

Ventilating and Vacuum Breaker Valves

Type 591/595



General

- **Size:** 3/8"–4"
- **Material:** PVC, CPVC, PROGEF® Standard PP, ABS, SYGEF® Standard PVDF
- **Seals:** EPDM, FPM
- **Type 595 Spring:** 304 stainless steel
- **End Connection:** Solvent cement socket, threaded, flanged, fusion spigot, fusion socket

Key Certifications

- **FDA CFR 21 177.1520:** PP
- **FDA CFR 21 177.2600:** EPDM and FPM
- **FDA CFR 21 177.1550:** PTFE
- **USP 25 Class VI (physiological non-toxic):** PP
- **ABS:** All materials

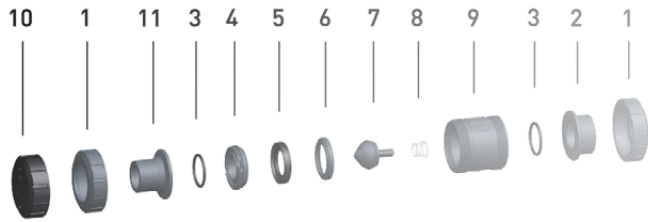
Optional Features

- **Spring for 595:** Nimonic 90, Halar coated stainless steel
- **End Connection:** Alternatives available upon request
- **Cleaned:** Silicone free/oil free
- **Float Material for 591:** Hollow PVDF

Sample Specification

The Type 591/595 Vent and Vacuum Breaker Valves shall be true union and fully serviceable. The float shall be of conical shape and stabilized by a guide rod. The carrier shall be adjustable and reverse threaded. The valve nut threads shall be of buttress type. All elastomeric seals shall be of like material. ANSI flanged versions shall meet ANSI B16.5 150lb standards. All valves shall be tested in accordance to ISO9393 and designed to ISO16137 standards. All valves shall be manufactured under ISO9001 for Quality and ISO14001 for Environmental Management. Following assembly, every valve shall be tested and certified bubble tight exceeding Class VI standards. PVC valves shall meet ASTM D1784 cell classification 12454 standards. CPVC valves shall meet ASTM D1784 cell classification 23447-B standards. PP valves shall meet ASTM D5847-14 cell classification PP0510B66851 standards. ABS valves shall meet ASTM D3965 cell classification 42222 standards. PVDF valves shall be type 1, grade 2 according to ASTM D3222 standards. Valves of all materials shall be RoHS compliant.

Components



Type 595 Valve Components

Part	Description	Material
1	Valve nut	PVC, CPVC, PP, ABS or PVDF
2	Valve end	PVC, CPVC, PP, PPn, ABS, PE or PVDF
3	Face seal	EPDM or FPM
4	Carrier	PVC, CPVC, PP, ABS or PVDF
5	Cone seal	EPDM or FPM
6	Backup ring	PVC, CPVC, PP, ABS or PVDF
7	Float	PVC, CPVC, PP, ABS or PVDF
8	Spring	304 Stainless steel
9	Valve body	PVC, CPVC, PP, ABS or PVDF
10	Cap	Glass-filled PP
11	Cap end	PVC, CPVC, PP, ABS or PVDF

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5	Cone seal	EPDM or FPM
6	Backup ring	PVC, CPVC, PP, ABS or PVDF
7	Float	PP or PVDF
9	Valve body	PVC, CPVC, PP, ABS or PVDF
10	Cap	Glass-filled PP
11	Cap end	PVC, CPVC, PP, ABS or PVDF



Optional Features

Float

The Type 595 utilizes floats constructed of the same material as the valve body because the buoyancy of the float is independent of the valve's functionality. Standard Type 591 valve constructed of PVC, CPVC, ABS or PP utilize a float constructed of PP because the specific gravity of PP is 0.91, making it buoyant in water. In the case of chemical resistance conflicts with a PP float, a float constructed of another standard material (PVC, CPVC, or ABS) can be substituted under the condition that the media is of higher density than the substitution material. Another option is to utilize the hollow PVDF float, however this option is only available for use with PVC, CPVC and ABS valves sizes 1"-4" (d32-d110).

Solid Float Density

Material	Density (g/cm ³)
PVC	1.38
CPVC	1.50
PP	0.91
PP-TV20 (PPh with 20% Talc)	1.05
ABS	1.03
PVDF	1.78

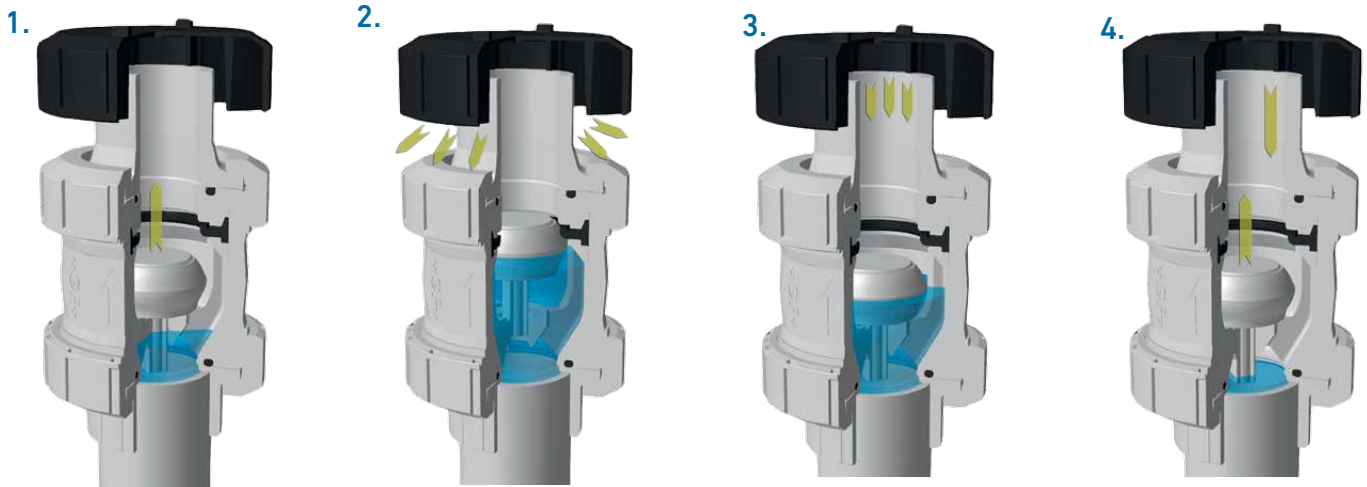
It is not recommended to use Type 561/562 Cone Check Valves in applications in which the media is of greater density than the cone. This will cause the cone to float, thus interfering with the valve's ability to seal properly. PP-TV20 cone used in PP valves.

Buoyancy: Hollow PVDF Float

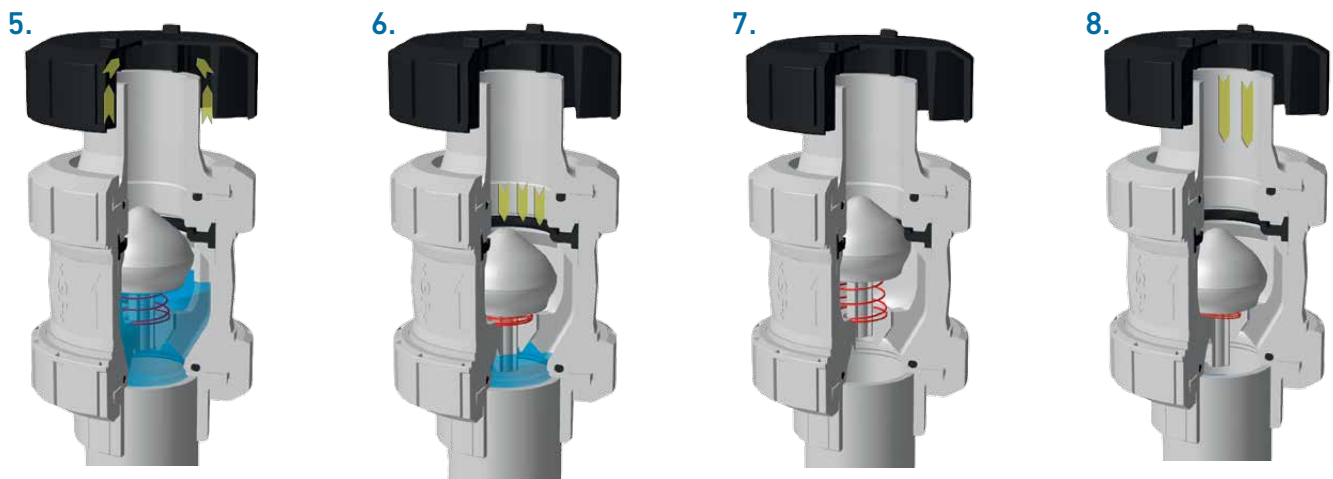
Size	d (mm)	Buoyancy (N)
3/8	16	0.02
1/2	20	0.02
3/4	25	0.04
1	32	0.09
1 1/4	40	0.09
1 1/2	50	0.13
2	63	0.18
2 1/2	75	0.68
3	90	1.38
4	110	3.13

Definition Valve Function

The Type 591 and 595 are designed for ventilation and vacuum breaker applications. Ventilation being defined as allowing gas out of a system and vacuum breaker being defined as allowing air into a system. The purpose of venting is to allow media to fill the system so it can function properly. The purpose of a vacuum breaker is to allow a system to drain or maintain atmospheric pressure in an previously drained system.



The Type 591 Valve can be used for vent applications. When the line is not pressurized and filled with air, the valve will remain open. Upon start up, media will begin to fill the system and air will be vented out of the valve¹. When media reaches the valve, the float will rise to the seat and seal the valve². The system will then begin to pressurize. Even if gas is introduced into a working system and completely fills a closed valve body, the float will remain sealed in a positively pressurized system. Negative pressure within the valve cavity is required to unseat the float³ and allow the system to drain⁴. Therefore, the valve will not continuously vent air while a system is in operation, it will only function as a vent valve during system start up.



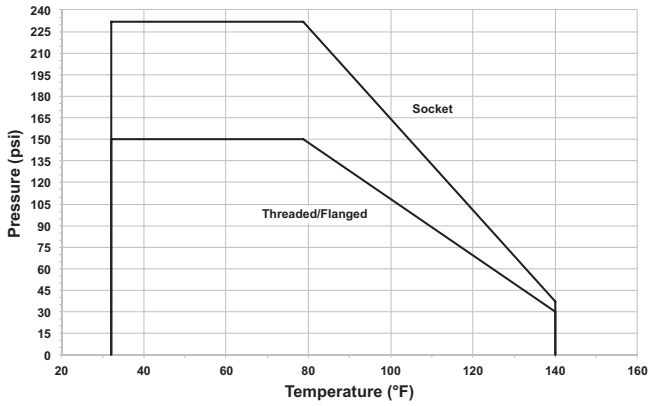
Both The Type 591 and Type 595 can be used in vacuum breaker applications. When a system is being drained, air must be allowed into a system. Draining a system will cause negative pressure at high points in the system⁵. This negative pressure will unseat the cone and allow air to pass through the valve and into the system⁶. The 595 is designed primarily for the protection against vacuums from building in systems by opening when negative pressure builds⁸ without continuously open those system to atmosphere. The difference between a 591 and 595 is that the 595 utilizes a spring that will re-close the valve once the vacuum is broken⁷ and the 591 will remain open until the system is restarted.

Technical Data

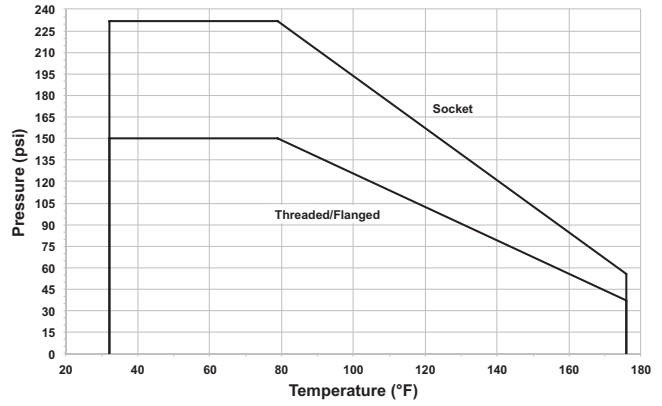
Pressure Temperature Curves

The following graphs are based on a 25 year lifetime water or similar media application

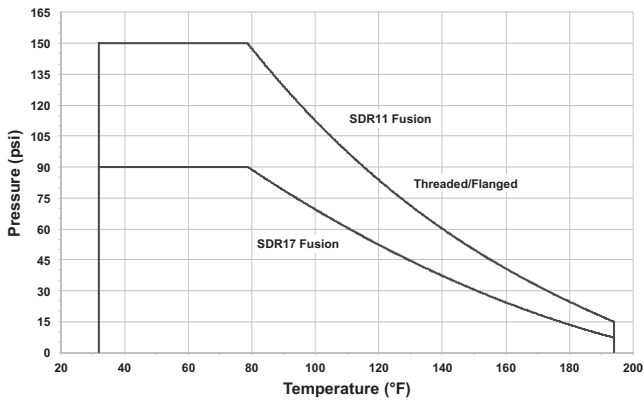
PVC



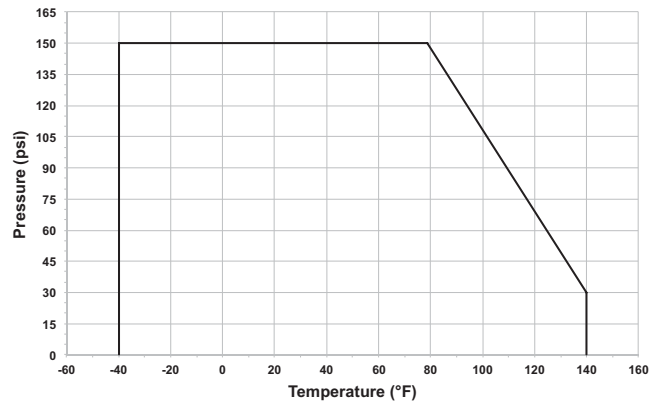
CPVC



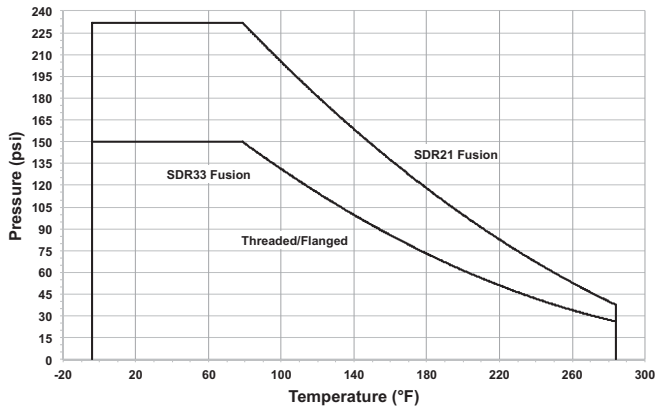
PP



ABS



PVDF



Pressure-Temperature

Material	Temperature Range (°F)	Max Pressure (psi)
PVC	32 to 140	232*
CPVC	32 to 176	232*
PP	32 to 176	150*
ABS	-40 to 140	150
PVDF	-4 to 284	232*

*Dependant on end connection as shown in P-T curves

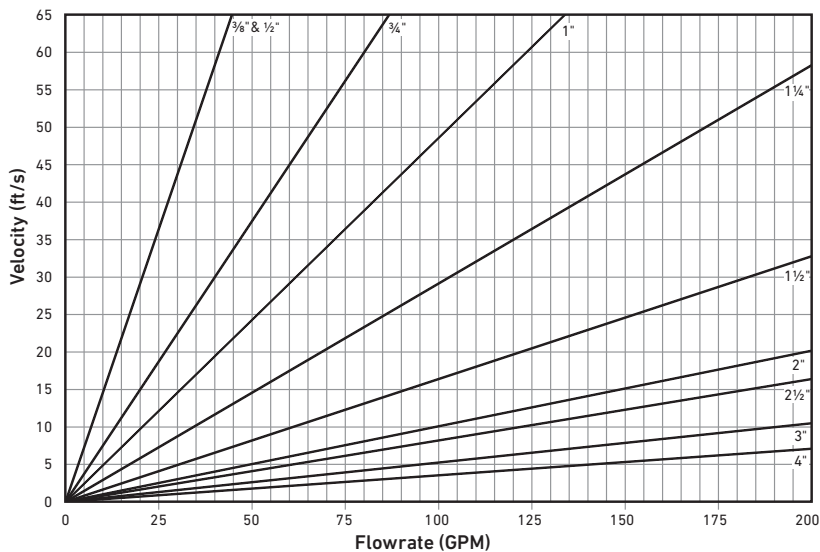
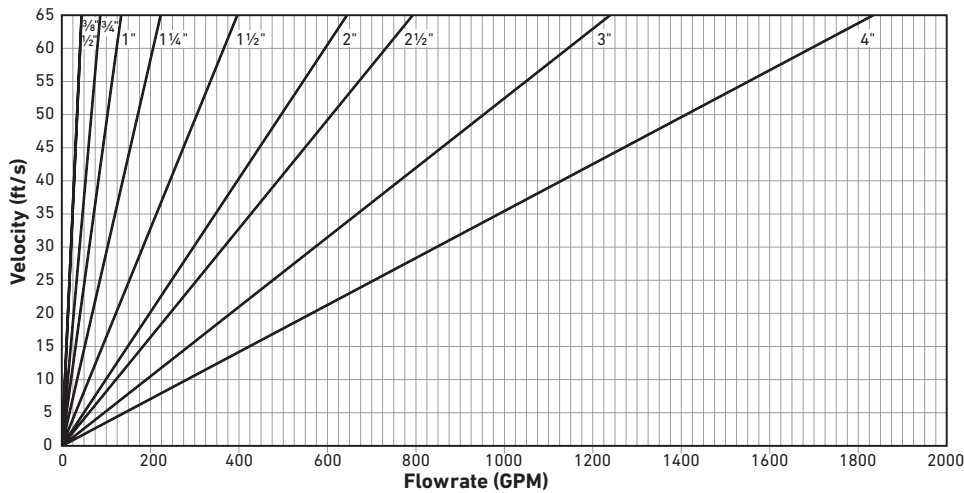
System Conditions

Size (inch)	d (mm)	591 Cracking (psi)	595 Cracking (psi)	591 Sealing (psi)	595 Sealing (psi)
3/8	16	0.04	0.41	2.9	1.45
1/2	20	0.04	0.41	2.9	1.45
3/4	25	0.04	0.44	2.9	1.45
1	32	0.07	0.44	2.9	1.45
1 1/4	40	0.07	0.51	2.9	1.45
1 1/2	50	0.15	0.58	2.9	1.45
2	63	0.29	0.73	2.9	1.45
2 1/2	75	0.36	0.87	2.9	1.45
3	90	0.44	0.87	2.9	1.45
4	110	0.44	0.87	2.9	1.45

Cracking pressure is amount of pressure on the inlet side of the valve required to unseat a closed valve and allow media to begin to pass through the valve. Sealing pressure is the amount of pressure on the outlet side of the valve required to seat an open valve and seal it so no media can pass through. The full stroke flowrate is the volume of media required to maintain the ideal position of the cone in order to optimize the valve's performance.

Air Flow Data

The following is based on air applications as 68°F. It is not recommend to exceed a velocity of 65 ft/s; 30–50 ft/s is ideal.



Maximum Flowrate

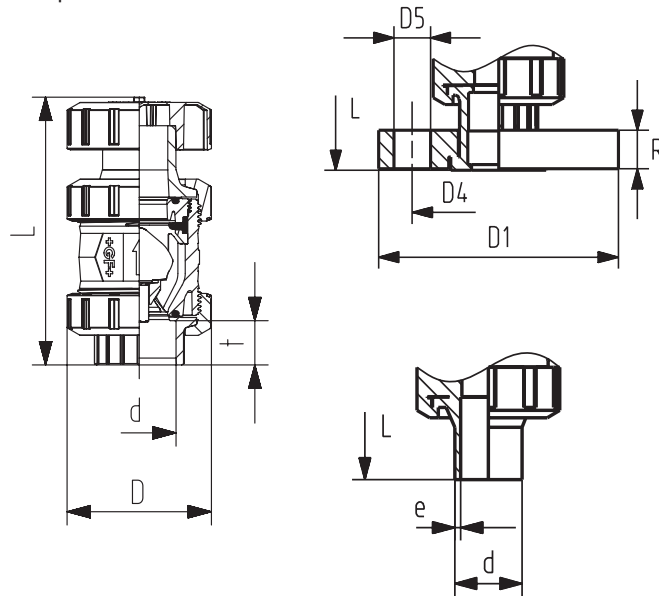
Size (inch)	d (mm)	Q (gpm)
3/8	16	45
1/2	20	45
3/4	25	87
1	32	134
1 1/4	40	223
1 1/2	50	396
2	63	644
2 1/2	75	793
3	90	1239
4	110	1831

Dimensions

The following tables are shown in millimeters unless otherwise specified

All Materials

Size (inch)	d (mm)	D
3/8	16	50
1/2	20	50
3/4	25	58
1	32	68
1 1/4	40	84
1 1/2	50	97
2	63	124
2 1/2	75	166
3	90	200
4	110	238



PVC/CPVC

Size (inch)	IPS Socket		Threaded NPT		ANSI Flanged				
	L	t	L	t	L	D1 (inch)	D4 (inch)	D5 (inch)	R (inch)
3/8	111	19	108	18	-	-	-	-	-
1/2	119	23	116	21	141	3.5	2.38	0.5	0.57
3/4	137	25	132	23	159	3.88	2.75	0.5	0.58
1	152	28	149	25	177	4.25	3.13	0.5	0.66
1 1/4	176	31	173	27	202	4.63	3.5	0.5	0.69
1 1/2	193	35	189	27	221	5	3.88	0.5	0.76
2	229	38	229	24	263	6	4.75	0.63	0.82
2 1/2	258	45	259	34	297	7	5.5	0.63	0.98
3	277	48	228	36	322	7.5	6	0.63	1.02
4	320	58	321	38	368	9	7.5	0.63	1.11

ABS

d (mm)	Socket	
	L	t
16	126	14
20	127	16
25	142	18
32	155	22
40	177	26
50	195	31
63	227	38
75	256	45
90	275	52
110	318	64

PP/PVDF

d (mm)	Metric Socket			Metric IR/Butt		
	L	t (PP)	t (PVDF)	L	e (PP)	e (PVDF)
16	126	14	14	-	-	-
20	127	15	15	140	1.9	1.9
25	142	16	16	157	2.3	1.9
32	153	18	18	168	2.9	2.4
40	171	19	19	189	3.7	2.4
50	190	21	21	211	4.6	3.0
63	219	28	28	245	5.8	3.0
75	256	29	29	280	6.8	3.6
90	275	33	33	296	8.2	4.3
110	318	39	39	336	10.0	5.3