

Valve Body Strength of Flomatic Submersible Check Valves Series 80E, 100E, 80DI, 80DIX, 80S6 installed with Schedule 40 pipe


June 25, 2018 Rev: 9

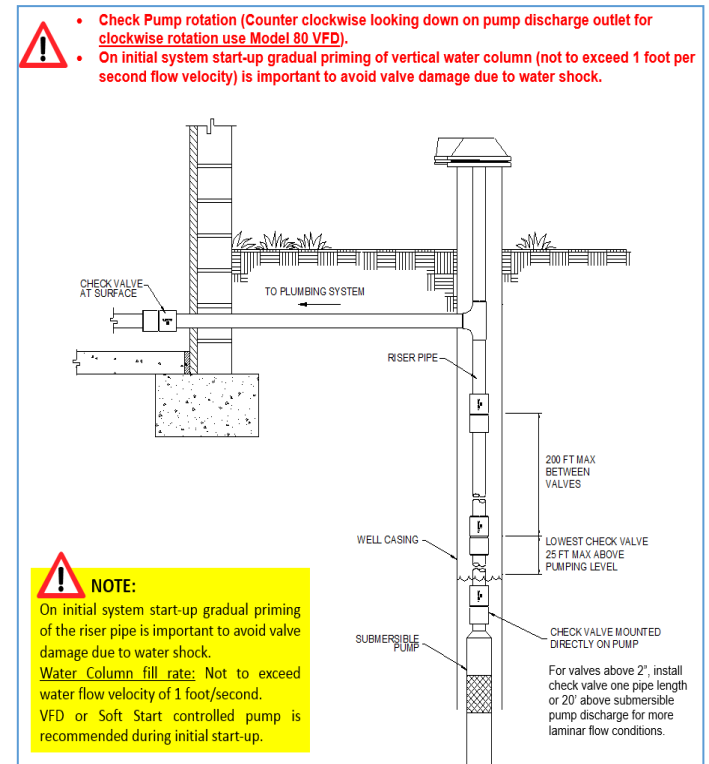
Model 80E & 100E ENIVIRO® Unleaded Bronze Check Valve

Body Material: ASTM C89833 (Federalloy® I-836-FL) Max Valve Operating Pressure: 400 PSI

Valve Size	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
Part No:	4031E/ 4201E	4032E/ 4202E	4033E	4034E	4035E	4036E	4037E
Valve External Diameter	1.85 Inches	2.2 Inches	2.6 Inches	3 Inches	3.69 Inches	4.54 Inches	5.84 Inches
Maximum recommended Valve Body load (With Safety Factor)	1,600 Lbs	2,200 Lbs	2,700 Lbs	3,200 Lbs	4,600 Lbs	7,900 Lbs	13,500 Lbs
Max recommended* pump setting:	605 Ft	613 Ft	591 Ft	474 Ft	471 Ft	584 Ft	653 Ft
Weight of schedule 40 pipe per 100 Feet with water	205 lbs	292 lbs	360 lbs	510 lbs	786 lbs	1,078 lbs	1,630 lbs
Gallons of water/Ft of pipe	0.045	0.078	0.106	0.174	0.249	0.384	0.661

*Note: Does not include weight of electric wire. It does include an estimated weight of the pump.

Note:
 **One check valve shall be installed at every 200 feet of vertical riser pipe and no more than 25 feet max above lowest pumping level for proper operation and pump protection. Follow Flomatic O & M manual and valve installation instruction to assure proper valve operation and pump protection.**



NOTE:
 Flomatic Corp. reserves the right to change valve models, dimension and materials without notifications.

Model 80DI and 80DIX Ductile Iron Check Valves

Body Material: Ductile Iron ASTM A536-84 Valve Operating Pressure: 1" thru 1 1/2" Max 400 PSI, 2" thru 8" Max 600 PSI, 10" & 12" Max 400 PSI

Valve Size	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"
Part No:	4031DI	4032DI	4033DI	7937	7936	7938	7939	4088	4089	4090	4091DIX	4092DIX
Valve External Diameter	1.85 Inches	2.2 Inches	2.6 Inches	3 Inches	3.69 Inches	4.54 Inches	5.75 Inches	6.75 Inches	8.00 Inches	9.69 Inches	12.13 Inches	15.41 Inches
Maximum recommended Valve Body load	4,500 Lbs	6,500 Lbs	7,800 Lbs	9,000 Lbs	13,300 Lbs	22,500 Lbs	36,000 Lbs	50,000 Lbs	60,000 Lbs	102,000 Lbs	158,000 Lbs	198,000 Lbs
Max recommended* pump setting:	1,743 Ft	1,748 Ft	1,684 Ft	1,344 Ft	1,333 Ft	1,644 Ft	1,715 Ft	1,685 Ft	1,447 Ft	1,752 Ft	1,577 Ft	1,425 Ft
Weight of schedule 40 pipe per 100 Feet with water	205 lbs	292 lbs	360 lbs	510 lbs	786 lbs	1,078 lbs	1,630 lbs	2,328 lbs	3,148 lbs	5,022 lbs	7,464 lbs	10,200 lbs
Gallons of water/Ft of pipe	0.045	0.078	0.106	0.174	0.249	0.384	0.66	1.04	1.5	2.6	4.1	5.8

*NOTE: Does not include weight of electric wire or submersible pump.

Model 80S6 Stainless Steel Check Valves

Body Material: Stainless Steel ASTM A351 Grade CF8 Max Valve Operating Pressure: 450 PSI

Valve Size	1"	1 1/4"	1 1/2"	2"	2 1/2"***	3"	4"	5"	6"	8"	10"
Part No:	4031S6	4032S6	4033S6	7937S6	7936S6	7938S6	7939S6	4088S6	4089S6	4090XXS	4091XSS
Valve External Diameter	1.85 Inches	2.2 Inches	2.6 Inches	3 Inches	3.69 Inches	4.54 Inches	5.75 Inches	6.75 Inches	8 Inches	9.69 Inches	12.13 Inches
Maximum recommended Valve Body load	3,400 Lbs	4,800 Lbs	5,700 Lbs	6,700 Lbs	10,000 Lbs	17,000 Lbs	27,000 Lbs	38,000 Lbs	45,000 Lbs	77,000 Lbs	118,000 Lbs
Max recommended* pump setting:	1,300 Ft	1,306 Ft	1,258 Ft	1,000 Ft	1,000 Ft	1,100 Ft	1,200 Ft	1,300 Ft	1,000 Ft	1,300 Ft	1,200 Ft
Weight of schedule 40 pipe per 100 Feet with water	205 lbs	292 lbs	360 lbs	510 lbs	786 lbs	1,078 lbs	1,630 lbs	2,328 lbs	3,148 lbs	5,022 lbs	7,464 lbs
Gallons of water/Ft of pipe	0.045	0.078	0.106	0.174	0.249	0.384	0.661	1.04	1.5	2.6	4.1

*NOTE: Does not include weight of electric wire or submersible pump

**Note: One check valve shall be installed at every 200 feet of vertical riser pipe for proper operation and pump protection.
Follow Flomatic O&M and valve installation instruction to assure proper valve operation and pump protection.**



Consult factory for the strength of other valve Models and valve body materials types.

Pipe Data for Schedule 40 Steel Pipes

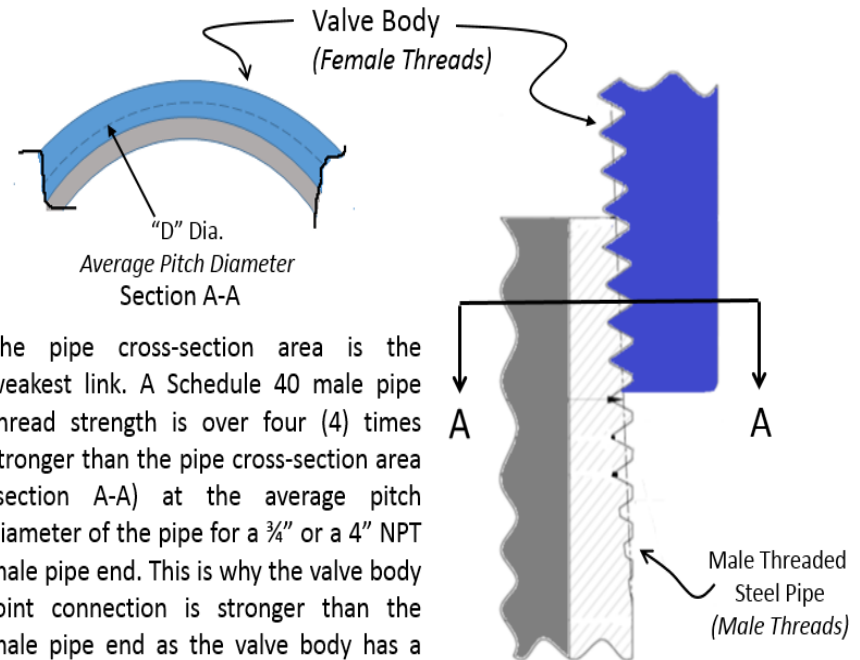
Pipe Strength based on a Material Yield strength of:
Steel Pipes Dimensions - ANSI Schedule 40

Pipe Size	Diameter		Gallons	Pipe Weight	Pipe & Water Weight	Calculated Max Pipe Load	Max Pipe Joint Strength
	(in)						
(in)	External	Internal	Gal/Ft	lb/ft	Lb/Ft	Force in Lbs. (Safety Factor of 4)	Force in Lbs. (Safety Factor of 4)
¾	1.05	0.82	0.03	1.1	1.4	2,956	834
1	1.32	1.05	0.04	1.7	2.1	4,398	1,167
1 ¼	1.66	1.38	0.08	2.3	2.9	5,850	1,750
1 ½	1.9	1.61	0.11	2.7	3.6	6,995	2,228
2	2.38	2.07	0.17	3.7	5.1	9,480	2,812
2 ½	2.88	2.47	0.25	5.8	7.9	15,074	4,177
3	3.5	3.07	0.38	7.6	10.8	19,415	6,230
3 ½	4	3.55	0.51	9.1	13.4	23,348	8,085
4	4.5	4.03	0.66	10.8	16.3	27,552	10,162
5	5.56	5.05	1.04	14.6	23.3	37,186	13,067
6	6.63	6.07	1.50	19.0	31.5	48,875	18,550
8	8.63	7.98	2.66	28.6	50.7	74,196	27,700
10	10.75	10.02	4.10	40.5	74.6	104,198	38,900
12	12.75	11.94	5.81	53.6	102.0	137,437	51,310



NPT Pipe Joint Strength

Schedule 40



The pipe cross-section area is the weakest link. A Schedule 40 male pipe thread strength is over four (4) times stronger than the pipe cross-section area (section A-A) at the average pitch diameter of the pipe for a ¾" or a 4" NPT male pipe end. This is why the valve body joint connection is stronger than the male pipe end as the valve body has a larger cross-section area (see section A-A). Select a Schedule 80 or 8 long round thread for more pipe joint strength.



NOTE: The above Pipe data are based on Schedule 40 pipe material with 35,000 psi minimum yield, minimum allowable wall, maximum allowable OD, and a safety factor of 4. The information and data presented above are standard values and are not a guarantee of maximum or minimum values. No liability is assumed for the correctness of this, or any other, data in this publication, either direct or indirect. Applications specifically suggested are made only for the purpose of illustration, to enable the reader to make his own evaluation, and are not intended as warranties, either expressed or implied, of fitness for these or other uses.

Pipe Data for Schedule 40 and 80 Pipe (ANSI B36.10-1975)



Schedule 40	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"
EXTERNAL DIA.	1.315	1.66	1.9	2.375	2.875	3.5	4.5	5.563	6.625	8.625	10.75	12.75
INSIDE DIA.	1.049	1.38	1.61	2.067	2.469	3.068	4.026	5.047	6.065	8.125	10.025	12.25
WALL THICKNESS	0.133	0.14	0.145	0.154	0.203	0.216	0.237	0.258	0.28	0.25	0.3625	0.25
WALL AREA SQ IN	0.49	0.67	0.80	1.07	1.70	2.23	3.17	4.30	5.58	6.58	11.83	9.82
INTERNAL PIPE AREA SQ IN	0.86	1.50	2.04	3.36	4.79	7.39	12.73	20.01	28.89	51.85	78.93	117.86
WEIGHT/FEET OF PIPE	1.68	2.27	2.72	3.65	5.79	7.58	10.79	14.62	18.97	28.55	40.48	53.52
MAX WORKING PRESSURE (PSI)	2,100	1,800	1,700	1,500	1,900	1,600	1,400	1,300	1,210	1,460	1,030	1,000
Yield at MAX working pressure:	3,675	4,027	4,329	4,684	5,338	5,308	5,615	6,048	6,263	11,508	6,873	12,005
WATER HAMMER FACTOR*	22.3	12.9	9.46	5.74	4.02	2.6	1.51	0.96	0.666	0.385	0.244	0.172
GALLONS/FT OF PIPE	0.045	0.078	0.106	0.174	0.249	0.384	0.661	1.039	1.501	2.693	4.100	6.123
WEIGHT OF 100 FEET OF												
PIPE WITH WATER:(LBS)	205	292	360	510	786	1,078	1,630	2,329	3,148	5,101	7,467	10,457
Schedule 80	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"
EXTERNAL DIA.	1.315	1.66	1.9	2.375	2.875	3.5	4.5	5.563	6.625	8.625	10.75	12.75
INSIDE DIA.	0.957	1.278	1.5	1.939	2.323	2.9	3.826	4.813	5.761	7.625	9.562	11.374
WALL THICKNESS	0.179	0.191	0.2	0.218	0.276	0.3	0.337	0.375	0.432	0.5	0.594	0.688
WALL AREA SQ IN	0.64	0.88	1.07	1.48	2.25	3.02	4.41	6.11	8.40	12.76	18.95	26.07
INTERNAL PIPE AREA SQ IN	0.72	1.28	1.77	2.95	4.24	6.61	11.50	18.19	26.07	45.66	71.81	101.61
WEIGHT/FEET OF PIPE	2.17	2.99	3.63	5.02	7.66	10.25	14.98	20.78	28.57	35.64	64.43	88.63
MAX WORKING PRESSURE (PSI)	3,500	3,000	2,800	2,500	2,800	2,600	2,300	2,090	2,070	2,280	1,800	1,800
Yield at MAX working pressure:	3,941	4,366	4,632	4,997	5,266	5,694	6,000	6,221	6,420	8,158	6,820	7,015
WATER HAMMER FACTOR*	26.8	15	10.9	6.52	4.54	2.92	1.67	1.06	0.738	0.422	0.268	0.181
GALLONS/FT OF PIPE	0.037	0.067	0.092	0.153	0.220	0.343	0.597	0.945	1.354	2.372	3.730	5.278
WEIGHT OF 100 FEET OF												
PIPE WITH WATER:(LBS)	248	355	440	630	950	1,311	1,996	2,866	3,986	5,542	9,553	13,264

*Note: Water Hammer Factor should be used to reduce allowable working pressure by the amount of flow in gal. Per min. times water hammer factor.