

Fisher™ 461 Increased Outlet Angle Sweep-Flo Valve

The Fisher 461 Sweep-Flo valve is a self-cleaning, increased outlet, angle valve that is typically used in the chemical and hydrocarbon industries where control of residual oils or other liquids with coking properties is necessary. The 461 features a venturi-type throat, which is useful in power plants or slurry services where high pressure drops and flashing might exist. Typical trim materials include an S44004 stainless steel plug, an S31600 stainless steel with CoCr-A hardfaced seat ring, and a hardened 410/416 stainless steel liner.

For increased protection, the 461 valve is offered with tungsten carbide trim. Use this trim only in the most severe abrasive conditions or in moderately corrosive environments.

Tungsten carbide inserts are used for the plug tip, seat ring, and the seat ring retainer. Typically, S17400 stainless steel is used as the base material.



W9553-1

Fisher 461 Valve with 657 Actuator

Features

- **Flashing, Outgassing, and Cavitation Control**—Increased outlet size reduces outlet fluid velocity to reduce flashing, outgassing, and cavitation damage with proper trim material selection.
- **Flow Characteristic**—Special cylinder-guided contour valve plug furnishes an equal percentage Micro-Form flow characteristic in the 12.7 to 31.8 mm (0.5 to 1.25 inch) port size and a modified parabolic flow characteristic in the 38.1 to 114.3 mm (1.5 to 4.5 inch) port size.
- **Availability**—NPS 2x3, 3x4, 4x6, and 6x8 valves are available with either flanged or welding ends in ratings from CL150 to 1500. NPS 2x3, 3x4, and 4x6 valves are available with CL2500 rating.
- **Flushing Connection**—Connection on the side of the valve is furnished for flushing oil between liner and valve plug guide to prevent buildup of coke. An optional bonnet purge connection is also available with extension bonnet. See figure 1.
- **Extended Trim Life**—Tungsten carbide trim is available for the most severe conditions and may extend the life of your trim.
- **Excellent Sealing Capability**—ENVIRO-SEAL™ packing systems (figure 4) provide an improved stem seal to help prevent the loss of process fluid. These packing systems feature PTFE or Graphite ULF packing with live-loading for reduced packing maintenance.

Specifications

Available Valve Sizes

See table 1

End Connections

■ CL150 to CL2500 raised-face (RF), ■ ring type joint (RTJ) or buttweld end (BWE)

Maximum Inlet Pressures and Temperatures⁽¹⁾

Consistent with applicable pressure/temperature rating according to ASME B16.34 ratings unless limited by temperature capabilities (see table 2)

Shutoff Classifications per ANSI/FCI 70-2 and IEC 60534-4

■ Class IV (standard), ■ Class V (optional)

Construction Materials

See table 2

Temperature Capabilities

Valve Body/Trim Combinations: See table 2
All Other Parts: See table 3

Flow Coefficients

See table 1 and Fisher Catalog 12

Flow Characteristic

■ Equal percentage (NPS 1/2 to 1-1/4 port sizes)
■ Modified parabolic flow (NPS 1-1/2 to 4-1/2 port sizes)

Flow Direction

Flow down (pressure tends to close)

Port Diameters, Valve Plug Travels, and Stem Sizes

See table 1

Typical Bonnet Styles

■ Plain (standard)
■ Extension (high temperature applications)

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

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Table 1. Maximum Trim Size and Flow Coefficients

VALVE SIZE, NPS	PORT DIAMETER		MAXIMUM PLUG TRAVEL		STEM SIZE		C _v AT MAXIMUM TRAVEL
	mm	Inch	mm	Inch	mm	Inches	
2x3	12.7	0.5	19	0.75	19 25.4 31.8	0.75 1 1.25	11.7
	19.1	0.75					25.4
	25.4	1					41.1
	31.8	1.25	29	1.125			74.9
	38.1	1.5					100
	41.3	1.625					106
3x4	25.4	1	19	0.75	19 25.4 31.8	0.75 1 1.25	45.2
	31.8	1.25	29	1.125			79.4
	38.1	1.5					104
	44.5	1.75					112
	50.8	2					123
	57.2 ⁽¹⁾	2.25 ⁽¹⁾					122
4x6	31.8	1.25	29	1.125	19 25.4 31.8	0.75 1 1.25	79.4
	38.1	1.5					104
	50.8	2					191
	57.2	2.25					217
	63.5	2.5					311
	69.9	2.75	38	1.5			332
	76.2	3					331
6x8	31.8	1.25	29	1.125	19 25.4 31.8	0.75 1 1.25	79.4
	38.1	1.5					104
	44.5	1.75					112
	50.8	2					191
	57.2	2.25					217
	76.2	3	38	1.5			342
	88.9	3.5	51	2			475
	101.6	4					605
	114.3	4.5					764

1. 404 and 405 trims not available. Contact your [Emerson sales office](#) for more information.

Special Constructions Available

- Extension bonnet to reduce conduction of heat to packing and actuator.
- Valve outlet extension nozzle can be provided to further reduce cavitation and erosion damage in tank-mounted installations.

Actuator Combinations

The 461 valve can be combined with Fisher 657 direct-acting, 667 reverse-acting actuators, 585C, 685, and 785C piston actuators, 1008 manual actuator, or type 1010 electric buy out adaptation actuator. See the appropriate actuator bulletin.

Table 2. Typical Trim Combinations⁽¹⁾

TRIM DESIGNATION	VALVE BODY MATERIAL	VALVE PLUG	SEAT RING	LINER (GUIDE CYLINDER)	RETAINER	TEMPERATURE CAPABILITIES			
						°C		°F	
						Min	Max	Min	Max
401	WCC	S44004 HT	S31600/CoCr-A	410/416 SST	410/416 SST	-29	427	-20	800
	WCC/1.0619					-10		14	
	WC9					-29		-20	
	C5								
402	WCC	S31600/CoCr-A SG&C	S31600/CoCr-A	S31600/CoCr-A/CRCT	S31600/CoCr-A/CRCT	-29	427	-20	800
	WCC/1.0619					-10		14	
	CF8M					-29	538	-20	1000
	C5					-29	316		600
	CF8C					-29	538		1000
404	WCC	17-4 SST/CoCr-A Tungsten Carbide	17-4 SST Tungsten Carbide	410/416 HT	17-4/ Tungsten Carbide	-29	427	-20	800
405	CF8M	N07718/CoCr-A Tungsten Carbide	N07718 Tungsten Carbide	S31600/CoCr-A/Chrome Coated	N07718/ Tungsten Carbide	-29	482	-20	900
	CF8C								
406	WCC	S31600/CoCr-A SG&C	S31600/CoCr-A	Alloy 6	Alloy 6	-29	427	-20	800
	WCC/1.0619					-10		14	
	CF8M					-29	232	-20	450
	C5					-29	427	-20	800
	CF8C					-29	232	-20	450
407	WCC	S34700/CoCr-A SG&C	S34700/CoCr-A	S34700/CoCr-A/CRCT	S34700/CoCr-A/CRCT	-29	427	-20	800
	WCC/1.0619					-10		14	
	CF8C					-29	538	-20	1000
408	WCC	S34700/CoCr-A SG&C	S34700/CoCr-A	Alloy 6	Alloy 6	-29	427	-20	800
	WCC/1.0619					-10		14	
	CF8C					-29	232	-20	450
420	CD3MN	S31803/Ultimet SG&C	S31803/Ultimet	S31803/Ultimet/CRCT	S31803/Ultimet/CRCT	-29	316	-20	600
421	CD3MN	S31803/Ultimet SG&C	S31803/Ultimet	Ultimet	Ultimet	-29		-20	
430	CW6MC	N06625/CoCr-A SG&C	N06625/CoCr-A	N06625/CoCr-A/CRCT	N06625/CoCr-A/CRCT	-29	538	-20	1000
431	CW6MC	N06625/CoCr-A SG&C	N06625/CoCr-A	Alloy 6	Alloy 6	-29		-20	

1. Additional materials are available. Consult your [Emerson sales office](#) for assistance.

Table 3. Construction Materials and Temperature Capabilities

PART	MATERIAL		TEMPERATURE CAPABILITIES			
			°C		°F	
			Minimum	Maximum	Minimum	Maximum
Valve plug stem	S20910 (standard)		(1)	(1)	(1)	(1)
	S31803 (standard)		-51	316	-60	600
	N06625 (standard)		-198	538	-325	1000
	N07718 HT		(1)	(1)	(1)	(1)
	S31600		(1)	427	(1)	800
Valve Body-to-bonnet bolting	Stud Nut Material	Body Material				
	B7 NCF2 Studs 2H NCF2 Nuts	WCC and WC9	-29	427	-20	800
	B7M NCF2 Studs ⁽³⁾ 2HM NCF2 Nuts ⁽³⁾	WCC	-29	427	-20	800
	B7 NCF2 Studs 2H NCF2 Nuts	SA-217-C5	(2)	(2)	(2)	(2)
	B7M NCF2 Studs ⁽³⁾ 2HM NCF2 Nuts ⁽³⁾		(2)	(2)	(2)	(2)
	B7 NCF2 Studs 2H NCF2 Nuts	CF8M	-29	232	-20	450
	S66286 Studs ⁽⁴⁾ Gr.7M Nuts ⁽⁴⁾		-29	538	-20	1000
	B8M2 Class 2B Studs ⁽³⁾ 8M Nuts ⁽³⁾		(2)	(2)	(2)	(2)
	S20910 Studs S20910/CRCT Nuts		-198	593	-325	1100
	B7 NCF2 Studs 2H NCF2 Nuts	CF8C	-29	232	-20	450
	S66286 Studs ⁽⁴⁾ Gr.7M Nuts ⁽⁴⁾		-29	538	-20	1000
	B8M2 Class 2B Studs ⁽³⁾ 8M Nuts ⁽³⁾		(2)	(2)	(2)	(2)
	S20910 Studs S20910/CRCT Nuts		-198	593	-325	1100
	B7 NCF2 Studs 2H NCF2 Nuts	CD3MN	-29	316	-20	600
	S32760 Studs S32760 Nuts		-51	316	-60	600
	N06625 Studs N06625 Nuts	CW6MC	-198	538	-325	1000
	Body to bonnet gasket	Metal jacketed gasket N04400		(1)	(1)	(1)
Packing	PTFE V-ring		-40	232	-40	450
	Graphite ribbon filament (oxidizing service to 371 °C [700 °F])		-73	538	-100	1000
	Graphite ULF (non-environmental service)		-198	538	-325	1000
Packing follower, spring, or lantern ring	S31600 stainless steel		-198	593	-325	1100
Packing box ring	S31600 stainless steel		-198	593	-325	1100
Packing flange, studs, or nuts	S31600 stainless steel		-198	593	-325	1100

1. These materials are not limiting factors.
2. For more information contact your [Emerson sales office](#).
3. All CL600, CL1500 and CL2500 designs are derated with this bolt material. Consult your Emerson sales office for information.
4. All CL600, CL1500 and CL2500 designs except for 4X6 size CL2500 are derated with this bolt material. Consult your Emerson sales office for information.

Figure 1. Dimensions (also see tables 4, 5, and 6)

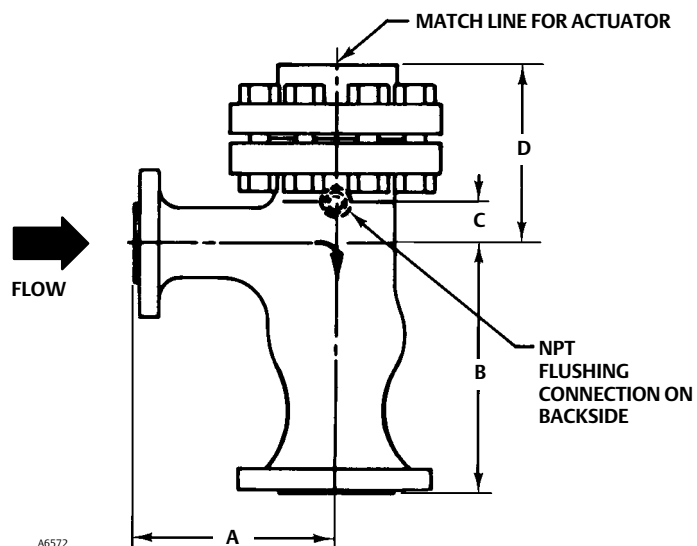


Table 4. CL150, CL300, and CL600 Dimensions⁽²⁾

SIZE	NPT	A INLET FLANGE						B OUTLET FLANGE						D ⁽¹⁾ STANDARD BONNET			C
		150 RF	150 RTJ	300 RF	300 RTJ	600 RF	600 RTJ	150 RF	150 RTJ	300 RF	300 RTJ	600 RF	600 RTJ	Yoke Boss Size			
														3-9/16	5	5H	
mm																	
2 x 3	1/2-14	---	---	213	221	222	224	---	---	283	291	292	294	200	318	---	13
3 x 4	1/2-14	---	---	238	246	248	249	---	---	337	344	349	351	267	321	---	24
4 x 6	3/4-14	---	---	241	249	254	256	---	---	425	433	443	445	282	419	---	13
6 x 8	3/4-14	305	305	305	313	322	324	533	533	533	541	554	556	387	481	481	44
Inch																	
2 x 3	1/2-14	---	---	8.38	8.69	8.75	8.81	---	---	11.13	11.44	11.50	11.56	7.87	12.50	---	0.50
3 x 4	1/2-14	---	---	9.38	9.69	9.75	9.81	---	---	13.25	13.56	13.75	13.81	10.50	12.62	---	0.94
4 x 6	3/4-14	---	---	9.50	9.81	10.00	10.06	---	---	16.75	17.06	17.44	17.50	11.13	16.49	---	0.50
6 x 8	3/4-14	12.00	12.00	12.00	12.31	12.69	12.75	21.00	21.00	21.00	21.31	21.81	21.88	15.23	18.92	18.92	1.75

1. This is the largest dimension that is provided.
2. Radiation Fin Bonnets are available. Consult your [Emerson sales office](#).

Table 5. CL900 and CL1500 Dimensions⁽²⁾

SIZE	NPT	A INLET FLANGE				B OUTLET FLANGE				D ⁽¹⁾ STANDARD BONNET			C
		Yoke Boss Size											
		900 RF	900 RTJ	1500 RF	1500 RTJ	900 RF	900 RTJ	1500 RF	1500 RTJ	3-9/16	5	5H	
mm													
2 x 3	1/2-14	241	243	241	243	297	298	306	308	284	354	---	25
3 x 4	1/2-14	254	256	264	265	356	357	365	367	305	357	376	38
4 x 6	3/4-14	295	297	305	306	433	435	461	464	394	457	457	51
6 x 8	3/4-14	357	359	381	383	554	556	579	583	548	572	572	25
Inch													
2 x 3	1/2-14	9.50	9.56	9.50	9.56	11.69	11.75	12.06	12.13	11.18	13.93	---	1.00
3 x 4	1/2-14	10	10.06	10.38	10.44	14	14.06	14.38	14.44	12.00	14.06	14.81	1.50
4 x 6	3/4-14	11.63	11.69	12	12.06	17.06	17.13	18.13	18.25	15.52	17.99	17.99	2.00
6 x 8	3/4-14	14.07	14.13	15.00	15.06	21.82	21.88	22.81	22.94	21.56	22.50	22.50	1.00

1. This is the largest dimension that is provided.
2. Radiation Fin Bonnets are available. Consult your [Emerson sales office](#).

Table 6. CL2500 Dimensions⁽²⁾

SIZE	NPT	A INLET FLANGE		B OUTLET FLANGE		D ⁽¹⁾ STANDARD BONNET			C
		Yoke Boss Size							
		2500 RF	2500 RTJ	2500 RF	2500 RTJ	3-9/16	5	5H	
mm									
2 x 3	1/2-14	260	262	327	330	360	419	---	32
3 x 4	1/2-14	327	330	367	372	414	438	438	32
4 x 6	3/4-14	375	379	461	467	453	477	576	51
Inch									
2 x 3	1/2-14	10.25	10.31	12.88	13	14.18	16.49	---	1.25
3 x 4	1/2-14	12.88	13	14.44	14.63	16.31	17.25	17.25	1.25
4 x 6	3/4-14	14.75	14.94	18.13	18.38	17.85	18.79	22.67	2.00

1. This is the largest dimension that is provided.
2. Radiation Fin Bonnets are available. Consult your [Emerson sales office](#).

Table 7. Approximate Weights (includes valve body and bonnet)

VALVE SIZE, NPS	PRESSURE RATING	WEIGHT	
		kg	lb
2x3	CL150	---	---
	CL300	100	219
	CL600	100	219
	CL900	120	265
	CL1500	136	300
	CL2500	168	370
3x4	CL150	---	---
	CL300	130	286
	CL600	130	286
	CL900	152	335
	CL1500	169	371
	CL2500	286	630
4x6	CL150	---	---
	CL300	218	480
	CL600	228	502
	CL900	405	890
	CL1500	448	985
	CL2500	673	1481
6x8	CL150	306	675
	CL300	327	720
	CL600	382	841
	CL900	694	1526
	CL1500	776	1707

Figure 2. Fisher 461 Valve - Closed

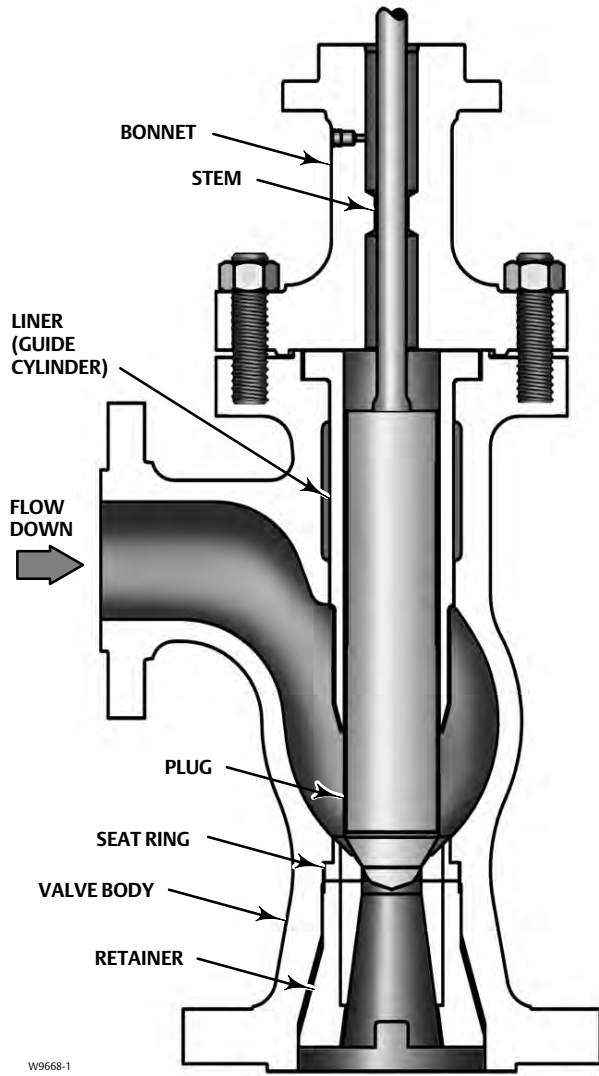


Figure 3. Fisher 461 Valve with Extended Retainer - Open

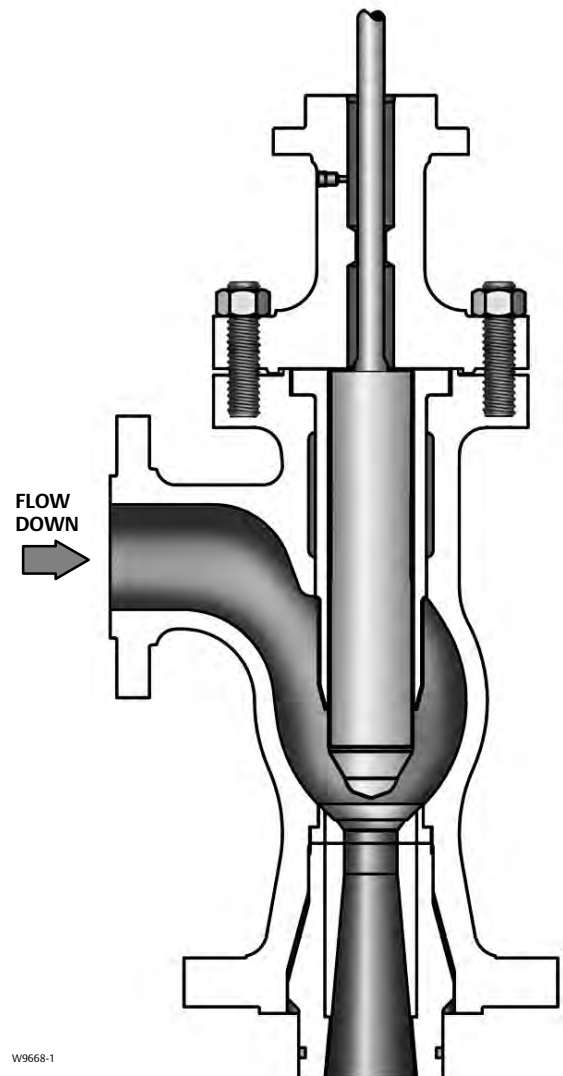
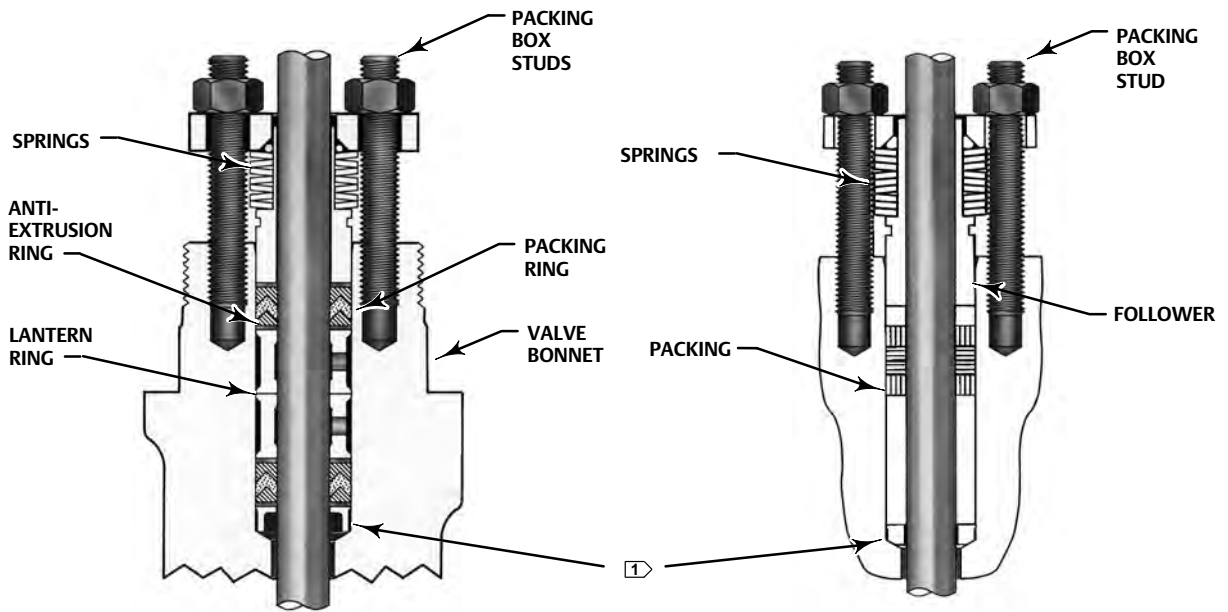
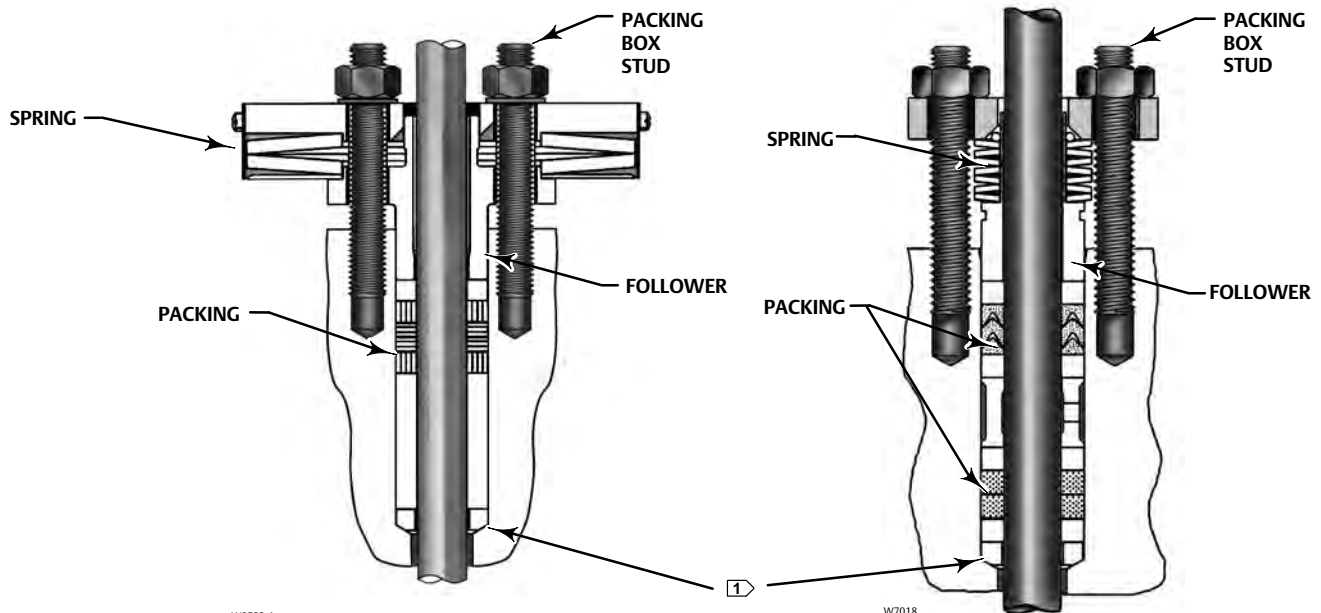


Figure 4. ENVIRO-SEAL and HIGH-SEAL Packing Systems



TYPICAL ENVIRO-SEAL PACKING SYSTEM WITH PTFE PACKING

TYPICAL ENVIRO-SEAL PACKING SYSTEM WITH GRAPHITE ULF PACKING

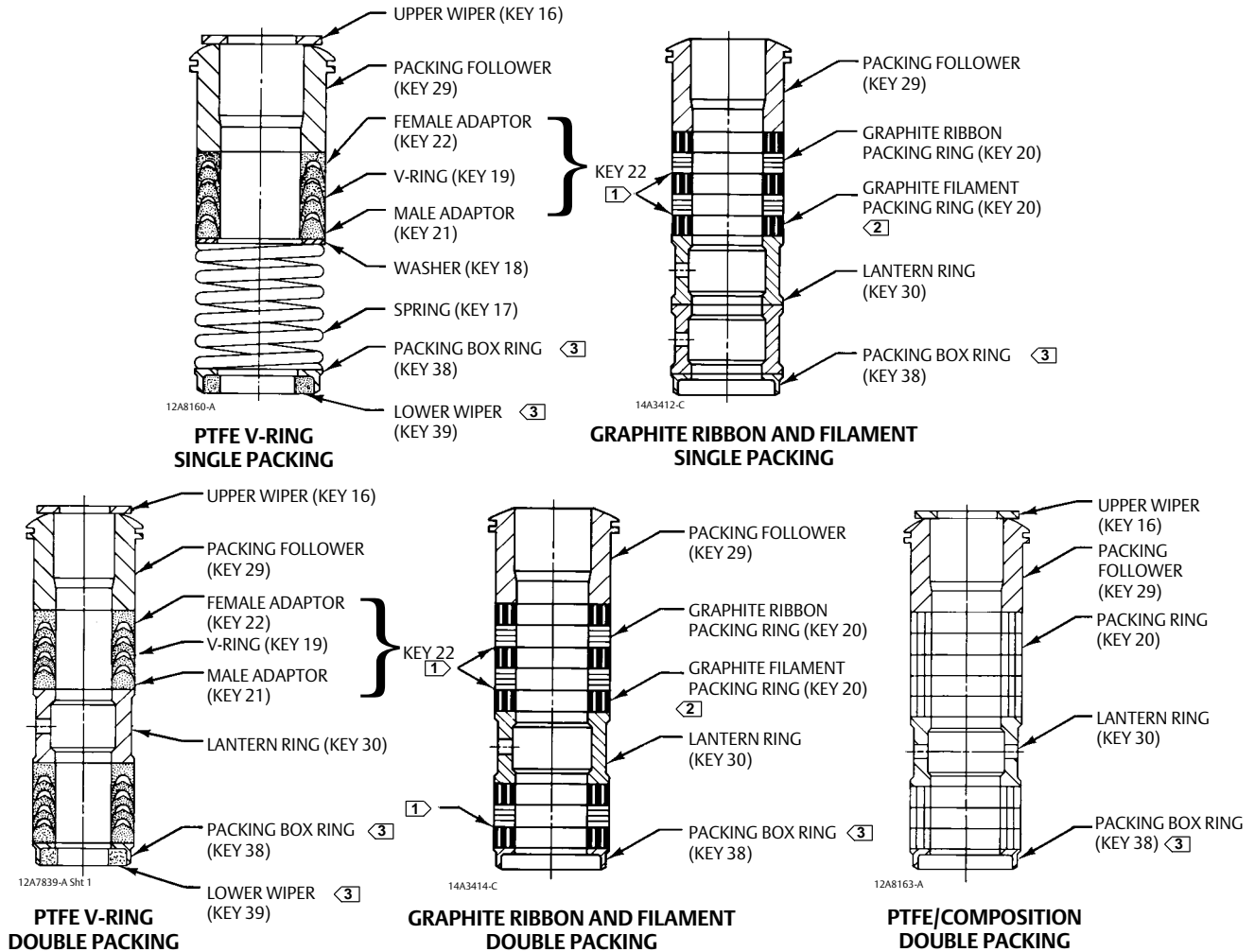


TYPICAL HIGH-SEAL PACKING SYSTEM WITH GRAPHITE ULF PACKING

TYPICAL ENVIRO-SEAL PACKING SYSTEM WITH DUPLEX PACKING

① For a flat bottom packing box, the packing box ring and lower wiper are not needed.

Figure 5. Packing Arrangements



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Notes:

- ① 0.102 mm (0.004 inch) thick sacrificial zinc washers. Use only one below each graphite ribbon ring.
- ② Has the appearance of a woven or braided ring.
- ③ For a flat bottom packing box, these parts are not needed.

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