.878	13.433	19.204	26.480	35.879	50.200
1 1/2"	V30	0.00	0.17	0.598	0.989	1.679	2.875	4.600	6.670	9.856	13.513	17.733
	V60	0.00	0.26	0.713	2.036	3.611	6.440	9.890	13.800	19.320	27.945	37.375
	V90	0.00	0.48	1.281	3.335	6.095	10.350	14.835	21.160	29.210	41.200	58.200
2"	V30	0.00	0.19	0.800	1.900	3.100	4.900	6.860	9.540	13.160	17.900	24.400
	V60	0.00	0.34	0.970	2.880	5.400	8.200	12.100	17.700	25.100	34.300	48.400
	V90	0.00	0.55	1.571	4.200	8.100	12.600	18.300	26.900	37.600	53.200	74.600
2 1/2"	V30	0.00	0.38	1.010	2.470	4.200	6.400	9.240	13.320	18.260	24.300	32.300
	V60	0.00	0.54	1.340	4.180	8.400	11.300	17.300	25.100	36.000	52.200	70.000
	V90	0.00	0.77	2.140	6.340	11.900	16.700	24.800	34.000	48.000	64.000	84.000
3"	V30	0.00	0.50	1.600	3.700	7.200	11.600	17.600	24.700	32.400	42.300	52.900
	V60	0.00	0.81	1.860	6.340	12.700	20.400	32.200	47.900	67.000	93.100	122.000
	V90	0.00	1.22	3.040	9.370	19.100	28.600	47.300	73.900	112.500	162.000	225.000
4"	V30	0.00	1.00	1.000	4.500	11.500	20.500	31.500	43.700	58.000	79.000	102.000
	V60	0.00	1.47	2.660	8.500	18.290	31.800	43.000	68.000	104.000	148.600	206.000
	V90	0.00	2.18	4.890	13.400	28.000	45.400	73.000	111.100	166.000	240.000	360.000
4"FB	V30	0.00	1.53	2.590	6.885	17.595	31.365	48.195	66.861	88.740	120.870	156.060
	V60	0.00	2.25	4.070	13.005	27.984	48.654	65.790	104.040	159.120	227.358	315.180
	V90	0.00	3.34	7.482	20.502	42.840	69.462	111.690	169.983	253.980	367.200	550.800
6"	V30	0.00	1.91	3.200	8.595	21.965	39.155	60.165	83.467	110.780	150.890	194.820
	V60	0.00	2.81	5.081	16.235	34.934	60.738	82.130	129.880	198.640	283.826	393.460
	V90	0.00	4.16	9.340	25.594	53.480	86.714	139.430	212.201	317.060	458.400	687.600
8"	V30	0.00	3.15	4.200	14.175	36.225	64.575	88.000	137.655	218.000	298.000	421.000
	V60	0.00	4.63	8.379	26.775	57.614	91.000	135.450	214.200	327.600	468.090	723.000
	V90	0.00	6.87	15.404	42.210	88.200	143.010	229.950	349.965	522.900	756.000	1134.000

# CONTROL VALVES

## Flow Coefficient - Cv

### Linear characteristics

1/2" - 1"

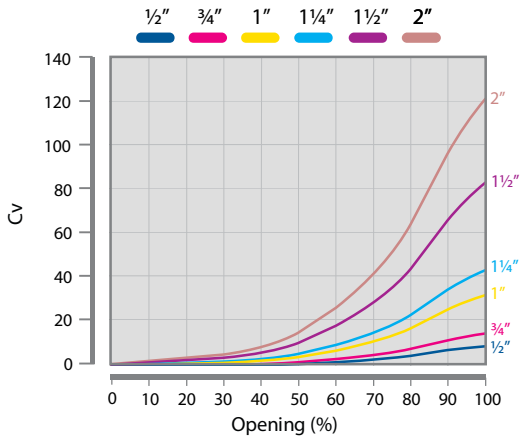


Valve size	Slot shape	Percent of valve rotation (degree of rotation)					
		0(0)	10(9)	20(18)	30(27)	40(36)	50(45)
1/2"	0.8	0.00	0.00	0.038	0.078	0.120	0.162
	1.6	0.00	0.00	0.107	0.224	0.347	0.475
	3.2	0.00	0.00	0.187	0.383	0.583	0.770
3/4"	0.8	0.00	0.00	0.05	0.11	0.16	0.21
	1.6	0.00	0.00	0.14	0.28	0.43	0.57
	3.2	0.00	0.00	0.23	0.47	0.73	0.98
1"	0.8	0.00	0.00	0.080	0.152	0.225	0.304
	1.6	0.00	0.00	0.238	0.495	0.739	0.988
	3.2	0.00	0.00	0.374	0.765	1.170	1.600

Valve size	Slot shape	Percent of valve rotation (degree of rotation)				
		60(54)	70(63)	80(72)	90(81)	100(90)
1/2"	0.8	0.202	0.242	0.284	0.324	0.366
	1.6	0.595	0.720	0.840	0.970	1.111
	3.2	0.957	1.152	1.360	1.574	1.800
3/4"	0.8	0.27	0.33	0.38	0.44	0.49
	1.6	0.71	0.86	1.01	1.16	1.33
	3.2	1.24	1.50	1.76	2.00	2.30
1"	0.8	0.380	0.463	0.545	0.618	0.710
	1.6	1.232	1.473	1.728	1.965	2.210
	3.2	2.035	2.450	2.900	3.316	3.700

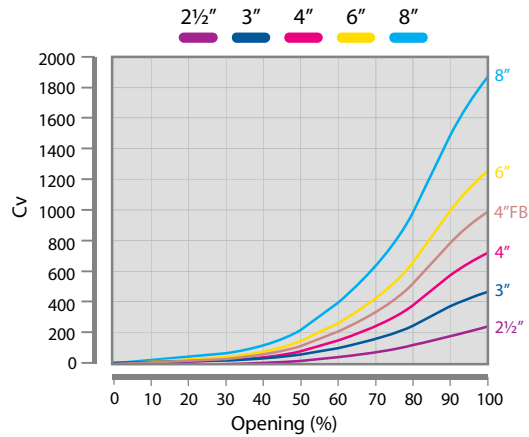
### Quick opening characteristics

1/2" - 2"



### Quick opening characteristics

2 1/2" - 8"



Valve size	Percent of valve rotation (degree of rotation)										
	0(0)	10(9)	20(18)	30(27)	40(36)	50(45)	60(54)	70(63)	80(72)	90(81)	100(90)
1/2"	0.00	0.15	0.29	0.46	0.70	1.09	1.76	2.60	4.30	6.40	8.00
3/4"	0.00	0.21	0.43	0.70	1.05	1.62	2.64	4.00	6.40	9.60	12.00
1"	0.00	0.58	1.15	1.90	2.80	4.30	7.00	10.50	17.00	26.00	32.00
* 1 1/4"	0.00	0.83	1.65	2.67	4.05	6.50	10.00	15.20	24.60	36.00	42.80
1 1/2"	0.00	1.48	2.95	4.75	7.20	11.00	18.00	27.00	44.00	65.50	82.00
2"	0.00	2.16	4.33	6.95	10.50	16.20	26.40	39.60	64.00	96.00	120.00
* 2 1/2"	0.00	4.30	9.10	15.60	23.70	34.60	52.50	83.00	126.00	185.00	256.00
3"	0.00	8.20	16.20	26.00	40.00	61.00	100.00	148.00	240.00	360.00	450.00
4"	0.00	13.10	26.00	42.10	63.10	97.20	159.00	238.00	385.00	575.00	720.00
* 4" FB	0.00	16.00	31.00	51.00	76.00	117.00	192.00	288.00	465.00	695.00	870.00
** 6"	0.00	18.40	36.70	59.00	90.00	138.00	224.00	338.00	545.00	815.00	1020.00
** 8"	0.00	34.00	68.00	109.00	165.00	254.00	415.00	620.00	1010.00	1500.00	1880.00

\* Available with N47 Series only

\*\* Available with N31/N32 Series only



## Manual Control

Habonim has developed a convenient and economical manual operation control valve package that provides a cost effective flow control solution for process applications that do not demand dynamic adjustment or the use of a fully automated control unit with sensors, positioners and various additional control devices. If the flow process is stable and accurate dynamic adjustment is not an issue, then Habonim's manual control package permits manual setting of the process parameters to a specified angular ball position.

Habonim's angular positioning device is comprised of a polished stainless steel 'Scale' (0°- 90°), mounted on top of the valve's ISO pad. The oval handle is designed with an integrated pointer that indicates the angle of the opening position. To avoid unintentional rotation of the valve stem, Habonim offers a special multi-position lockable handle.

## D Series

### 3-Way control valve

"Habonim" D Series 3-way control valve, fitted with a V-Port characterized metal seat, provides accurate diverting or mixing over a wide range of flow rates for various applications.

### Diverting

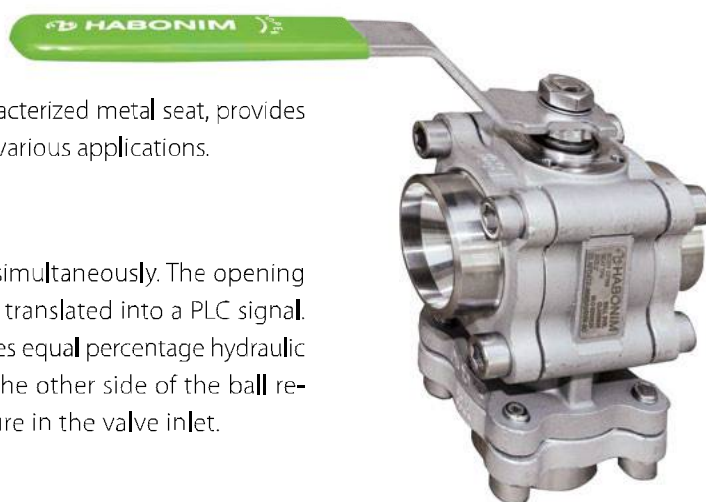
Diverter valves direct flow from the inlet towards two outlets simultaneously. The opening of each outlet port is determined by the process requirement translated into a PLC signal. A T-Port ball lapped with a V-notch metal seat on one side provides equal percentage hydraulic characteristics for the flow process loop. The round port on the other side of the ball recirculates the surplus flow while eliminating increased pressure in the valve inlet.

### Mixing

Mixing valves are designed to combine the flow of two inlets into a single outlet. They are used in industrial applications where specific concentrations must be combined and regulated or their temperature maintained. Optimum performance is achieved with equal pressure on both inlets.

Applications for the D Control Valve Series for both flow configurations (diverting or mixing) include: refineries, chemical plants and oil production, all of which use boilers, coolers, heaters and condensers. They are also ideal for engines, turbines, gear boxes and heat exchanges, where air cooling, fuel and lube oil preheating, co-generation and engine jacket water demand precise control.

The D Series can also be fitted with a range of accessories from position feedback to full control capabilities.



# CONTROL VALVE SIZER SOFTWARE (HVS)

## Habonim's Valve Sizing (HVS) Software

Habonim Valve Sizer (HVS) is a unique software tool which simplifies the task of selecting the perfect control valve package for most services. HVS has access to a database of over 5,800 different media. Accurate calculations of process Cv, valve opening percentages, velocity, critical condition warnings and predicted noise levels are just some of the many features provided by HVS in a variety of output formats. Operating in accordance with International Standards of IEC60534 and ISA 75-17 1989, HVS can be used for multiple requirements as well as individual packages.

### Define the process

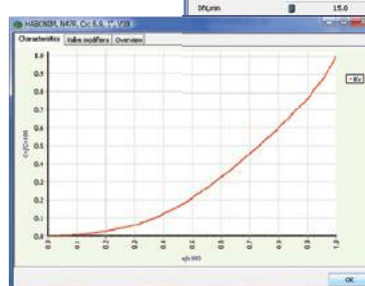
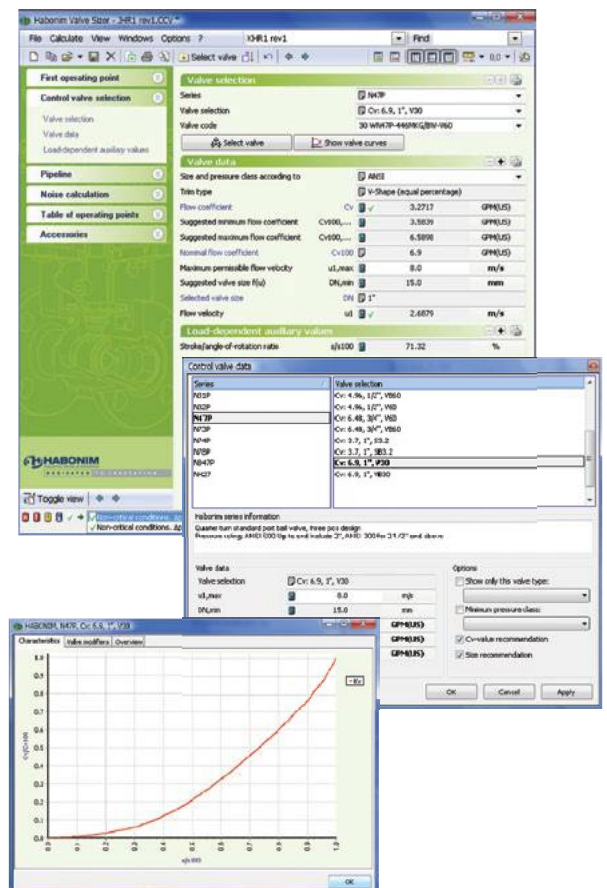
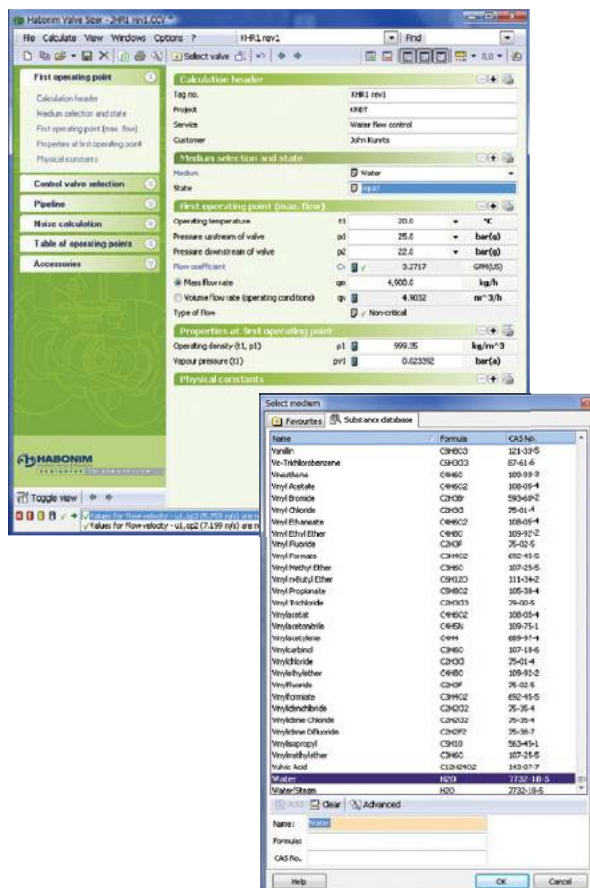
HVS leads the engineer step-by-step through all the parameters needed to accurately define the process from the first operating point. Simultaneously, HVS calculates the flow rate according to IEC 60534 and ISA S75-17 1989, including gases and vapors. HVS provides the industry's most comprehensive database of coefficient parameters for more than 5,800 flow media, including density, vapor pressure, critical pressure, and saturated steam temperature at a given pressure.

### Select the control valve

With the process now defined, HVS displays a list of all the control valves that meet the process acceptance criteria. Once the desired valve is chosen, HVS indicates the velocity through the valve, angle of rotation, valve modifiers and more.



Available to download free of charge from Habonim website: <https://www.habonim.com/control-valve-sizer-hvs/>





# Habonim's Valve Sizing (HVS) Software

## Dynamic Cv correction

Unique among industry software tools, HVS automatically performs a correction of the flow rate calculation, taking into account the resistance of installed fittings.

## Noise level calculation

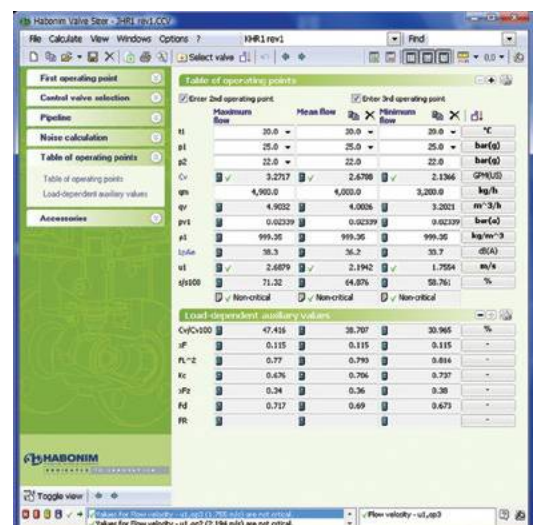
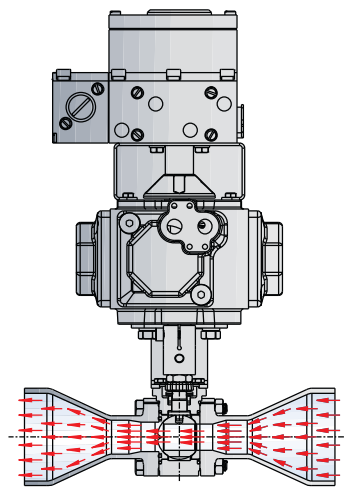
Unlike most control sizing software programs, HVS calculate the sound pressure level for both liquids and gases. HVS provides sound pressure level at a distance of 1 m from the valve surface, and then presents the spectrum of sound levels, by frequency, in both table and bar graph format.

## Define multiple operating points (min, mean, max)

It is easy to add up to two additional operating points. There is no need to re-type the parameters for each additional point - either accept the default values for the maximum flow rate or modify them as needed.

## A complete control package!

In the Accessories section you can select the best pneumatic actuator and positioner for safe operation, in accordance with site standards. HVS guides you with simple, drop-down



# CONTROL VALVE SIZER SOFTWARE (HVS)

## Generate detailed summary reports

HVS summarizes all the engineering data of the defined control valve configuration in an easy-to-read report. All program inputs, process data, HVS-calculations, fluid and pipe data, valve data can be displayed, in addition to numerous other fields. The HVS summary report can be output in a number of convenient formats including ISA and HVS.

HVS provides many accessible tutorial aids throughout the HVS program, providing answers to most questions. For further assistance, please contact the Habonim support team at: [hvs@habonim.com](mailto:hvs@habonim.com)

## Download HVS at [www.habonim.com](http://www.habonim.com)

You can download a FREE copy of the newest version of HVS from the Habonim website. Follow the installation instructions and save the program to your local workstation.

Once the installation is complete, just click the HVS icon on your desktop or run it from the Windows® Start menu. Email the simple registration form and you will soon receive a personal license code from the HVS support team.

Save the license to your computer and you now have access to this powerful engineering tool.

As an HVS registered user you will benefit from free future software updates, Habonim newsletters, new product announcements and success stories.

Habonim Valve Sizer powered by CONVAL® Version 1.1 (Build 1.1.10) 3/19/2020 4:10:29 PM  
**HABONIM**  
 Habonim Valve Sizer: PP-GG-VC-603

**Calculation header**  
 Tag no: PP-GG-VC-603

**Medium**  
 Medium: Propane  
 State: Liquid

**Pipeline**  
 Line size (valve = pipelinge)

**Operating data**

	Maximum flow	Mean flow	Minimum flow	
t1	90.5	90.5	90.5	K
p1	175.0	158.0	75.0	bar(a)
p2	165.5	130.0	41.0	bar(a)
Cr	1.9306	0.91768	0.24984	GPM(US)
qm	1.2	1.0	0.3	kg/s
qr	1.6325	1.3613	0.40339	l/s
qv1	9.3413 E-9	9.3413 E-9	9.3413 E-9	bar(a)
p1	734.6	734.6	734.6	kg/m <sup>3</sup>
LuAe	42.4	48.4	41.8	dB(A)
u1	3.2238	2.6865	0.80396	m/s
s8100	55.759	41.459	23.685	%

Non-critical      Non-critical      Non-critical

**Valve**  
 Series: NH27  
 Valve selection: Cv: 6.9, 1", V30  
 Valve code: 10 OF C28W-666MFA G/XBW160-V30-C005  
 Size and pressure class according to: ANSI  
 Trim type: V-Shape (equal percentage)  
 Nominal flow coefficient: 6.9 GPM(US)  
 Selected valve size: Cv100 DN 1"

**Accessories**  
 Mode of operation: Normally close  
 Actuator type: Spring return

**Hint:**  
 • Approximate value: Dynamic viscosity (t1.p1) - η1.op3  
 • Approximate value: Dynamic viscosity (t1.p1) - η1.op2  
 • Approximate value: Dynamic viscosity (t1.p1) - η1

**Confirmation:**  
 • Values for Flow velocity - u1.op3 (0.806 m/s) are not critical  
 • Values for Flow velocity - u1.op2 (2.687 m/s) are not critical  
 • Values for Flow velocity - u1 (3.224 m/s) are not critical  
 • Non-critical conditions: Δp.op3 (34.0 bar) < 34.59 bar  
 • Non-critical conditions: Δp.op2 (28.0 bar) < 57.3 bar  
 • Non-critical conditions: Δp (9.5 bar) < 54.13 bar

PP-GG-VC-603 CCV 1/2



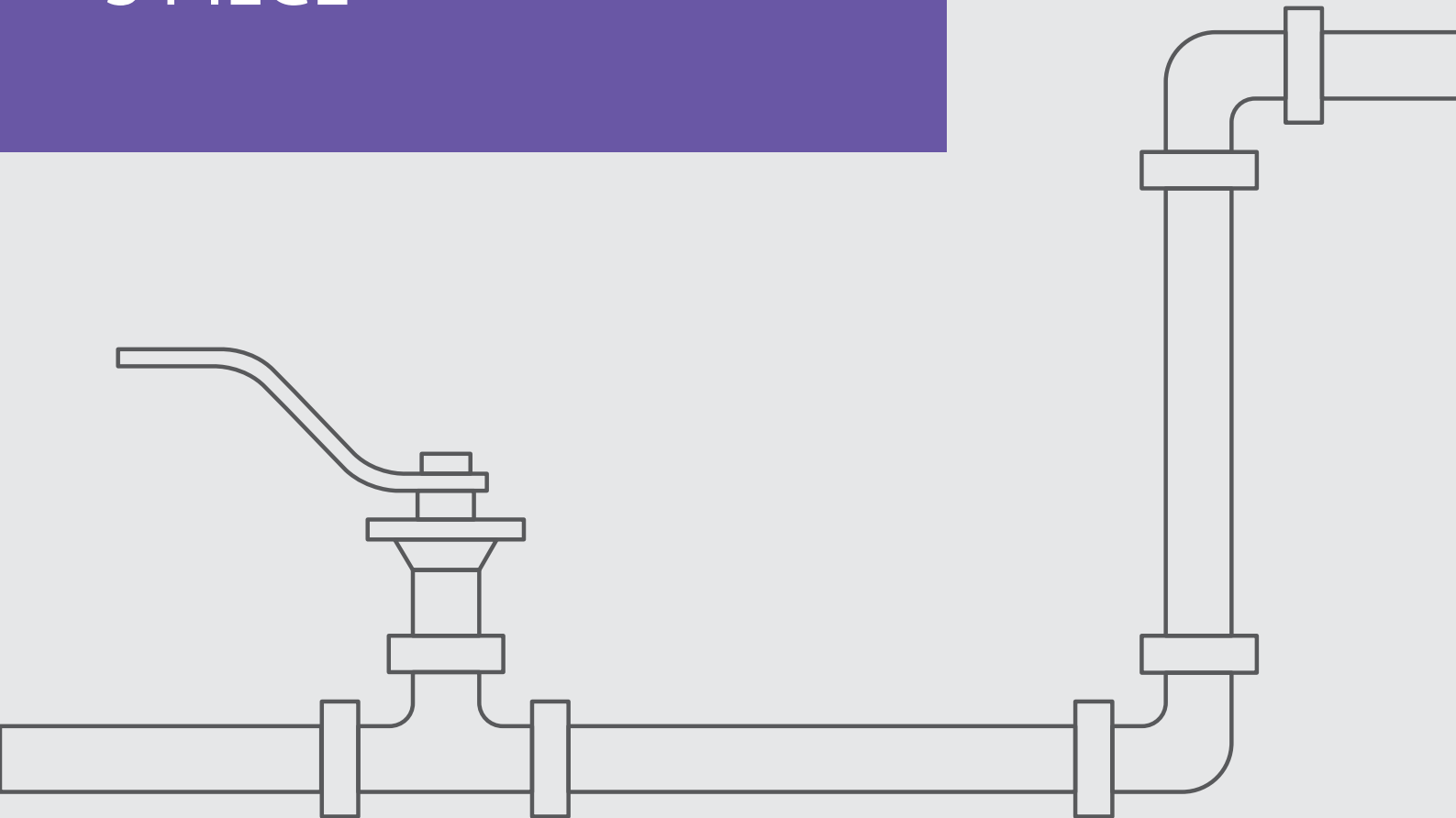
N47



Control Valves

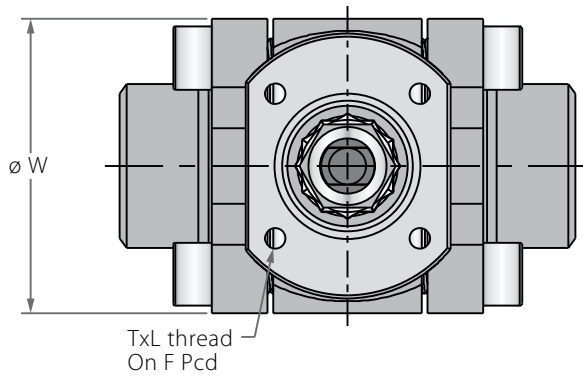
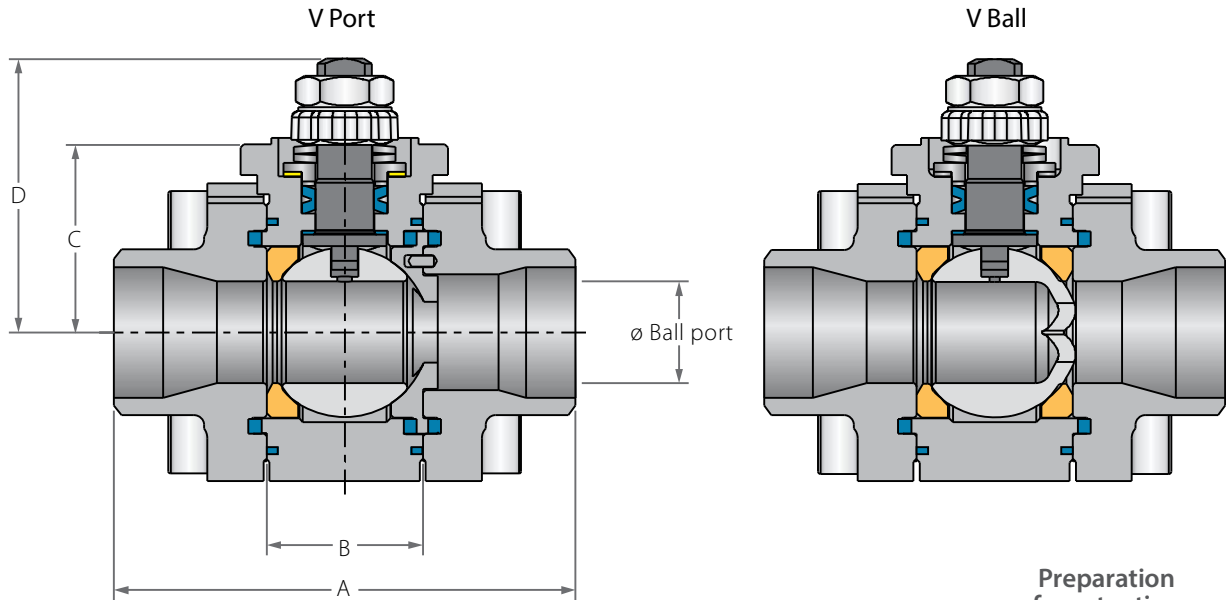
# FLOATING BALL

3 PIECE

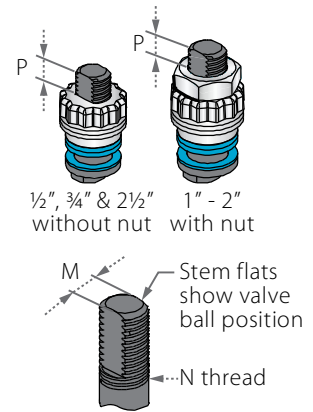


## Control Floating Ball 3 Piece

### Valve dimensions



### Preparation for actuation



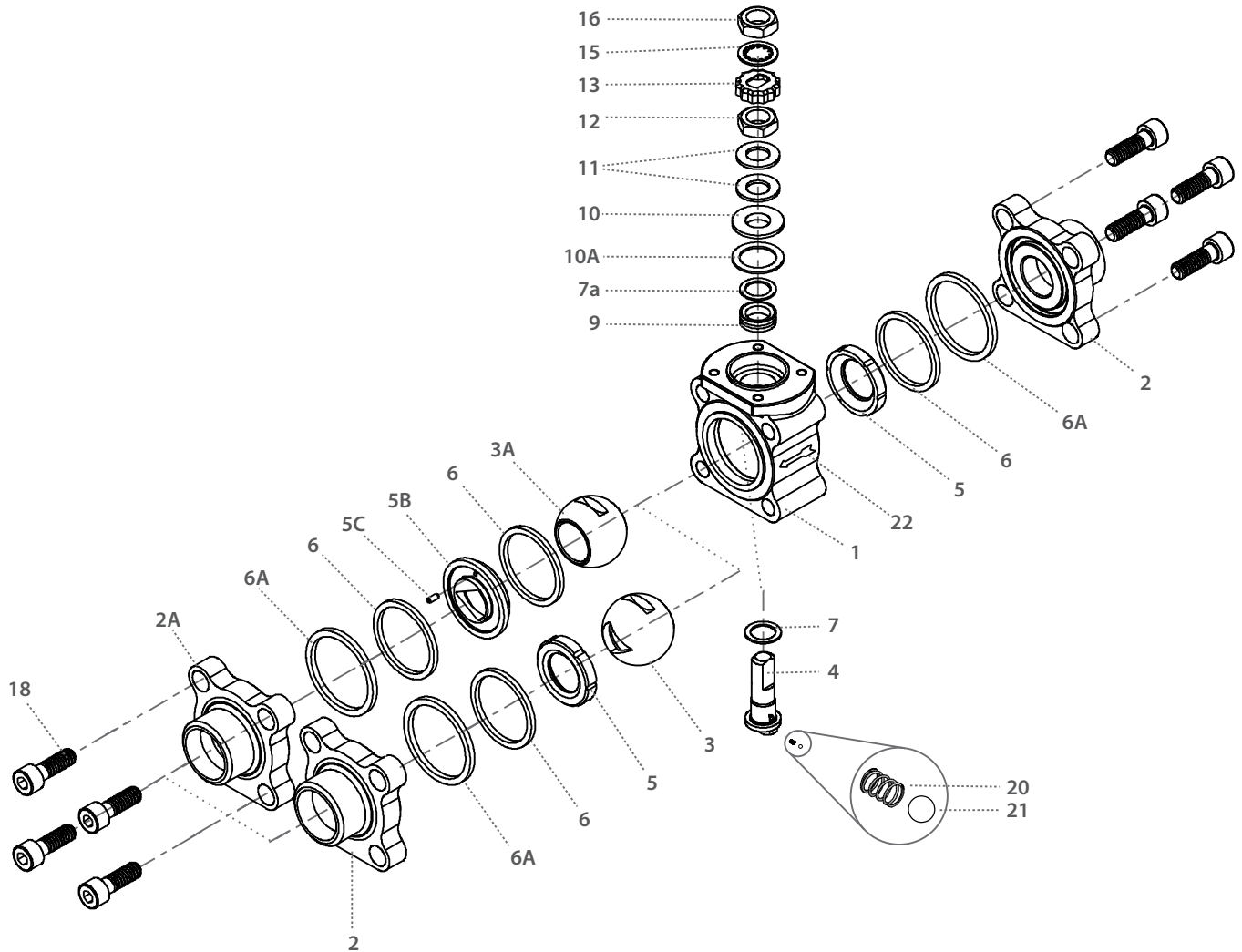
Valve Face To Face sizes are according to Habonim catalog data only, for Extended-weald/Flanged/Tri-clamp end see Face To Face sizes page.

Std. port	Full port	Unit	Ball port	A	B	C	D	W	M	N	P	F	TxL	Weight kg/lb	
DN15	DN10	mm	11.15	66.00	20.60	29.00	38.70	47.00	5.54	1/2" UNF	6.65	(F03)	36.00	M5X10	0.60
1/2"	3/8"	inch	0.44	2.60	0.81	1.14	1.52	1.85	0.22	1/2" UNF	0.26		1.42	M5X10	1.33
DN20	DN15	mm	14.30	70.60	24.50	31.40	40.30	53.70	5.54	3/4" UNF	6.65	(F03)	36.00	M5X10	0.80
3/4"	1/2"	inch	0.56	2.78	0.97	1.24	1.59	2.11	0.22	3/4" UNF	0.26		1.42	M5X10	1.77
DN25	DN20	mm	20.60	93.70	31.70	38.20	55.60	63.70	7.54	1" UNF	7.40	(F04)	42.00	M5X10	1.60
1"	3/4"	inch	0.81	3.69	1.25	1.50	2.19	2.51	0.30	1" UNF	0.29		1.65	M5X10	3.54
DN32	DN25	mm	25.40	108.00	41.30	42.70	60.20	71.70	7.54	1 1/4" UNF	7.40	(F04)	42.00	M5X10	2.50
1 1/4"	1"	inch	1.00	4.25	1.62	1.68	2.37	2.82	0.30	1 1/4" UNF	0.29		1.65	M5X10	5.53
DN40	DN32	mm	31.80	115.50	48.40	43.60	73.00	86.70	8.71	1 1/2" UNF	8.50	(F05)	50.00	M6X12	3.60
1 1/2"	1 1/4"	inch	1.25	4.55	1.91	1.72	2.87	3.41	0.34	1 1/2" UNF	0.33		1.97	M6X12	7.96
DN50	DN40	mm	38.10	128.00	56.30	48.30	77.80	96.90	8.71	2" UNF	8.50	(F05)	50.00	M6X12	4.50
2"	1 1/2"	inch	1.50	5.04	2.22	1.90	3.06	3.82	0.34	2" UNF	0.33		1.97	M6X12	9.95
DN50	DN50	mm	50.80	158.00	72.60	70.00	88.10	108.00	8.71	2 1/2" UNF	13.50	(F07)	70.00	M8X12	9.50
2 1/2"	2"	inch	2.00	6.22	2.86	2.76	3.47	4.25	0.34	2 1/2" UNF	0.53		2.76	M8X12	21.0



# Control Floating Ball 3 Piece

## Valve dimensions



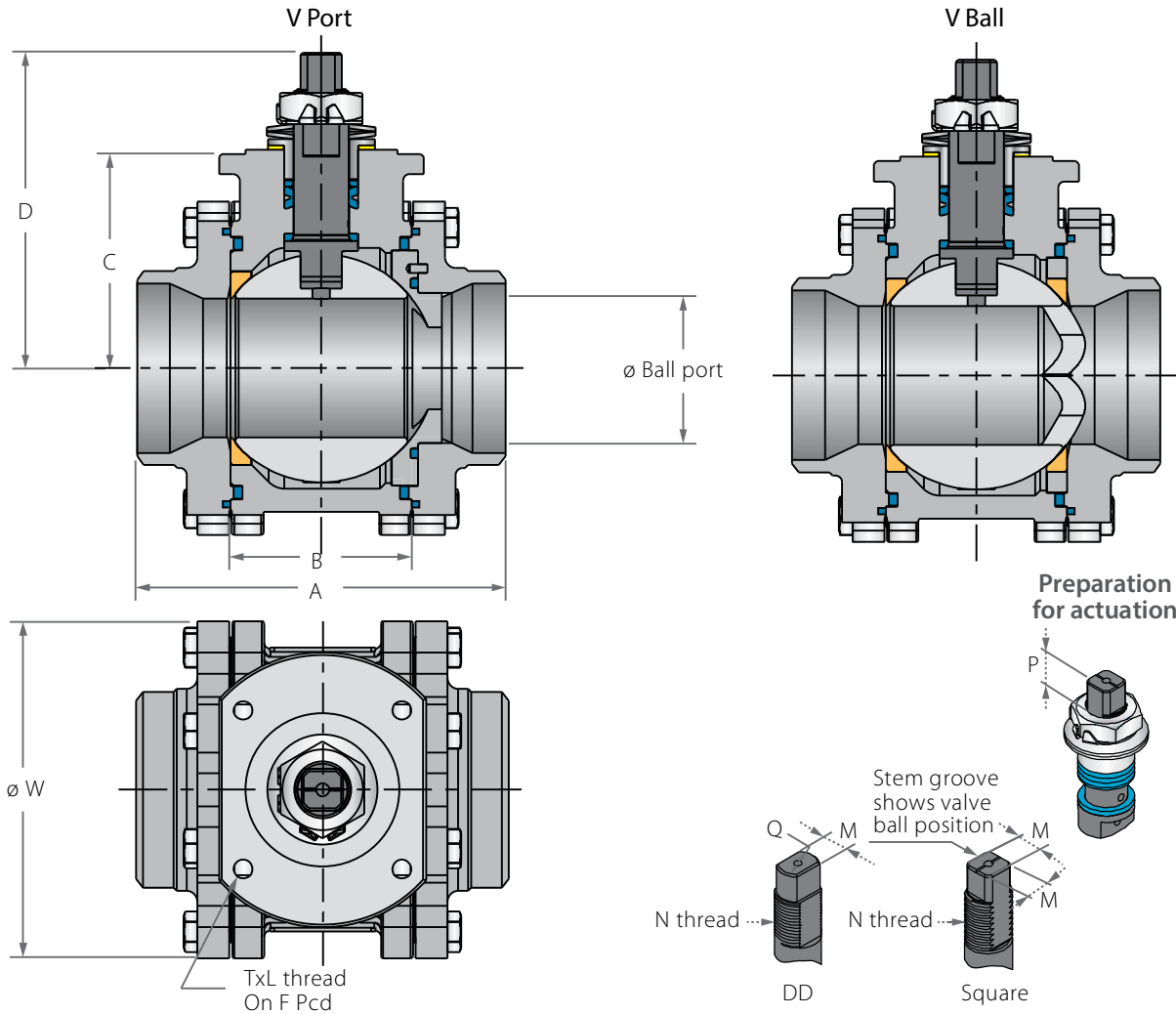
Item	Description	Material specification	Qty.
1	Body	Acc. Ordering Code	1
2	End	Acc. Ordering Code	1-2
2A	V- Port End	Acc. Ordering Code	1
3	V ball	Acc. Ordering Code	1
3A	Ball	Acc. Ordering Code	1
4	Stem	Acc. Ordering Code	1
5*	Seat	Acc. Ordering Code	1-2
5B	V seat	Acc. Ordering Code	1
5C	Dowel Pin	S. Steel	1
6*	Body seal	Acc. Ordering Code	2-3
6A*	Outer seal	Acc. Ordering Code	2
7*	Stem thrust seal	PEEK, CF PEEK, PCTFE	1

Item	Description	Material specification	Qty.
7a*	Anti-abrasion ring	PEEK, CF PEEK, PCTFE	1
9*	Stem seal	CF PTFE, TFM	1
10	Follower	S. Steel	1
10A*	Slide bearing	S. Steel	1
11	Disc spring	S. Steel	2
12	Stem nut	S. Steel	1
13	Locking clip	S. Steel	1
16	Handle nut	S. Steel	1
18	Body bolts	S. Steel	8
22	Arrow flow	S. Steel	1
23	Tag (not shown)	S. Steel	1

\* Repair kit components

## Control Floating Ball 3 Piece

### Valve dimensions



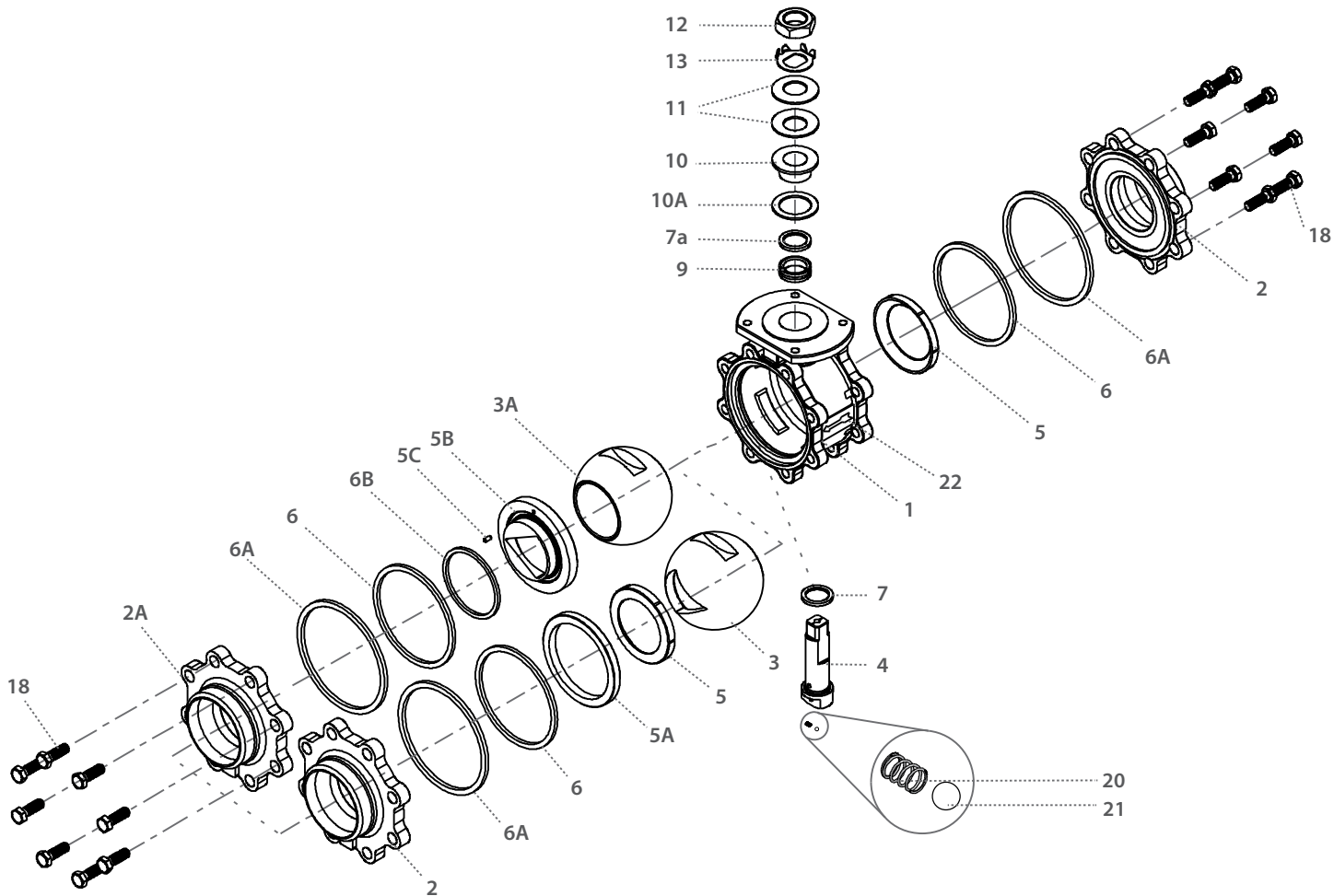
Valve Face To Face sizes are according to Habonim catalog data only, for Extended-weald/Flanged/Tri-clamp end see Face To Face sizes page.

Std. port	Full port	Unit	Ball port	A	B	C	D	W	M	N	P	Q	F	TxL	Weight kg/lb
DN80	DN65	mm	63.50	169.00	83.30	98.30	144.90	140.00	18.90	1"-14	16.70	22.70	(F10)	102.00	13.70
3"	2½"	inch	2.50	6.65	3.28	3.87	5.71	5.50	0.74	UNS-2A	0.66	0.89		4.02	30.30
DN100	DN80	mm	82.60	214.00	108.80	114.10	160.70	177.00	18.90	1"-14	16.70	22.70	(F10)	102.00	23.70
4"	3"	inch	3.25	8.43	4.28	4.49	6.33	6.97	0.74	UNS-2A	0.66	0.89		4.02	52.40
	DN100	mm	100.00	239.00	123.00	124.00	170.50	217.00	18.90	1"-14	16.70	22.70	(F10)	102.00	30.00
	4"	inch	3.94	9.41	4.84	4.88	6.71	8.54	0.74	UNS-2A	0.66	0.89		4.02	66.30



## Control Floating Ball 3 Piece

### Valve dimensions



Item	Description	Material specification	Qty.
1	Body	Acc. Ordering Code	1
2	End	Acc. Ordering Code	1-2
2A	V-End	Acc. Ordering Code	1
3	V-Ball	Acc. Ordering Code	1
3A	Ball	Acc. Ordering Code	1
4	Stem	Acc. Ordering Code	1
5*	Seat	Acc. Ordering Code	1-2
5A	Seat support	S. Steel	1
5B	V seat	Acc. Ordering Code	1
5C	Dowel pin	S. Steel	1
6*	Body seal	Acc. Ordering Code	2
6A	Outer seal	Acc. Ordering Code	2
6B	Seat seal	Acc. Ordering Code	1

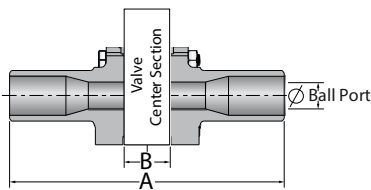
Item	Description	Material specification	Qty.
7*	Stem thrust seal	PEEK, CF PEEK, PCTFE	1
7a*	Anti-abrasion ring	PEEK, CF PEEK, PCTFE	1
9*	Stem seal	CF PTFE, TFM	1
10	Follower	S. Steel	1
10A	Slide bearing	S. Steel	1
11	Disc spring	S. Steel	2
12	Stem nut	S. Steel	1
13	Tab lock washer	S. Steel	1
18	Body bolts	S. Steel	16
20	Anti-static spring	S. Steel	2
21	Anti-static plunger	S. Steel	2
22		S. Steel	1
23	Tag (not shown)	S. Steel	1

\* Standard items supplied in repair kits

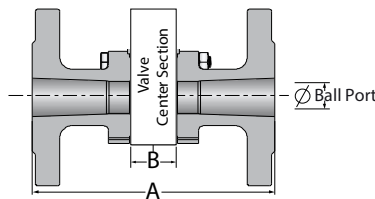
## Face To Face Sizes

Valve Size	Unit	B		A-XBW		A-ETO	A-Flanged		A-TC
		Std. port	Full port	Std. port	Full port	Std. port	Std. port	Full port	Full port
DN10	mm	20.6	20.6	140.6	143.0	108.6			
3/8"	inch	0.8	0.8	5.5	5.6	4.3			
DN15	mm	20.6	24.6	140.6	147.0	137.0	140.0	152.0	88.8
1/2"	inch	0.8	1.0	5.5	5.8	5.4	5.5	6.0	3.5
DN20	mm	24.6	31.7	147.0	168.7	147.0	152.0	165.1	101.6
3/4"	inch	1.0	1.2	5.8	6.6	5.8	6.0	6.5	4.0
DN25	mm	31.7	41.3	168.7	179.3	164.1	165.1	178.1	114.3
1"	inch	1.2	1.6	6.6	7.1	6.5	6.5	7.0	4.5
DN32	mm	41.3	48.4	179.3	189.4	179.3	178.1	190.0	
1 1/4"	inch	1.6	1.9	7.1	7.5	7.1	7.0	7.5	
DN40	mm	48.4	56.3	189.4	200.3	184.0	190.0	216.1	139.8
1 1/2"	inch	1.9	2.2	7.5	7.9	7.2	7.5	8.5	5.5
DN50	mm	56.3	72.6	200.3	232.6	193.5	216.1	241.0	158.9
2"	inch	2.2	2.9	7.9	9.2	7.6	8.5	9.5	6.3
DN65	mm	72.6	83.4	232.6	283.4	222.6	241.0	282.0	213.0
2 1/2"	inch	2.9	3.3	9.2	11.2	8.8	9.5	11.1	8.4
DN80	mm	83.4	108.8	283.4	348.8	250.4	282.0	282.0	215.8
3"	inch	3.3	4.3	11.2	13.7	9.9	11.1	11.1	8.5
DN100	mm	108.8	123.0	348.8	390.0	348.8	305.0	305.0	245.4
4"	inch	4.3	4.8	13.7	15.4	13.7	12.0	12.0	9.7
DN200	mm	146.1	180.0	444.1	180.0	444.1	403.1	403.0	146.1
6"	inch	5.8	7.1	17.5	7.1	17.5	15.9	15.9	5.8

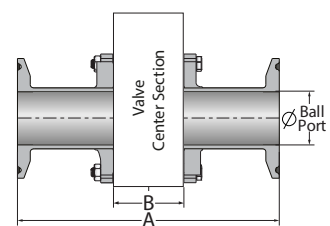
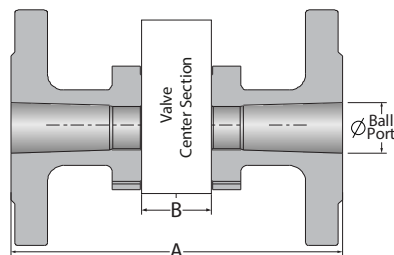
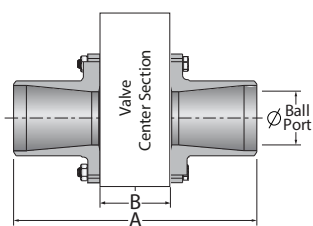
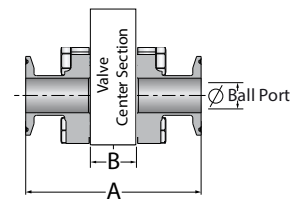
XBW / ETO



Flanged



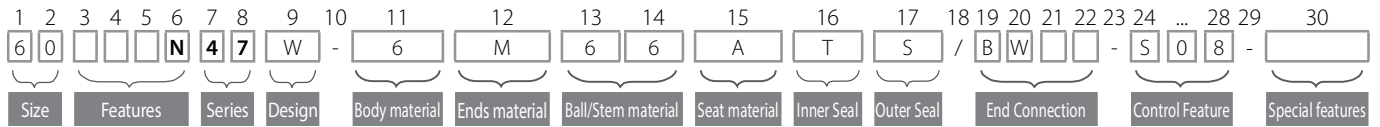
TC





# Control Floating Ball 3 Piece - Ordering Code System

"Mandatory option" options are marked with **green background** | "Standard offer" options are marked with **light green background**



Size (1-2)		
Code	inch	mm
02	1/4"	8
03	3/8"	10
05	1/2"	15
07	3/4"	20
10	1"	25
12	1 1/4"	32
15	1 1/2"	40
20	2"	50
25	2 1/2"	65
30	3"	80
40	4"	100

Features (3-6)	
N	Control valve
F	Fire safe
B	Full port
O	Oxygen service
C	Cryogenic [R]
Z	High Temp. (MTM) [R]

Series (7-8)	
47	Floating ball 3 piece

Design (9)	
W	Total HermetiX Integrity package
G	Total HermetiX Integrity package - FDA compliant

Body material (11) [R]	
6	S. SteelCF8M/CF3M
4	C. steel
W	Hasteloy-C22
S	254SMO
D	Duplex
9	Low Temp C. steel
1	Bronze
K	Super Duplex
7	Monel
A	Alloy-20
C	Hasteloy-C276

Ends material (12) [R]	
6	S. SteelCF8M/CF3M
4	C. steel
W	Hasteloy-C22
S	254SMO
D	Duplex
9	Low Temp C. steel
1	Bronze
K	Super Duplex
7	Monel
A	Alloy-20
C	Hasteloy-C276

Ball material (13)	
6*	S. SteelCF8M/CF3M
W**	Hasteloy-C22
S**	254SMO
D**	Duplex
K**	Super Duplex
7**	Monel
A**	Alloy-20
C**	Hasteloy-C276

\* V-port must use St. St.  
St. St. is optional for V-ball  
\*\* V-ball only

Stem Material (14)	
M	High Strength S. Steel
6	S. Steel316L
Z	Inconel 718 B637
W	Alloy-C22 B574
S	254SMO A479
A	Alloy-20 A351 CN7M
D	Duplex A479
K	Super Duplex A479
7	Monel
C	Hasteloy-C276

Seat material (15)	
P	CF PTFE
K	CF PEEK
A	TFM

Inner Seal material (16) [R]	
T	PTFE
G	Expanded graphite
U	UHMWPE
V	Viton
B	NBR

Outer Seal material (17) [R]	
G	Expanded graphite
A	TFM

End connections (19-23) [R]	
Welded	
BW10	Buttweld schd. 10
BW	Buttweld schd. 40
SW	Socket weld
XBW10	Extended buttweld schd. 10
XBW	Extended buttweld schd. 40
XSW	Extended socket weld
BW5	Buttweld schd. 5
BW80	Buttweld schd. 80
BWO	Buttweld tube OD
BWD	Buttweld DIN 11850
BWI	buttweld ISO
SWO	Socket weld tube OD
ETO	Extended tube OD
ETI	Extended buttweld ISO
ETD	Extended buttweld DIN

Threaded	
NPT	ASME B1.20.1 - National Pipe Taper thread
BSPT	EN 10226 - Pipe Taper thread
BSPP	ISO228-1, DIN3852 - Pipe Parallel thread
DIN3852	DIN3852 - Pipe Parallel thread
AS5202	SAE internal straight thread
MNPT	Male NPT
MBSPT	Male BSPT

Flanged	
150	ASME B16.5 #150 RF
300	ASME B16.5 #300 RF
600	ASME B16.5 #600 RF
900	ASME B16.5 #900 RF - up to 1-1/4" only
PN16	EN1092 PN16 RF
PN40	EN1092 PN40 RF
PN64	EN1092 PN64 RF
PN100	EN1092 PN100 RF
PN160	EN1092 PN160 RF

Clamp	
LL	Compression fitting (Imperial)
LM	Compression fitting (metric)
TC	Tri-Clamp
GR	Grayloc® compatible hub (Grayloc® is a registered trademark of Grayloc Products, L.L.C.)

Control Feature (24-28)	
V-Port	
S08*	0.8mm Slot on downstream seat
S16*	1.6mm Slot on downstream seat
S32*	3.2mm Slot on downstream seat
V30	V30° Shape on downstream seat
V60	V60° Shape on downstream seat
V90	V90° Shape on downstream seat

\* Up to 1"

V-Ball	
SB08*	0.8mm Slot on ball
SB16*	1.6mm Slot on ball
SB32*	3.2mm Slot on ball
VB30	V30° Shape on ball
VB60	V60° Shape on ball
VB90	V90° Shape on ball

\* Up to 1"

Ball/Down stream Seat Surface hardening	
PN*	Low Temperature Plasma carboNitriding (Standard)

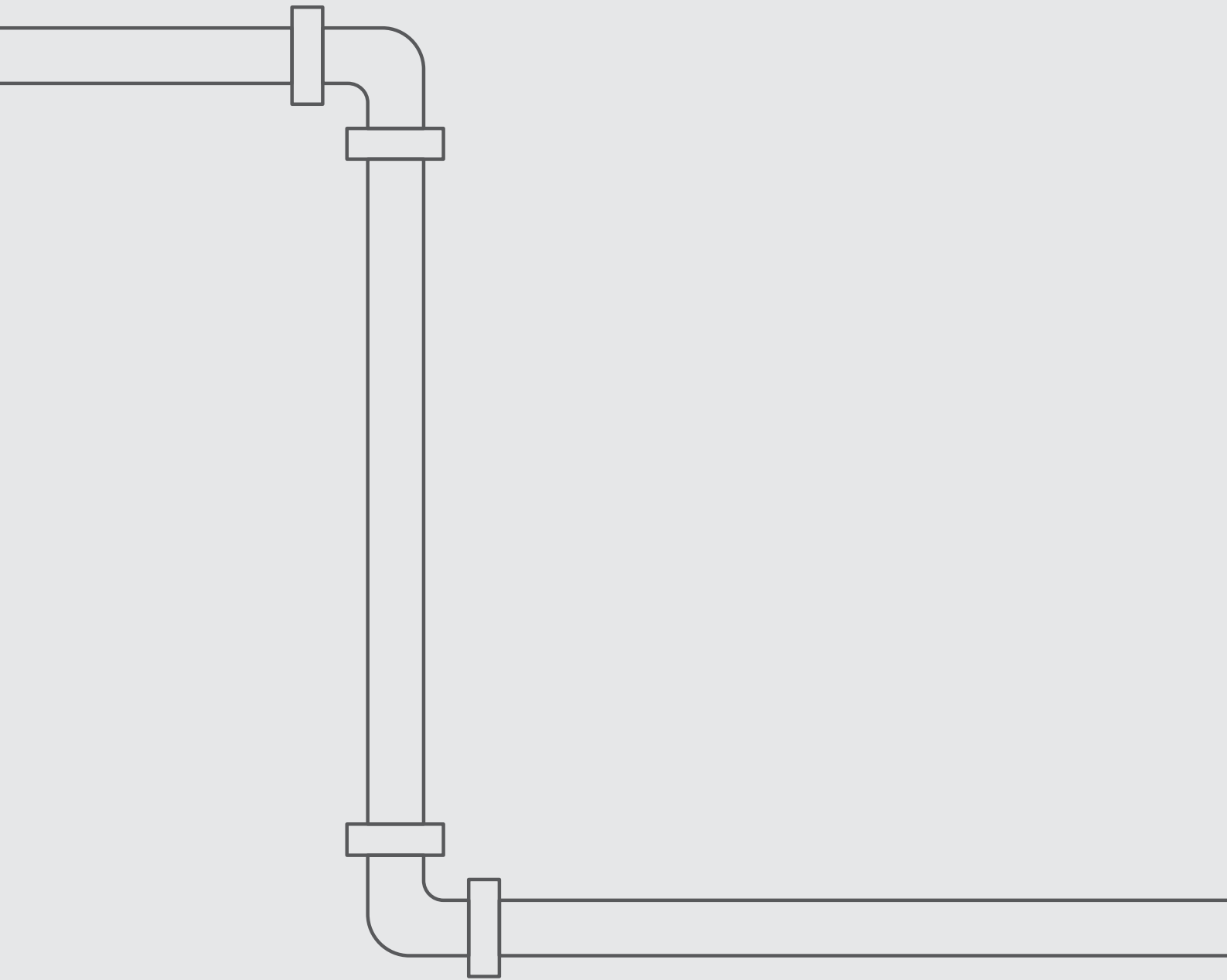
\* Standard option up to 2"

Hardening	
I*	Cr3C2 - Chromium Carbide with Nickel Chrome binder - HVOF technique
O	WC-Co - Tungsten Carbide with Cobalt binder - HVOF technique

\* Standard option for 2-1/2" and up

Special Features (30-...) [R]	
SRS	Self Relief Seat
B	Body made from barstock
EP	Electropolished
J2N05	Jacketed valve - number of ports(2), type(NPT) and size(1/2")
Valve Special Stem Seals	
LAX	FDA Compliant, Stem seal, Virgin Peek thrust and TFM, X shape, gasket
HC	High Cycle service
HYD	Hydrogen

[R]:  
 • For Cryogenic CNxx valve see options in Cryogenic chapter.  
 • For High Temp. (MTM) ZNxx valve see options in High Temp. (MTM) chapter.





N31

N32

N73

N74

N77

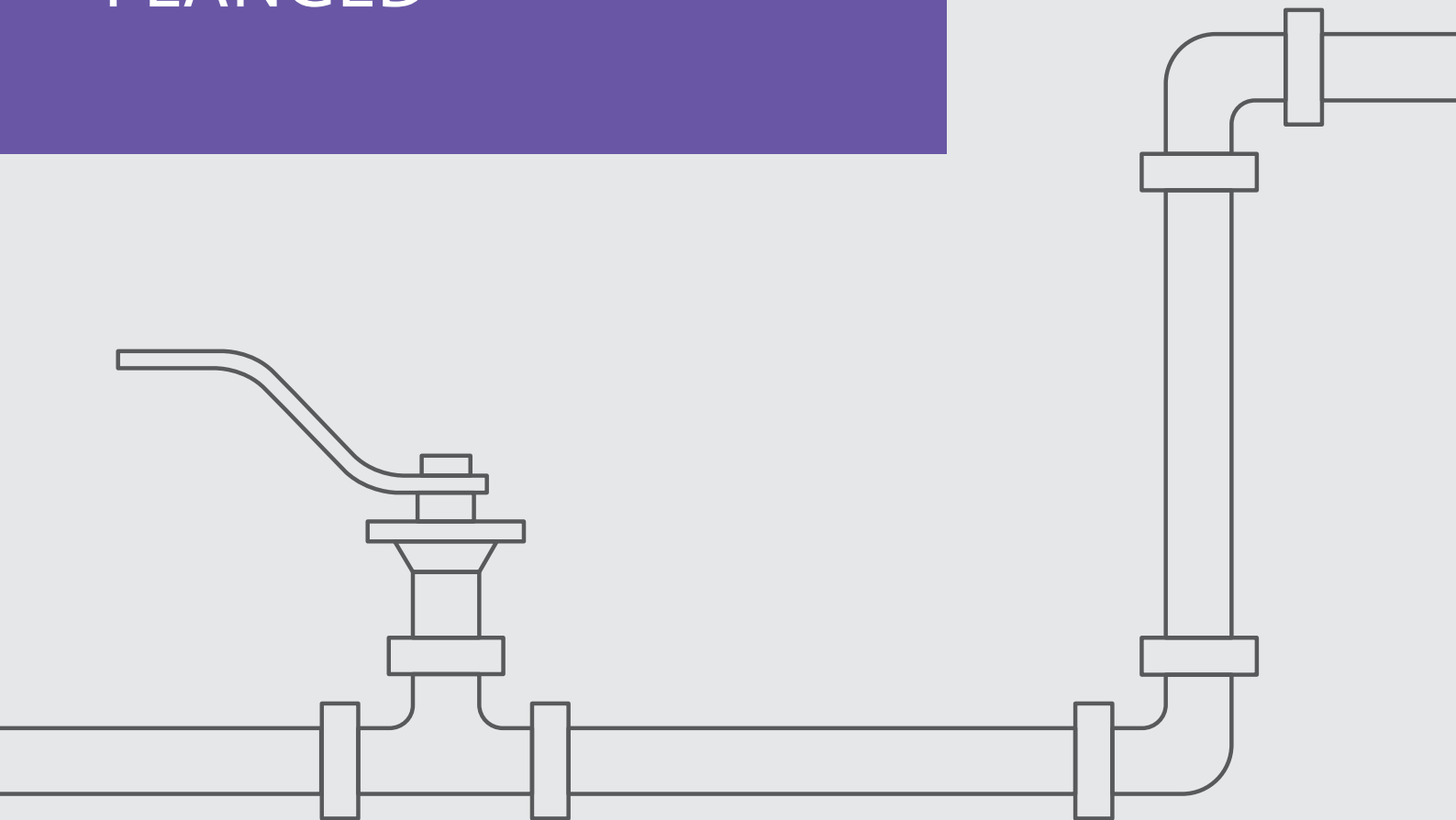
N78



Control Valves

# FLOATING BALL

FLANGED



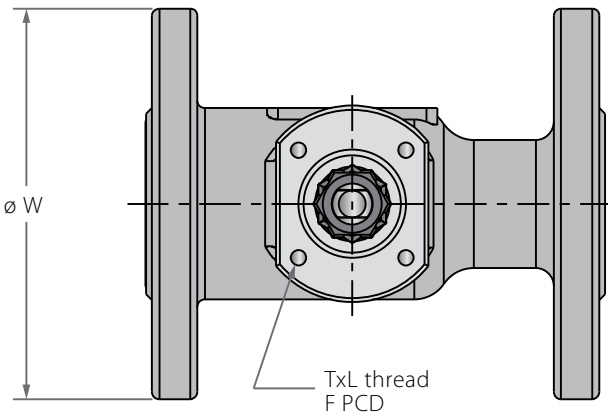
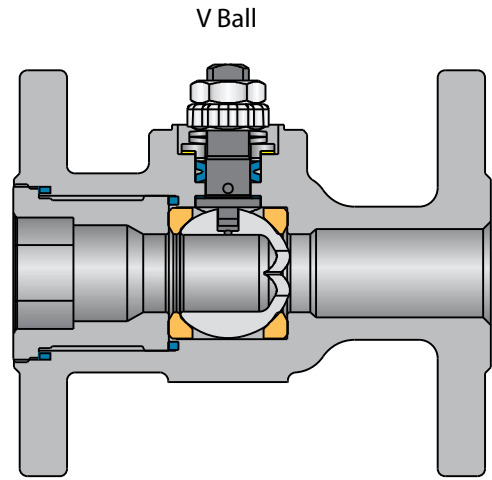
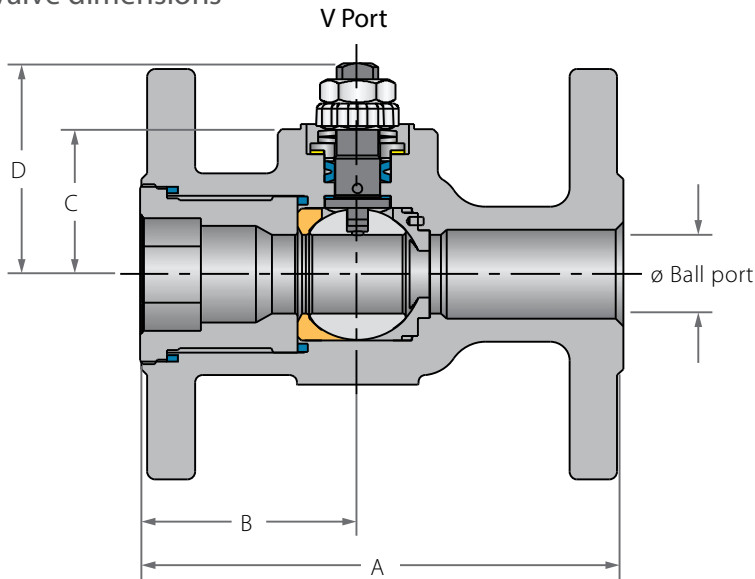
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N32

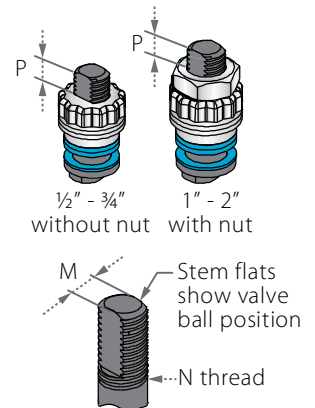
1/2"-2" | DN15-DN50 | ANSI CLASS 150/300

## Control Flanged Floating Ball

### Valve dimensions



### Preparation for actuation

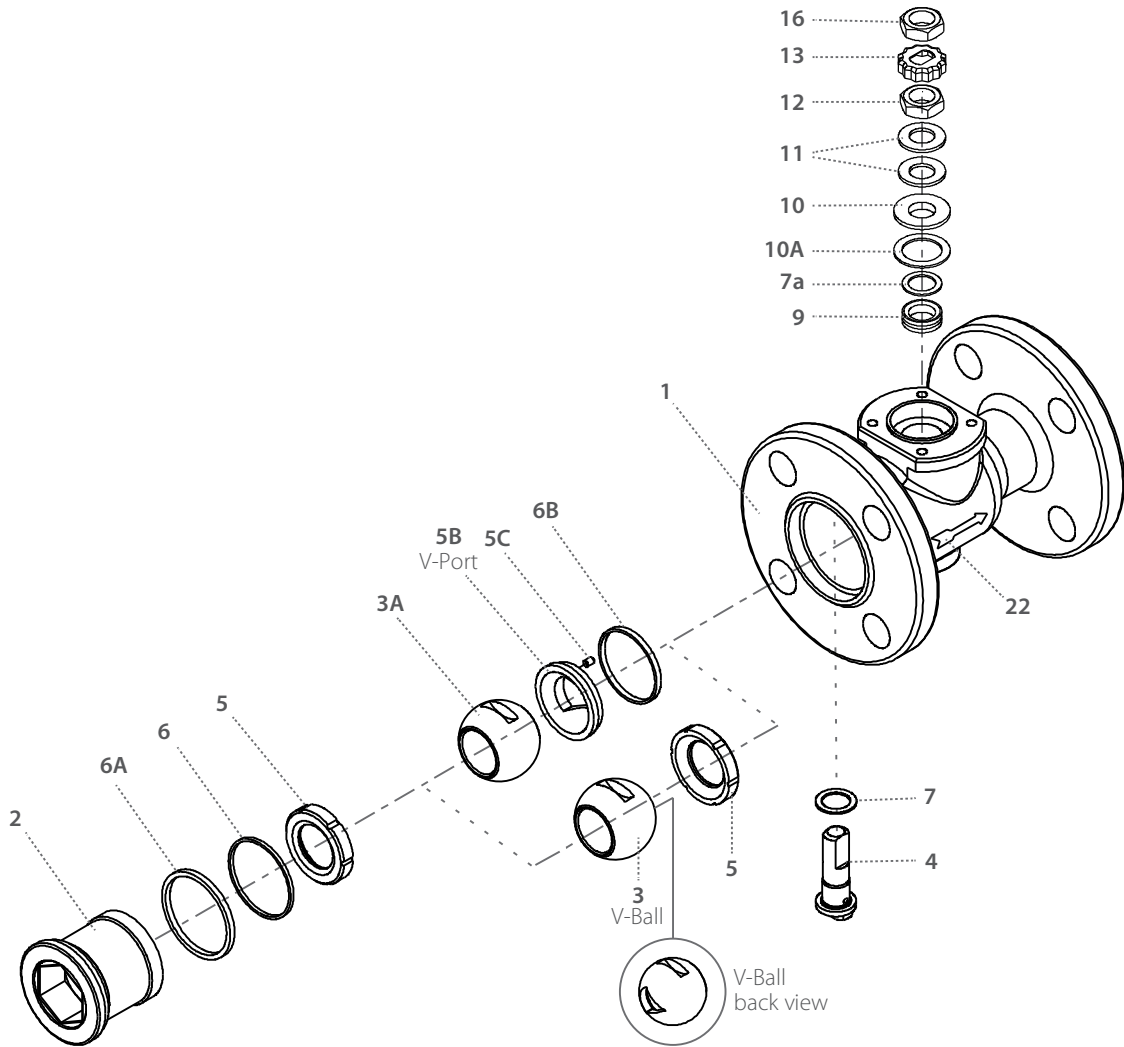


Std. port	Unit	Ball port	A		B	C	D	W		M	N	P	F	TxL	Weight kg/lb	
			150	300				150	300						150	300
DN15	mm	11.15	108.00	140.00	46.00	29.00	38.00	88.90	95.25	5.54	3/8" UNF	6.65 (F03)	36.00	M5x10	1.70	2.40
1/2"	inch	0.44	4.25	5.50	1.81	1.14	1.50	3.50	3.75	0.22	3/8" UNF	0.26	1.42	M5x10	3.80	5.30
DN20	mm	14.30	117.00	152.00	49.00	31.40	40.30	98.55	163.07	5.54	3/8" UNF	6.65 (F03)	36.00	M5x10	2.30	3.30
3/4"	inch	0.56	4.61	6.00	1.93	1.24	1.59	3.88	6.42	0.22	3/8" UNF	0.26	1.42	M5x10	5.10	7.30
DN25	mm	20.60	127.00	165.00	57.00	38.20	55.60	107.95	123.95	7.54	7/16" UNF	7.40 (F04)	42.00	M5x10	3.10	4.60
1"	inch	0.81	5.00	6.50	2.25	1.50	2.19	4.25	4.88	0.30	7/16" UNF	0.29	1.65	M5x10	7.30	10.20
DN40	mm	31.80	165.00	190.00	62.00	43.60	73.10	127.00	155.52	8.71	1/2" UNF	8.50 (F05)	50.00	M6x12	5.50	8.70
1 1/2"	inch	1.25	6.50	7.50	2.44	1.72	2.88	5.00	6.10	0.34	1/2" UNF	0.33	1.97	M6x12	12.20	19.30
DN50	mm	38.20	178.00	216.00	68.00	48.30	77.80	152.40	165.10	8.71	9/16" UNF	8.50 (F05)	50.00	M6x12	8.10	10.80
2"	inch	1.50	7.00	8.50	2.67	1.90	3.06	6.00	6.50	0.34	9/16" UNF	0.33	1.97	M6x12	18.00	24.00



# Control Flanged Floating Ball

## Valve dimensions



Item	Description	Material specification	Qty.
1	Body	Acc. Ordering Code	1
2	Plug	Acc. Ordering Code	1
3	V ball	Acc. Ordering Code	1
3A	Ball	Acc. Ordering Code	1
4	Stem	Acc. Ordering Code	1
5*	Seat	Acc. Ordering Code	1-2
5B	V seat	Acc. Ordering Code	1
5C	Dowel Pin	S. Steel	1
6*	Body seal	PTFE	1
6a*	Outer Seal	Acc. Ordering Code	1
6B*	Seat seal	Acc. Ordering Code	1
7*	Stem thrust seal	PEEK, CF PEEK, PCTFE	1

Item	Description	Material specification	Qty.
7a*	Anti-abrasion ring	PEEK, CF PEEK, PCTFE	1
9*	Stem seal	CF PTFE, TFM	1
10	Follower	S. Steel	1
10A*	Slide bearing	S. Steel	1
11	Disc spring	S. Steel	2
12	Stem nut	S. Steel	1
13	Locking clip	S. Steel	1
16	Handle nut	S. Steel	1
22		S. Steel	1
23	Tag (not shown)	S. Steel	1

\* Repair kit components

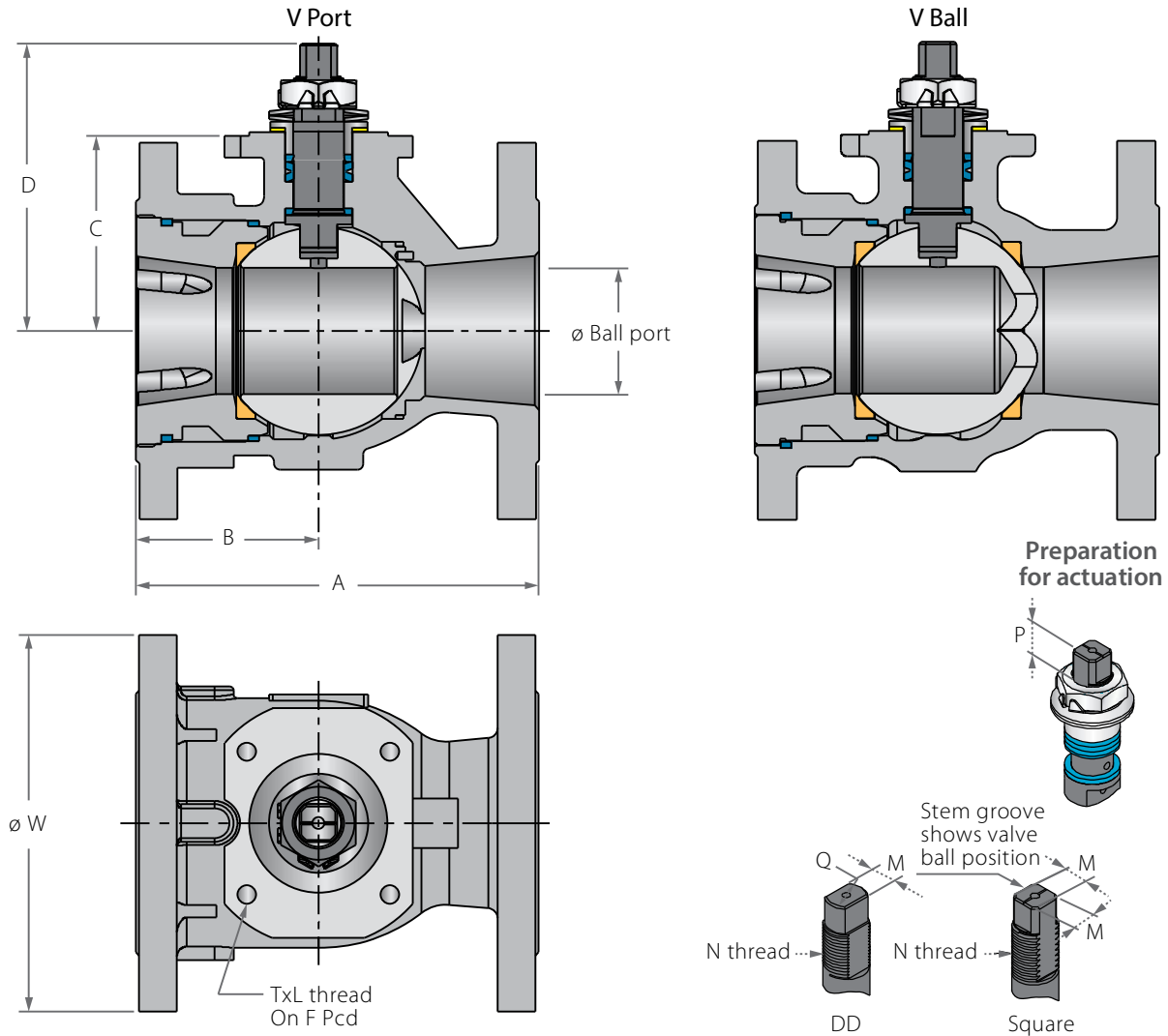
N31

N32

3"-8" | DN80-DN200 | ANSI CLASS 150/300

## Control Flanged Floating Ball

### Valve dimensions

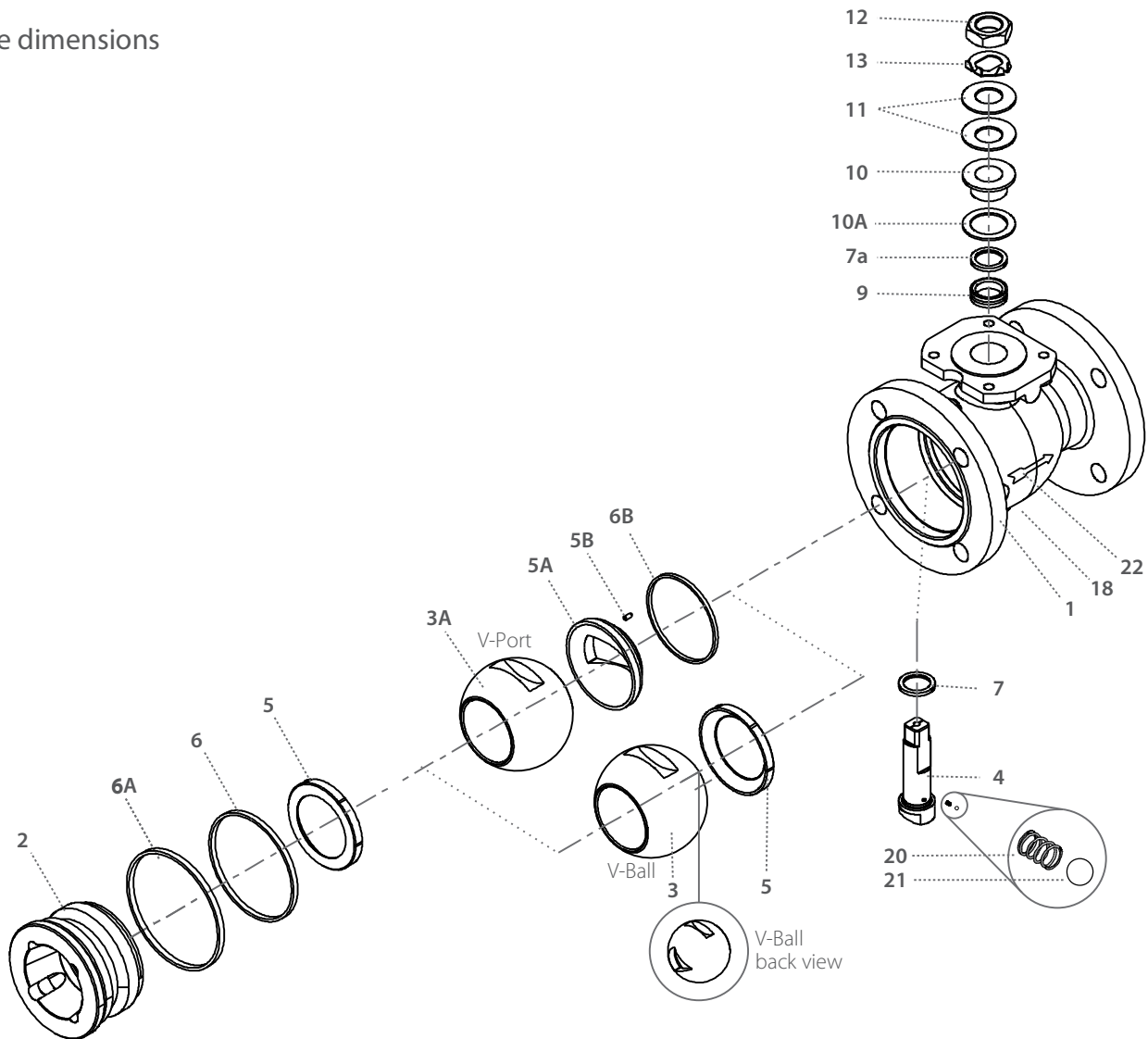


Std. port	Unit	Ball port	A		B	C	D	W		M	N	P	Q	F	TxL	Weight kg/lb		
			150	300				150	300							150	300	
DN80	mm	63.50	203.00	284.00	92.00	98.40	145.00	190.50	209.55	18.90	1"-14	16.70	22.70	(F10)	102.00	M10x20	18.00	22.70
3"	inch	2.50	8.00	11.18	3.62	3.88	5.72	7.50	8.25	0.74	UNS-2A	0.66	0.89		4.02		40.00	50.40
DN100	mm	82.60	229.00	305.00	102.00	114.10	161.00	228.60	254.00	18.90	1"-14	16.70	22.70	(F10)	102.00	M10x20	28.20	36.30
4"	inch	3.25	9.00	12.00	4.00	4.49	6.34	9.00	10.00	0.74	UNS-2A	0.66	0.89		4.02		62.80	80.60
DN150	mm	111.10	267.00	403.20	108.00	157.40	226.00	279.40	317.50	28.45	1½"-12	26.20	35.20	(F12)	125.00	M12x20	41.00	69.00
6"	inch	4.38	10.50	15.88	4.25	6.20	8.91	11.00	12.50	1.12	UNF-2A	1.03	1.39		4.92		91.00	153.00
DN200	mm	144.40	292.00	419.00	163.50	185.20	254.00	342.90	381.00	28.45	1½"-12	26.20	35.20	(F12)	125.00	M12x20	82.00	105.00
8"	inch	5.68	11.50	16.50	5.37	7.30	10.00	13.50	15.00	1.12	UNF-2A	1.03	1.39		4.92		182.00	233.00



# Control Flanged Floating Ball

## Valve dimensions



Item	Description	Material specification	Qty.
1	Body	Acc. Ordering Code	1
2	Plug	Acc. Ordering Code	1
3	V ball	Acc. Ordering Code	1
3A	Ball	Acc. Ordering Code	1
4	Stem	Acc. Ordering Code	1
5*	Seat	Acc. Ordering Code	1-2
5A	V seat	A479 316L	1
5B	Dowel Pin	Acc. Ordering Code	1
6*	Body seal	PTFE	1
6A*	Outer seal	Acc. Ordering Code	1
6B*	Seat seal	Acc. Ordering Code	1

Item	Description	Material specification	Qty.
7*	Stem thrust seal	PEEK, CF PEEK, PCTFE	1
7a*	Anti-abrasion ring	PEEK, CF PEEK, PCTFE	1
9*	Stem seal	CF PTFE, TFM	1
10	Follower	S. Steel	1
10A*	Slide bearing	S. Steel	1
11	Disc spring	S. Steel	2
12	Stem nut	S. Steel	1
13	Tab lock washer	S. Steel	1
22	Arrow flow	S. Steel	1
23	Tag (not shown)	S. Steel	1

\* Repair kit components

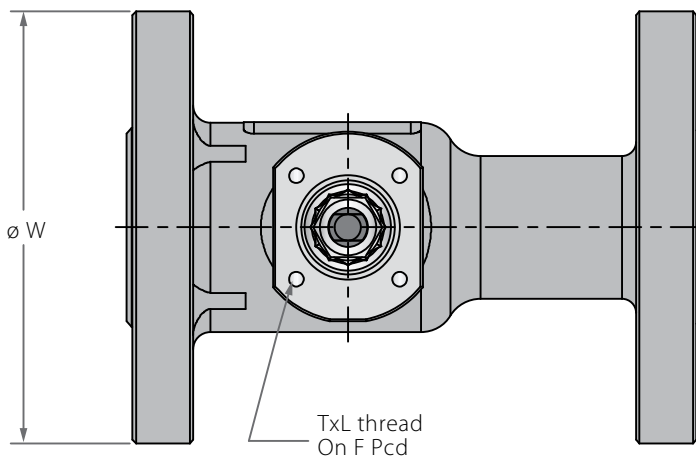
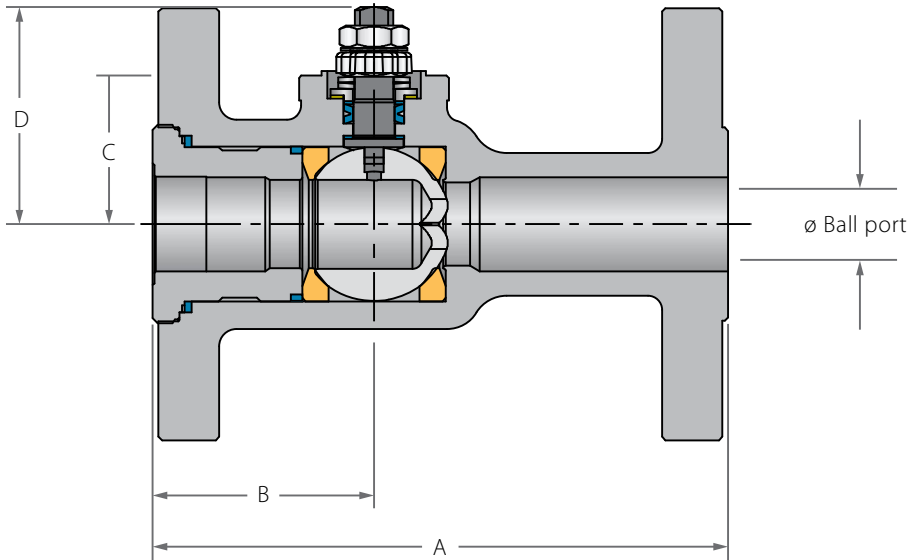
N73

N74

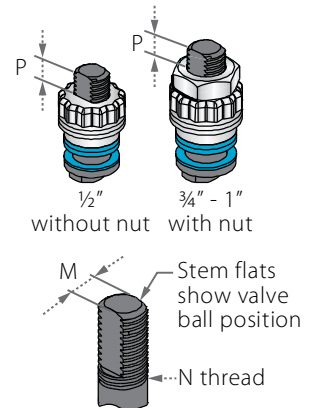
1/2"-1" | DN15-DN25 | ANSI CLASS 150/300

## Control Flanged Floating Ball

### Valve dimensions



### Preparation for actuation

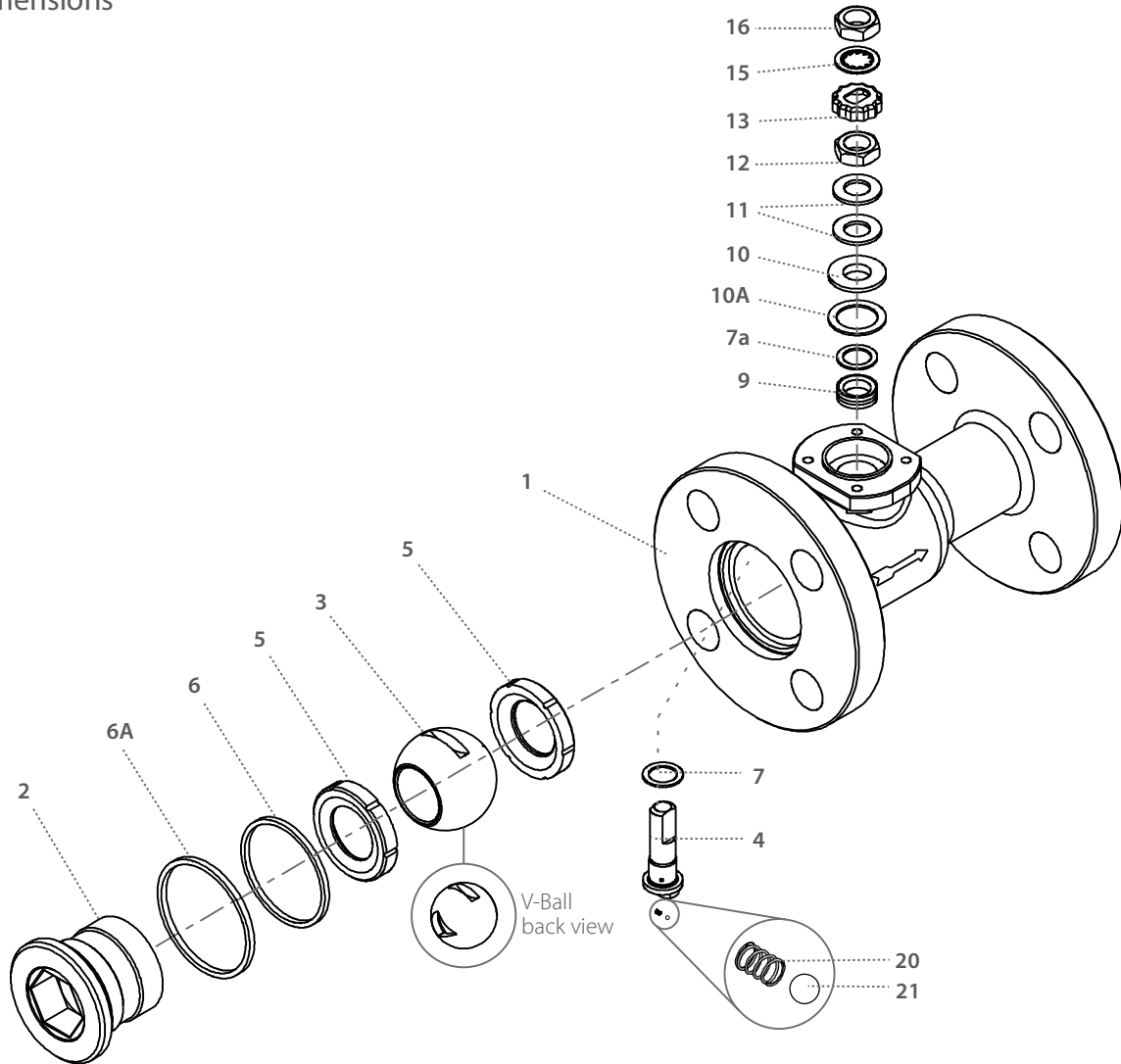


Std. port	Unit	Ball port	A		B	C	D	W		M	N	P	F	TxL	Weight kg/lb		
			150	300				150	300						150	300	
DN15	mm	14.30	108.00	140.00	47.00	31.40	40.50	89.00	95.00	5.54	3/8" UNF	11.10	(F03)	36.00	M5x10	1.80	2.30
1/2"	inch	0.56	4.25	5.51	1.85	1.24	1.59	3.50	3.74	0.22		0.44		1.42	M5x10	4.00	5.10
DN20	mm	20.60	117.00	152.00	57.00	38.20	55.60	98.00	117.00	7.54	1/2" UNF	15.40	(F04)	42.00	M5x10	2.20	3.30
3/4"	inch	0.81	4.61	5.98	2.24	1.50	2.19	3.86	4.61	0.30		0.61		1.65	M5x10	4.80	7.30
DN25	mm	25.40	127.00	165.00	62.00	42.70	60.30	108.00	124.00	7.54	3/4" UNF	15.40	(F04)	42.00	M5x10	3.20	4.60
1"	inch	1.00	5.00	6.50	2.44	1.68	2.37	4.25	4.88	0.30		0.61		1.65	M5x10	7.00	10.10



# Control Flanged Floating Ball

## Valve dimensions



Item	Description	Material specification	Qty.
1	Body	Acc. Ordering Code	1
2	Insert	Acc. Ordering Code	1
3	V-Ball	Acc. Ordering Code	1
4	Stem	Acc. Ordering Code	1
5*	Seat	Acc. Ordering Code	2
6*	Body seal	PTFE	1
6A*	Outer seal	Acc. Ordering Code	1
7*	Stem thrust seal	CF PEEK, PCTFE, CF PTFE	1
7a*	Anti-abrasion ring	CF PEEK, PCTFE, CF PTFE	1
9*	Stem seal	CF PTFE, TFM	1
10	Follower	S. Steel	1

Item	Description	Material specification	Qty.
10A*	Slide bearing	S. Steel	1
11	Disc spring	S. Steel	2
12	Stem nut	S. Steel	1
13	Locking clip	S. Steel	1
15	Serrated washer	S. Steel	1
16	Handle nut	S. Steel	1
20	Anti-static spring	S. Steel	1
21	Anti-static plunger	S. Steel	1
22	Arrow Flow	S. Steel	1
23	Tag (not shown)	S. Steel	1

\* Standard items supplied in repair kits

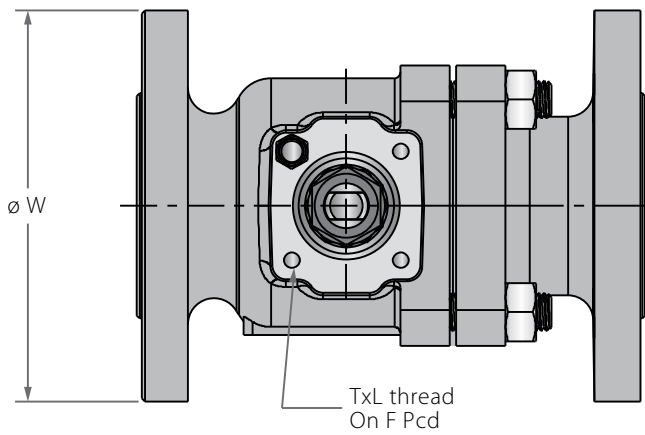
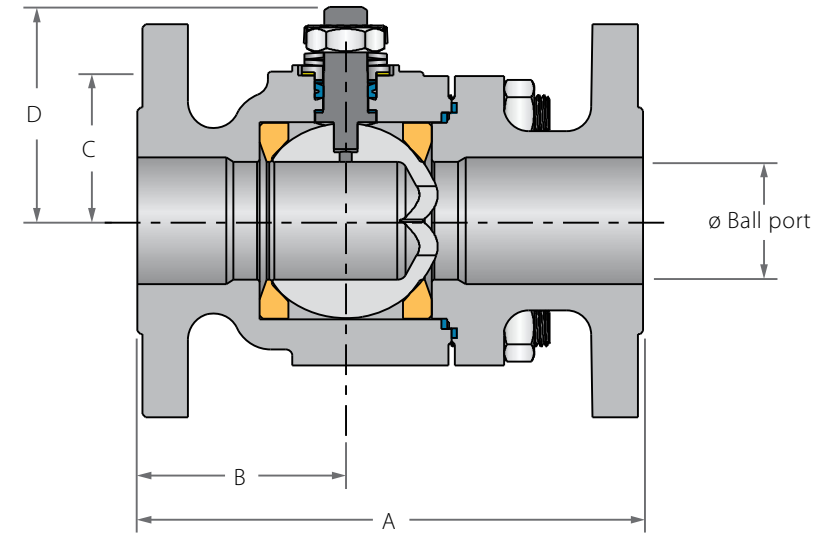
N73

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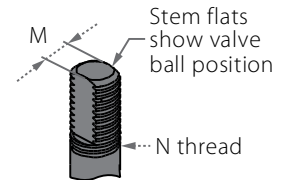
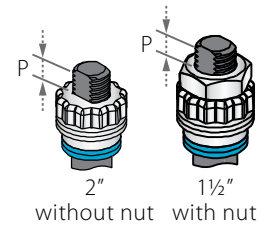
1½"-2" | DN40-DN50 | ANSI CLASS 150/300

# Control Flanged Floating Ball

## Valve dimensions



### Preparation for actuation



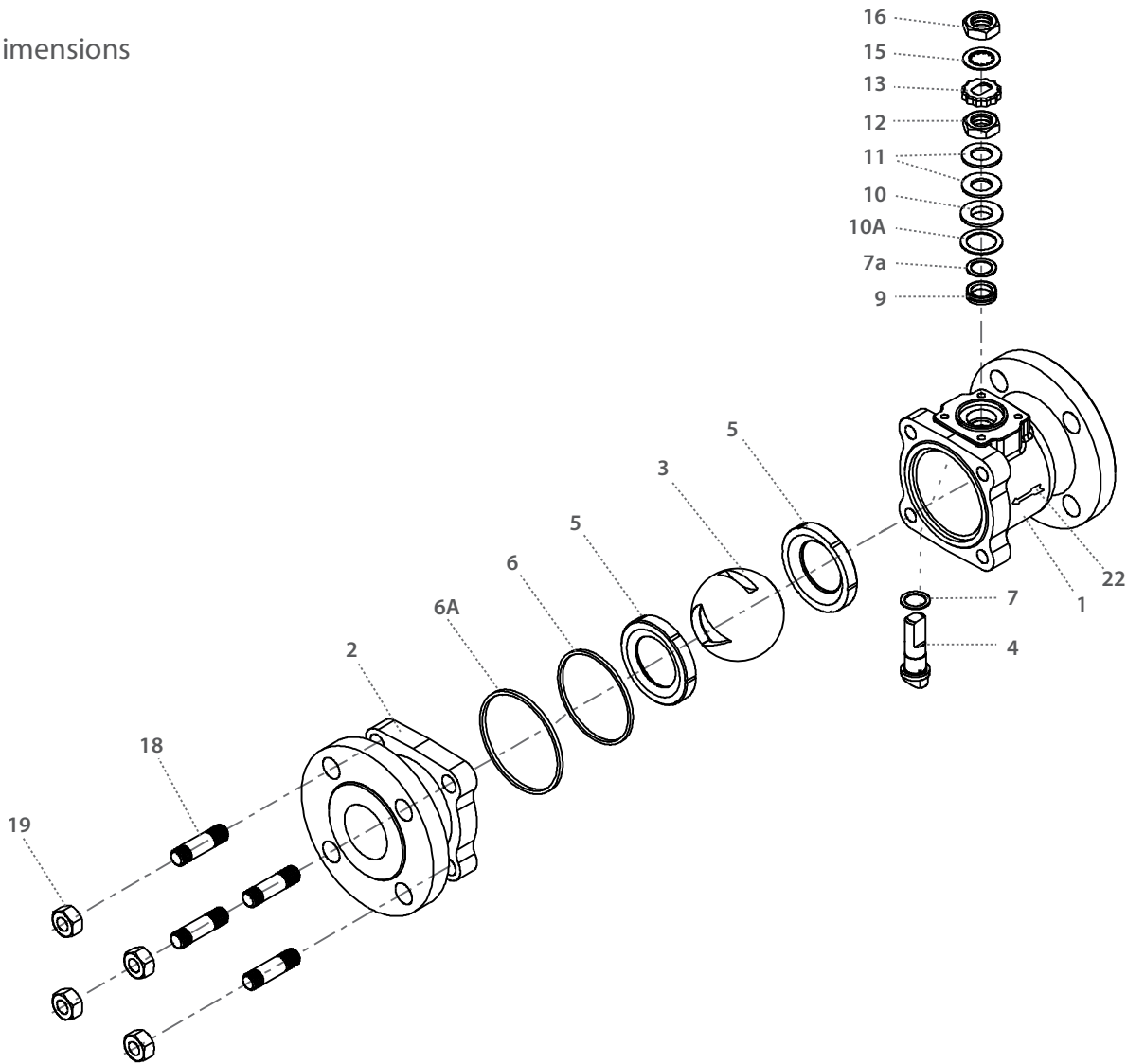
Std. port	Unit	Ball port	A		B		C	D	W		M	N	P	F	TxL	Weight kg/lb	
			150	300	150	300			150	300						150	300
DN15	mm	38.10	165.00	190.00	97.00	110.00	48.30	77.80	127.00	156.00	8.71	½" UNF	8.50 (F05)	50.00	M6x12	6.60	10
1½"	inch	1.50	6.50	7.50	3.82	4.33	1.90	3.06	5.00	6.14	0.34		0.33	1.97		14.50	22
DN50	mm	50.00	178.00	216.00	109.00	141.00	70.00	88.00	152.00	165.00	8.71	¼" UNF	13.50 (F07)	70.00	M8x12	13.00	15
2"	inch	2.00	7.00	8.50	4.29	5.55	2.75	3.46	5.98	6.50	0.34		0.53	2.76		28.60	33





# Control Flanged Floating Ball

## Valve dimensions



Item	Description	Material specification	Qty.
1	Body	Acc. Ordering Code	1
2	End	Acc. Ordering Code	1
3	V-Ball	Acc. Ordering Code	1
4	Stem	Acc. Ordering Code	1
5*	Seat	Acc. Ordering Code	2
6*	Body seal	PTFE	1
6A*	Outer seal	Acc. Ordering Code	1
7*	Stem thrust seal	CF PEEK, PCTFE, CF PTFE	1
7a*	Anti-abrasion ring	CF PEEK, PCTFE, CF PTFE	1
9*	Stem seal	CF PTFE, TFM	1
10	Follower	S. Steel	1
10a	Slide bearing	S. Steel	1

Item	Description	Material specification	Qty.
11	Disc spring	S. Steel	2
12	Stem nut	S. Steel	1
13	Locking clip	S. Steel	1
16	Handle nut	S. Steel	1
18	Studs	S. Steel	4
19	Body nuts	S. Steel	4
20	Anti-static spring	S. Steel	1
21	Anti-static plunger	S. Steel	1
22		S. Steel	1
23	Tag (not shown)	S. Steel	1

\* Standard items supplied in repair kits

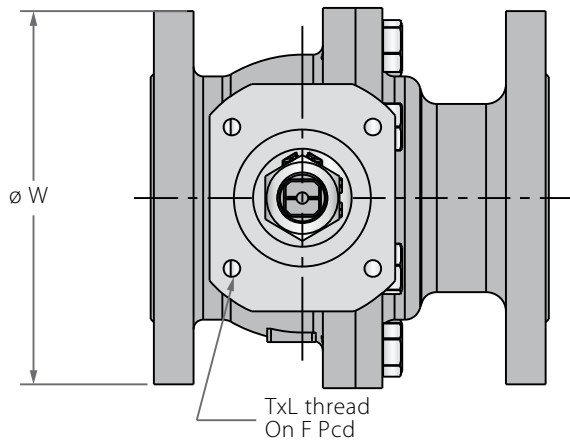
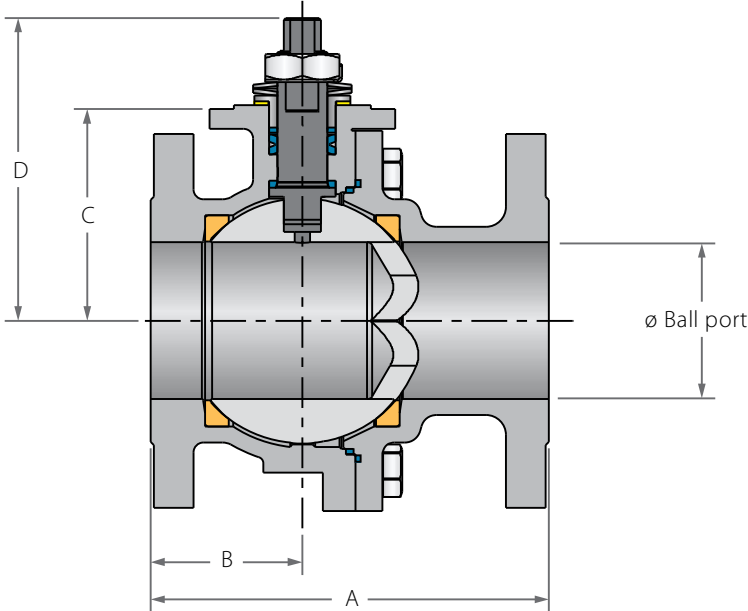
N73

N74

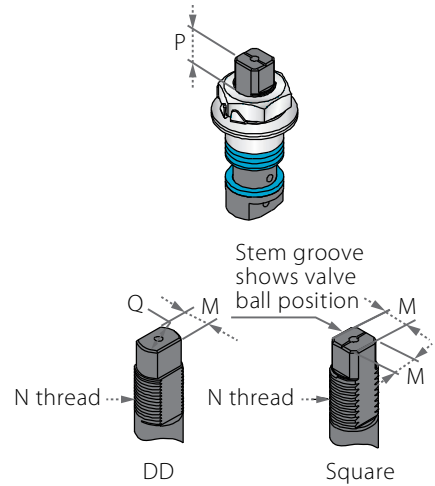
3"-8" | DN80-DN200 | ANSI CLASS 150/300

## Control Flanged Floating Ball

### Valve dimensions



### Preparation for actuation

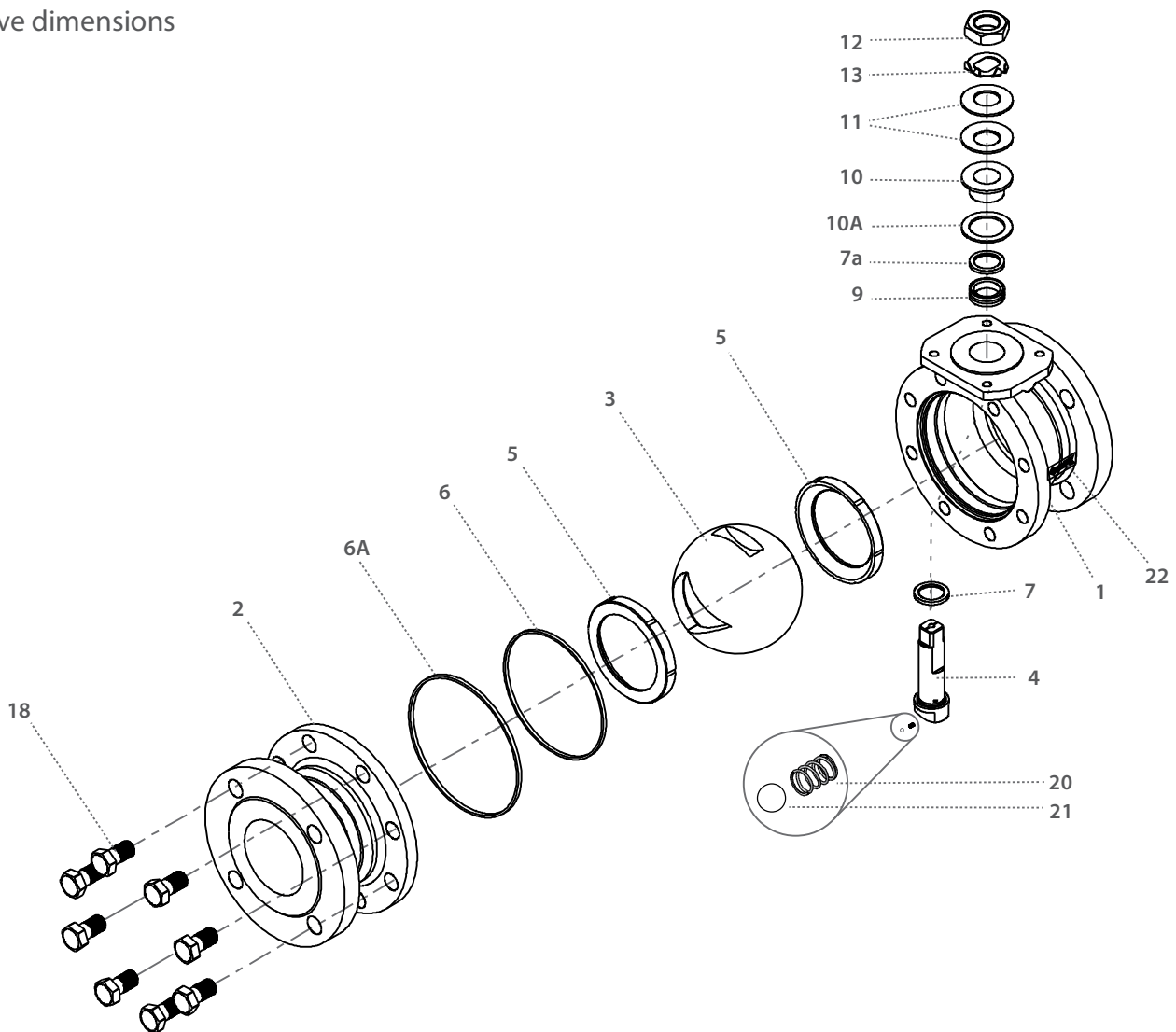


Std. port	Unit	Ball port	A		B		C	D	H	S	W		M	M-DO	N	P	Q	F	TxL	Weight kg/lb		
			150	300	150	300					150	300								150	300	150
DN80	mm	80.00	203.00	283.00	126.00	185.00	108.00	154.60	194.80	400.00	191.00	210.00	18.90	15.90	1"-14	16.70	22.70	(F10)	102.00	M10x20	26	29
3"	inch	3.25	8.00	11.14	4.96	7.28	4.25	6.08	7.67	15.75	7.52	8.27	0.74	0.63	UNF-2A	0.66	0.89		4.02		57	64
DN100	mm	100.00	229.00	305.00	144.00	200.00	124.00	170.60	211.00	610.00	230.00	254.00	18.90	15.90	1"-14	16.70	22.70	(F10)	102.00	M10x20	34	39
4"	inch	3.94	9.00	12.01	5.67	7.87	4.88	6.71	8.31	24.00	9.06	10.00	0.74	0.63	UNF-2A	0.66	0.89		4.02		75	86
DN150	mm	150.00	394.00	403.00	230.00	229.00	179.00	248.50	308.00	916.00	328.00	328.00	28.45	23.75	1½"-12	26.20	35.20	(F12)	125.00	M12x20	71	78
6"	inch	5.91	15.51	15.87	9.06	9.02	7.05	9.78	12.12	36.00	12.91	12.91	1.12	0.94	UNF-1A	1.03	1.39		4.92		156	172
DN200	mm	200.00	457.20	403.50	215.00	261.00	241.00	353.70	-	-	450.00	450.00	35.92	35.92	2"-8	37.50	46.50	(F14)	140.00	M16x30	190	225
8"	inch	7.87	18.00	15.89	8.46	10.28	9.49	13.93	-	-	17.72	17.72	1.41	1.41	UN-2A	1.48	1.83		5.51		419	496



# Control Flanged Floating Ball

## Valve dimensions



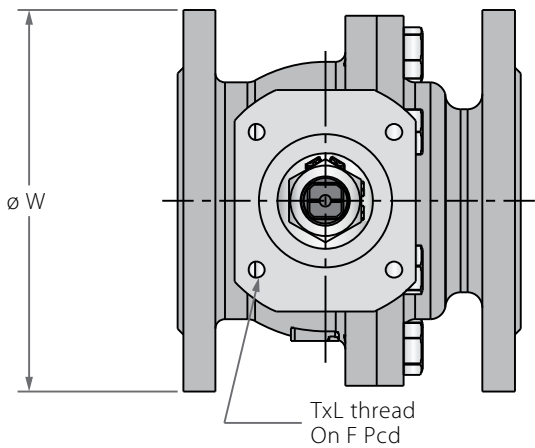
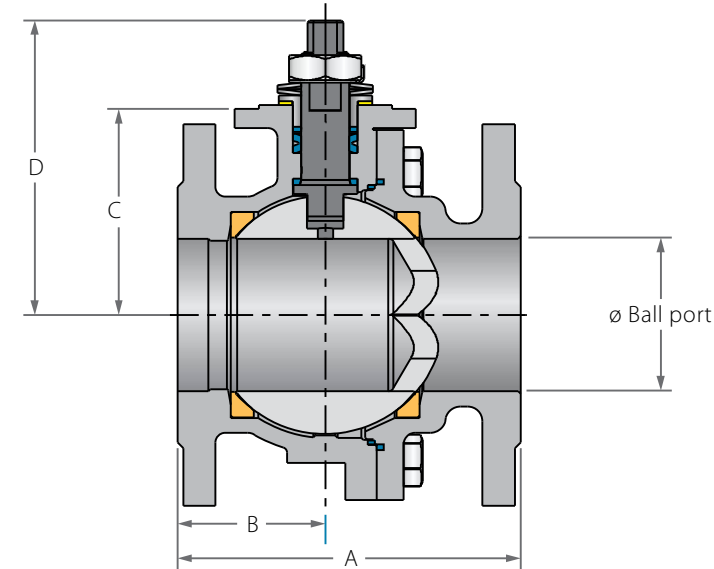
Item	Description	Material specification	Qty.
1	Body	Acc. Ordering Code	1
2	End	Acc. Ordering Code	1
3	V-Ball	Acc. Ordering Code	1
4	Stem	Acc. Ordering Code	1
5*	Seat	Acc. Ordering Code	2
6*	Body seal	PTFE	1
6A*	Outer seal	Acc. Ordering Code	1
7*	Stem thrust seal	CF PEEK, PCTFE, CF PTFE	1
7a*	Anti-abrasion ring	CF PEEK, PCTFE, CF PTFE	1
9*	Stem seal	CF PTFE, TFM	1
10	Follower	S. Steel	1

Item	Description	Material specification	Qty.
10A	Slide bearing	S. Steel	1
11	Disc spring	S. Steel	2
12	Stem nut	S. Steel	1
13	Tab lock washer	S. Steel	1
18	Bolt	S. Steel	8-12
20	Anti-static spring	S. Steel	1
21	Anti-static plunger	S. Steel	1
22		S. Steel	1
23	Tag (not shown)	S. Steel	1

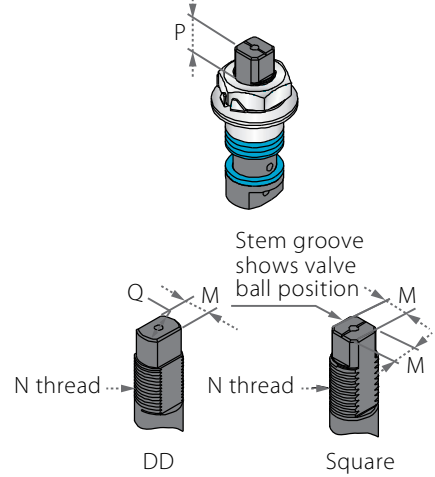
\* Standard items supplied in repair kits

## Control Flanged Floating Ball

### Valve dimensions



### Preparation for actuation

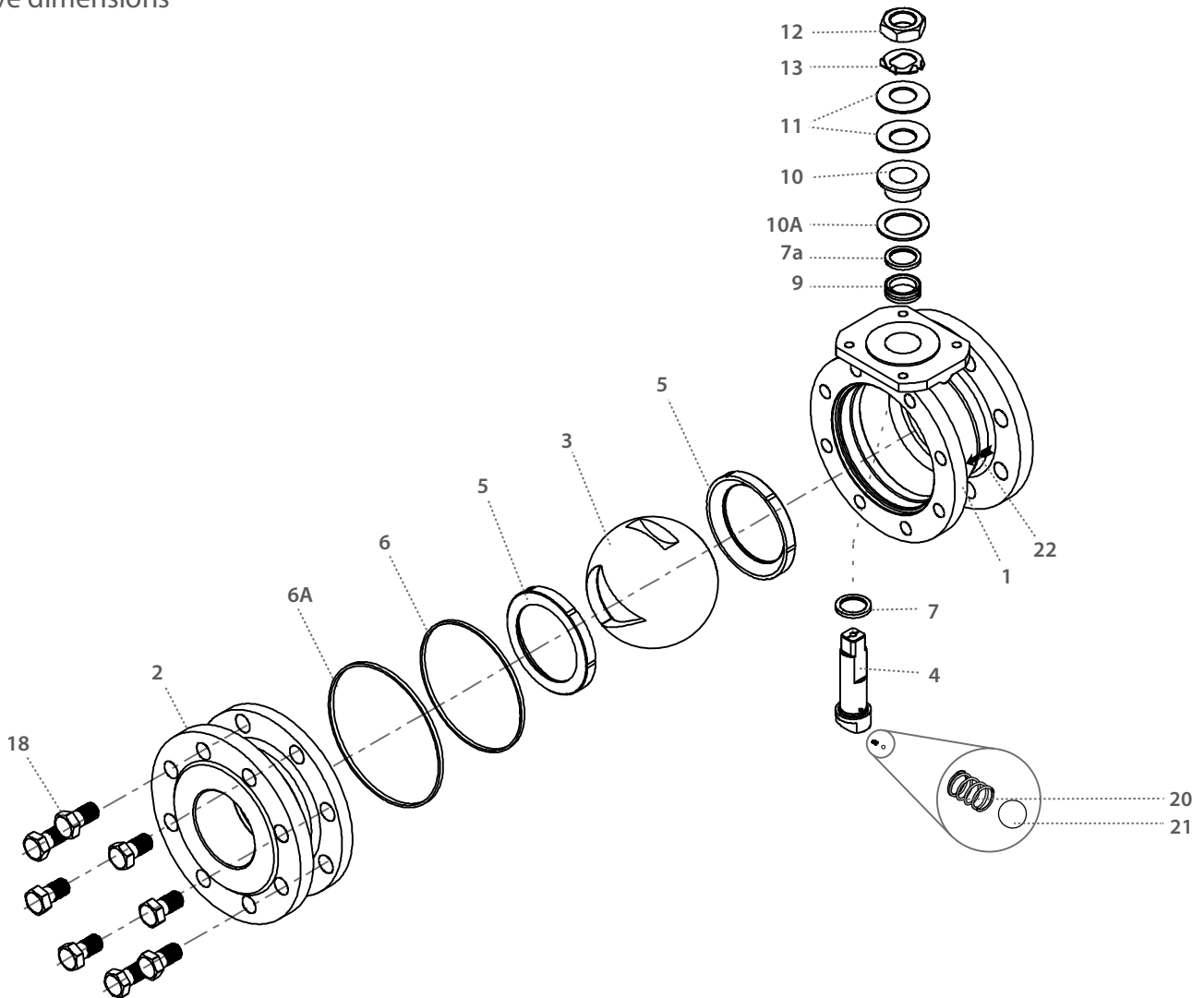


Std. port	Unit	Ball port	A			B	C	D	W	M	N	P	F	TxL	Weight kg/lb			
			F1	F2	F3										F1	F2	F3	
DN80	mm	80.00	310.00	180.00	-	108.00	77.50	162.00	200.00	18.90	M24	22.70	(F10)	102.00	M10x20	26	24	25
3"	inch	3.20	12.20	7.09	-	4.25	3.05	6.40	7.87	0.74		0.89	4.02	57		53	55	
DN100	mm	100.00	350.00	190.00	-	132.00	84.50	186.00	225.00	18.90	M24	22.70	(F10)	102.00	M10x20	34	30	34
4"	inch	3.94	13.78	7.48	-	5.20	3.33	7.32	8.86	0.74		0.89	4.02	75		66	75	
DN150	mm	150.00	-	-	350.00	178.00	163.50	236.00	328.00	28.45	M35	35.20	(F12)	125.00	M12x20	-	-	63
6"	inch	5.91	-	-	13.78	7.01	6.44	9.29	12.91	1.12		1.39	4.92	-		-	139	



## Control Flanged Floating Ball

### Valve dimensions



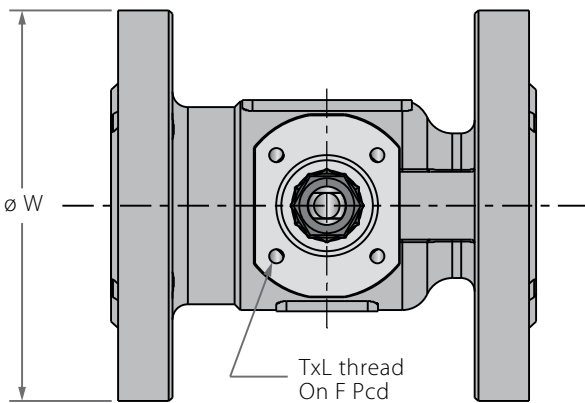
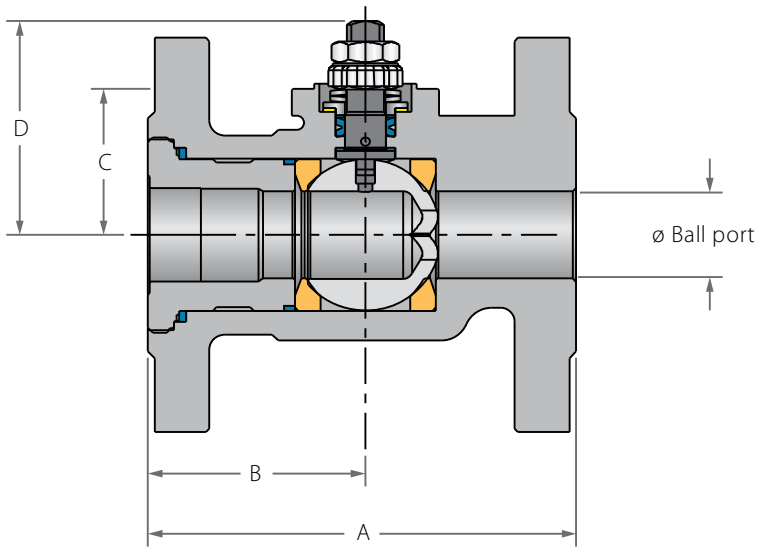
Item	Description	Material specification	Qty.
1	Body	Acc. Ordering Code	1
2	End	Acc. Ordering Code	1
3	V-Ball	Acc. Ordering Code	1
4	Stem	Acc. Ordering Code	1
5*	Seat	Acc. Ordering Code	2
6*	Body seal	PTFE	2
6A*	Outer seal	Acc. Ordering Code	2
7*	Stem thrust seal	PEEK, CF PEEK, PCTFE, CF PTFE	1
7a*	Anti-abrasion ring	PEEK, CF PEEK, PCTFE, CF PTFE	1
9*	Stem seal	CF PTFE, TFM	1
10	Follower	S. Steel	1

Item	Description	Material specification	Qty.
10A	Slide bearing	S. Steel	1
11	Disc spring	S. Steel	2
12	Stem nut	S. Steel	1
13	Tab lock washer	S. Steel	1
18	Body bolts	S. Steel	8-10
20	Anti-static spring	S. Steel	1
21	Anti-static plunger	S. Steel	1
22		S. Steel	1
23	Tag (not shown)	S. Steel	1

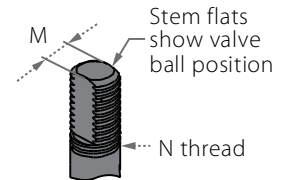
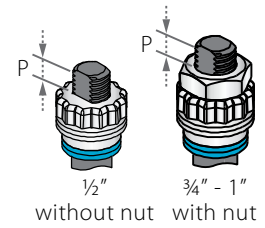
\* Standard items supplied in repair kits

## Control Flanged Floating Ball

### Valve dimensions



#### Preparation for actuation

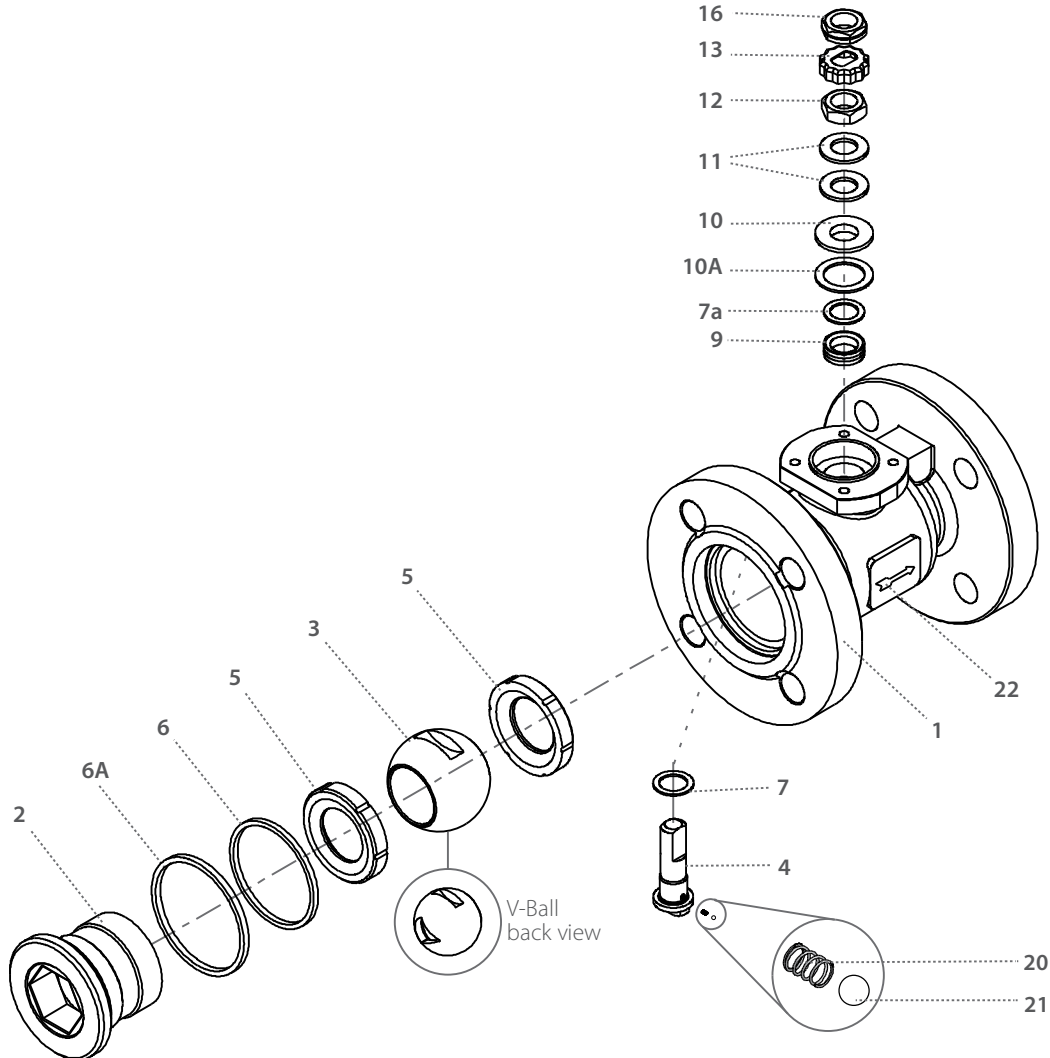


Std. port	Unit	Ball port	A		B	C	D	W	M	N	P	Q	F	TxL	Weight kg/lb		
			F1	F2											F1	F2	
DN15	mm	14.30	130.00	115.00	48.00	31.50	40.50	5.54	5.54	1/2" UNF	6.65	95.00	(F03)	36.00	M5x10	2.2	2.1
1/2"	inch	0.56	5.12	4.53	1.89	1.24	1.59	0.22	0.22		0.26	3.74		1.42		4.80	4.60
DN20	mm	20.60	150.00	120.00	58.00	38.30	56.50	7.54	7.54	3/4" UNF	7.40	105.00	(F04)	42.00	M5x10	3.2	3
3/4"	inch	0.81	5.91	4.72	2.28	1.51	2.22	0.30	0.30		0.29	4.13		1.65		7.00	6.60
DN25	mm	25.40	160.00	125.00	63.50	41.80	61.00	7.54	7.54	7/16" UNF	7.40	115.00	(F04)	42.00	M5x10	4.2	4
1"	inch	1.00	6.30	4.92	2.50	1.65	2.40	0.30	0.30		0.29	4.53		1.65		9.20	8.8



## Control Flanged Floating Ball

### Valve dimensions



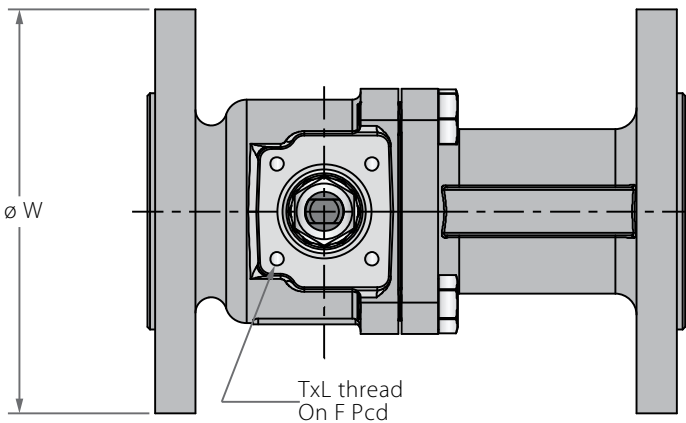
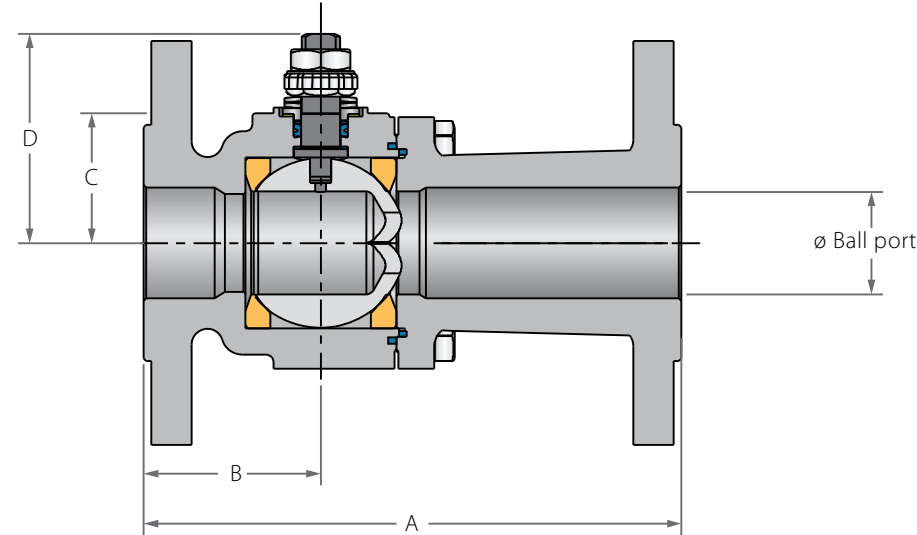
Item	Description	Material specification	Qty.
1	Body	Acc. Ordering Code	1
2	End	Acc. Ordering Code	1
3	Ball	Acc. Ordering Code	1
4	Stem	Acc. Ordering Code	1
5*	Seat	Acc. Ordering Code	2
6*	Body seal	PTFE	1
6A*	Outer seal	Acc. Ordering Code	1
7	Stem thrust seal	CF PEEK, PCTFE, CF PTFE	1
7a*	Anti-abrasion ring	CF PEEK, PCTFE, CF PTFE	1
9*	Stem seal	CF PTFE, TFM	1
10	Follower	S. Steel	1

Item	Description	Material specification	Qty.
10A	Slide bearing	S. Steel	1
11	Disc spring	S. Steel	2
12	Stem nut	S. Steel	1
13	Locking clip	S. Steel	1
16	Handle nut	S. Steel	1
20	Anti-static spring	S. Steel	1
21	Anti-static plunger	S. Steel	1
22	Arrow Flow	S. Steel	2
23	Tag (not shown)	S. Steel	1

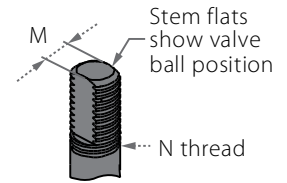
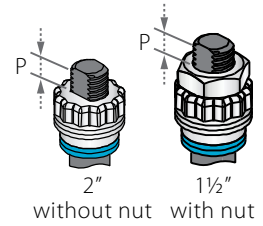
\* Standard items supplied in repair kits

## Control Flanged Floating Ball

### Valve dimensions



### Preparation for actuation



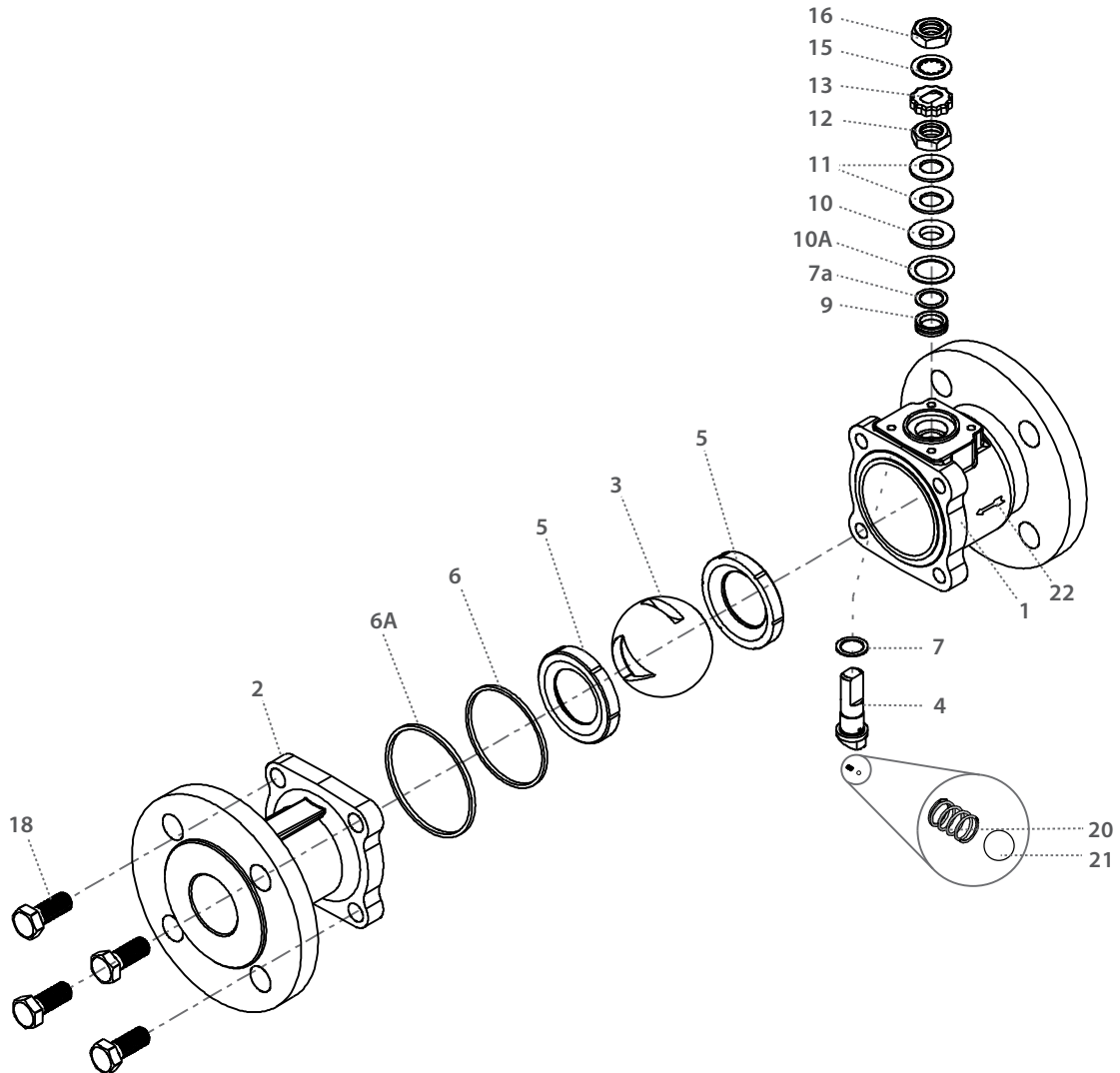
Std. port	Unit	Ball port	A		B	C	D	W	M	N	P	F	TxL	Weight kg/lb		
			F1	F4										F1	F4	
DN40	mm	38.10	200.00	140.00	48.30	65.90	77.80	150.00	8.70	1/8" UNF	19.60	(F05)	50.00	M6x12	10.90	10.30
1½"	inch	1.50	7.87	5.51	1.90	2.59	3.06	5.91	0.34		0.77		1.97			24.00
DN50	mm	50.00	230.00	150.00	78.00	60.70	119.00	165.00	8.70	M16	11.00	(F07)	70.00	M8x12	15.00	13.00
2"	inch	2.00	9.06	5.91	3.07	2.39	4.69	6.50	0.34		0.43		2.76			33.00





## Control Flanged Floating Ball

### Valve dimensions



Item	Description	Material specification	Qty.
1	Body	Acc. Ordering Code	1
2	End	Acc. Ordering Code	1
3	V-Ball	Acc. Ordering Code	1
4	Stem	Acc. Ordering Code	1
5*	Seat	Acc. Ordering Code	2
6*	Body seal	PTFE	1
6A*	Outer seal	Acc. Ordering Code	1
7*	Stem thrust seal	CF PEEK, PCTFE, CF PTFE	1
7a*	Anti-abrasion ring	CF PEEK, PCTFE, CF PTFE	1
9*	Stem seal	CF PTFE, TFM	1
10	Follower	S. Steel	1
10A	Slide bearing	S. Steel	1

Item	Description	Material specification	Qty.
11	Disc spring	S. Steel	2
12	Stem nut	S. Steel	1
13	Locking clip	S. Steel	1
15	Serrated washer	S. Steel	1
16	Handle nut	S. Steel	1
18	Body bolt	S. Steel	4-8
20	Anti-static spring	S. Steel	1
21	Anti-static plunger	S. Steel	1
22	Arrow Flow	S. Steel	2
23	Tag (not shown)	S. Steel	1

\* Standard items supplied in repair kits

N31

N32

N73

N74

N77

N78



## Control Flanged Floating Ball - Ordering Code System

"Mandatory option" options are marked with **green background** | "Standard offer" options are marked with **light green background**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	...	28	29	30
6	0				N	3	1	W	-	6	6	6	6	A	T	G	/	1	5	0		-	S	0	8	-	
Size		Features				Series		Design	Body/end materials			Ball/Stem material		Seat material	Inner Seal	Outer Seal	End Connection				Control Feature			Special features			

Size (1-2)		
Code	inch	mm
05	½"	8
07	¾"	10
10	1"	15
12	1¼"	20
15	1½"	25
20	2"	32
25	2½"	40
30	3"	50
40	4"	65
60	6"	80
80*	8"	100

\* 31/32 series only

Features (3-6)	
N	<b>Control service</b>
F	Fire safe
O	Clean assembly for O2 service
C	Cryogenic [R]
Z	High Temp. (MTM) [R]

Series (7-8)	
31	ANSI #150 std. port
32	ANSI #300 std. port
73	ANSI #150 full port
74	ANSI #300 full port
77	DIN PN 16 full port
78	DIN PN 40 full port

Design (9)	
W	Total HermetiX Integrity package
G	Total HermetiX Integrity package - FDA compliant [R]

Body/Ends material (11-12) [R]	
6*	S. SteelCF8M/CF3M
4**	C. steel
W**	Hasteloy-C22
S**	254SMO
D**	Duplex
9**	Low Temp C. steel
K**	Super Duplex
7**	Monel
A**	Alloy-20
C**	Hasteloy-C276

\* V-port must use St. St.;

St. St. is optional for V-ball

\*\* V-ball only

Ball material (13) [R]	
6	S. SteelCF8M/CF3M
M	High Strength S. Steel
W	Hasteloy-C22
S	254SMO
D	Duplex
1	Bronze
K	Super Duplex
7	Monel
A	Alloy-20
C	Hasteloy-C276

Stem material (14)	
6	S. Steel316L
M	High Strength S. Steel
Z	Inconel 718 B637
W	Alloy-C22 B574
S	254SMO A479
A	Alloy-20 A351 CN7M
D	Duplex A479
K	Super Duplex A479
7	Monel
C	Hasteloy-C276

Seat material (15)	
P	CF PTFE
K	CF PEEK
A	TFM

Inner Seal material (16) [R]	
T	PTFE
A	TFM
G	Expanded graphite
U	UHMWPE
V	Viton
B	NBR [R]

Outer Seal material (17) [R]	
G	Expanded graphite
A	TFM

End connections (19-22)	
Flanged	
150	ASME B16.5 #150 RF
300	ASME B16.5 #300 RF
PN16	EN1092 PN16 RF
PN40	EN1092 PN40 RF

Control Feature (24-28)	
V-Port	
S08*	0.8mm Slot on downstream seat
S16*	1.6mm Slot on downstream seat
S32*	3.2mm Slot on downstream seat
V30	V30 <sup>0</sup> Shape on downstream seat
V60	V60 <sup>0</sup> Shape on downstream seat
V90	V90 <sup>0</sup> Shape on downstream seat

\* Up to 1"

V-Ball	
SB08*	0.8mm Slot on ball
SB16*	1.6mm Slot on ball
SB32*	3.2mm Slot on ball
VB30	V30 <sup>0</sup> Shape on ball
VB60	V60 <sup>0</sup> Shape on ball
VB90	V90 <sup>0</sup> Shape on ball

\* Up to 1"

Ball/Down stream Seat Surface hardening	
PN*	Low Temperature Plasma carboNitriding (Standard)

\* standard up to 2"

Hardening	
I*	Cr3C2 - Chromium Carbide with Nickel Chrome binder - HVOF technique
O	WC-Co - Tungsten Carbide with Cobalt binder - HVOF technique

\* standard from 2-½" and up

Special Features (24-30) [R]	
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[R]:

- For Cryogenic CNxx valve see options in Cryogenic chapter.
- For High Temp. (MTM) ZNxx valve see options in High Tem. (MTM) chapter.