

## Design V260 Ball Control Valve

The Design V260 is a full bore control valve designed from the ground up with features for optimized pressure, flow and process control. An integral drilled attenuator controls noise and vibration from high pressure drop liquids and gases. The splined shaft connection to the actuator reduces lost motion.

The Design V260A with Aerodome attenuator, V260B with Hydrodome attenuator, and V260C Ball Control Valves (figures 1, 2 and 3) combine the efficiency of a rotary valve with the energy-dissipating capability of a special trim to provide improved performance for demanding applications. The valve is available with single, dual, or dual block-and-bleed seal options (see the Specifications table).

The trim design of the Design V260A is used in gas service to reduce noise effects that cause pipeline vibration. The Design V260B provides improved performance for demanding applications such as pump bypass and pipeline take-off. The trim is

designed for liquid service to help eliminate or reduce cavitation and associated pipeline noise and vibration. The Design V260C full-bore ball valve is designed for automated control in bypass, batch, monitor, and emergency shutoff service applications, and it presents little or no restriction to flow.

The Design V260 full-bore ball valve is available with composition seals, and process type stem packing for improved service life.

Unless otherwise noted, all NACE references are to NACE MR0175-2002.

### Note

**Neither Emerson, Emerson Process Management, nor any of their affiliated entities assumes responsibility for the selection, use and maintenance of any product. Responsibility for the selection, use, and maintenance of any product remains with the purchaser and end-user.**



W6539 / IL

Figure 1. Design V260 Valve



## Specifications

### Valve Body Sizes and End Connection Styles

■ 8-, ■ 10-, ■ 12-, ■ 16-, and ■ 20-inch flanged valves with Class 300 and Class 600 raised-face flanges compatible with ASME B16.5. Consult your Emerson Process Management™ sales office for other end style connections.

### Maximum Inlet Pressures and Temperatures<sup>(1)</sup>

Consistent with Class 300 or 600 pressure-temperature ratings per ASME B16.34

### Maximum Allowable Shutoff Pressure Drop<sup>(1)</sup>

**For Single-Seal and Dual-Seal Construction (Except where further limited by the pressure-temperature rating of the valve body):**

- Class 300: 51 bar (740 psi) at 38°C (100°F)
- Class 600: 103 bar (1480 psi) at 38°C (100°F)

### Flow Characteristic

- Modified linear with single high density attenuator, ■ Modified equal percentage with single characterized attenuator (see figure 4), or
- Modified equal percentage without attenuator

### Flow and Shutoff Direction

Unidirectional flow for Design V260 is forward flow. Seal is upstream.

■ **Single Seal Constructions:** Should be used for unidirectional flow and unidirectional shutoff only.

■ **Double Seal Constructions:** V260A and V260C may be used for unidirectional and bidirectional flow. V260B should be used for unidirectional flow only for effective anti-cavitation protection. Bidirectional shutoff requires the dual seal construction.

### Flow Coefficients

See the section titled Coefficients in this bulletin,

or Catalog 12

### Shutoff Classification

#### Single-Seal Composition Constructions:

0.001% of maximum valve capacity (less than 10% of ANSI/FCI 70-2 Class IV and IEC 60534-4)

**Dual-Seal Composition Constructions:** 0.001% of maximum valve capacity (less than 10% of ANSI/FCI 70-2 Class IV and IEC 60534-4)

### Seal Material and Temperature Capability<sup>(1)</sup>

**Standard:** ■ POM (polyoxymethylene) –29 to 82°C (–20 to 180°F)

**Optional:** ■ PTFE/PEEK<sup>(2)(3)</sup> –29 to 93°C (–20 to 200°F)

### Maximum Ball Rotation

90 degrees

### Actuator Mounting

Right-hand or left-hand mounted as viewed from the valve inlet for forward flow

### Packing Arrangements

**PTFE Packing:** Standard construction (see figure 5)

**ENVIRO-SEAL® Packing:** This optional packing system provides improved sealing, guiding, and transmission of loading force to control liquid and gas emissions. Contact your Emerson Process Management sales office for availability of ENVIRO-SEAL packing (see figure 5)

### Dimensions

See figure 6

### Options

- Double block-and-bleed applications (Dual-seal construction is required), ■ Two Stage V260A Attenuator, ■ Two or Three Stage V260B Attenuator, ■ Class 150 or Class 900 flanges, ■ Ring type joint flanges

1. The pressure/temperature limits in this bulletin and any applicable standard or code limitation for this valve should not be exceeded.

2. PTFE stands for Polytetrafluoroethylene, and PEEK stands for PolyEtherEtherKetone.

3. Temperature limit of PTFE/PEEK is limited due to standard Nitrile O-Ring. Contact your Emerson Process Management sales office for higher temperature options, up to 232°C (450°F).

Table 1. Aerodome and Hydrodome Trim Benefits Comparison

Benefits	Typical Competitive Device	Design V260A with Aerodome Attenuator	Design V260B with Hydrodome Attenuator
Up to -20 dBA aerodynamic noise attenuation	No	Yes	N/A
Excellent attenuation effect at critical opening position	No	Yes	Yes
High Density (Full) or characterized attenuation	No	Yes	Yes
2 or 3 stage options	No	Yes	Yes
Effective bidirectional attenuation option	No	Yes	Yes
Integrated ball, shaft, and attenuator design for best throttling dynamics	No	Yes	Yes
Dual seal option	No	Yes	Yes
Ball seal exchange without actuator removal	No	Yes	Yes
K <sub>c</sub> improved versus unattenuated device	Yes	N/A	Yes
Double block-and-bleed option	No	Yes	Yes
Overall ease of maintenance	No	Yes	Yes
Trunnion-mounted ball for excellent wear resistance	Yes	Yes	Yes
Low profile for ease of piping	Yes	Yes	Yes

Table 2. Standard Materials of Construction

Part	Material
Valve Body	LF2 Carbon Steel
Ball	WCC Carbon Steel
Seal	POM with S31600 SST Seal Blank or PTFE/PEEK with S31600 SST Seal Blank
Dome Attenuator	S17400 SST
Shaft	S17400 SST H1075 or S17400 SST H1150 DBL
Wave Spring	S17700 SST or N07750
Tailpiece	LCC Carbon Steel
Tailpiece Mounting Bolting	B7 Steel or B7M Steel
Bearing Plate	Carbon Steel
Bearings	S30400 SST with Aramid liner
Thrust Washer	Carbon filled PTFE
Packing Box Housing	LCC Carbon Steel
Packing	PTFE/Carbon filled PTFE
Packing Bolting	B7 Steel, B7M Steel, or B8M Class 2 SST
Packing Follower, Packing Box Ring	Annealed S31600 SST
Groove Pins	B8M SST
O-Rings	Nitrile
Actuator Mounting Bolting	Steel Grade 5

**Features**

- **Excellent Throttling Performance**—The splined ball to shaft connection, splined shaft to actuator connection, double power-end bushing assemblies, and trunnion guiding, all provide improved dynamic control.

- **Aerodynamic Performance**—Up to -20 dBA acoustical attenuation can be achieved for the V260A within a single stage construction. Dual-stage construction can provide up to -25 dBA attenuation.

- **Improved Service Life**—The attenuator is an integral part of the seal assembly. The seal wipes to ball surface, not the attenuator, promoting increased service life.

- **Trim Versatility**—Key valve components, such as valve body, ball, shaft and bearings, are interchangeable between the Design V260A, V260B and V260C. This feature allows you to reduce your spare parts inventory and maintenance time.

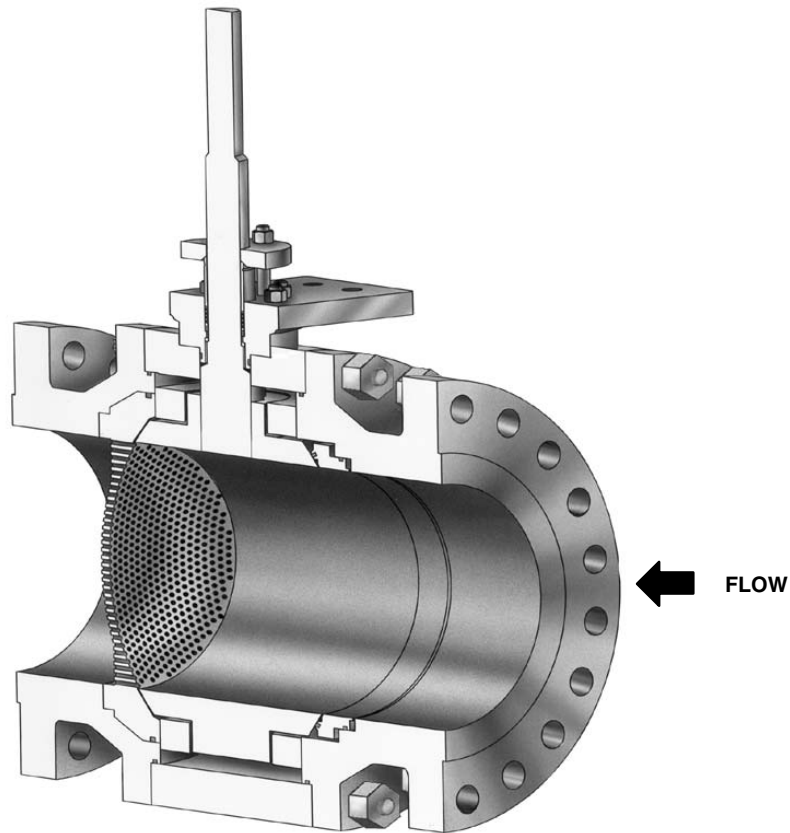
- **Sour Service and Sour Crude Oil Capability**—Optional materials are available that comply with NACE Standard MR0175-2002.

- **Tight Shutoff**—Self-adjusting seal(s) that are pressure assisted provide tight shutoff for long reliable service. The design incorporates a heavy duty S31600 stainless steel carrier that retains the composition seal for full-rated pressure drop service.

- **Heavy Duty Trunnion**—The ball trunnions are designed for demanding applications requiring long service life, with a reduction in maintenance time and costs.

- **Broad Hydrodynamic Applications**—Single, dual, and three-stage attenuators for the V260B may be provided for a varying range of applications. A  $K_c$  value of 1.0 is achievable depending on service conditions.

- **Flexible Applications**—The attenuator is active throughout the ball rotation for very demanding services or a characterized attenuator is used to match the service conditions (see figure 4).



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Figure 2. Sectional View of Valve (Single Seal)

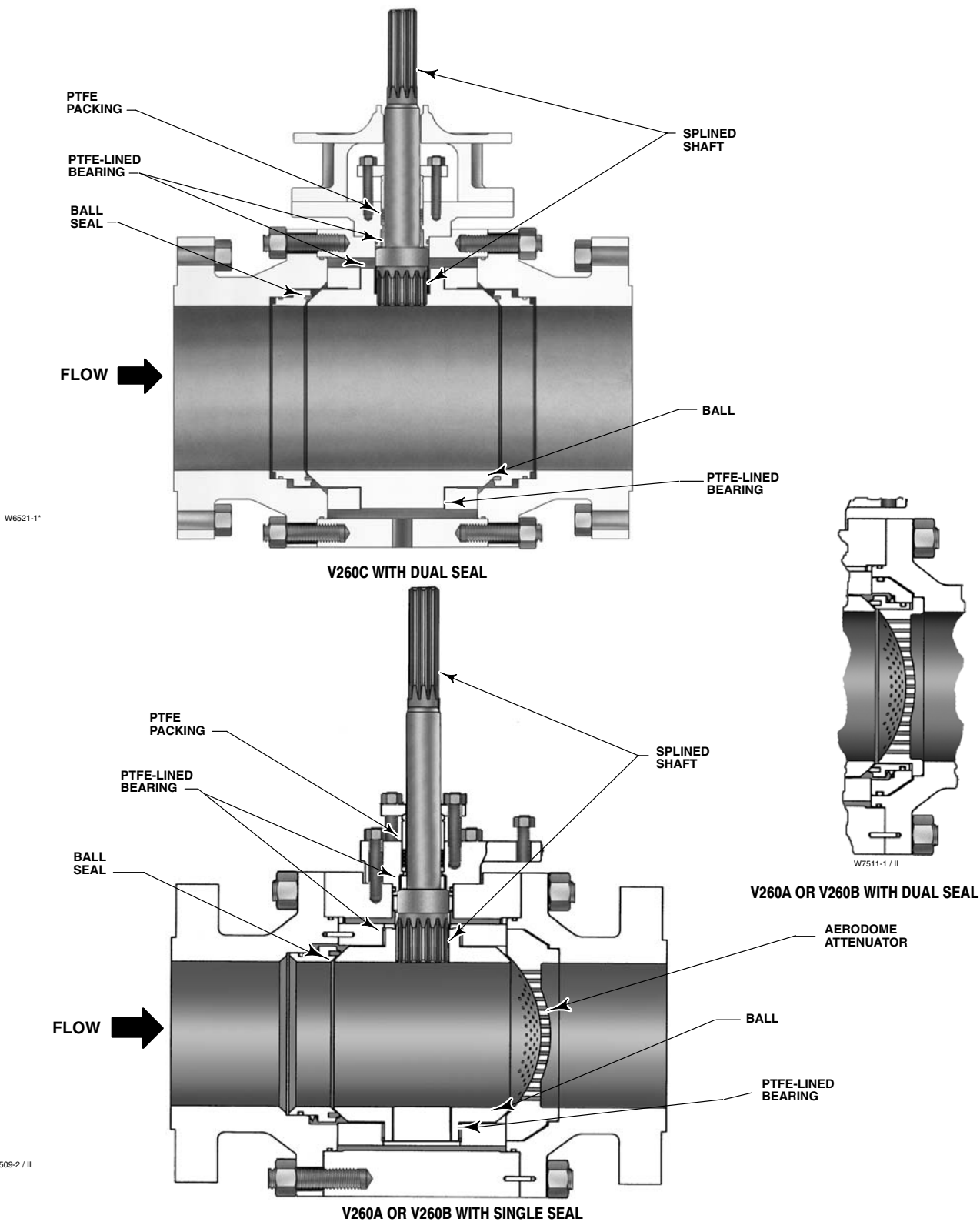


Figure 3. Typical Design V260 Valve Assembly

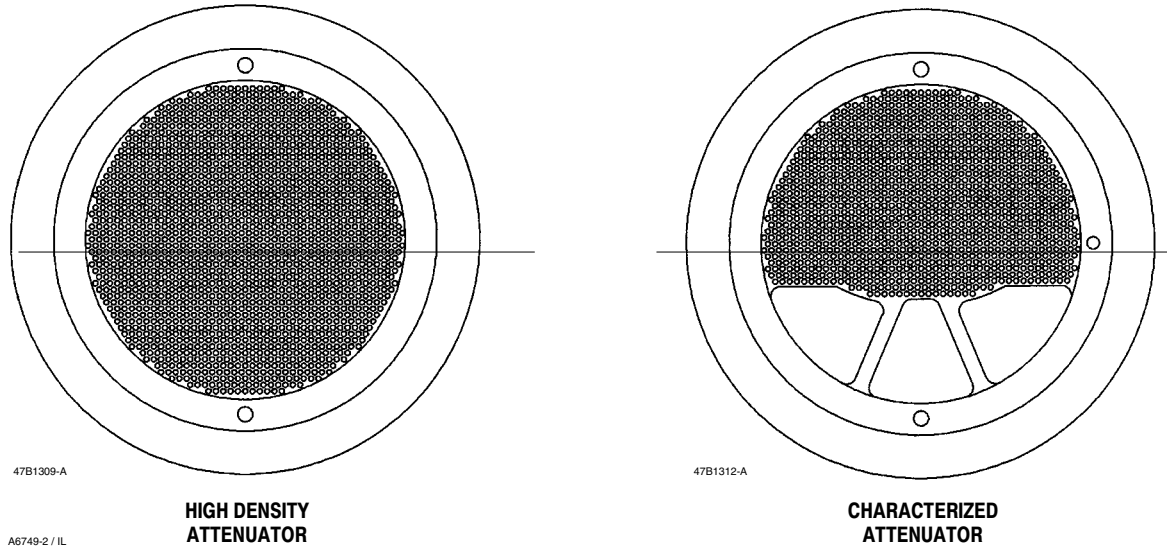


Figure 4. Aerodome and Hydrodome Attenuator Details

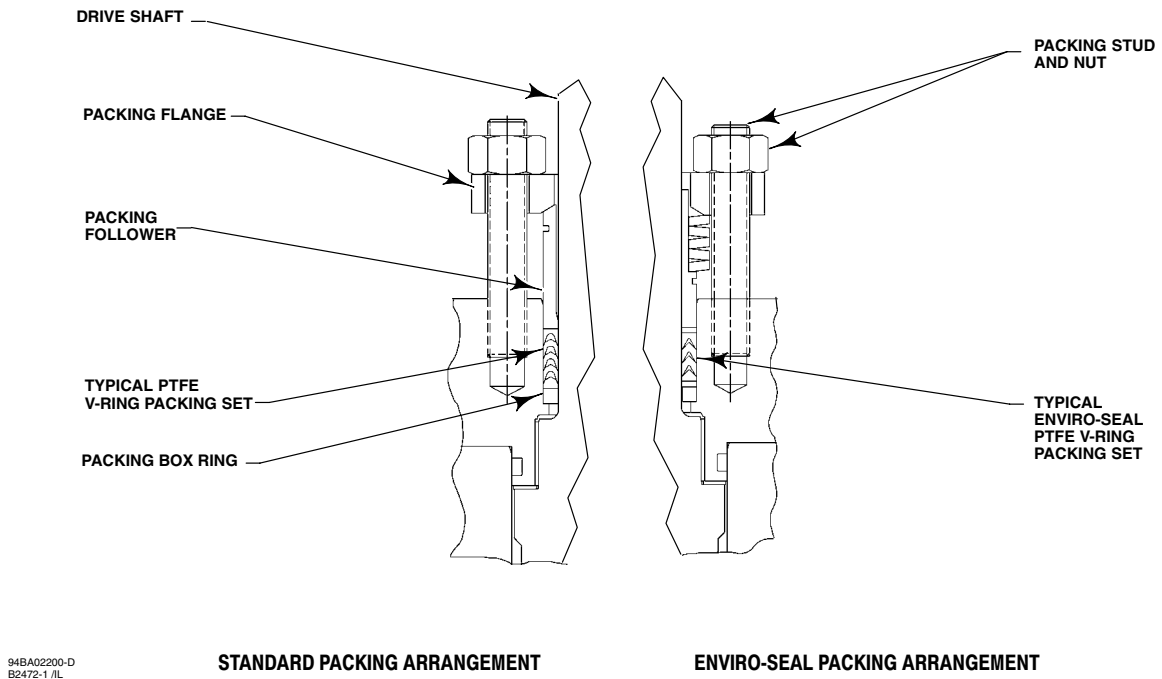


Figure 5. Packing Arrangement Details

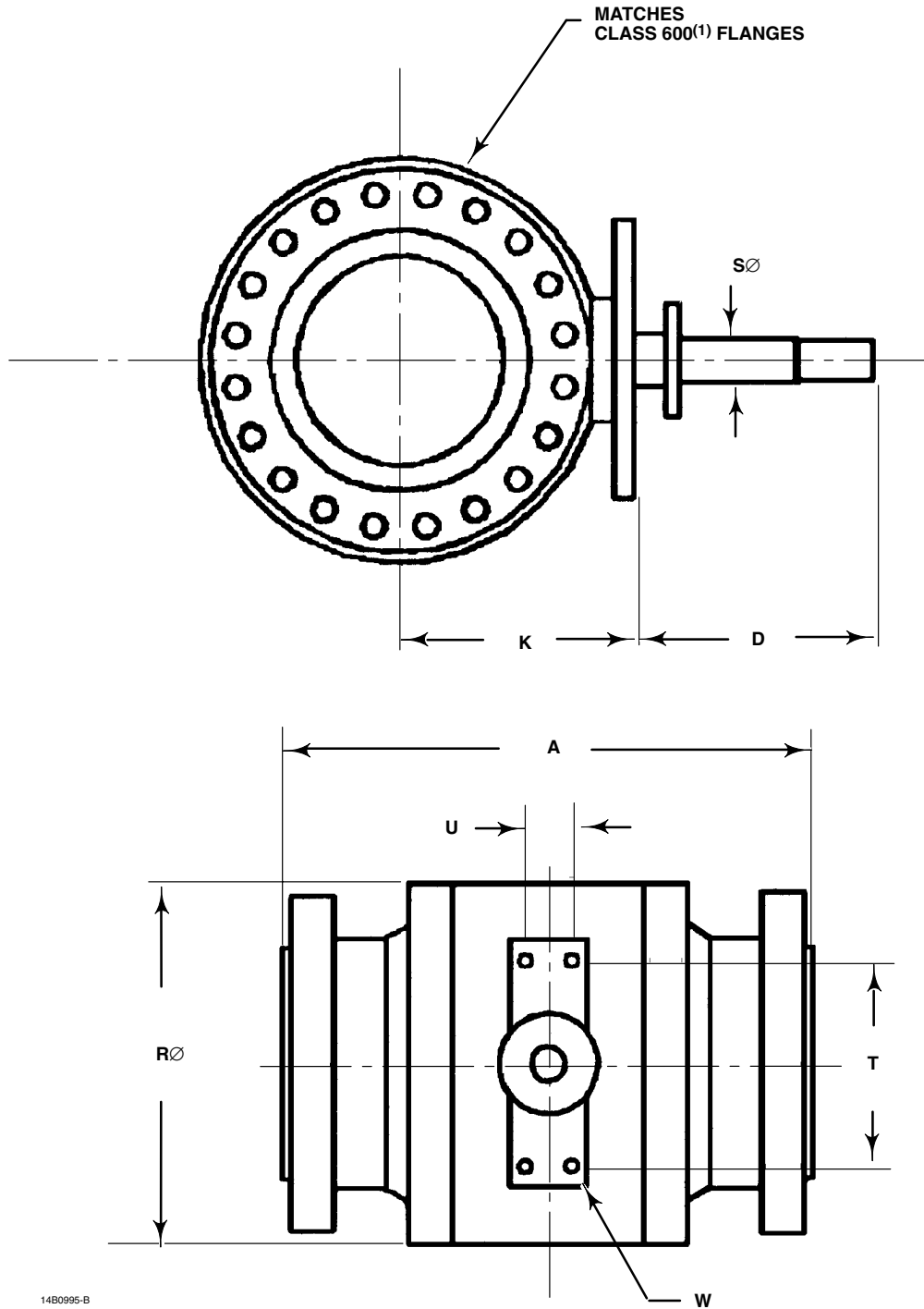
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**V260 Valve**

Table 3. Dimensions

VALVE SIZE, INCHES	A	D	K	R $\emptyset$	S $\emptyset$		T	U	W (THREADED)	APPROXIMATE WEIGHT
					Shaft Dia.	Spline Dia.				
<b>mm</b>										<b>kg</b>
8	661	356	273	457	44.4	44.4	273	51	See thread info below	424
10	788		324	553	63.5	63.5	337	76		653
12	840		369	639						882
16	991	508	508	848	76.2	76.2	533	127		2472
20	1194		602	1040	88.9	88.9				63.5
<b>Inches</b>										<b>Pounds</b>
8	26.04	14.00	10.75	18.00	1-3/4	1-3/4	10.75	2.00	3/4-10	975
10	31.04		12.75	21.77	2-1/2	2-1/2	13.25	3.00	7/8-9	1550
12	33.07		14.53	25.15						2025
16	39.00	20.00	19.99	33.38	3 3	3 2-1/2	21.00	5.00	1-1/4-8	5450
20	47.00		23.70	40.96	3-1/2 3-1/2	3-1/2 2-1/2				9500



NOTE:  
1. FOR CLASS 300 VALVES, FACE-TO-FACE DIMENSIONS ARE THE SAME AS CLASS 600 VALVES.  
2. VALVE SHOWN MEETS CLASS 600 FLANGES. FLANGE AND BOLT DIMENSIONS VARY FOR CLASS 300 VALVES.

Figure 6. Dimensions (also see table 3)

**Coefficients**

Table 4. Design V260A with Aerodome Attenuator, Forward Flow

Characterized <sup>(1)</sup> Aerodome		Modified Equal Percentage Characteristic									
Valve Size, Inches	Minimum Throttling C <sub>v</sub> <sup>(2)</sup>	Coefficients	Valve Rotation, Degrees								
			10	20	30	40	50	60	70	80	90
8	41.1	C <sub>v</sub>	18.7	66.6	160	260	400	570	790	1120	1360
		K <sub>v</sub>	16.2	57.6	138	225	346	493	683	970	1180
		F <sub>d</sub>	---	0.10	0.060	0.046	0.038	0.032	0.032	0.035	0.039
		F <sub>L</sub>	0.90	0.88	0.79	0.74	0.71	0.66	0.69	0.69	0.65
		X <sub>T</sub>	0.764	0.549	0.534	0.457	0.395	0.387	0.374	0.308	0.280
10	64.8	C <sub>v</sub>	29.4	104	251	407	618	894	1240	1750	2130
		K <sub>v</sub>	25.4	90	217	352	535	773	1070	1510	1840
		F <sub>d</sub>	---	0.081	0.048	0.037	0.030	0.025	0.025	0.028	0.031
		F <sub>L</sub>	0.90	0.88	0.79	0.74	0.71	0.66	0.69	0.69	0.65
		X <sub>T</sub>	0.764	0.548	0.534	0.462	0.408	0.387	0.373	0.309	0.280
12	93.3	C <sub>v</sub>	42.2	150	360	584	887	1280	1780	2520	3060
		K <sub>v</sub>	36.5	130	311	505	767	1110	1540	2180	2650
		F <sub>d</sub>	---	0.064	0.040	0.030	0.025	0.021	0.021	0.023	0.026
		F <sub>L</sub>	0.90	0.88	0.79	0.74	0.71	0.66	0.69	0.69	0.65
		X <sub>T</sub>	0.758	0.548	0.538	0.457	0.411	0.388	0.373	0.308	0.279
16	167	C <sub>v</sub>	75.5	268	647	1047	1592	2304	3201	4515	5480
		K <sub>v</sub>	65.3	232	559	906	1380	1990	2770	3910	4740
		F <sub>d</sub>	---	0.051	0.031	0.023	0.019	0.016	0.016	0.018	0.020
		F <sub>L</sub>	0.90	0.88	0.79	0.74	0.71	0.66	0.69	0.69	0.65
		X <sub>T</sub>	0.765	0.549	0.535	0.459	0.410	0.385	0.371	0.308	0.280
20	262	C <sub>v</sub>	118	421	1010	1640	2490	3610	5020	7070	8590
		K <sub>v</sub>	102.4	364	874	1420	2150	3120	4340	6120	7430
		F <sub>d</sub>	---	0.041	0.026	0.019	0.016	0.014	0.014	0.015	0.016
		F <sub>L</sub>	0.90	0.88	0.79	0.74	0.71	0.66	0.69	0.69	0.65
		X <sub>T</sub>	0.766	0.549	0.536	0.459	0.410	0.385	0.368	0.308	0.281

1. Window starts at about 60 degrees.  
2. Valves should not be required to throttle at a C<sub>v</sub> less than the specified minimum C<sub>v</sub>.

Table 5. Design V260A with Aerodome Attenuator, Forward Flow

		<b>Modified Equal Percentage Characteristic</b>									
Valve Size, Inches	Minimum Throttling $C_v^{(1)}$	Coefficients	Valve Rotation, Degrees								
			10	20	30	40	50	60	70	80	90
8	41.1	$C_v$	16.1	62.9	153	256	390	553	737	919	996
		$K_v$	13.9	54.4	133	221	337	478	638	795	861
		$F_d$	---	0.10	0.060	0.046	0.038	0.032	0.028	0.026	0.024
		$F_L$	0.91	0.88	0.79	0.73	0.69	0.66	0.66	0.66	0.66
		$X_T$	0.752	0.615	0.528	0.463	0.406	0.366	0.332	0.302	0.290
10	64.8	$C_v$	25.5	100	243	405	618	876	1170	1460	1580
		$K_v$	22.1	87	210	350	535	758	1010	1260	1370
		$F_d$	---	0.081	0.048	0.037	0.030	0.025	0.023	0.021	0.019
		$F_L$	0.94	0.87	0.77	0.72	0.70	0.68	0.66	0.65	0.65
		$X_T$	0.751	0.612	0.528	0.467	0.408	0.364	0.332	0.300	0.288
12	93.3	$C_v$	36.9	144	351	586	893	1270	1690	2110	2280
		$K_v$	31.9	125	304	507	773	1099	1460	1830	1970
		$F_d$	---	0.064	0.040	0.030	0.025	0.021	0.019	0.017	0.016
		$F_L$	0.97	0.85	0.75	0.71	0.70	0.69	0.67	0.66	0.66
		$X_T$	0.617	0.505	0.434	0.383	0.333	0.297	0.273	0.247	0.238
16	167	$C_v$	65.9	257	627	1050	1590	2260	3020	3760	4070
		$K_v$	57.0	222	542	908	1380	1950	2610	3250	3520
		$F_d$	---	0.051	0.031	0.023	0.019	0.016	0.014	0.013	0.012
		$F_L$	0.94	0.87	0.77	0.72	0.70	0.68	0.66	0.65	0.65
		$X_T$	0.751	0.614	0.527	0.460	0.408	0.364	0.330	0.301	0.289
20	262	$C_v$	103	403	983	1640	2500	3540	4730	5890	6380
		$K_v$	89	349	850	1420	2160	3060	4090	5090	5520
		$F_d$	---	0.041	0.026	0.019	0.016	0.014	0.012	0.011	0.011
		$F_L$	0.94	0.87	0.77	0.72	0.70	0.68	0.66	0.65	0.65
		$X_T$	0.756	0.618	0.528	0.464	0.406	0.365	0.330	0.303	0.292

1. Valves should not be required to throttle at a  $C_v$  less than the minimum throttling  $C_v$ .

Table 6. Design V260B with Hydrodome Attenuator, Forward Flow

Characterized <sup>(1)</sup> Hydrodome			Modified Equal Percentage Characteristic								
Valve Size, Inches	Minimum Throttling C <sub>v</sub> <sup>(2)</sup>	Coefficients	Ball Angle of Opening, Degrees								
			10	20	30	40	50	60	70	80	90
8	46.6	C <sub>v</sub>	13.6	79.6	160	265	408	585	797	1150	1380
		K <sub>v</sub>	11.8	68.9	138	229	353	506	689	995	1190
		F <sub>L</sub>	0.84	0.90	0.82	0.77	0.72	0.68	0.66	0.66	0.62
10	72.1	C <sub>v</sub>	21.1	123	248	411	632	907	1240	1780	2140
		K <sub>v</sub>	18.2	107	215	355	547	784	1070	1540	1850
		F <sub>L</sub>	0.84	0.90	0.82	0.77	0.72	0.68	0.66	0.66	0.62
12	105	C <sub>v</sub>	30.7	179	361	597	920	1320	1800	2590	3110
		K <sub>v</sub>	26.5	155	312	517	796	1140	1550	2240	2690
		F <sub>L</sub>	0.84	0.90	0.82	0.77	0.72	0.68	0.66	0.66	0.62
16	189	C <sub>v</sub>	55.1	322	648	1070	1650	2370	3230	4660	5590
		K <sub>v</sub>	47.6	279	560	928	1430	2050	2790	4030	4830
		F <sub>L</sub>	0.84	0.90	0.82	0.77	0.72	0.68	0.66	0.66	0.62
20	292	C <sub>v</sub>	85.1	498	1000	1660	2550	3660	4990	7190	8630
		K <sub>v</sub>	73.6	431	866	1430	2210	3170	4310	6220	7470
		F <sub>L</sub>	0.84	0.90	0.82	0.77	0.72	0.68	0.66	0.66	0.62

1. Window starts at about 60 degrees.  
2. Valves should not be required to throttle at a C<sub>v</sub> less than the minimum throttling C<sub>v</sub>.

Table 7. Design V260B with Hydrodome Attenuator, Forward Flow

High Density Hydrodome			Modified Equal Percentage Characteristic								
Valve Size, Inches	Minimum Throttling C <sub>v</sub> <sup>(1)</sup>	Coefficients	Ball Angle of Opening, Degrees								
			10	20	30	40	50	60	70	80	90
8	46.6	C <sub>v</sub>	13.3	79.9	162	268	415	593	801	1020	1060
		K <sub>v</sub>	11.5	69.1	140	232	359	513	693	882	917
		F <sub>L</sub>	0.84	0.90	0.82	0.77	0.72	0.68	0.66	0.66	0.62
10	71.8	C <sub>v</sub>	20.5	123	250	413	640	914	1230	1570	1630
		K <sub>v</sub>	17.7	106	216	357	554	791	1060	1360	1410
		F <sub>L</sub>	0.84	0.90	0.82	0.77	0.72	0.68	0.66	0.66	0.62
12	106	C <sub>v</sub>	30.2	181	367	608	941	1350	1820	2310	2400
		K <sub>v</sub>	26.1	157	317	526	814	1170	1570	2000	2080
		F <sub>L</sub>	0.84	0.90	0.82	0.77	0.72	0.68	0.66	0.66	0.62
16	186	C <sub>v</sub>	53.0	318	645	1070	1650	2360	3190	4060	4210
		K <sub>v</sub>	45.8	275	558	926	1430	2040	2760	3510	3640
		F <sub>L</sub>	0.84	0.90	0.82	0.77	0.72	0.68	0.66	0.66	0.62
20	292	C <sub>v</sub>	83.2	500	1010	1680	2600	3710	5010	6380	6620
		K <sub>v</sub>	72.0	432	877	1450	2250	3210	4330	5520	5730
		F <sub>L</sub>	0.84	0.90	0.82	0.77	0.72	0.68	0.66	0.66	0.62

1. Valves should not be required to throttle at a C<sub>v</sub> less than the minimum throttling C<sub>v</sub>.

Table 8. Design V260C without Attenuator, Forward Flow

Gas or Liquid Flow			Modified Equal Percentage Characteristic								
Valve Size, Inches	Minimum Throttling $C_v^{(1)}$	Coefficients	Valve Rotation, Degrees								
			10	20	30	40	50	60	70	80	90
8	86.7	$C_v$	47.3	126	236	382	604	972	1600	3000	4960
		$K_v$	40.9	109	204	330	522	841	1380	2600	4290
		$F_L$	0.79	0.87	0.91	0.91	0.85	0.81	0.73	0.63	0.63
		$F_d$	0.37	0.64	0.78	0.88	0.94	0.97	0.98	0.99	1.00
		$X_T$	0.44	0.64	0.77	0.77	0.67	0.51	0.38	0.20	0.13
10	136	$C_v$	74.1	197	369	598	946	1520	2510	4700	7770
		$K_v$	64.1	171	320	517	818	1320	2170	4060	6720
		$F_L$	0.79	0.87	0.91	0.91	0.85	0.81	0.73	0.63	0.63
		$F_d$	0.37	0.64	0.78	0.87	0.94	0.97	0.99	0.99	1.00
		$X_T$	0.44	0.64	0.77	0.77	0.67	0.51	0.38	0.20	0.13
12	196	$C_v$	107	284	532	861	1360	2190	3610	6760	11 200
		$K_v$	92.2	246	460	745	1180	1890	3120	5850	9670
		$F_d$	0.39	0.67	0.79	0.87	0.93	0.97	0.99	1.00	1.00
		$F_L$	0.79	0.87	0.91	0.91	0.85	0.81	0.73	0.63	0.63
		$X_T$	0.44	0.64	0.77	0.77	0.67	0.51	0.38	0.20	0.13
16	347	$C_v$	189	505	945	1530	2420	3890	6410	12 000	19 900
		$K_v$	164	437	818	1320	2090	3370	5540	10 400	17 200
		$F_d$	0.38	0.64	0.79	0.87	0.93	0.97	0.99	0.99	1.00
		$F_L$	0.79	0.87	0.91	0.91	0.85	0.81	0.73	0.63	0.63
		$X_T$	0.44	0.64	0.77	0.77	0.67	0.51	0.38	0.20	0.13
20	542	$C_v$	296	788	1480	2390	3780	6080	10 000	18 800	31 000
		$K_v$	256	681	1280	2070	3270	5260	8660	16 200	26 800
		$F_d$	0.42	0.66	0.79	0.87	0.93	0.97	0.99	1.00	1.00
		$F_L$	0.79	0.87	0.91	0.91	0.85	0.81	0.73	0.63	0.63
		$X_T$	0.44	0.63	0.76	0.76	0.66	0.50	0.38	0.20	0.13

1. Valves should not be required to throttle at a  $C_v$  less than the minimum throttling  $C_v$ .

**Note**

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