

FLOWRITE II®

HEAVY DUTY BRONZE CONTROL VALVES

TECHNICAL INSTRUCTIONS

Heavy Duty Bronze Series

HEAVY DUTY BRONZE SERIES

DESCRIPTION

The Flowrite II Heavy Duty Bronze Series are designed for low cost modulating control or mixing of steam or water. Single seat designs include reduced trim, short stroke and high lift stem, with characterized plug for excellent modulating control. Double seat, balanced versions provide high capacity and take advantage of lower cost actuation. The Utility Bronze Series includes a variety of trim, actuators (pneumatic and electric), and accessory options. The Flowrite II line offers the most cost effective choices for maximum reliability including: 1/2" to 2" body style, air to open (ATO), air to close (ATC) failsafe configurations.

GROUP VALVES

- VE * Single Seat, unbalanced, reduced trim (low flow, high rangeability)
- SS Single Seat, unbalanced, stainless trim (modulating <200 psig)
- SD Single Seat, unbalanced, bronze trim (modulating < 50 psig)
- DB * Double Seat, balanced, trim choices (high capacity < 125 psig)
- WM 3-Way Mixing, balanced, trim choices (mixing & bypass)

SPECIFICATIONS

Body Size	1/2"	3/4"	1"	1 1/2"	2"
Pressure Class:	ANSI Class 250 per ASME/ANSI B165.34				
End Connectors:	Screwed NPT *(DB and VE are union ends)				
Materials:	Bronze				
Trim:	Bronze, Stainless Steel, Teflon or Composition				
Packing:	Teflon, or EP-V Ring (per application)				
	Live load typical				

Size	Actuators Available
1/2"	46" Diaphragm*
3/4"	46" Diaphragm
1"	46" Diaphragm
1 1/4"	46" Diaphragm
1 1/2"	46" and 84" Diaphragm**
2"	46" and 84" Diaphragm**

** 84" Diaphragm Actuator not available on Type DB

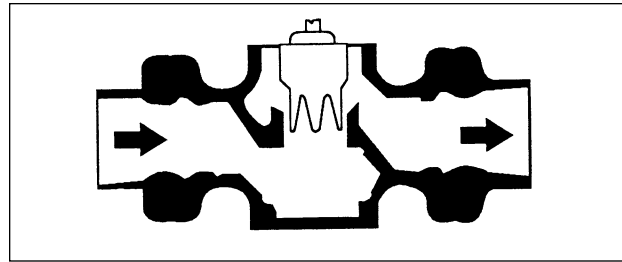


SD Single Seat Valve

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FLOWRITE II TYPE VE TECHNICAL DATA



Push to Close

MAXIMUM WATER CAPACITIES (GALLONS PER MINUTE)

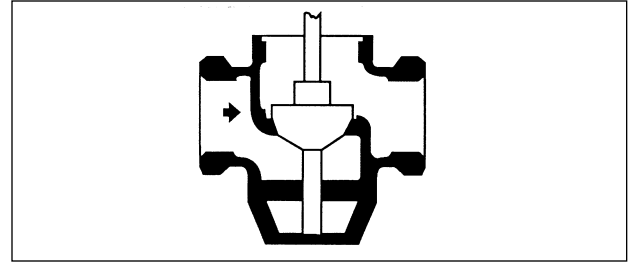
VALVE SIZE (in)	AVAILABLE SIZING PRESSURE DIFFERENTIAL-PSI														
	Cv1	2	4	6	8	10	15	20	30	40	50	60	80	100	125
1/2A	0.25	0.35	0.5	0.61	0.71	0.79	0.97	1.1	1.4	1.6	1.8	1.9	2.2	2.5	2.8
1/2B	0.50	0.71	1.0	1.2	1.4	1.6	1.9	2.2	2.7	3.2	3.5	3.9	4.5	5.0	5.6
1/2C	1.0	1.4	2.0	2.5	2.8	3.2	3.9	4.5	5.5	6.3	7.1	7.7	8.9	10	11
1/2D	2.0	2.8	4.0	4.9	5.6	6.3	7.8	9.0	11	13	14	16	18	20	22

MAXIMUM STEAM CAPACITIES (LBS. PER HOUR)

VALVE SIZE (in)	INLET PRESSURE-PSIG																
	2		5				10				15				25		
	AVAILABLE PRESSURE DROP FOR SIZING-PSI																
	1	2	1	2	3	5	2	4	6	8	10	2	5	10	MAX 15	2	5
1/2A	3.0	4.0	3.3	4.5	5.3	6.4	5.0	6.8	8.0	8.7	9.1	5.6	8.4	10	11	6.5	9.9
1/2B	6.0	8.1	6.5	8.9	11	13	10	14	16	17	18	11	17	21	22	13	20
1/2C	12	16	13	18	21	26	20	27	32	35	36	22	33	42	44	26	40
1/2D	24	32	26	36	42	51	40	55	64	69	73	45	67	84	89	52	79

VALVE SIZE (in)	INLET PRESSURE-PSIG																	
	25			50				75				100			125	150	250	
	AVAILABLE PRESSURE DROP FOR SIZING-PSI																	
	MAX			MAX				MAX				MAX			MAX	MAX	MAX	
	10	15	20	10	15	20	32.5	10	25	35	45	10	25	35	57.5	70	82.5	107.5
1/2A	13	14	15	18	20	22	24	21	30	33	34	25	36	40	43	52	62	80
1/2	26	29	30	35	41	44	49	42	60	66	67	49	72	79	86	105	123	161
1/2C	52	58	60	70	82	89	97	85	121	131	134	99	142	158	172	210	247	322
1/2D	103	116	119	140	164	178	194	169	214	262	269	194	284	317	344	419	494	644

FLOWRITE II TYPE SS TECHNICAL DATA



Push to Close

MAXIMUM WATER CAPACITIES (GALLONS PER MINUTE)

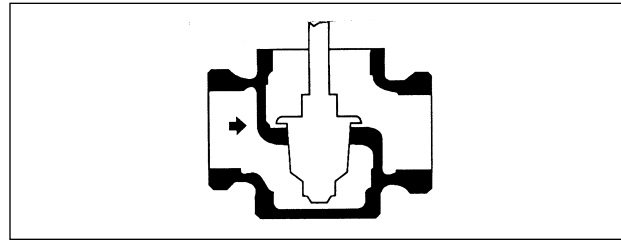
VALVE SIZE (in)	AVAILABLE PRESSURE DROP FOR SIZING-PSI															
	Cv1	2	4	6	8	10	15	20	25	30	40	50	60	80	100	125
1/2	2.7	3.8	5.4	6.6	7.6	8.5	11	12	14	15	17	19	21	24	27	30
3/4	6	9	12	15	17	19	23	27	30	33	38	43	47	54	60	67
1	10	14	20	25	28	32	39	45	50	54	63	71	78	90	100	111
1 1/4	16	23	32	40	45	51	62	72	80	88	101	114	124	144	160	179
1 1/2	20	29	40	49	57	63	77	89	100	110	126	142	155	179	200	224
2	38	54	76	93	107	120	147	170	190	208	240	269	295	340	380	425

MAXIMUM STEAM CAPACITIES (LBS. PER HOUR)

VALVE SIZE (in)	INLET PRESSURE-PSIG																					
	2		5				10				15				25				50			
	AVAILABLE PRESSURE DROP FOR SIZING-PSI																					
	1	2	1	2	3	5	2	4	6	8	10	2	5	10	15	2	5	10	15	20	10	15
1/2	32	45	35	49	59	74	55	76	91	103	112	60	93	126	146	70	109	149	176	195	196	235
3/4	72	100	78	109	132	165	123	170	203	229	250	134	208	280	324	156	243	332	392	433	435	522
1	119	166	130	182	219	275	204	283	339	382	417	224	346	466	540	261	405	553	653	722	726	870
1 1/4	191	266	208	291	351	441	327	453	542	611	667	358	554	747	865	418	648	885	1044	1156	1161	1392
1 1/2	239	333	260	363	439	551	409	566	678	764	834	447	692	933	1081	522	810	1106	1305	1445	1451	1740
2	454	632	494	690	834	1047	777	1075	1288	1452	1584	850	1316	1773	2054	993	1539	2102	2480	2746	2757	3305

VALVE SIZE (in)	INLET PRESSURE-PSIG																					
	50		75				100				125			150			175			200		
	AVAILABLE PRESSURE DROP FOR SIZING-PSI																					
	MAX		MAX				MAX				MAX			MAX			MAX			MAX		
	20	32.5	10	25	35	45	10	25	36	58	20	50	70	25	50	83	50	70	95	50	75	108
1/2	265	318	233	352	403	441	265	405	468	563	408	607	686	495	670	809	728	834	932	781	924	1055
3/4	589	706	518	782	895	979	590	900	1040	1252	908	1349	1525	1099	1489	1798	1617	1854	2071	1735	2054	2344
1	982	1177	864	1305	1493	1632	983	1500	1732	2087	1513	2249	2542	1832	2482	2997	2695	3090	3452	2892	3424	3906
1 1/4	1572	1884	1383	2087	2388	2612	1573	2400	2770	3340	2420	3598	4068	2931	3971	4795	4312	4945	5523	4628	5478	6520
1 1/2	1965	2355	1728	2609	2986	3265	1967	3000	3464	4175	3025	4498	5085	3664	4964	5994	5390	6181	6904	5785	6847	7813
2	3733	4475	3284	4958	5673	6024	3737	5700	6582	7933	5748	8546	9661	6661	9432	11389	10241	11744	13117	10991	13010	14845

FLOWRITE II TYPE SD TECHNICAL DATA



Push to Close

MAXIMUM WATER CAPACITIES (GALLONS PER MINUTE)

VALVE SIZE (in)	AVAILABLE PRESSURE DROP FOR SIZING-PSI											
	Cv1	2	4	6	8	10	15	25	30	40	50	
3/4	6	9	12	15	17	19	23	30	33	38	43	
1	10	14	20	25	28	32	39	50	54	63	71	
1 1/4	16	23	32	40	45	51	62	80	88	101	114	
1 1/2	20	29	40	49	57	63	77	100	110	126	142	
2	28	54	76	93	107	120	147	190	208	240	269	

MAXIMUM STEAM CAPACITIES (LBS. PER HOUR)

VALVE SIZE (in)	INLET PRESSURE-PSIG											
	2		5					10				
	AVAILABLE PRESSURE DROP FOR SIZING-PSI											
	1	2	1	2	3	4	5	2	4	5	8	10
3/4	72	100	78	109	132	150	165	123	170	203	229	250
1	119	166	130	182	219	250	275	204	283	339	382	417
1 1/4	191	266	208	291	351	400	441	327	453	542	611	667
1 1/2	239	333	260	363	439	500	551	409	566	678	764	834
2	454	632	494	690	834	950	1047	777	1075	1288	1452	1584

VALVE SIZE (in)	INLET PRESSURE-PSIG											
	15				25				50*			
	AVAILABLE PRESSURE DROP FOR SIZING-PSI											
	6	9	12	MAX 15	5	10	15	MAX 20	10	20	40	MAX 40
3/4	225	268	300	324	243	332	392	433	435	589	688	706
1	376	447	501	540	405	553	653	722	726	982	1147	1177
1 1/4	601	718	801	865	648	885	1044	1156	1161	1572	1835	1884
1 1/2	752	894	1002	1181	810	1106	1305	1445	1451	1965	2293	2355
2	1428	1700	1903	2054	1539	2102	2480	2746	2757	3733	4358	4475

* Maximum recommended steam pressure for normal seat and disc wear is 50 psi for all sizes.

FLOWRITE II TYPE DB TECHNICAL DATA

Double Seat Balanced Valves are not recommended for tight shut off applications

MAXIMUM WATER CAPACITIES (GALLONS PER MINUTE)

VALVE SIZE(in)	AVAILABLE SIZING PRESSURE DIFFERENTIAL –PSI*														
	Cv1	2	4	6	8	10	15	20	25	30	40	50	60	80	100
1/2	14	19	27	33	38	43	52	60	68	74	85	95	105	121	135
1 1/4	22	31	44	54	62	70	85	98	110	120	139	156	170	197	220
1 1/2	28	40	56	69	79	88	108	125	140	153	177	198	217	250	280
2	53	75	106	130	150	168	205	237	265	290	335	375	411	474	530
2 1/2	77	109	154	189	218	243	298	344	385	422	487	544	596	689	770
3	120	170	240	294	339	379	465	537	600	657	759	849	930	1073	1200
4	145	205	290	355	410	458	562	648	725	794	917	1025	1123	1297	1450
5	280	396	560	686	792	885	1084	1252	1400	1534	1771	1980	2169	2504	2800
6	360	509	720	882	1018	1138	1394	1510	1800	1972	2277	2546	2789	3220	3600
8	685	969	1370	1678	1937	2166	2653	3063	3425	3752	4332	4844	5306	6127	6850

MAXIMUM STEAM CAPACITIES (LBS. PER HOUR)

VALVE SIZE (in)	INLET PRESSURE–PSIG															
	2		5				10				15			25		
	AVAILABLE PRESSURE DROP FOR SIZING–PSI															
	1	2	1	2	3	5	2	4	6	8	10	6	9	12	MAX 15	25
1	161	225	176	245	298	372	276	382	457	516	563	507	604	676	728	547
1 1/4	263	366	286	400	483	606	450	623	745	841	917	827	984	1102	1189	891
1 1/2	335	466	364	508	614	771	572	792	949	1070	1167	1052	1252	1402	1513	1134
2	633	882	690	963	1163	1460	1084	1500	1796	2025	2209	1992	2370	2654	2855	2147
2 1/2	920	1231	1002	1398	1690	2121	1574	2179	2609	2943	3210	2894	3444	3856	4162	3119
3	1434	1997	1592	2179	2633	3305	2454	3396	4066	4586	5002	4511	5367	6010	6486	4860
4	1733	2413	1887	2633	3182	3993	2965	4103	4914	5542	6044	5450	6485	7262	7838	5873
5	3347	4660	3644	5085	6144	7711	5725	7924	9488	10700	11670	10520	12520	14020	15130	11340
6	4303	5991	4685	6538	7900	9915	7361	10190	12200	13760	15010	13530	16100	18030	19460	14580
8	8188	11400	8914	12440	15030	18870	14010	19380	23210	26180	28550	25750	30640	34310	37030	27740

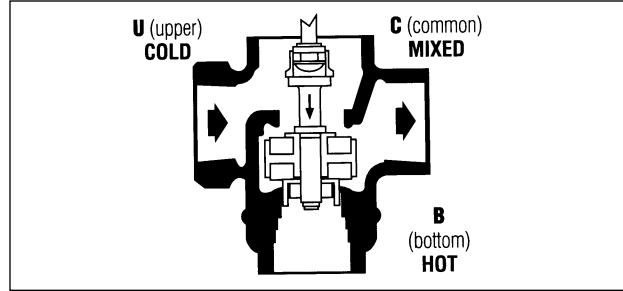
VALVE SIZE (in)	INLET PRESSURE–PSIG*															
	2		5				10				15			25		
	AVAILABLE PRESSURE DROP FOR SIZING–PSI															
	10	15	MAX 20	10	20	30	MAX 32.5	20	30	40	MAX 45	30	40	50	MAX 57.5	MAX 70
1	747	881	975	980	1326	1548	1590	1600	1898	2117	2204	2193	2468	2685	2818	3432
1 1/4	1217	1436	1590	1596	2161	2523	2591	2609	3093	3450	3592	3573	4021	4376	4593	5594
1 1/2	1549	1827	2023	2032	2750	3211	3297	3320	3936	4391	4571	4548	5118	5569	5845	7119
2	2932	3459	3829	3846	5206	6078	6241	6284	7451	8311	8652	8608	9688	10541	11064	13475
2 1/2	4260	5026	5683	5587	7564	8830	9067	9130	10820	12070	12570	12510	14070	15310	16070	19580
3	6639	7832	8670	8708	11790	13760	14130	14230	16870	18820	19590	19490	21930	23870	25050	30510
4	8022	9464	10480	10520	14240	16630	17070	17190	20390	22740	23670	23550	26500	28840	30270	36870
5	15490	18270	20230	20320	27500	32110	32970	33200	39360	43910	45710	45480	51180	55690	58450	71190
6	19920	23500	26010	26120	35360	41280	42390	42690	50610	56450	58770	58470	65800	71600	75150	91530
8	37900	44710	49490	49710	67290	78550	80660	81220	96300	10740	11180	11130	12520	13620	14330	17420

*Use stainless trim for inlet pressure exceeding 50 psi

FLOWRITE II TYPE WM TECHNICAL DATA

MAXIMUM WATER CAPACITIES (GALLONS PER MINUTE)

MAXIMUM MIXED FLOW-GPM



VALVE SIZE(in)	AVAILABLE SIZING PRESSURE DIFFERENTIAL –PSI*											
	Cv1	2	4	6	8	10	15	20	25	30	40	50
1/2	4.2	5.9	8.4	10	12	13	16	19	21	23	27	30
3/4	7.2	10	14	18	20	23	28	33	36	39	46	51
1	12	18	25	30	35	39	48	55	62	68	78	88
1-1/4	20	28	40	49	57	64	78	90	100	110	127	142
1-1/2	26	36	51	62	72	81	99	114	127	140	161	180
2	39	55	79	96	111	124	152	176	197	215	248	278
2-1/2	82	116	164	201	232	259	318	367	410	449	519	580
3	120	170	240	294	339	379	465	537	600	657	759	843
4	190	269	380	465	537	601	736	850	950	1041	1202	1344
5	270	382	540	661	764	854	1046	1207	1350	1479	1708	1909
6	340	481	680	833	962	1075	1317	1521	1700	1862	2150	2404

* For hot water tempering, use minimum differential of 10 PSI at maximum flow.

FLOW THRU BOTTOM PORT (UPPER PORT CLOSED)-GPM

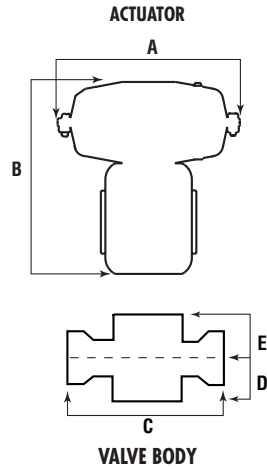
VALVE SIZE(in)	AVAILABLE SIZING PRESSURE DIFFERENTIAL-PSI											
	Cv1	2	4	6	8	10	15	20	25	30	40	50
1/2	2.2	3.1	4.4	5.4	6.2	7.0	9.0	10	11	12	14	16
3/4	6.0	8.5	12	15	17	19	23	27	30	33	38	42
1	8.9	13	18	22	25	28	34	40	45	49	56	63
1-1/4	16	22	32	39	45	50	61	71	79	87	100	112
1-1/2	18	25	36	44	51	57	69	80	90	98	113	127
2	30	43	60	74	85	96	117	135	151	165	191	214
2-1/2	82	116	164	201	232	259	318	367	410	449	519	580
3	120	170	240	294	339	379	465	537	600	657	759	849
4	190	269	380	465	537	601	736	850	950	1041	1202	1344
5	270	382	540	661	764	854	1046	1207	1350	1479	1708	1909
6	340	481	680	833	962	1075	1317	1521	1700	1862	2150	2404

FLOW THRU UPPER PORT (UPPER PORT CLOSED)-GPM

VALVE SIZE(in)	AVAILABLE SIZING PRESSURE DIFFERENTIAL-PSI											
	Cv1	2	4	6	8	10	15	20	25	30	40	50
1/2	3.5	4.9	7.0	8.6	9.9	11	14	16	18	19	22	25
3/4	6.0	8.5	12	15	17	19	23	27	30	33	38	42
1	11	16	22	27	32	35	43	50	56	61	71	79
1-1/4	17	24	33	41	47	53	65	75	84	91	106	118
1-1/2	24	34	47	58	67	75	92	106	119	130	150	168
2	38	54	76	93	108	120	148	170	191	209	241	269
2-1/2	77	109	154	189	218	243	298	344	385	422	487	544
3	92	130	184	225	260	291	356	411	460	504	582	651
4	160	226	320	392	452	506	620	716	800	876	1012	1131
5	252	356	504	617	713	797	976	1127	1260	1380	1594	1782
6	275	389	550	674	778	870	1056	1230	1375	1506	1739	1945

FLOWRITE II DIMENSIONAL DATA

DB



Pneumatic Actuators

Actuator*	A	B	lbs.
46"	10"	10-3/8"	14

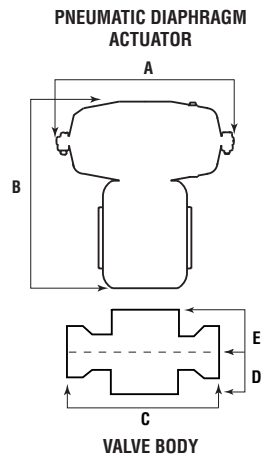
Valve Body

Size	C	D	E	lbs.
1"	6-5/8"	2-1/8"	3-5/8"	7
1-1/4"	7"	2-7/18"	3-5/8"	9
1-1/2"	7-7/8"	2-9/16"	3-3/4"	10
2"	9-7/32"	3-5/8"	4-13/16"	21

Utility (S-Series) Electric Actuators (not pictured)

Actuator*	Width	Depth	Height	lbs.
SA, SC, SB, SG, SH, SJ	5-3/8"	6-3/4"	13-1/2"	14
SD, SE, SF, SK, SL, SM	5-3/8"	9"	11-5/8"	29

SD



Pneumatic Actuators

Actuator	A	B	lbs.
46"	10"	10-3/8"	14

Valve Body

Size	C	D	E	lbs.
3/4"	3-15/16"	2"	2-5/8"	3
1"	3-13/16"	2-1/8"	2-11/16"	4
1-1/4"	4-11/16"	2-1/2"	3-1/16"	6
1-1/2"	5-1/16"	2-3/4"	3-5/16"	8
2"	6-1/8"	3-1/8"	3-5/8"	13

Utility (S-Series) Electric Actuators (not pictured)

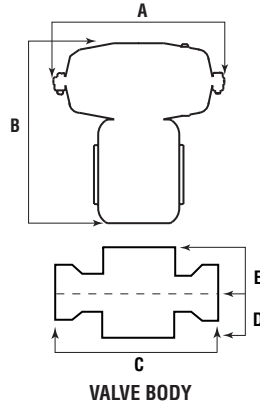
Actuator*	Width	Depth	Height	Lbs.
SA, SB, SC, SG, SH, SJ	5-3/8"	6-3/4"	13-1/2"	14
SD, SE, SF, SK, SL, SM	5-3/8"	9"	11-5/8"	29

FLOWRITE II DIMENSIONAL DATA

SS



PNEUMATIC DIAPHRAGM ACTUATOR



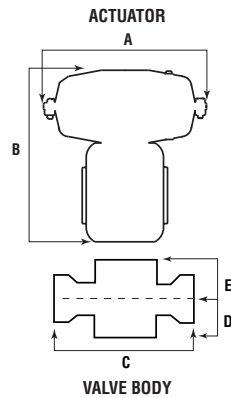
Pneumatic Diaphragm Actuators

Actuator*	A	B	lbs.
46"	10"	10-3/8"	14
84"	13-7/8"	15-3/4"	47

Valve Body

Size	C	D	E	lbs.
1/2	2-13/18"	1-11/16"	2-1/2"	2.5
3/4 & 1	3-7/8"	2-3/4"	2-7/8"	5
1-1/4	5-1/16"	3-7/8"	3-13/16"	10
1-1/2	5-1/16"	3-7/8"	3-13/16"	10.5
2	6-3/16"	3-1/4"	3-7/8"	15.5

VE



Pneumatic Actuators

Actuator*	A	B	lbs.
46"	10"	10-3/8"	14

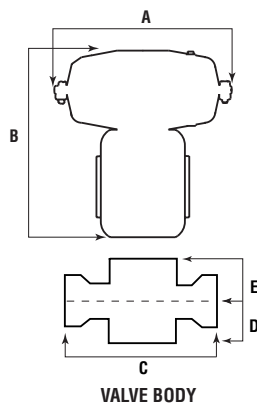
Valve Body

Valve Body	C	D	E	lbs.
1/2	5-5/8"	1-13/16"	2-7/16"	4

WM



PNEUMATIC DIAPHRAGM ACTUATOR



Pneumatic Actuators

Actuator*	A	B	lbs.
46"	10"	10-3/8"	14

Valve Body

Size	C	D	E	lbs.
1/2	2-7/8"	1-3/4"	2-3/8"	2
3/4	3-3/8"	2-1/8"	2-5/8"	3
1	3-7/8"	2-7/16"	2-11/16"	4
1-1/4"	4-5/8"	2-5/8"	3-1/16"	6
1-1/2"	5-3/16"	2-7/8"	3-5/16"	8
2	6-1/4"	3-15/16"	3-5/8"	14

FLOWRITE II MAINTENANCE

PACKING REPLACEMENT

The steam service Flowrite II uses spring loaded glass Teflon® V-Rings or Split Ring Graphite. This packing is self lubricating; additional lubricant is not recommended. Liquid service Flowrite II valves use EP spring loaded V-ring packing, on which silicone lubricant (part number 590-165A) is only for installation. For the proper packing kit see Packing Kit Chart in Appendix.

1. The stem surface must be smooth with no roughness or imperfections, which can cut, nick, or stretch packing pieces. Replace stem if imperfections are present.
2. Do not lubricate the bonnet chamber for steam service packing and EP liquid service packing. Steam service packing is self lubricating.
3. Protect the **beveled** or O-ring mating surfaces of valve body and bonnet. Damaged or nicked **bevel** or O-ring surface will cause the valve to leak.

REPACKING PROCEDURE

1. Shut off controlled medium passing through the valve (steam, water, or other liquid) and remove control signal to the actuator.
2. Remove bonnet locknut; turn counterclockwise, (**Figure 1**).
3. Hold the actuator stem in place, loosen the stem locknuts; turn locknuts counterclockwise. (**Figure 2**).
4. Place masking tape on valve stem to indicate how far actuator stem threads onto valve stem.
5. Hold actuator stem and turn valve stem counterclockwise using locknuts until stems are separated.
6. Remove actuator from valve assembly.
7. Remove packing gland nut. Remove bonnet from body and push out stem assembly for access to packing.
8. Remove old packing and replace with new parts in packing kit (see table for kit part numbers). If using EP V-ring packing, lubricate with silicone grease, (part number 590-165A).
9. Reassemble valve in reverse sequence.

Figure 1



Figure 2



DISC REPLACEMENT

1. Shut off controlled medium passing through the valve (steam, water, or other liquid) and remove control signal to the actuator.
2. Remove bonnet locknut (turn counterclockwise). Hold the actuator stem in place and loosen the stem in place and loosen the stem locknuts (turn locknuts counterclockwise). Place masking tape on valve stem to indicate how far actuator stem threads onto valve stem. Hold actuator stem and turn valve stem counterclockwise using locknuts until stems are separated. Remove actuator from valve assembly.
3. Unscrew the bonnet (turn counterclockwise) and pull assembly out of the valve body.
4. Remove locknut, throttling plug, and old disc from stem assembly.
5. Replace with new disc and reassemble in reverse order. See **Figure 3**.



Figure 3

SEAT REPLACEMENT

Note: Seats are not replaceable on all valves. If seats are damaged, a new valve body may be required.

Valve	Replaceable
VE	Yes (special tool required)
SD	No
SS	Yes (special tool required)
WM	No
DB	No

Stem Assembly



VALVE REPAIR KITS

Three different types of valve repair kits are available across all of our valves:

Kit Type	Kit Contents
Repack kit	Packing material
Repack & inspection kit	Packing and bonnet gasket
Rebuild kit	Packing, bonnet gasket, and trim (stem included)

To order repair kits, utilize the first 12 digits of the valve part number, which would clearly indicate the valve type, trim, connection, inner trim, action, and packing. The remaining 4 digits, which are not needed to source a valve kit, would then be available to indicate the type of kit. Since the same kit applications are available for all valves, the last four digits would use the following nomenclature for kit identification and ordering:

Kit Type	Nomenclature
Repack	KIT1
Repack & inspection	KIT2
Rebuild	KIT3

For example, the part number to order a rebuild kit for a Flowrite II with iron body and single seat bronze trim that is three inches, flanged (125#), bronze, Fail closed, and has Teflon packing is: 593-SI300FBCTKIT3.

These kits are not in a "Stock on the Shelf" form. They are built and priced to order. Contact Powers Technical Support (Phone 1-800-669-5430, Fax 1-847-673-9044) and request price and delivery for your chosen kit. Powers will respond within one business day for this request.

PACKING

Packing Type	Application
Teflon V-Ring (No Lubricant)	Effective from 200-400°F Steam: Up to maximum PSI valve rating Water: Up to maximum PSI valve rating
EP V-Ring Silicone lubricant required for installation, optional for service	Effective from 0-300°F Steam: 50 PSI maximum Water: Up to maximum PSI valve rating

PACKING APPLICATIONS

The packing on a Flowrite II provides a “seal” around the valve stem to prevent loss of the controlled medium (i.e., steam, water, thylene glycol solutions, etc.), while allowing the valve stem to pass through the packing for functional opening and closing of the valve.

V-RING PACKING

All Flowrite II Utility Valves now utilize the spring loaded V-ring packing. The teflon V-ring packing does not require lubricant. The EP V-ring packing must be lubricated with silicine grease (part #590-165A) prior to installation. Use of lubrication in service is optional. The packing rings are not split and disassembly of the valve is required to install or replace this packing.

PARTIAL REPACKING

The top three packing rings can be replaced without disassembling the valve, to minimize servicing time for critical system operation. However, replacement of all four packing rings is recommended to obtain optimum packing performance and life.

Coat new rings with recommended lubricant, slip rings around stem, staggering cuts, push down as far as possible and tighten packing gland nut sufficiently to compress the packing rings toward the bottom of the packing gland. Loosen packing gland nut and readjust to “finger tight” only. Pack the bonnet with recommended lubricant.

Note: Single set 2-way screwed valves should be repacked in the closed position.

For complete repacking, see page 9.

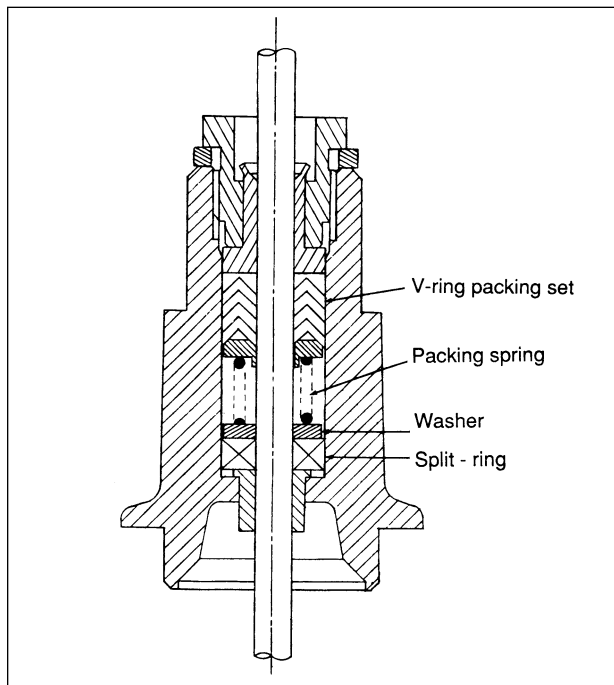
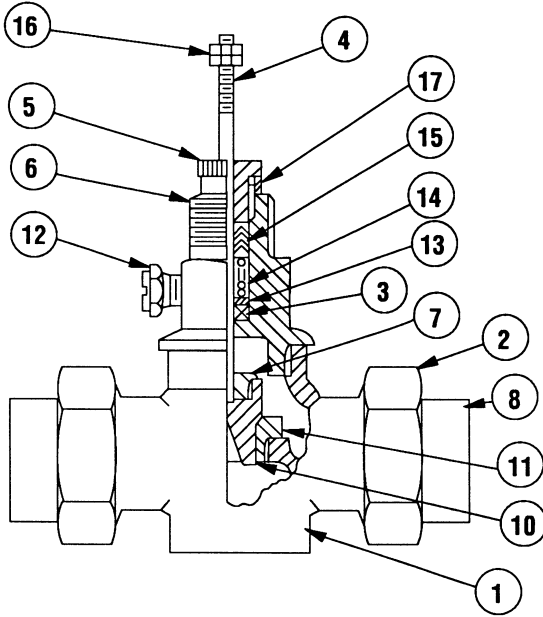


Figure 1. V-Ring and Split Ring Packing

FLOWRITE II APPENDIX A

VE VALVE CONSTRUCTION



Repair Kits

Repacking (KIT 1)	3, 13, 14, 15, 17
Packing & Inspection (KIT 2)	3, 13, 14, 15, 17, 5, 6
Rebuild (KIT 3)	3, 13, 14, 15, 17, 5, 6, 4, 7, 10, 11, 12

VALVE BODY PARTS

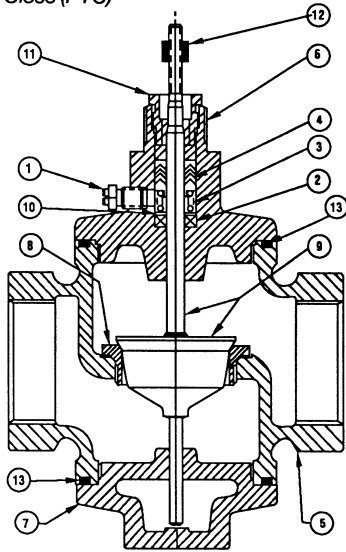
Item	Description	Use	Valve Body Size	Qty.	Material	
1	Valve Body†		—	590-487	1	Bronze
2	Union Nut		—	601-004	2	Bronze
3*	Packing Ring		—	594-170	1	Teflon®
4	Stem Assembly		—	594-814H	1	316 Stainless Steel
5	Packing Gland Assembly		—	590-763	1	Brass
6	Bonnet		—	590-131	1	Brass
7	Stem Retainer		—	590-604	1	416 Stainless Steel
8	Union Tail Piece		—	601-005	2	Brass
10	Poppet		1/2A	590-566	1	416 Stainless Steel
			1/2B	590-567	1	416 Stainless Steel
			1/2C	590-568	1	416 Stainless Steel
			1/2D	590-569	1	416 Stainless Steel
11	Valve Seat		—	590-608	1	416 Stainless Steel
12	Pipe Plug		—	403-007	1	Brass
13*	Washer		—	591-919	1	Brass
14*	Spring		—	591-920	1	Stainless Steel
15*	Packing Set		—	591-921	1	TFE
	Bonnet Lock Nut▲		—	628-008	1	Brass
16	Locknut		—	041-125	2	Brass
17*	Spacer		—	591-922A	1	Brass
	Valve Body Assembly		1/2A	590-954		
		1/2B	590-955			
		1/2C	590-956			
		1/2D	590-957			
	Actuator Assembly	D.A. R.A.	—	672-606D 672-606R		

* Parts available in packing kit only. † Seat not included. ▲ Not shown.

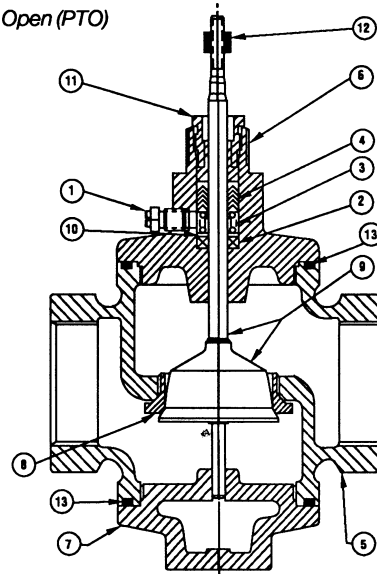
FLOWRITE II APPENDIX A

SS VALVE CONSTRUCTION

Push to Close (PTC)



Push to Open (PTO)



Repair Kits

Repacking	2, 3, 4, 10
Packing & Inspection	2, 3, 4, 10, 11, 13
Rebuild	2, 3, 4, 10, 11, 13, 1, 8, 9, 12, 14

Valve Body Parts

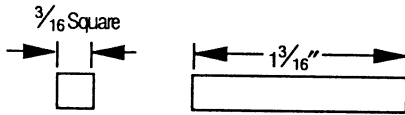
Item	Description	Use	Valve Body Size (Inches)						Qty.	Material
			1/2"	3/4"	1"	1 1/4"	1 1/2"	2"		
1	Pipe Plug	All	403-007						1	Brass
2*	Packing Ring	All	594-170			594-171			1	Garlock®
3*	Packing Spring	All	591-920			591-924			1	S.S.
4*	Packing Set	Steam	594-080			594-081			1	TFE
		Water	594-090			594-091				EP
5	Valve Body	All	N/A	N/A	N/A	N/A	N/A	N/A	1	Bronze
6	Bonnet	All	594-104	594-126		594-137		594-152	1	Bronze
7	Cap	All	594-106	594-194		594-195		594-196	1	Bronze
8	Valve Seat	All	594-107	594-129	594-130	594-140	594-141	594-155	1	17-4 S.S.
9	Stem Assembly	PTC	594-570	594-571	594-572	594-549	594-550	594-551	1	17-4 S.S. (plug)
		PTO	N/A	N/A	594-575	594-558	594-559	594-560		316 S.S. (stem)
10*	Washer	All	594-118			594-119			1	S.S.
11	Packing Nut Assembly	All	594-157			594-158			1	Brass
12	Locknut	All	041-125						2	Brass
13	O-ring	All	084-007	084-008		084-009		084-010	2	Silicone Rubbe
14	Bonnet Locknut (not shown)	All	628-008						1	Brass
	Valve Body Assembly (TFE) (46 sq. in. Actuator)	PTC	594-001	594-002	594-003	594-004	594-005	594-006		
	Valve Body Assembly (EP) (46 sq. in. Actuator)	PTC	594-013	594-014	594-015	594-016	594-017	594-018		
	Actuator Assembly (46 sq. in. Actuator)	DA RA	672-604D 672-604R	672-607L 672-607F	672-607D 672-607R	672-605D 672-605R	672-605D 672-605R	672-605D 672-605R		
	Valve Body Assembly (TFE) (75 sq. in. Actuator)	PTC PTO	NA	NA	NA	594-025 594-028	594-026 594-029	594-027 594-030		
	Valve Body Assembly (EP) (75 sq. in. Actuator)	PTC PTO				594-031 594-034	594-032 594-035	594-033 594-036		
	Actuator Assembly (75 sq. in. Actuator)	DA	NA	NA	NA	594 230A	594 230A	594 230A		

* Parts available in packing kit only.

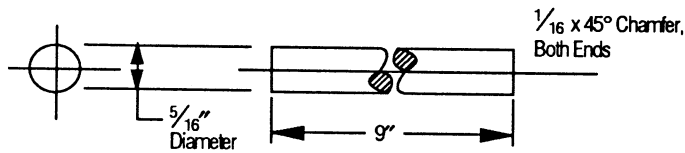
FLOWRITE II APPENDIX B SPECIAL TOOL DESIGN VE

TOOL FOR REPLACING "V" PORT VALVE SEATS

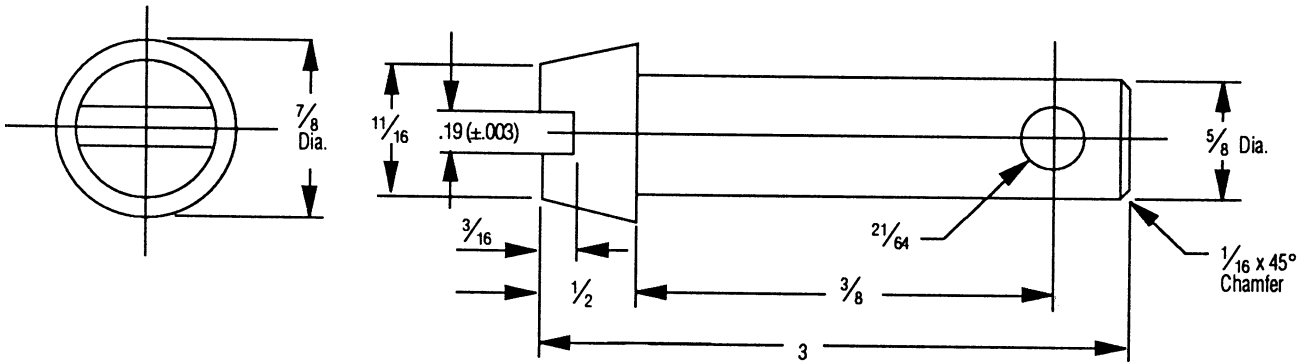
Tool Bit
Material: Tool Steel



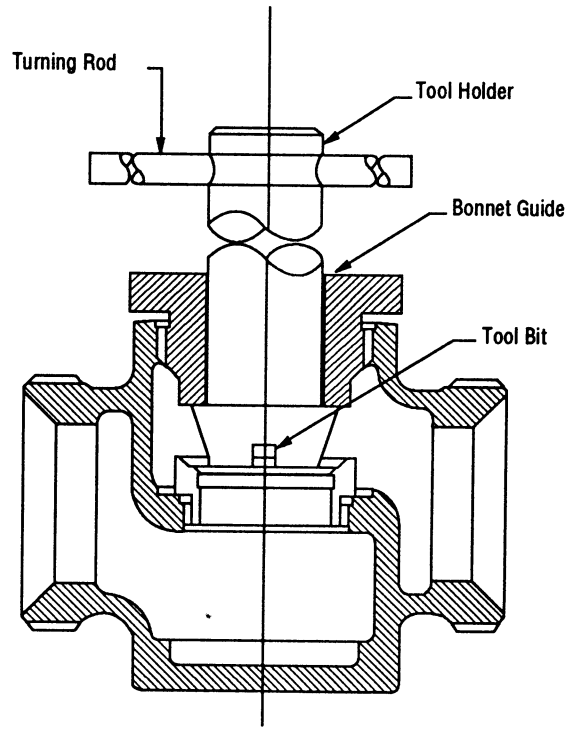
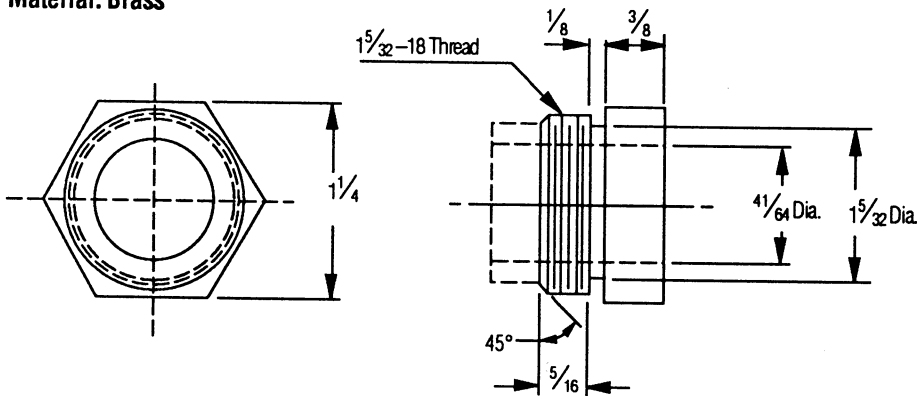
Turning Rod
Material: C.R. Steel



Tool Holder
Material: C.R. Steel

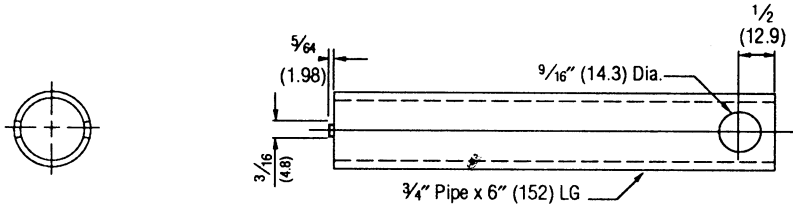


Bonnet Guide
Material: Brass

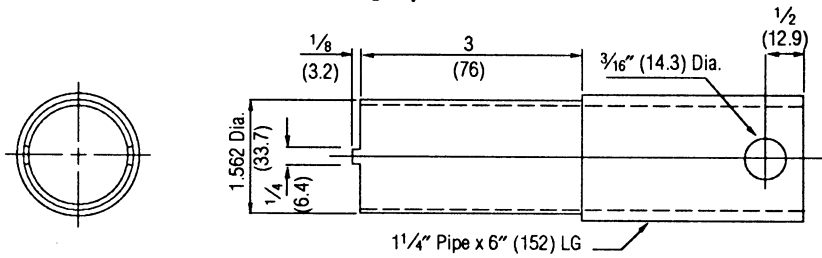


FLOWRITE II APPENDIX B SPECIAL TOOL DESIGN SS

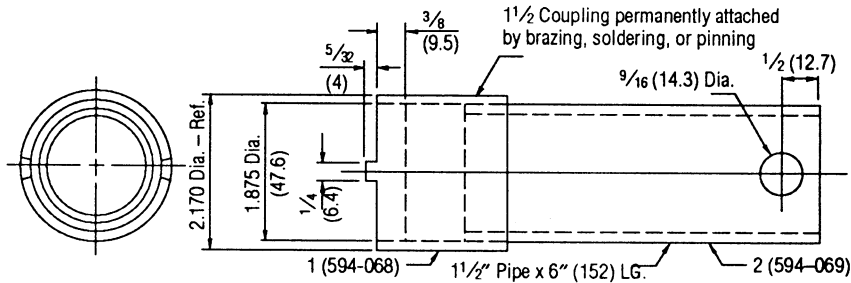
DIMENSIONAL DATA FOR PRODUCTION OF SEAT REMOVAL TOOL INCHES (MM)



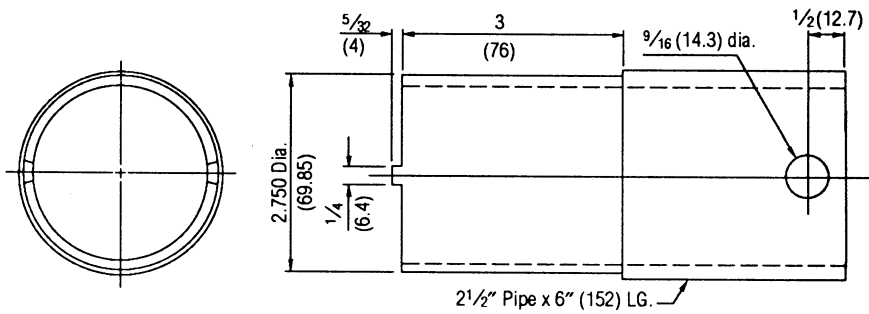
Dimensions for 1/2" Special Tool



Dimensions for 3/4" Special Tool



Dimensions for 1 1/4" Special Tool



Dimensions for 2" Special Tool

CALIFORNIA PROPOSITION 65 WARNING

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. (Installer: California law requires that this warning be given to the consumer.)

For more information: www.wattsind.com/prop65

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