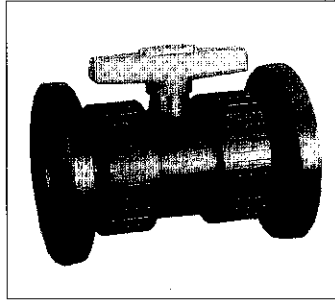
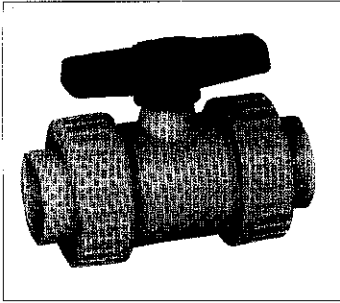


## George Fischer True Union Ball Valve Type 346



### General

The Type 346 Ball Valve permits radial installation or removal. Flow in either direction irrespective of installation position.

Available in sizes 3/8" – 2", (16 mm – 63 mm) in PVC, CPVC, SYGEF-PVDF, and polypropylene (PP).

Pressure rating 232 psi in accordance with DIN 3441 for PVC, CPVC, and SYGEF-PVDF socket; 150 psi for polypropylene and all threaded valves.

Access to all components, ball, stem, seats, and seals is provided by removal of the single threaded seat carrier. The double lever handle has a molded-in wrench to engage the seat carrier for removal by rotating clockwise to remove, counterclockwise to tighten (left-hand threads).

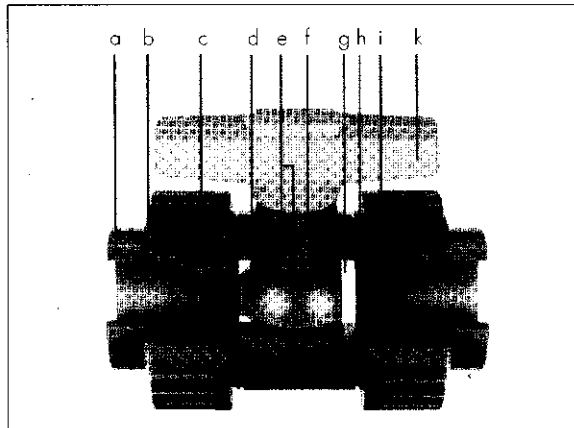
George Fischer plastic valves have the following outstanding features:

- Corrosion resistance
- Ideal flow characteristics
- Long working life, maintenance-free
- Light weight
- Ball valves Type 346 can be equipped with George Fischer electric or pneumatic actuators (refer to Type 112-119 or Type 220-226 resp.)
- Can be actuated after installation
- Capable of vacuum service down to 1 Torr (1mm of Hg) or 1.33 mbar. 29.881 inches of Mercury (U.S. units)
- Silicone free versions available
- EPDM and FPM seals available

10

### Technical Features

- a) Socket and threaded end connections.
- b) Union ends allow for repair or replacement. Also allow positioning of valve.
- c) Screwed-in seat carrier (left-hand threads) enables downstream connection to be removed without leakage.
- d) Floating ball principle provides leak-proof closure. Full bore cross section gives minimum pressure loss.
- e) Double stem sealing for maintenance free operation.
- f) Blow out proof stem (no undercut for O-ring seals).
- g) PTFE seats provide tight sealing with long service life.
- h) Backing O-rings provide a self-adjusting seal between seat and floating ball.
- i) Full block valve functions.

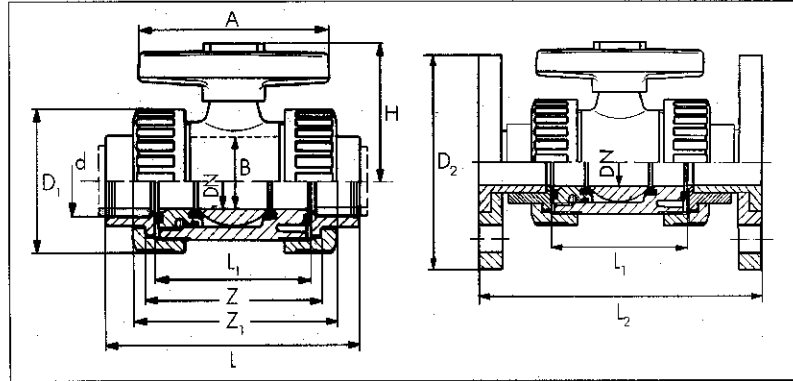


- k) Snap-on handle indicates open or close, can only be mounted correctly, and maintains clearance for knuckles. The handle remains firmly fixed.

## Dimensions for Type 346 True Union Ball Valve, PVC and CPVC

Z\* Solvent cement socket valve (laying length)

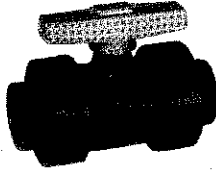
Z<sub>1</sub>\*\* Threaded valve (laying length is herein defined as the dimension between the ends of pipe when threaded into valve to a depth equal to the nominal "Handtight" plus 1/2 turn)



Inch size	L inch socket	thruaded	L <sub>1</sub> inch	L <sub>2</sub> inch	Z* inch	Z <sub>1</sub> ** inch	B inch	D <sub>1</sub> inch	D <sub>2</sub> inch	H inch	A inch	Weight lbs.
3/8	4.45	4.14	2.48	—	2.93	3.61	.55	1.81	—	1.97	3.07	.33
1/2	4.49	4.17	2.48	6.21	2.70	3.46	.55	1.81	3.50	1.97	3.07	.33
3/4	5.18	4.75	2.95	7.01	3.15	4.00	.74	2.20	3.88	2.36	3.62	.55
1	5.62	5.30	3.11	7.68	3.34	4.41	.94	2.64	4.25	2.76	3.94	.79
1-1/4	6.58	5.91	3.50	8.69	4.05	4.98	1.21	3.23	4.63	3.14	4.33	1.32
1-1/2	6.76	6.42	3.74	8.86	3.98	5.49	1.53	3.86	5.00	3.62	4.72	2.05
2	7.97	7.76	4.53	10.54	4.95	6.80	1.92	4.72	6.00	4.33	5.75	3.75

**Part Numbers for Type 346 True Union Ball Valve**

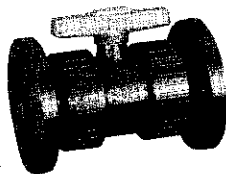
**PVC**



PTFE Seats

Inch size	solvent cement socket/NPT thread		flanged EPDM	FPM*
	EPDM	FPM*		
3/8	161.346.301	161.346.311	N/A	N/A
1/2	161.346.302	161.346.312	161.346.342	161.346.352
3/4	161.346.303	161.346.313	161.346.343	161.346.353
1	161.346.304	161.346.314	161.346.344	161.346.354
1-1/4	161.346.305	161.346.315	161.346.345	161.346.355
1-1/2	161.346.306	161.346.316	161.346.346	161.346.356
2	161.346.307	161.346.317	161.346.347	161.346.357

**CPVC**



PTFE Seats

Inch size	solvent cement socket/NPT thread		flanged EPDM	FPM*
	EPDM	FPM*		
1/2	163.346.302	163.346.312	163.346.342	163.346.352
3/4	163.346.303	163.346.313	163.346.343	163.346.353
1	163.346.304	163.346.314	163.346.344	163.346.354
1-1/4	N/A	N/A	N/A	N/A
1-1/2	163.346.306	163.346.316	163.346.346	163.346.356
2	163.346.307	163.346.317	163.346.347	163.346.357

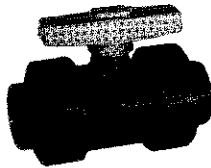
FPM seals are made of Viton® or equal materials. Viton® is a registered trademark of DuPont Dow Elastomers. Teflon® is a registered trademark of DuPont.

\*\*Assembled with silicone free lubricant

**Type 346 Silicone-Free True Union Ball Valve for Paint and Coating Applications\*\***

Contact Technical Service at 800-854-4090 for applications other than paint and coatings.

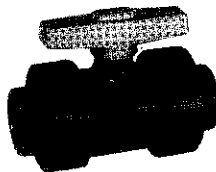
**PVC**



PTFE Seats

Inch Size	with solvent cement socket, ASTM		with taper female thread, NPT	
	EPDM seals	FPM* seals	EPDM seals	FPM* seals
3/8	161 346 681	161 346 691	161 346 701	161 346 711
1/2	161 346 682	161 346 692	161 346 702	161 346 712
3/4	161 346 683	161 346 693	161 346 703	161 346 713
1	161 346 684	161 346 694	161 346 704	161 346 714
1-1/4	161 346 685	161 346 695	161 346 705	161 346 715
1-1/2	161 346 686	161 346 696	161 346 706	161 346 716
2	161 346 687	161 346 697	161 346 707	161 346 717

**CPVC**



PTFE Seats

Inch Size	with solvent cement socket, ASTM		with taper female thread, NPT	
	EPDM seals	FPM* seals	EPDM seals	FPM* seals
1/2	163 346 682	163 346 692	163 346 702	163 346 712
3/4	163 346 683	163 346 693	163 346 703	163 346 713
1	163 346 684	163 346 694	163 346 704	163 346 714
1-1/4	163 346 685	163 346 695	163 346 705	163 346 715
1-1/2	163 346 686	163 346 696	163 346 706	163 346 716
2	163 346 687	163 346 697	163 346 707	163 346 717

## Product Specification

### Type 346 True Union Ball Valve - PVC

PVC true union ball valves 3/8" through 2" shall have either solvent cement socket or threaded pipe connections. Incorporated into its design safety features is a blow-out proof stem and the ability to hold pressure when the downstream union nut is removed. Seats shall be PTFE (Teflon®) with backing rings creating self-adjusting seals and constant operating torque. Backing rings and seals shall be EPDM or FPM\*. The handle shall include in its design a key for removal of the seat carrier in addition to having sufficient elevation to permit hand clearance. Seat carrier shall have left-hand threads to prevent possible unscrewing when threaded end connectors are removed from pipe. Material shall meet or exceed the requirements of 12454-B according to the classifications and requirements of ASTM D-1784. Socket end connection dimensions shall conform to ASTM D-2467. Threaded pipe connections shall be in accordance with ASTM D-2464 which references ANSI B1.20.1 (was B2.1) for tapered pipe threads. Optional flanged version shall be in accordance with ANSI B16.5, class 150 flanges. The valve, type 346, shall carry a pressure rating of 232 psi at 68°F as supplied by George Fischer, Inc., Tustin, CA 92780.

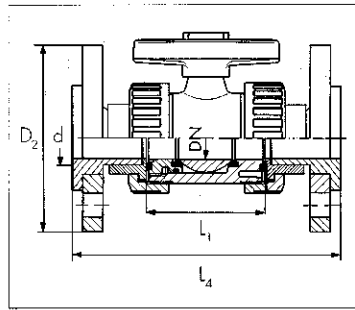
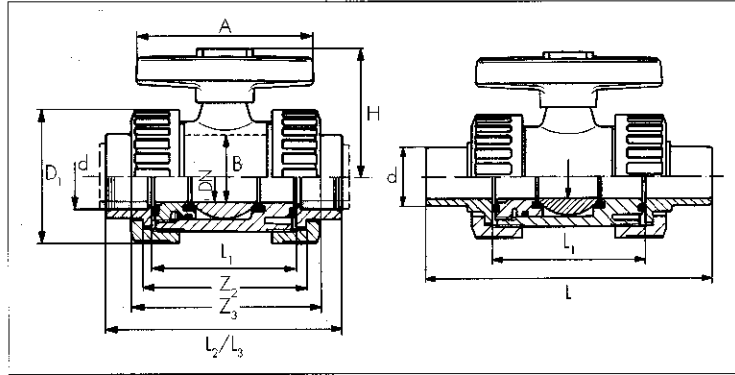
### Type 346 True Union Ball Valve - CPVC

CPVC true union ball valves 1/2" through 2" shall have either solvent cement socket or threaded pipe connections. Incorporated into its design safety features is a blow-out proof stem and the ability to hold pressure when the downstream union nut is removed. Seats shall be PTFE (Teflon®) with backing rings creating self-adjusting seals and constant operating torque. Backing rings and seals shall be EPDM or FPM\*. The handle shall include in its design a key for removal of the seat carrier in addition to having sufficient elevation to permit hand clearance. Seat carrier shall have left-hand threads to prevent possible unscrewing when threaded end connectors are removed from pipe. Material shall meet or exceed the requirements of 23447-B according to the classifications and requirements of ASTM D-1784. Socket end connection dimensions shall conform to ASTM F439 (formerly D-2467). Threaded end connections shall conform to the dimensions as listed in ASTM F437 (formerly D-2464) which references ANSI B1.20.1 (was B2.1) for tapered pipe threads. Optional flanged version shall be in accordance with ANSI B16.5, class 150 flanges. The valve, type 346, shall carry a pressure rating of 232 psi at 68°F as supplied by George Fischer, Inc., Tustin, CA 92780.

*\*FPM seals are made of Viton® or equal materials.  
Viton® is a registered trademark of DuPont Dow Elastomers.  
Teflon® is a registered trademark of DuPont.*

### Dimensions for Type 346 True Union Ball Valve, Polypropylene and SYGEF-PVDF

- L Overall length of IR/butt fusion valve
- L<sub>2</sub> Overall length of metric fusion socket valve
- L<sub>3</sub> Overall length of threaded valve
- L<sub>4</sub> Face to face dim.
- Z<sub>2</sub>\* Metric fusion socket valve (laying length)
- Z<sub>3</sub>\*\* Threaded valve (laying length is herein defined as the dimension between the ends of pipe when threaded into valve to a depth equal to the nominal "Handlight" plus 1/2 turn)



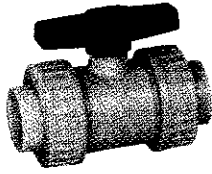
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OD d mm	ID DN mm	L inch	L <sub>1</sub> inch	L <sub>2</sub> inch	L <sub>3</sub> inch	L <sub>4</sub> inch	Z <sub>2</sub> * inch	Z <sub>3</sub> ** inch	B inch	D <sub>1</sub> inch	PP D <sub>2</sub> inch	SYGEF D <sub>2</sub> inch	H inch	A inch	Inch size
16	10	4.29	2.44	3.86	4.37	—	2.83	3.48	.55	1.81	—	—	1.97	3.07	3/8
20	15	5.12	2.44	3.98	4.37	6.81	2.87	3.31	.55	1.81	3.74	3.50	1.97	3.07	1/2
25	20	5.67	2.91	4.69	5.12	7.36	3.43	3.88	.74	2.20	4.13	3.86	2.36	3.62	3/4
32	25	5.91	3.07	5.12	5.51	7.95	3.70	4.30	.94	2.64	4.53	4.25	2.76	3.94	1
40	32	6.73	3.46	5.87	6.50	8.62	4.29	5.19	1.21	3.23	5.51	4.61	3.11	4.33	1-1/4
50	40	7.52	3.70	6.38	6.57	9.45	4.57	5.12	1.53	3.86	5.91	5.00	3.58	4.72	1-1/2
63	50	8.66	4.45	7.68	7.83	10.51	5.55	6.28	1.92	4.72	6.50	5.98	4.29	5.75	2

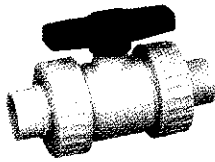
OD d mm	ID DN mm	Weight lbs.		Inch size
		PP	PVDF	
16	10	.22	.37	3/8
20	15	.22	.37	1/2
25	20	.35	.64	3/4
32	25	.53	.97	1
40	32	.86	1.61	1-1/4
50	40	1.34	2.49	1-1/2
63	50	2.47	4.52	2

## Part Numbers for Type 346 True Union Ball Valve

### Polypropylene (PP)

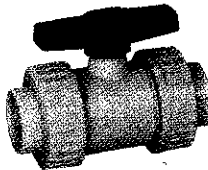


OD d mm	ID DN mm	metric fusion sockets		threaded NPT		Inch size
		EPDM seals PTFE seats	FPM* seals PTFE seats	EPDM seals PTFE seats	FPM* seals PTFE seats	
16	10	167.346.001	167.346.011	167.346.321	167.346.331	3/8
20	15	167.346.002	167.346.012	167.346.322	167.346.332	1/2
25	20	167.346.003	167.346.013	167.346.323	167.346.333	3/4
32	25	167.346.004	167.346.014	167.346.324	167.346.334	1
40	32	167.346.005	167.346.015	167.346.325	167.346.335	1-1/4
50	40	167.346.006	167.346.016	167.346.326	167.346.336	1-1/2
63	50	167.346.007	167.346.017	167.346.327	167.346.337	2



OD d mm	ID DN mm	IR/butt fusion ends		flanged		Inch size
		EPDM seals PTFE seats	FPM* seals PTFE seats	EPDM seals PTFE seats	FPM* seals PTFE seats	
20	15	167.346.082	167.346.092	167.346.362	167.346.372	1/2
25	20	167.346.083	167.346.093	167.346.363	167.346.373	3/4
32	25	167.346.084	167.346.094	167.346.364	167.346.374	1
40	32	167.346.085	167.346.095	167.346.365	167.346.375	1-1/4
50	40	167.346.086	167.346.096	167.346.366	167.346.376	1-1/2
63	50	167.346.087	167.346.097	167.346.367	167.346.377	2

### Polypropylene Specially Cleaned for Microelectronics Service\*\* Single bagged, available by special order only



OD d mm	ID DN mm	metric fusion sockets		IR/butt fusion ends		Inch size
		EPDM seals PTFE seats	FPM* seals PTFE seats	EPDM seals PTFE seats	FPM* seals PTFE seats	
16	10	700 244 020	700 244 027	—	—	3/8
20	15	700 244 021	700 244 028	700 244 034	700 244 040	1/2
25	20	700 244 022	700 244 029	700 244 035	700 244 041	3/4
32	25	700 244 023	700 244 030	700 244 036	700 244 042	1
40	32	700 244 024	700 244 031	700 244 037	700 244 043	1-1/4
50	40	700 244 025	700 244 032	700 244 038	700 244 044	1-1/2
63	50	700 244 026	700 244 033	700 244 039	700 244 045	2

### Polypropylene Specially Cleaned for Paint and Coating Applications\*\* Single bagged, available by special order only

OD d mm	ID DN mm	metric fusion sockets		IR/butt fusion ends		Inch size
		EPDM seals PVDF seats	FPM* seals PVDF seats	EPDM seals PVDF seats	FPM* seals PVDF seats	
16	10	167 346 601	167 346 611	—	—	3/8
20	15	167 346 602	167 346 612	167 346 662	167 346 672	1/2
25	20	167 346 603	167 346 613	167 346 663	167 346 673	3/4
32	25	167 346 604	167 346 614	167 346 664	167 346 674	1
40	32	167 346 605	167 346 615	167 346 665	167 346 675	1-1/4
50	40	167 346 606	167 346 616	167 346 666	167 346 676	1-1/2
63	50	167 346 607	167 346 617	167 346 667	167 346 677	2

\*FPM seals are made of Viton® or equal materials.  
Viton® is a registered trademark of DuPont Dow Elastomers.

\*\*Assembled with silicone free lubricant

**Part Numbers for Type 346 True Union Ball Valve**

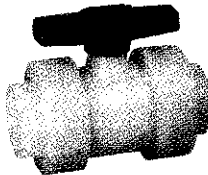
**SYGEF-PVDF**



OD d mm	ID DN mm	metric fusion sockets	IR/butt fusion ends	flanged	threaded NPT	Inch size
		FPM* seals PTFE seats	FPM* seals PTFE seats	FPM* seals PTFE seats	FPM* seals PTFE seats	
16	10	175.346.011	N/A	N/A	175.346.331	3/8
20	15	175.346.012	175.346.092	175.346.372	175.346.332	1/2
25	20	175.346.013	175.346.093	175.346.373	175.346.333	3/4
32	25	175.346.014	175.346.094	175.346.374	175.346.334	1
40	32	175.346.015	175.346.095	175.346.375	175.346.335	1-1/4
50	40	175.346.016	175.346.096	175.346.376	175.346.336	1-1/2
63	50	175.346.017	175.346.097	175.346.377	175.346.337	2

**SYGEF-PVDF Specially Cleaned for Microelectronics Service\*\***

**Single bagged**



OD d mm	ID DN mm	metric fusion sockets	Inch size
		FPM* seals PTFE seats	
16	10	700.243.449	3/8
20	15	700.243.450	1/2
25	20	700.243.451	3/4
32	25	700.243.452	1
40	32	700.243.453	1-1/4
50	40	700.243.454	1-1/2
63	50	700.243.455	2

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**SYGEF-PVDF Specially Cleaned for Paint and Coating Applications\*\***

**Single bagged, available by special order only**

OD d mm	ID DN mm	metric fusion sockets	IR/butt fusion ends	Inch size
		FPM seals PVDF seats	FPM* seals PVDF seats	
16	10	175 346 691	—	3/8
20	15	175 346 692	175 346 752	1/2
25	20	175 346 693	175 346 753	3/4
32	25	175 346 694	175 346 754	1
40	32	175 346 695	175 346 755	1-1/4
50	40	175 346 696	175 346 756	1-1/2
63	50	175 346 697	175 346 757	2

\*FPM seals are made of Viton® or equal materials.  
 Viton® is a registered trademark of DuPont Dow Elastomers.  
 Teflon® is a registered trademark of DuPont.

\*\*Assembled with silicone free lubricant

## Product Specification

### Type 346 True Union Ball Valve – Polypropylene

Polypropylene true union ball valves 3/8" through 2" (16 mm – 63 mm) shall have either metric fusion socket or threaded type pipe connections. Incorporated into its design safety features is a blow-out-proof stem and the ability to hold pressure when the downstream union nut is removed. Seats shall be PTFE (Teflon®) with backing rings creating self-adjusting, constant operating torque sealing characteristics. Backing rings and seals shall be EPDM or FPM\*. The handle shall include in its design a key for removal of the seat carrier in addition to providing sufficient height to permit hand clearance. Seat carrier shall have left-hand threads to prevent possible unscrewing when threaded end connector is installed on the pipe. Material shall meet or exceed the requirements of ASTM D 4101 as pertains to a type I homopolymer compound having a minimum tensile strength of 4350 psi/300 bar at 73°F/20°C when tested in accordance with ASTM D 638 and shall have a melt point which initiates at 316°F/158°C. The melt flow index (at 374°F/190°C/50 N) shall be 0.4–0.8 grams per 10 minutes in accordance with ASTM D 1238. End connections shall be as outlined in ASTM D 2657 for fusion socket joining, and shall be compatible with metric pipe and fittings as manufactured by George Fischer, Inc. Threaded end connections shall be in accordance with ASTM D 2464 which references ANSI B 1.20 (was B 2.1) for tapered pipe threads. Optional flanged version shall be in accordance with ANSI B 16.5 class 150 flanges. The valve, Type 346, shall carry a pressure rating of 150 psi/10 bar at 68°F/20°C as supplied by George Fischer, Inc., Tustin, CA 92780.

### Type 346 True Union Ball Valve – PVDF

PVDF true union ball valves 3/8" through 2" (16 mm – 63 mm) shall have either metric fusion socket or threaded type pipe connections. Incorporated into its design safety features is a blow-out-proof stem and the ability to hold pressure when the downstream union nut is removed. Seats shall be PTFE (Teflon®) with backing rings creating self-adjusting, constant operating torque sealing characteristics. Backing rings and seals shall be FPM\*. The handle shall include in its design a key for removal of the seat carrier in addition to providing sufficient height to permit hand clearance. Seat carrier shall have left-hand threads to prevent possible unscrewing when threaded end connector is installed on the pipe. Material shall meet or exceed the requirements of ASTM D 3222 as pertains to a natural, unpigmented, virgin, noncompounded polyvinylidene fluoride compound having a minimum tensile strength of 7800 psi/538 bar at 73°F/20°C when tested in accordance with ASTM D 638 and shall have a flexural strength of 10,700 psi/738 bar at 73°F/20°C when tested according to ASTM D 790. End connections shall be as outlined in ASTM D 2657 for fusion socket joining, and shall be compatible with metric pipe and fittings as manufactured by George Fischer, Inc. Threaded end connections shall be in accordance with ASTM D 2464 which references ANSI B 1.20 (was B 2.1) for tapered pipe threads. Optional flanged version shall be in accordance with ANSI B 16.5 class 150 flanges. The valve, Type 346, shall carry a pressure rating of 232 psi/16 bar at 68°F/20°C as supplied by George Fischer, Inc., Tustin, CA 92780.

*\*FPM seals are made of Viton® or equal materials.  
Viton® is a registered trademark of DuPont Dow Elastomers.  
Teflon® is a registered trademark of DuPont.*



## Type 346 True Union Ball Valve Installation Suggestions

(Fig. 1)  
Whenever possible valves should be mounted independently, i.e. they should become a fixed point so that the operating forces are not transmitted along the pipeline. To assist in the correct installation George Fischer ball valve brackets Type 126 are available.

Ball valve and pipeline must be correctly aligned to keep the valve free from excess stresses.



(Fig. 1)

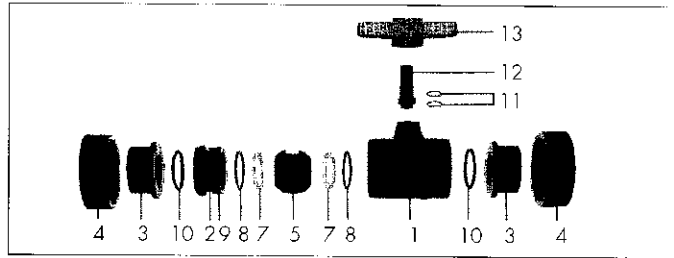
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### Component Parts for Type 346 True Union Ball Valve (continued)



\* 1 piece for sizes 3/8" & 1/2"

Nr./Part	Mat.	Qty	3/8" OD d 16 mm ID DN 10 mm	1/2" d 20 mm DN 15 mm	3/4" d 25 mm DN 20 mm	1" d 32 mm DN 25 mm	1-1/4" d 40 mm DN 32 mm	1-1/2" d 50 mm DN 40 mm	2" d 63 mm DN 50 mm
Ball set consisting of:									
5 Ball	CPVC	1	—	163.480.545	163.480.546	163.480.547	—	163.480.549	163.480.550
7 Ball seat	PTFE	2							
6 Stem	CPVC	1							
11 Stem seal	FPM	2*							
12 Handle	PVC	1							
Ball set consisting of:			167.480.875	167.480.875	167.480.876	167.480.877	167.480.878	167.480.879	167.480.880
5 Ball	PP	1							
7 Ball seat	PTFE	2							
6 Stem	PP	1							
11 Stem seal	EPDM	2*							
12 Handle	PP	1							
Ball set consisting of:			167.480.883	167.480.883	167.480.884	167.480.885	167.480.886	167.480.887	167.480.888
5 Ball	PP	1							
7 Ball seat	PTFE	2							
6 Stem	PP	1							
11 Stem seal	FPM	2*							
12 Handle	PP	1							
Ball set consisting of:			175.480.900	175.480.900	175.480.901	175.480.902	175.480.903	175.480.904	175.480.905
5 Ball	SYGEP	1							
7 Ball seat	PTFE	2							
6 Stem	SYGEP	1							
11 Stem seal	FPM	2*							
12 Handle	PP	1							
Seal set consisting of:			161.482.883	161.482.883	161.482.884	161.482.885	161.482.886	161.482.887	161.482.888
8 Backing seal	EPDM	2							
9 Body seal	EPDM	1							
10 O-Ring	EPDM	2							
11 Stem seal	EPDM	2*							
Seal set consisting of:			161.482.892	161.482.892	161.482.893	161.482.894	161.482.895	161.482.896	161.482.897
8 Backing seal	FPM	2							
9 Body seal	FPM	1							
10 O-Ring	FPM	2							
11 Stem seal	FPM	2*							
10 O-Ring	EPDM	2	748.410.042	748.410.042	748.410.116	748.410.103	748.410.027	748.410.010	748.410.011
	FPM	2	749.410.042	749.410.042	749.410.116	749.410.103	749.410.027	749.410.010	749.410.011

Component Parts for Type 346 True Union Ball Valve

Nr./Part	Mat.	Qty.	3/8" OD d 16 mm ID DN 10 mm	1/2" d 20 mm DN 15 mm	3/4" d 25 mm DN 20 mm	1" d 32 mm DN 25 mm	1-1/4" d 40 mm DN 32 mm	1-1/2" d 50 mm DN 40 mm	2" d 63 mm DN 50 mm
1 Valve body	PVC	1	161.482.332	161.482.333	161.482.334	161.482.335	161.482.336	161.482.337	161.482.338
	CPVC	1	—	163.480.221	163.480.222	163.480.223	—	163.480.225	163.480.226
	PP	1	167.480.510	167.480.511	167.480.512	167.480.513	167.480.514	167.480.515	167.480.516
	SYGEF	1	175.480.770	175.480.771	175.480.772	175.480.773	175.480.774	175.480.775	175.480.776
2 Seat carrier	PVC	1	161.482.339	161.482.339	161.482.340	161.482.341	161.482.342	161.482.343	161.482.344
	CPVC	1	—	163.480.228	163.480.229	163.480.230	—	163.480.232	163.480.233
	PP	1	167.480.519	167.480.519	167.480.520	167.480.521	167.480.522	167.480.523	167.480.524
	SYGEF	1	175.480.779	175.480.779	175.480.780	175.480.781	175.480.782	175.480.783	175.480.784
3 End connector cement socket	PVC	1	161.482.377	161.482.378	161.482.379	161.482.380	161.482.381	161.482.382	161.482.383
	CPVC	1	—	163.480.173	163.480.174	163.480.175	—	163.480.177	163.480.178
	End connector NPT thread	PVC	1	161.482.389	161.482.390	161.482.391	161.482.392	161.482.393	161.482.394
	CPVC	1	—	163.480.185	163.480.186	163.480.187	—	163.480.189	163.480.190
End connector fusion socket	PP	1	167.480.452	167.480.453	167.480.454	167.480.455	167.480.456	167.480.457	167.480.458
	SYGEF	1	175.480.727	175.480.728	175.480.729	175.480.730	175.480.731	175.480.732	175.480.733
	PP	1	167.480.159	167.480.160	167.480.161	167.480.162	167.480.163	167.480.164	167.480.165
	SYGEF	1	175.480.031	175.480.032	175.480.033	175.480.034	175.480.035	175.480.036	175.480.037
End connector butt fusion	PP	1	167.480.545	167.480.546	167.480.547	167.480.548	167.480.549	167.480.550	167.480.551
	SYGEF	1	175.480.796	175.480.797	175.480.798	175.480.799	175.480.800	175.480.801	175.480.802
4 Valve nut	PVC	1	161.340.617	161.340.617	161.340.618	161.340.619	161.340.620	161.340.621	161.480.522
	CPVC	1	163.480.995	163.480.995	163.480.081	163.480.082	—	163.480.084	163.480.085
	PP	1	167.480.786	167.480.786	167.480.787	167.480.788	167.480.789	167.480.790	167.480.791
	SYGEF	1	175.480.819	175.480.819	175.480.820	175.480.821	175.480.822	175.480.823	175.480.824
Ball set consisting of:		161.482.869	161.482.869	161.482.870	161.482.871	161.482.872	161.482.873	161.482.874	
5 Ball	PVC	1							
7 Ball seat	PTFE	2							
6 Stem	PVC	1							
11 Stem seal	EPDM	2*							
12 Handle	PVC	1							
Ball set consisting of:		161.482.875	161.482.875	161.482.876	161.482.877	161.482.878	161.482.879	161.482.880	
5 Ball	PVC	1							
7 Ball seat	PTFE	2							
6 Stem	PVC	1							
11 Stem seal	FPM	2*							
12 Handle	PVC	1							
Ball set consisting of:		—	163.480.535	163.480.536	163.480.537	—	163.480.539	163.480.540	
5 Ball	CPVC	1							
7 Ball seat	PTFE	2							
6 Stem	CPVC	1							
11 Stem seal	EPDM	2*							
12 Handle	PVC	1							

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\* 1 piece for sizes 3/8" & 1/2"

# Technical Data for Ball Valves

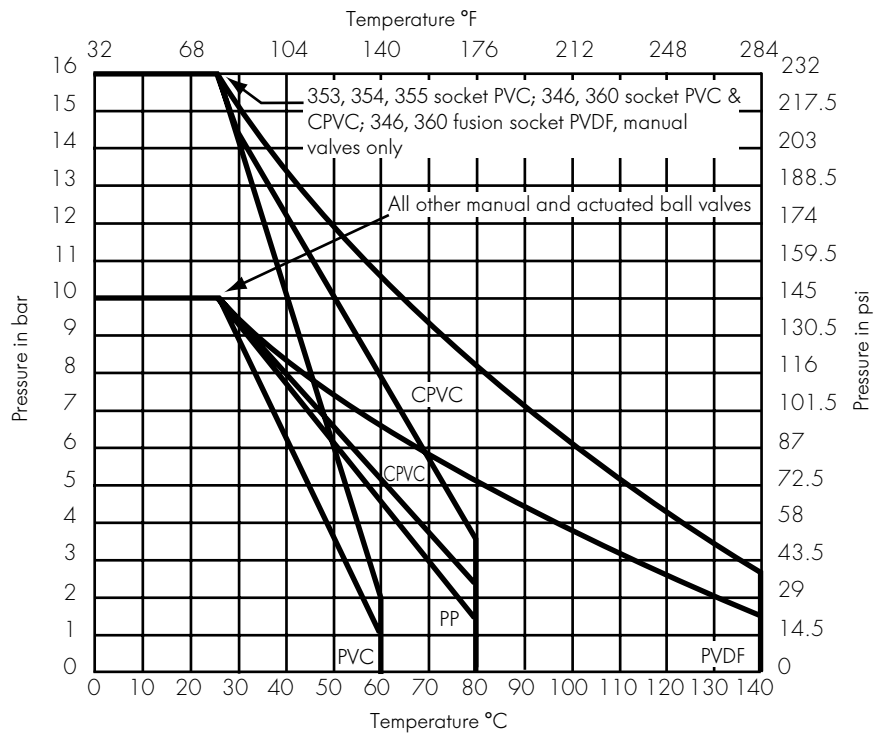
## Pressure/Temperature Diagrams

All pressures are given in atmospheric excess pressure values. Ambient temperature max. 122°F/50°C.

### Safety factors for selected Thermoplastics

Based on a 50 year operating life at 68°F/20°C with water

Material	Safety factor
PVC	2.5
CPVC	2.75
PVDF	2
PP	2.1



### Bolt tightening torque values for flanged joints

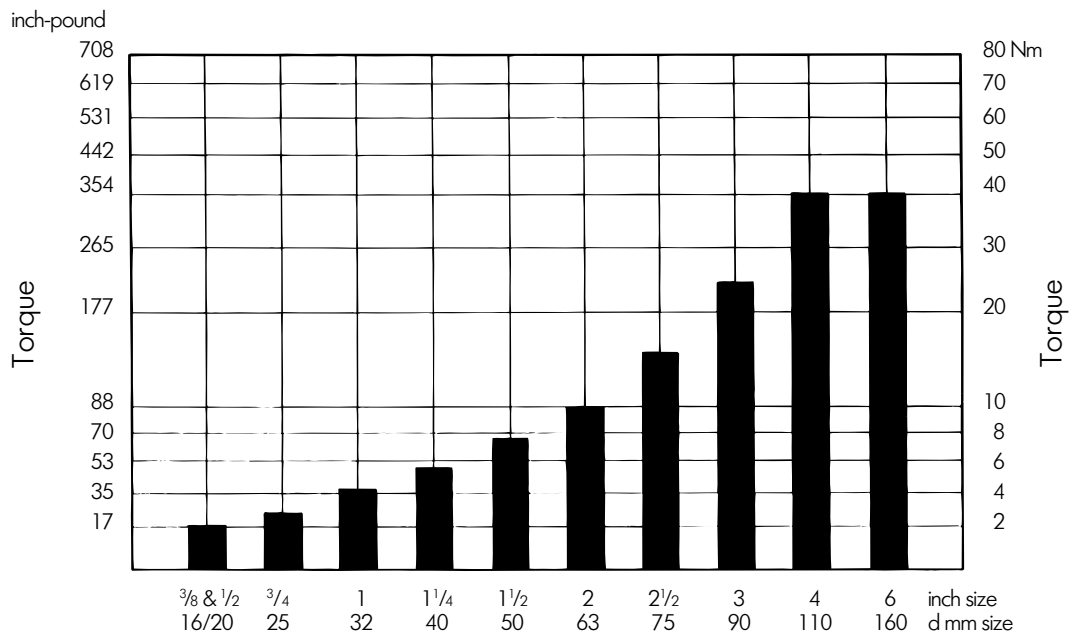
#### Type 346

Inch size	in-lbs.
1/2	133
3/4	133
1	133
1 1/4	177
1 1/2	266
2	304

#### Type 370

Inch size	in-lbs.
2 1/2	221
3	221
4	266
6	354

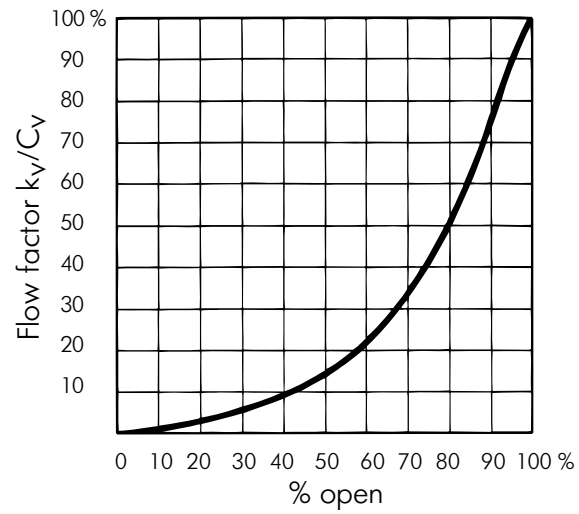
### Torque for all ball valve types



# Flow Characteristics

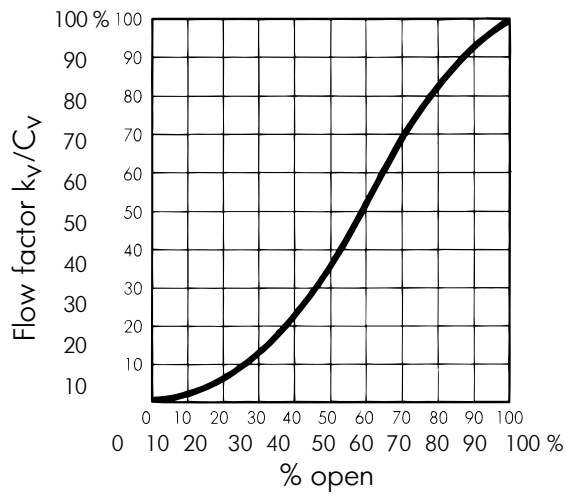
for Ball Valves

Types 324, 346, 350, 353, 354, 355, 370, 560

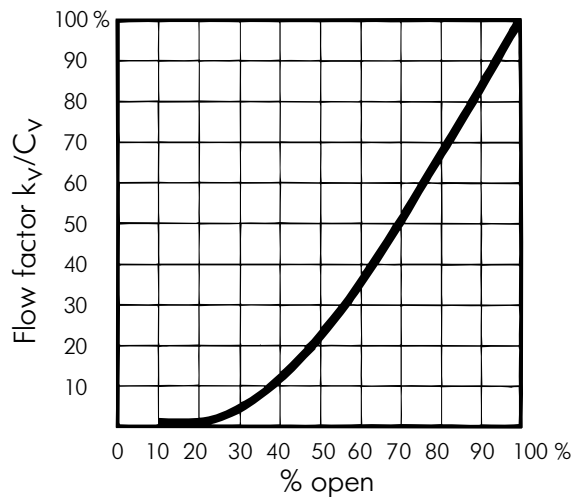


for Vertical 3-way Ball Valve (L-port) Type 343

(see type 343 vertical and horizontal for additional flow charts)



for Metering Ball Valve Type 323



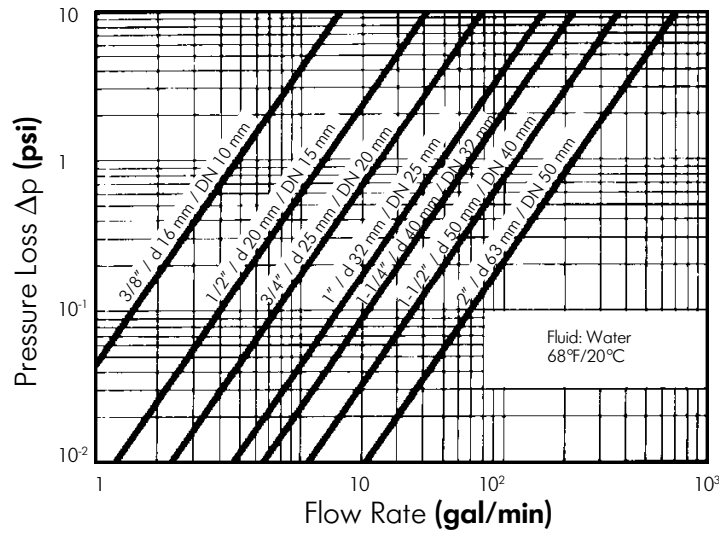
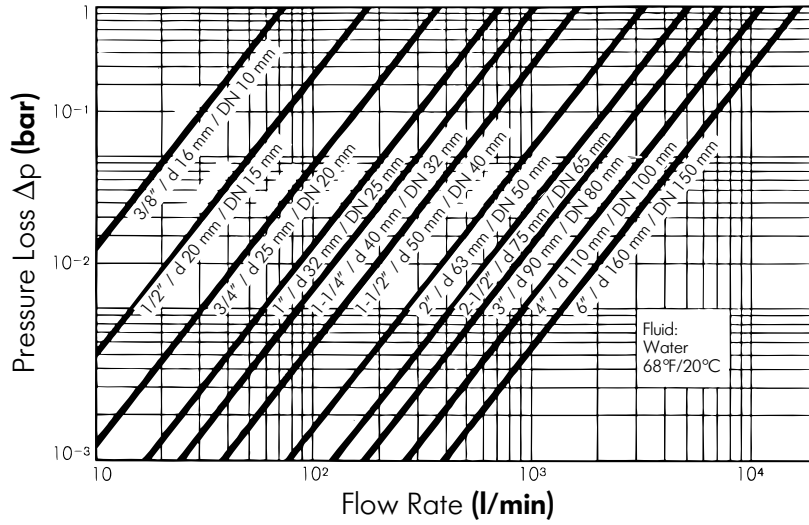
## Pressure Loss Characteristics

### Cv/kv Values

Inch size	Cv	kv	d mm size
1/4	2.20	32	12
3/8	4.97	71	16
1/2	12.95	185	20
3/4	24.50	350	25
1	49.01	700	32
1 1/4	70.02	1000	40
1 1/2	112.04	1600	50
2	217.08	3100	63
2 1/2	350.00	5000	75
3	490.00	7000	90
4	770.00	11000	110
6	1120.00	16000	160

1 bar = 14.5 psi ≈ 15 psi  
1 gal = 3.785 liters

### for Ball Valves Types 324, 346, 353, 354, 355, 370, 560



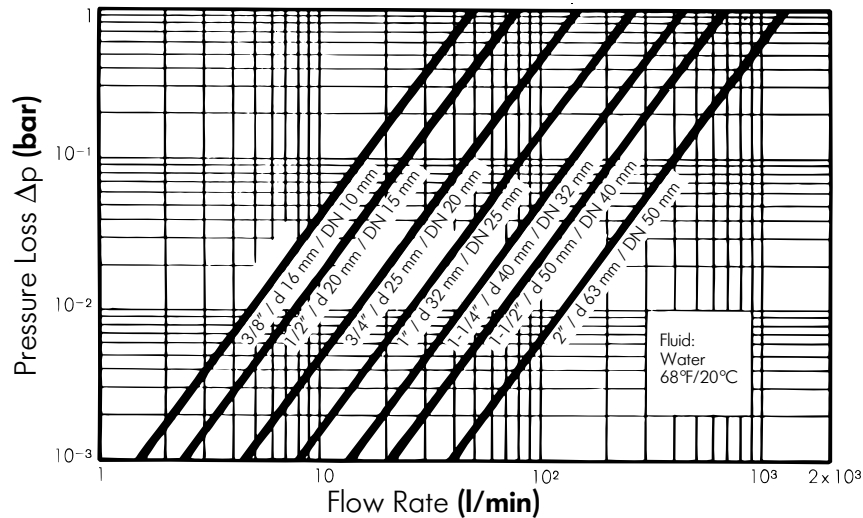
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### Cv/kv Values

Inch size	Cv	kv	d mm size
3/8	3.43	49	16
1/2	5.39	77	20
3/4	10.22	146	25
1	18.20	260	32
1 1/4	30.60	437	40
1 1/2	46.70	667	50
2	90.54	1293	63

1 bar = 14.5 psi ≈ 15 psi  
1 gal = 3.785 liters

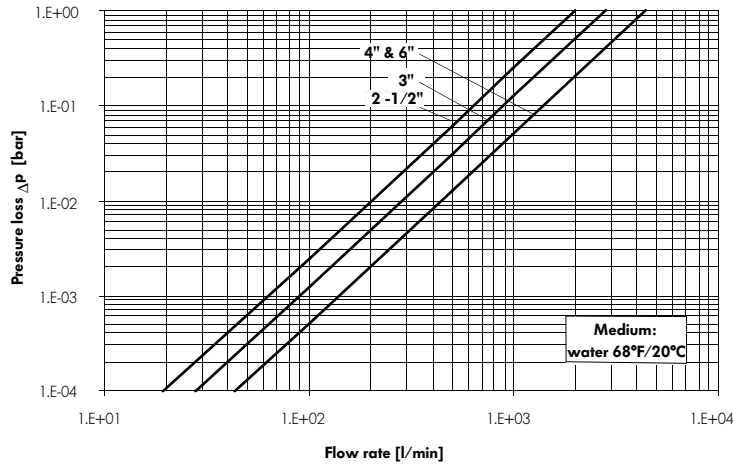
### for 3-way Ball Valve Type 343 (Vertical, L-port Ball) 3/8"-2"



### Cv/kv Values

Inch size	Cv	kv
2 1/2	139.3	1990
3	185.5	2650
4	307.3	4390

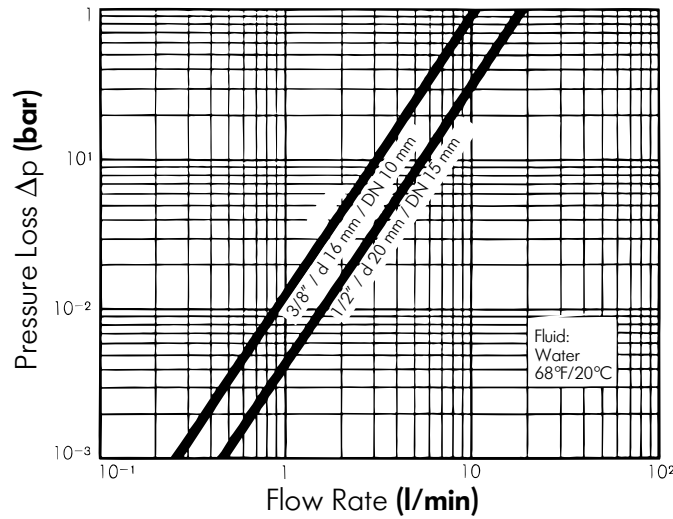
### for 3-way Ball Valve Type 343 (Vertical, L-port Ball) 2 1/2"-4"



### Cv/kv Values

Inch size	Cv	kv	d mm size
3/8	.77	11	16
1/2	1.40	20	20

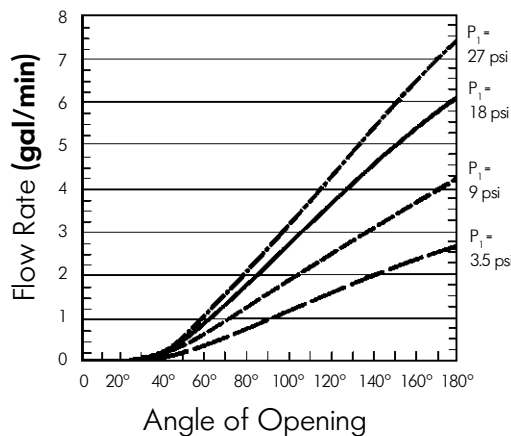
### for Metering Ball Valve Type 323



1 bar = 14.5 psi ≈ 15 psi  
1 gal = 3.785 liters

$Q = C_v \sqrt{\Delta p}$  to determine flow rate at higher  $\Delta p$ 's.

1/2" metering ball valve



3/8" metering ball valve

