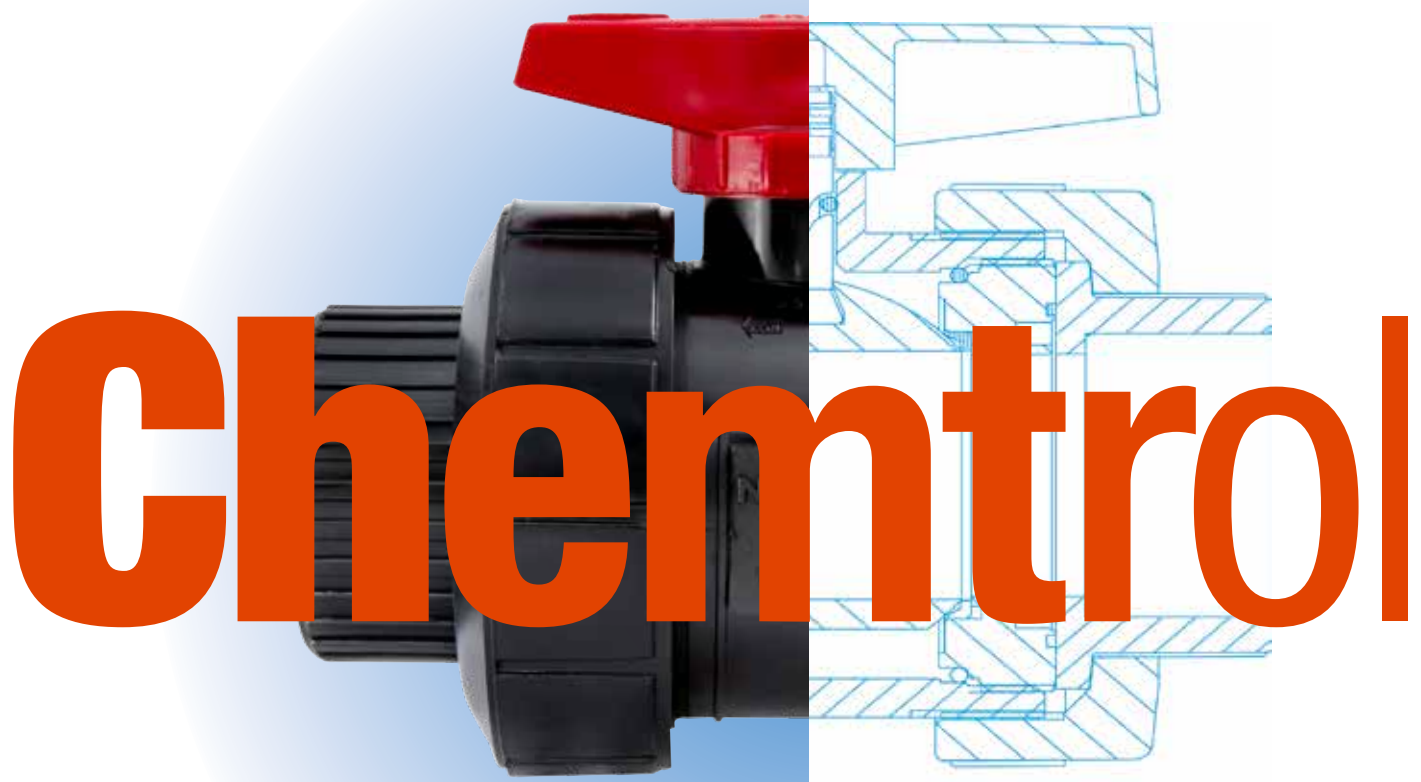


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PP Pipe, Valves & Fittings



Chemtrol® Thermoplastic Flow Solutions

®

Product Guide – Valves

Black and Chem-Pure® (Natural) Polypropylene Tru-Bloc® True Union Ball Valve, Model C



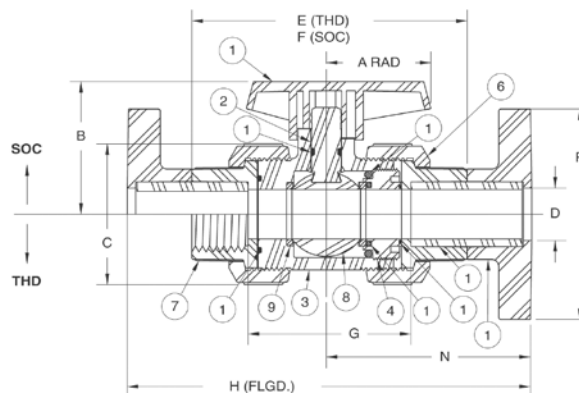
Construction Materials

Components ¹	Black PP	Nat. PP
1. Handle	Red PVC	
2. Stem	Nat. PP	Nat. PP
3. Body	Black PP	Nat. PP
4. Seat-Carrier	Nat. PP	Nat. PP
6. Union Nut	Black PP	Nat. PP
7. End Connector	Black PP	Nat. PP
8. Ball	Nat. GBPP ⁴	Nat. GBPP ⁴
9. Seat ² ; (2 ea.)	PTFE	
10. O-Ring ³ – Seat-Carrier; End Seal	FKM	
11. O-Ring ³ – Body; End Seal		
12. O-Ring ³ – Stem; OD Seal		
13. O-Ring ³ – Seat-Carrier; OD Seal		
14. O-Ring ³ – Seat-Carrier; Seat Energizer		
15. Plain-End Nipple; 2 ea. Spg x Spg	Black PP	N.A.
16. Flange – 2 ea. Socket-End	Black PP	N.A.
17. Stem; Friction Washer (4" Only)	PTFE	
18. Handle Bolt (4" Only)	Nat. PP	

- 1 All components except valve bodies are available as replacement parts.
 2 Each replacement PTFE seat kit contains two seats.
 3 Each replacement O-ring kit contains all the O-rings required to refurbish a particular size True Union Ball or Check Valve (regardless of model or style), or a minimum of two pipe unions.
 4 Polypropylene filled with glass micro-beads.

Features

- Rated at 150 psi with non-shock water service at 73°F
- Designed with an energizer O-ring beneath the seat-carrier, Model C valves automatically adjust for seat wear.
- Full port design produces minimum flow restriction with the lowest possible pressure-drop.
- Valves are manufactured and assembled without exposure to silicone compounds.
- Distinctive red handle indicates "open/close" and direction of flow at a distance.



Chemtrol Figure Numbers

Valve Sizes	Materials	Elastomeric Trim	End Connections		
			Soc.	Thd.	Flgd.
1/2" – 4"	Black Polypro	FKM	S61TB-V ¹	T61TB-V ¹	F61TB-V ¹
1/2" – 4"	Natural Polypro	FKM	S62TB-V ²	S62TB-V ²	NA ²

- 1 Flanged figures are not available in the 1 1/4" size.
 2 Socket Chem-Pure® (natural PP) Valves are available in the range of sizes shown except for the 1 1/4" size. Socket valves may be converted to threaded by exchanging the socket end connector with a threaded end connector. Flanged figures are not available.

Dimensions–Weights–Flow Coefficients

Valve Size	Profile						End-to-End					Fluid Flow Coefficient
	A ¹	B	C	D	N	P	E Thd.	F Soc.	G Soc.	H Flgd.	Approx. ² Wt. Lbs.	C _v ³
1/2	1.70	1.94	1.96	0.50	2.98	3.44	4.19	4.19	2.49	6.04	0.32	22
3/4	2.12	2.50	2.41	0.75	3.63	3.82	5.00	5.00	3.05	7.32	0.58	56
1	2.12	2.69	2.76	1.00	4.13	4.20	5.50	5.50	3.30	8.06	0.76	113
1 1/4	2.56	3.74	4.01	1.25	4.70	4.55	6.47	N/A	N/A	N/A	1.69	180
1 1/2	2.56	3.74	4.01	1.50	4.98	4.91	6.76	6.76	4.06	9.92	1.79	288
2	2.92	4.25	5.13	2.00	5.78	5.87	8.01	8.01	5.06	11.41	3.52	544
3	4.00	5.59	7.04	2.97	7.42	7.41	10.39	10.39	6.70	14.87	7.98	1348
4	8.00	6.05	8.59	4.01	8.52	8.85	12.22	12.22	7.78	17.52	15.78	2602

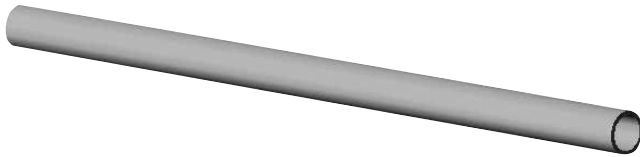
- 1 Handle is not symmetrical about centerline. Dimension shown represents the longest operational radius, but the handle position must be rotated 180° from that shown for the 4" size.
 2 Weight shown represents the polypropylene threaded figure.
 3 C_v values were computed for basic valve laying lengths (G).
 4 No flanged figures are offered in any size for natural PP.

Product Guide – Black/Chem-Pure® Natural PP

Pipe

Chemtrol
Fig. No.

6100-80(1/2"-6")/6200-80(1/2"-4") Plain End Schedule 80 Pipe (20 ft. Lengths)

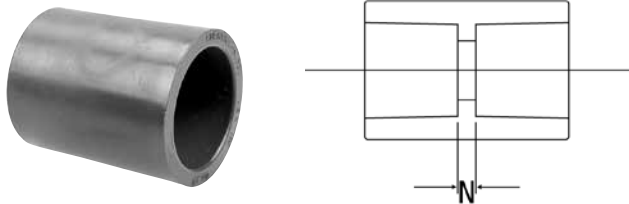


Pipe is ordered and specified with the Chemtrol figure number followed by the nominal size (e.g., 1 1/2" Schedule 80 PP Pipe – 6100 1 1/2"). Weights and dimensions for all pipe may be found in the Reference Data section of this catalog.

Couplings

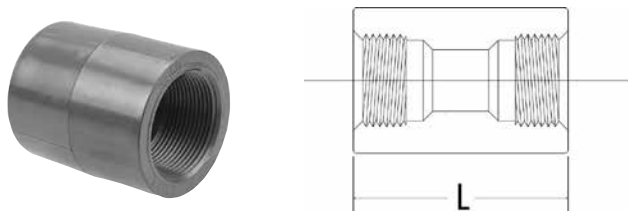
Chemtrol
Fig. No.

6101/6201 Socket Couplings (S x S)



Nominal Size	Universal Part No. Black	Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Dim. N
1/2	2829-005	7829-005	10	0.06	0.29
3/4	2829-007	7829-007	10	0.08	0.29
1	2829-010	7829-010	10	0.13	0.28
1 1/2	2829-015	7829-015	10	0.22	0.28
2	2829-020	7829-020	10	0.35	0.27
3	2829-030	7829-030	5	0.60	0.24
4	2829-040	7829-040	5	1.01	0.22
6	2829-060	—	2	2.37	0.26

6101-3-3/6201-3-3 Thread* Coupling (FPT x FPT)



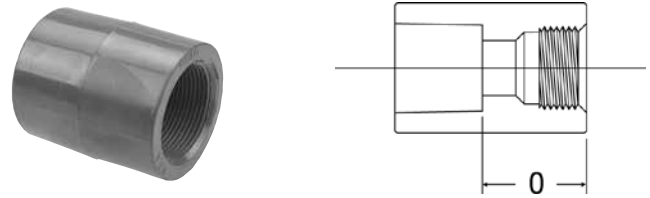
Nominal Size	Universal Part No. Black	Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Dim. L
1/2	2830-005	7830-005	10	0.06	1.99
3/4	2830-007	7830-007	10	0.09	2.24
1	2830-010	7830-010	10	0.14	2.48
1 1/4	2830-012	7830-012	10	0.19	2.73
1 1/2	2830-015	7830-015	10	0.26	2.98
2	2830-020	7830-020	10	0.35	3.22
3	2830-030	7830-030	5	0.73	3.93
4	2830-040	7830-040	5	1.21	4.66

*Recommended for intermittent service not exceeding 20 psi.

Adapters

Chemtrol
Fig. No.

6103/6203 Female Adapter Coupling (S x FPT*)



Nominal Size	Universal Part No. Black	Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Dim. O
1/2	2835-005	7835-005	10	0.06	1.14
3/4	2835-007	7835-007	10	0.08	1.26
1	2835-010	7835-010	10	0.13	1.38
1 1/2	2835-015	7835-015	10	0.24	1.63
2	2835-020	7835-020	10	0.34	1.75
3	2835-030	7835-030	5	0.65	2.08
4	2835-040	7835-040	5	1.16	2.44

*Recommended for intermittent service not exceeding 20 psi.

6150 Tank Adapter (Tank x FPT*)



Nom. Size	Part No.	Ctn. Qty.	Approx. Lbs./Ea.	Dim. A	Dim. Or	Dim. Do
1/2	Use	5	0.20	14npt	1.19	1.63
3/4	Figure	5	0.30	14npt	1.19	1.63
1	No. &	5	0.31	11 1/2npt	1.38	2.50
1 1/4	Nom. Size	5	0.35	11 1/2npt	1.38	2.50
1 1/2		5	0.39	11 1/2npt	1.38	2.50
2		5	0.52	11 1/2npt	1.56	3.13
3		5	0.81	8npt	1.75	4.25

*Recommended for intermittent service not exceeding 20 psi.

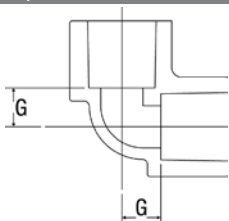
Note: 1. Gasket is EPDM

Product Guide – Black/Chem-Pure® Natural PP

Elbows

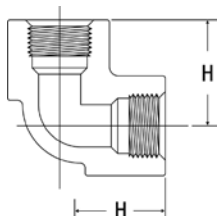
Chemtrol
Fig. No.

6107/6207 Socket 90° Elbow (S x S)



Nominal Size	Universal Part No.		Ctn. Qty.	Approx. Lbs./Ea.	Dim. G
	Black	Chem-Pure			
1/2	2806-005	7806-005	10	0.06	0.53
3/4	2806-007	7806-007	10	0.08	0.70
1	2806-010	7806-010	10	0.15	0.76
1 1/2	2806-015	7806-015	10	0.32	1.06
2	2806-020	7806-020	10	0.49	1.25
3	2806-030	7806-030	5	1.14	1.83
4	2806-040	7806-040	5	1.93	2.32
6	2806-060	—	2	4.47	3.44

6107-3-3/6207-3-3 Thread* 90° Elbow (FPT x FPT)

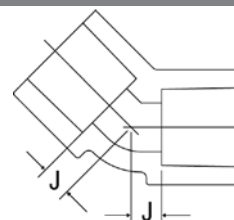


Nominal Size	Universal Part No.		Ctn. Qty.	Approx. Lbs./Ea.	Dim. H
	Black	Chem-Pure			
1/2	2808-005	7808-005	10	0.07	1.38
3/4	2808-007	7808-007	10	0.11	1.67
1	2808-010	7808-010	10	0.16	1.86
1 1/4	2808-012	7808-012	10	0.25	2.14
1 1/2	2808-015	7808-015	10	0.33	2.41
2	2808-020	7808-020	10	0.49	2.73
3	2808-030	7808-030	5	1.12	3.67
4	2808-040	7808-040	5	2.02	4.54

*Recommended for intermittent service not exceeding 20 psi.

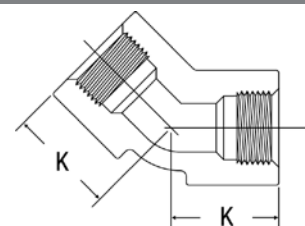
Chemtrol
Fig. No.

6106/6206 Socket 45° Elbow (S x S)



Nominal Size	Universal Part No.		Ctn. Qty.	Approx. Lbs./Ea.	Dim. J
	Black	Chem-Pure			
1/2	2817-005	7817-005	10	0.06	0.28
3/4	2817-007	7817-007	10	0.08	0.35
1	2817-010	7817-010	10	0.14	0.38
1 1/2	2817-015	7817-015	10	0.25	0.48
2	2817-020	7817-020	10	0.37	0.61
3	2817-030	7817-030	5	0.80	0.79
4	2817-040	7817-040	5	1.54	1.02
6	2817-060	—	2	3.55	1.72

6106-3-3/6206-3-3 Thread* 45° Elbow (FPT x FPT)



Nominal Size	Universal Part No.		Ctn. Qty.	Approx. Lbs./Ea.	Dim. K
	Black	Chem-Pure			
1/2	2819-005	7819-005	10	0.06	1.13
3/4	2819-007	7819-007	10	0.11	1.32
1	2819-010	7819-010	10	0.15	1.48
1 1/4	2819-012	7819-012	10	0.21	1.66
1 1/2	2819-015	7819-015	10	0.30	1.83
2	2819-020	7819-020	10	0.42	2.09
3	2819-030	7819-030	5	0.92	2.64
4	2819-040	7819-040	5	1.62	3.24

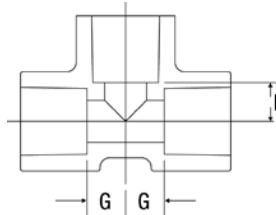
*Recommended for intermittent service not exceeding 29 psi.

Product Guide – Black/Chem-Pure® Natural PP

Tees

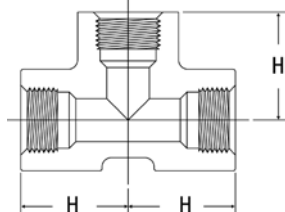
Chemtrol
Fig. No.

6111/6211 Socket Tee (S x S x S)



Nominal Size	Universal Part No.		Ctn. Qty.	Approx. Lbs./Ea.	Dim. G	Dim. l
	Black	Chem-Pure				
1/2	2801-005	7801-005	10	0.09	0.53	0.53
3/4	2801-007	7801-007	10	0.14	0.70	0.70
1	2801-010	7801-010	10	0.19	0.76	0.76
1 1/2	2801-015	7801-015	10	0.43	1.06	1.06
2	2801-020	7801-020	10	1.69	1.25	1.25
3	2801-030	7801-030	5	1.43	1.83	1.83
4	2801-040	7801-040	5	2.41	2.32	2.32
6	2801-060	—	2	5.71	3.44	3.44

6112-3-3/6212-3-3 Thread* Tee (FPT x FPT x FPT)



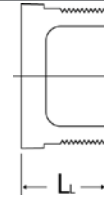
Nominal Size	Universal Part No.		Ctn. Qty.	Approx. Lbs./Ea.	Dim. H
	Black	Chem-Pure			
1/2	2805-005	7805-005	10	0.10	1.38
3/4	2805-007	7805-007	10	0.16	1.67
1	2805-010	7805-010	10	0.24	1.86
1 1/4	2805-012	7805-012	10	0.35	2.14
1 1/2	2805-015	7805-015	10	0.46	2.41
2	2805-020	7805-020	10	0.67	2.73
3	2805-030	7805-030	5	1.54	3.67
4	2805-040	7805-040	5	1.97	4.54

* Recommended for intermittent service not exceeding 20 psi.

Plugs

Chemtrol
Fig. No.

6116-4/6216-4 Thread* Plug (MPT)



Nominal Size	Universal Part No.		Ctn. Qty.	Approx. Lbs./Ea.	Dim. L
	Black	Chem-Pure			
1/2	2850-005	7850-005	10	0.02	1.15
3/4	2850-007	7850-007	10	0.02	1.27
1	2850-010	7850-010	10	0.04	1.53
1 1/4	2850-012	7850-012	5	0.13	1.57
1 1/2	2850-015	7850-015	5	0.16	1.55
2	2850-020	7850-020	5	0.25	1.55
3	2850-030	7850-030	5	0.33	2.38
4	2850-040	7850-040	5	0.66	2.76

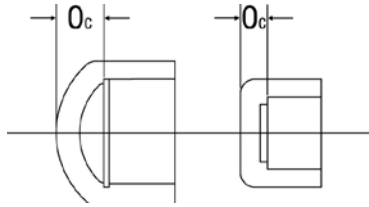
* Recommended for intermittent service not exceeding 20 psi.

Product Guide – Black/Chem-Pure® Natural PP

Caps

Chemtrol
Fig. No.

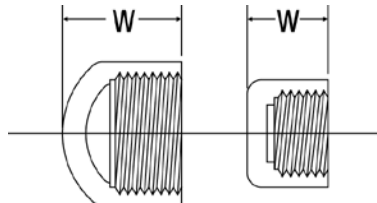
6117/6217 Socket Cap[‡] (S)



Nominal Size	Universal Part No. Black	Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Dim. O _c
1/2	2847-005	7847-005	10	0.04	0.41
3/4	2847-007	7847-007	10	0.05	0.38
1	2847-010	7847-010	10	0.09	0.42
1 1/2	2847-015	7847-015	10	0.17	0.42
2	2847-020	7847-020	10	0.23	0.42
3	2847-030	7847-030	5	0.52	1.29
4	2847-040	7847-040	5	0.90	1.57
6	2847-060	—	2	2.08	2.04

‡ Sizes 2" and smaller are flat; 3" and larger are domed.

6117-3/6217-3 Thread* Cap[‡] (FPT)



Nominal Size	Universal Part No. Black	Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Dim. W
1/2	2848-005	7848-005	10	0.04	1.26
3/4	2848-007	7848-007	10	0.08	1.36
1	2848-010	7848-010	10	0.09	1.52
1 1/4	2848-012	7848-012	10	0.13	1.63
1 1/2	2848-015	7848-015	10	0.19	1.77
2	2848-020	7848-020	10	0.26	1.90
3	2848-030	7848-030	5	0.58	3.13
4	2848-040	7848-040	5	1.02	3.79

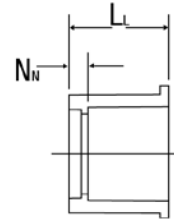
* Recommended for intermittent service not exceeding 20 psi.

‡ Sizes 2" and smaller are flat; 3" and larger are domed.

Bushings

Chemtrol
Fig. No.

6118/6218 Flush Socket Reducer Bushing (SPG x S)

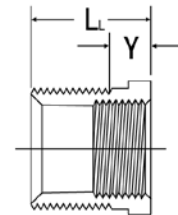


Nominal Size	Universal Part No. Black	Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Design Style [†]	Dim. L _L	Dim. N _N
3/4 x 1/2	2837-101	7837-101	10	0.02	S	1.28	0.43
1 x 1/2	2837-130	7837-130	10	0.04	S	1.53	0.68
1 x 3/4	2837-131	7837-131	10	0.03	S	1.53	0.56
1 1/2 x 1	2837-211	7837-211	10	0.10	S	1.78	0.68
2 x 1	2837-249	7837-249	10	0.18	S	1.91	0.81
2 x 1 1/2	2837-251	7837-251	10	0.12	S	1.91	0.56
3 x 2	2837-338	7837-338	5	0.42	S	2.38	0.90
4 x 3	2837-422	7837-422	5	0.62	S	2.76	0.91
6 x 4	2837-532	—	2	1.74	S	3.00	0.78

Note: 3" and 4" sizes are hex head; 3/4", 1", 1 1/2", 2", and 6" have round heads.

† All Bushings have solid walls.

6118-3-4/6218-3-4 Flush Thread* Reducer Bushing (MPT x FPT)



Nominal Size	Universal Part No. Black	Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Design Style [†]	Dim. L _L	Dim. Y**
3/4 x 1/2	2839-101	7839-101	10	0.02	S	1.27	0.43
1 x 1/2	2839-130	7839-130	10	0.04	S	1.53	0.43
1 x 3/4	2839-131	7839-131	10	0.03	S	1.53	0.45
1 1/4 x 3/4	2839-167	7839-167	10	0.09	S	1.38	0.45
1 1/4 x 1	2839-168	7839-168	10	0.07	S	1.38	0.53
1 1/2 x 1	2839-211	7839-211	10	0.11	S	1.55	0.53
1 1/2 x 1 1/4	2839-212	7839-212	10	0.07	S	1.55	0.55
2 x 1	2839-249	7839-249	10	0.18	S	1.57	0.53
2 x 1 1/2	2839-251	7839-251	10	0.13	S	1.57	0.55
3 x 2	2839-338	7839-338	5	0.38	S	2.38	0.57
4 x 3	2839-422	7839-422	5	0.49	S	2.76	0.95

* Recommended for intermittent service not exceeding 20 psi.

** Typical male component engagement, hand tight (L_L in ANSI B1.20.1 thread spec.) plus 1 1/2 turns.

Note: 3/4", 1", 3", and 4" sizes are hex head; 1 1/4", 1 1/2", and 2" are knurled round.

† All Bushings have solid walls.

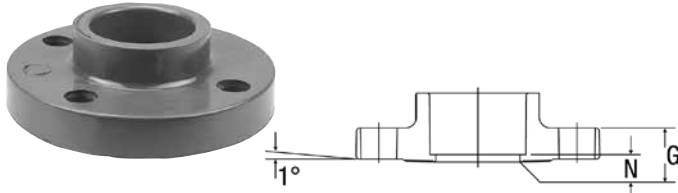
Product Guide – Black/Chem-Pure® Natural PP

Class 150 Flanges

For flange dimensions that comply with ANSI B16.5, 150 lb., steel flanges, see page 37.

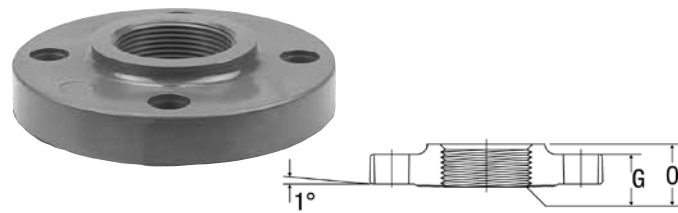
Chemtrol
Fig. No.

6151-H/6251-H Socket Flange (S), One-Piece (Solid)



Nominal Size	Universal Part No. Black	Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Dim. G	Dim. N
1/2	2851-H05	7851-H05	10	0.13	0.54	0.23
3/4	2851-H07	7851-H07	10	0.20	0.60	0.20
1	2851-H10	7851-H10	10	0.24	0.67	0.21
1 1/2	2851-H15	7851-H15	10	0.41	0.72	0.23
2	2851-H20	7851-H20	10	0.79	0.90	0.27
3	2851-H30	7851-H30	5	1.50	1.12	0.34
4	2851-H40	7851-H40	5	2.20	1.23	0.33
6	2851-H60	—	2	3.45	1.33	0.28

6151-H-3/6251-H-3 Thread* Flange (FPT), One-Piece (Solid)

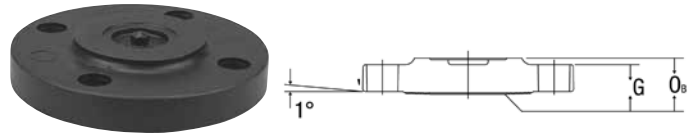


Nominal Size	Universal Part No. Black	Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Dim. G	Dim. Or
1/2	2852-H05	7852-H05	10	0.13	0.54	0.87
3/4	2852-H07	7852-H07	10	0.18	0.60	0.90
1	2852-H10	7852-H10	10	0.24	0.67	1.07
1 1/4	2852-H12	7852-H12	5	0.34	0.65	1.11
1 1/2	2852-H15	7852-H15	5	0.39	0.72	1.07
2	2852-H20	7852-H20	5	0.71	0.90	1.17
3	2852-H30	7852-H30	5	1.22	1.12	1.53
4	2852-H40	7852-H40	5	2.03	1.23	1.65

* Recommended for intermittent service not exceeding 20 psi.

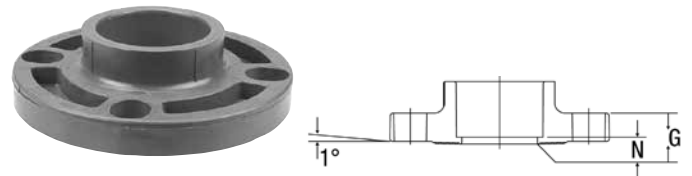
Chemtrol
Fig. No.

6119-H/6219-H Blind Flange, One-Piece (Solid)



Nominal Size	Universal Part No. Black	Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Dim. G	Dim. Ob
1/2	2853-H05	7853-H05	10	0.13	0.54	0.75
3/4	2853-H07	7853-H07	10	0.20	0.60	0.82
1	2853-H10	7853-H10	10	0.26	0.67	0.87
1 1/4	2853-H12	—	10	0.32	0.65	0.89
1 1/2	2853-H15	7853-H15	10	0.39	0.72	0.98
2	2853-H20	7853-H20	5	0.82	0.90	1.11
3	2853-H30	7853-H30	5	1.74	1.12	1.37
4	2853-H40	7853-H40	5	2.70	1.23	1.49
6	2853-H60	—	2	4.28	1.33	1.53

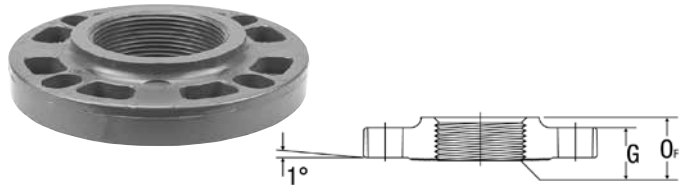
6151-W/6251-W Socket Flange (S), One-Piece (Webbed Design)



Nominal Size	Universal Part No. Black	Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Dim. G	Dim. N
2	2851-020	7851-020	10	0.61	0.90	0.27
3	2851-030	7851-030	5	1.16	1.12	0.34
4	2851-040	7851-040	5	1.69	1.23	0.33
6	2851-060	7851-060	2	2.66	1.33	0.28

Note: One-piece webbed flanges have oblong bolt holes which permit mating with ANSI B16.5, 150 lb.; BS 1560, class 150; ISO 2084, PN10; and DIN 2532, PN10 flanges.

6151-W-3/6251-W-3 Thread* Flange (FPT), One-Piece (Webbed Design)



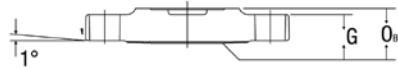
Nominal Size	Universal Part No. Black	Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Dim. G	Dim. Or
2	2852-020	7852-020	5	0.56	0.90	1.17
3	2852-030	7852-030	5	0.98	1.12	1.53
4	2852-040	7852-040	5	1.62	1.23	1.65

* Recommended for intermittent service not exceeding 20 psi.

Note: One-piece webbed flanges have oblong bolt holes which permit mating with ANSI B16.5, 150 lb.; BS 1560, class 150; ISO 2084, PN10; and DIN 2532, PN10 flanges.

Product Guide – Black/Chem-Pure® Natural PP

6119-W Blind Flange, One-Piece (Webbed Design)

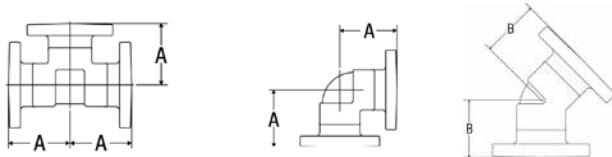


Nominal Size	Universal Part No.	Ctn. Qty.	Approx. Lbs./Ea.	Dim. G	Dim. O _B
2	2853-020	5	0.59	0.90	1.11
3	2853-030	5	1.14	1.12	1.37
4	2853-040	5	1.94	1.23	1.49
6	2853-060	2	3.08	1.33	1.53

Note: One-piece webbed flanges have oblong bolt holes which permit mating with ANSI B16.5, 150 lb.; BS 1560, class 150; ISO 2084, PN10; and DIN 2532, PN10.

Chemtrol
Fig. No.

Flanged Fittings*— Fabricated from Molded Components



Nominal Size	Flanged Tee		Flanged 90° ELL		Flanged 45° ELL	
	Approx. Lbs./Ea.	Dim. A	Approx. Lbs./Ea.	Dim. A	Approx. Lbs./Ea.	Dim. B
1/2	0.24	2 13/32	0.21	2 13/32	0.21	2 5/32
3/4	0.37	2 23/32	0.31	2 23/32	0.31	2 15/32
1	0.48	3 3/32	0.44	3 3/32	0.43	2 23/32
1 1/2	0.94	3 31/32	0.83	3 31/32	0.76	3 13/32
2	1.64	5 7/32	1.44	4 15/32	1.32	3 27/32
3	4.97	5 15/32	3.04	5 13/32	2.70	4 25/32
4	5.30	7 3/32	4.82	7 3/32	4.43	5 25/32

*Flanged fittings are produced by heat fusion of socket flanges to socket fittings with short plain end pipe nipples.

NR 51 Flange Gaskets, for Class 150 Flanges

Note: These gaskets are 1/8" thick, full face polychloroprene (CR), 70 durometer.

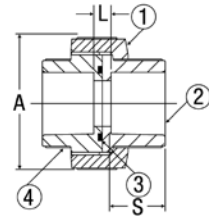


Nominal Size	Part No.	Approx. Lbs./Ea.
1/2	↑	0.11
3/4		0.12
1		0.13
1 1/4		0.14
1 1/2		0.15
2	Use Figure No.	0.20
2 1/2	& Nom. Size	0.25
3	↓	0.28
4		0.30
6		0.40
8		0.50

Unions

Chemtrol
Fig. No.

6133/6233 FKM Socket Union (S x S)

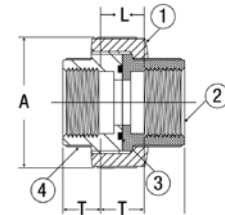


Nominal Size	Universal Black	Part No. Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Dim. A	Dim. L	Dim. S*
1/2	2897-005	7897-005	10	0.11	1.98	0.46	0.85
3/4	2897-007	7897-007	10	0.20	2.41	0.50	0.98
1	2897-010	7897-010	10	0.28	2.77	0.48	1.10
1 1/2	2897-015	7897-015	5	0.70	4.04	0.79	1.35
2	2897-020	7897-020	5	1.31	5.20	0.82	1.48

Unions are supplied with FKM O-Rings. EPDM O-Rings may be ordered for field replacement, where required. Socket x Thread is available on request. Threaded fittings are recommended for intermittent service not exceeding 20 psi.

* Socket Depth

6133-3-3/6233-3-3 FKM Threaded* Union (FPT x FPT)



Nominal Size	Universal Black	Part No. Chem-Pure	Ctn. Qty.	Approx. Lbs./Ea.	Dim. A	Dim. L	Dim. T**
1/2	2898-005	7898-005	10	0.12	1.17	1.30	0.43
3/4	2898-007	7898-007	10	0.20	2.41	1.55	0.45
1	2898-010	7898-010	10	0.29	2.77	1.62	0.53
1 1/4	2898-012	7898-012	5	0.67	4.04	2.17	0.55
1 1/2	2898-015	7898-015	5	0.74	4.04	2.39	0.55
2	2898-020	7898-020	5	1.39	5.20	2.63	0.57

Unions are supplied with FKM O-Rings. EPDM O-Rings may be ordered for field replacement, where required. Socket x Thread is available on request.

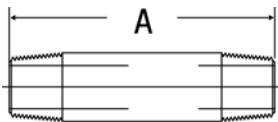
* Recommended for intermittent service not exceeding 20 psi.

** Thread Joint Engagement

Product Guide – Black/Chem-Pure® Natural PP

Nipples

6129 Threaded* Pipe Nipple (MPT x MPT)



Length – 2"			Example of part identification		
Nom. Size	Ctn. Qty.	Approx. Lbs./Ea.	1/2" x Short PP Nipple – 6129 1/2" – SH		
1/2	10	0.02			

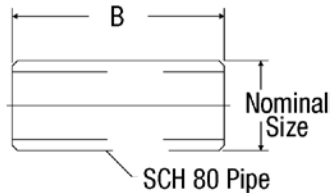
Nom. Size	Length – Close			Length – Short			Length – 3"		
	Ctn. Qty.	Approx. Lbs./Ea.	Dim. A	Ctn. Qty.	Approx. Lbs./Ea.	Dim. A	Ctn. Qty.	Approx. Lbs./Ea.	Dim. A
1/2	10	0.01	1.13	10	0.01	1.50	10	0.03	
3/4	10	0.02	1.38	10	0.03	2.00	10	0.04	
1	10	0.03	1.50	10	0.04	2.00	10	0.06	
1 1/4	10	0.04	1.63	10	0.06	2.50	10	0.08	
1 1/2	10	0.06	1.75	10	0.08	2.50	10	0.10	
2	10	0.09	2.00	10	0.11	2.50	10	0.14	
3	5	0.21	2.63	5	0.26	3.00	See Short		
4	5	0.35	2.88	5	0.50	4.00	See Close		

Nom. Size	Length – 4"		Length – 5"		Length – 6"	
	Ctn. Qty.	Approx. Lbs./Ea.	Ctn. Qty.	Approx. Lbs./Ea.	Ctn. Qty.	Approx. Lbs./Ea.
1/2	10	0.04	10	0.05	10	0.06
3/4	10	0.06	10	0.07	10	0.09
1	10	0.08	10	0.10	10	0.12
1 1/4	10	0.12	10	0.14	10	0.18
1 1/2	10	0.14	10	0.18	10	0.21
2	10	0.20	10	0.24	10	0.30
3	5	0.37	5	0.46	5	0.59
4	See Short		5	0.72	5	0.85

*Recommended for intermittent service not exceeding 20 psi.

Chemtrol
Fig. No.

6131 Plain End Pipe Nipple (SPG x SPG)



Used for joining any
Sch. 80 Polypropylene
fitting face-to-face.

Nominal Size	Part Number	Ctn. Qty.	Approx. Lbs./Ea.	Dim. B
1/2	Use Figure No. & Nom. Size	6	0.02	1.62
3/4		10	0.03	2.86
1		10	0.05	2.08
1 1/2		10	0.10	2.56
2		10	0.16	2.77
3		6	0.40	3.48
4	6	0.69	4.26	
6	3	1.80	5.70	

Reference Data

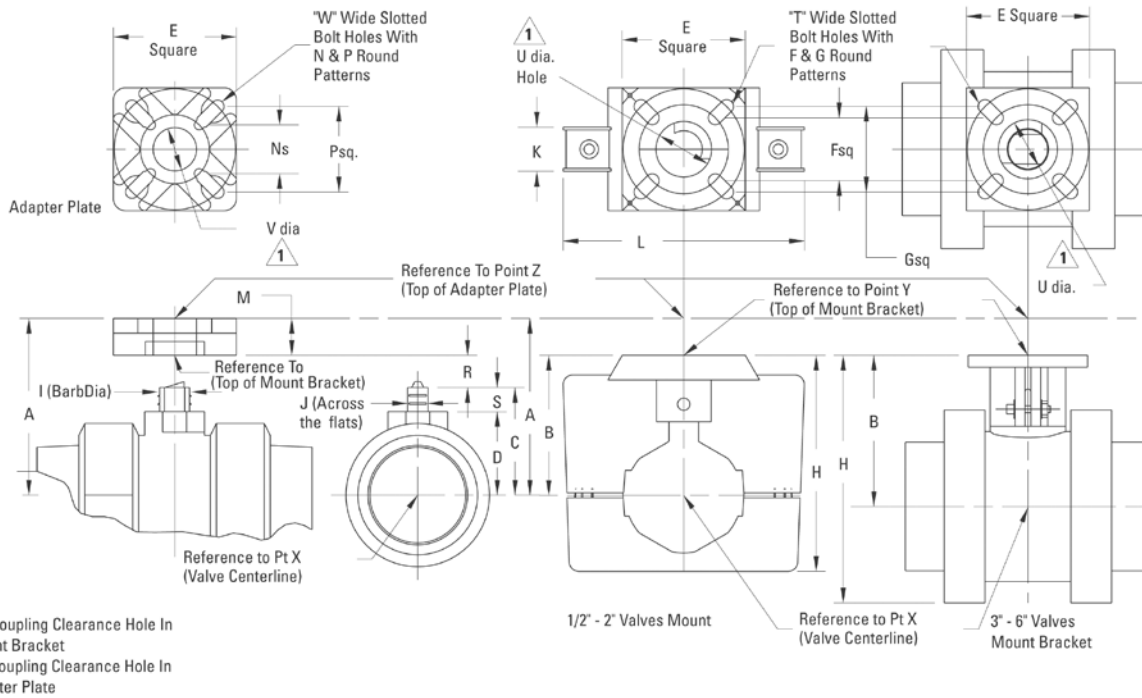
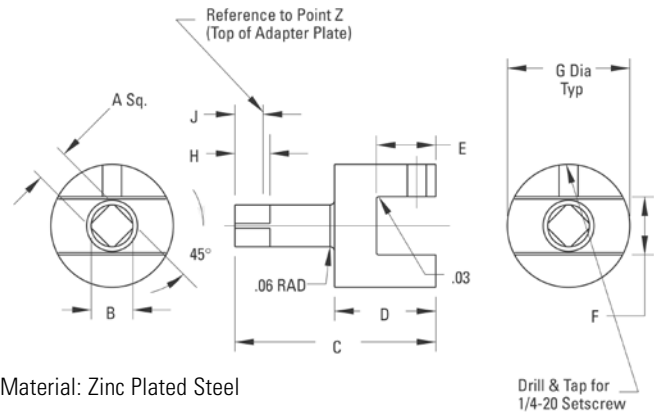
Actuator Mounting Data

The same plastic modular mounting kits, including fastener hardware and drive couplings, used for factory assembly, are available for field assembly of Chemtrol® actuation equipment to installed valves. When designing the CPVC mounting brackets and adapter plates we recognized that some facilities specify Chemtrol® plastic valves, but are standardized on other actuator brands. Therefore, holes in the mounting platforms are slotted and the heights of platforms over valve stems are set to offer the broadest mounting flexibility. For many reasons, including economic, the use of Chemtrol® mount kits is also encouraged when joining Chemtrol® valves to other actuator brands, and the critical data on this page is offered to facilitate adaptation.

TU Tru-Bloc® Ball Valve Min. Torque & Actuator-Mounting Dimensions

Valve Size	Min. Torque (in. lbs.)	A	B	C	D
1/2	40	3.62	2.87	1.35	0.96
3/4	50	3.62	2.87	1.87	1.53
1	50	3.62	2.87	2.16	1.70
1 1/4 / 1 1/2	90	5.25	4.50	3.01	2.46
2	170	5.25	4.50	3.75	3.07
3	360	7.00	6.00	4.75	4.00
4/6	540	8.35	7.35	5.81	5.31

Ball Valve Drive Coupling



Valve Size	E		F		G		H	I	J	K	L	M	N		P		R	S	T	U	V	W
	B. C.	Sq.	B. C.	Sq.	B. C.	Sq.							B. C.	Sq.								
1/2	2.50	1.82	1.29	2.46	1.74	4.43	0.422	0.280	0.90	4.89	0.75	1.40	0.99	2.60	1.84	1.34	0.57	0.28	1.13	0.88	0.26	
3/4	2.50	1.82	1.29	2.46	1.74	4.43	0.613	0.450	0.90	4.89	0.75	1.40	0.99	2.60	1.84	1.00	0.34	0.28	1.13	0.88	0.26	
1	2.50	1.82	1.29	2.46	1.74	4.43	0.613	0.450	0.90	4.89	0.75	1.40	0.99	2.60	1.84	0.71	0.46	0.28	1.13	0.88	0.26	
1 1/4 / 1 1/2	3.00	2.46	1.74	3.02	2.14	7.22	0.738	0.535	1.26	7.32	0.75	1.40	0.99	3.02	2.14	1.49	0.55	0.34	1.64	0.88	0.32	
2	3.00	2.46	1.74	3.02	2.14	7.22	0.988	0.755	1.26	7.32	0.75	1.40	0.99	3.02	2.14	0.75	0.68	0.34	1.64	0.88	0.32	
3	5.00	2.74	1.94	5.16	3.65	9.59	1.240	0.900	-	-	1.00	1.84	1.30	5.16	3.65	1.25	0.75	0.32	1.83	1.02	0.40	
4/6	5.00	4.20	2.97	5.16	3.65	11.74	2.090	1.260	-	-	1.00	1.84	1.30	5.16	3.65	1.54	0.50	0.39	3.03	1.02	0.40	

WARNING: DO NOT USE OR TEST THE PRODUCTS IN THIS CATALOG WITH COMPRESSED AIR OR OTHER GASES. FAILURE TO FOLLOW THIS WARNING CAN RESULT IN PERSONAL INJURY OR DAMAGE TO PROPERTY.

Reference Data

Actuator Mounting Data

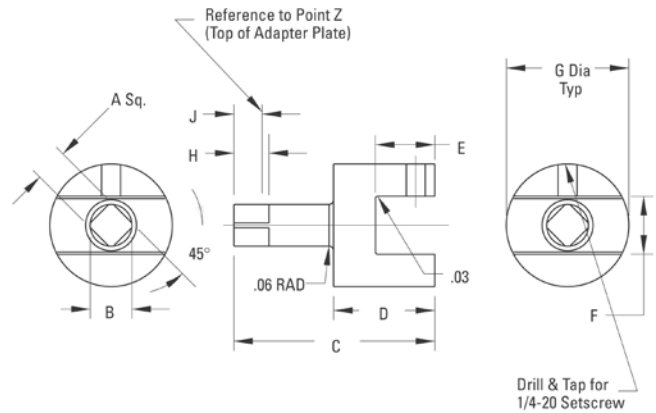
Ball Valve Mount Kit Part Numbers & Coupling Dimensions

Valve Size	Mount Kit Pt. #	Actuator Type ¹	Drive Coupling Dimensions								
			A	B	C	D	E	F	G	H	J
1/2	T111556	A/A, A/SR & E	0.351	0.437	3.08	1.81	0.67	0.281	1.10	0.46	0.42
3/4	T111557	A/A, A/SR & E	0.351	0.437	2.51	1.24	0.44	0.451	1.10	0.46	0.42
1	T111558	A/A, A/SR & E	0.351	0.437	2.34	1.07	0.56	0.451	1.10	0.46	0.42
1 1/4 / 1 1/2	T111559	A/A & E	0.351	0.437	3.24	1.97	0.65	0.539	1.61	0.46	0.45
	T111566	A/SR	0.430	0.549	3.28	1.97	0.65	0.539	1.61	0.57	0.49
2	T111560	A/A	0.430	0.549	2.64	1.33	0.78	0.761	1.61	0.50	0.46
	T111567	A/SR	0.548	0.704	2.64	1.33	0.78	0.761	1.61	0.50	0.46
	T111770	E	0.351	0.437	2.60	1.33	0.78	0.761	1.61	0.46	0.42
3	T111561	A/A & E	0.548	0.704	3.46	1.90	0.86	0.911	1.50	0.50	0.46
	T111568	A/SR	0.666	0.882	2.46	1.90	0.86	0.911	1.50	0.50	0.46 ²
4/6	T111562	A/A	0.666	0.882	3.44	1.88	0.59	1.266	1.75	0.50	0.40
	T111569	A/SR	0.863	1.000	3.44	1.88	0.59	1.266	1.75	0.50	0.40
	T111724	E	0.548	0.704	3.44	1.88	0.59	1.266	1.75	0.50	0.40

¹ A/A = Pneumatic Air to Air. A/SR = Pneumatic Air to Spring Return (fail-safe). E = Electric (motor driven).

² No adapter plate is used with this coupling. J represents distance above reference point Y (top of mount bracket).

Ball Valve Drive Coupling



Reference Data

Valve Installation

For socket-end valves refer to the solvent cement joining instructions for PVC and CPVC, and the heat fusion joining instructions for PP and PVDF in the *Chemtrol Thermoplastic Piping Technical Manual*.

For threaded-end valves usually one or two turns beyond hand-tight using a suitable strap wrench, if necessary, is sufficient. Do not overtighten threads. ANSI B1.20.1 defines hand tight as 4 to 5 threads for sizes through 2" and 5 to 6-3/4 threads for sizes greater than 2".

For flanged-end valves refer to the plastic flange joining instructions in the *Chemtrol Thermoplastic Piping Technical Manual*.

CAUTION: Over tightening threads may result in damage to products.

Ball and Check Valves

When joining union-end valves, or when flanging end connectors, never make the joint to the end connectors while they are attached to the valve body. Remove the union nuts and end connectors from the valve cartridge first. Slide the union nut (smallest bore first) over the pipe or nipple and flange hub (when flanging) before making the joint to the end connector.

After allowing the proper joint drying time, or cooling time in the case of PP and PVDF, end connections may be joined to the valve cartridge. O-rings provide the seal between the valve cartridge faces and the end connectors. Ensure that these O-rings are clean and in their proper grooves before slipping the valve cartridge between its end connectors. Slide the union nuts over the end connectors and screw onto the valve cartridge threads, no more than handtight. Once the end connector engages the O-ring seal, no more than 1/8 to 1/4 turn of the union nut will fully compress the O-ring in its groove.

CAUTION: Over tightening threads may result in damage to products.

The pipe supports surrounding the valve must be loose and the adjoining piping must be well aligned with the valve. The union nuts cannot be expected to bend and/or stretch the adjoining pipe in order to allow the end connectors to make the required flush seal against the valve cartridge faces.

Check Valves - Check valves should be installed at least four feet from the discharge side of a pump. Ball chatter and internal damage may result if fluid flow is too turbulent. Also, in keeping with good mechanical design practice, the upper threshold of fluid flow recommended from Chemtrol products is five feet per second.

The valves may be installed vertically or horizontally (refer to the preceding page for minimum seating head requirements), but the molded-in flow arrow on the valve cartridge must be installed in the direction of the fluid flow such that reverse flow will be checked.

Vent Valve Conversion - The ball in a standard Chemtrol Ball Check Valve is intended by design to have a greater density than the fluid medium. When installed in the upright (seat down – arrow on body pointed in direction of normal flow) to horizontal positions, gravitational force on the ball allows it to sink in the fluid and seal at the seat in order to prevent back-flow when directional flow is ceased (e.g., pump stops). However, the mechanical designer sometimes wants air or gas to be vented from a piping system or vessel as fluid fills the system, but to check flow of fluid beyond the vent tube. As fluid is evacuated from the system or vessel, the vent valve must open to prevent formation of a vacuum. The field conversion of the check valve to the venting function requires the replacement of the standard ball with a polypropylene ball, which will float in water or fluids of greater density. A vent valve must be installed in the inverted vertical position (seat up – arrow on body pointed in opposite direction of normal venting). The floater ball must also be chemically resistant to the medium. Failure to follow these instructions may cause stress cracking to the polypropylene ball (e.g., bleach, concentrated sulfuric or nitric acids).

Valve Maintenance

Valve repair should only be performed by qualified maintenance personnel. Contact the nearest Chemtrol distributor should further information be required.

Ball Valves

Should a valve need repair, depressurize and drain the system on all sides of the valve. Loosen the valve union nuts and slide them back over the end connectors. To minimize downtime, it may be advisable to have a replacement valve cartridge ready to install in place of the one to be repaired. An advantage of the Chemtrol design is that the current model is interchangeable with all earlier models. Disassemble valve cartridge following the instructions provided with the valve.

General Design and Installation Guidelines

- The manufacturer does NOT recommend running a thermoplastic piping system with velocity greater than 5 feet/sec.
- **WARNING:** Do NOT close a quarter turn valve quickly. This will create shock in the system and cause damage to property or personal injury.
- Installing thermoplastic piping components at temperatures at 40°F requires extra precaution in handling because the material may be at increased risk of impact damage.
- **WARNING:** Follow the recommended bolt tightening techniques, including sequence of tightening and final torque values, for flanges and butterfly valves because failure to do so will result in damage to the product.
- Do not allow primer or solvent cement to come in contact with the sealing face of valve end connectors or internal components of the valve.
- Valves must be installed with the molded-in flow arrow(s) on the valve cartridge facing in the direction of the fluid flow.
- To ensure comprehensive chemical compatibility, a piping system must take into consideration the chemical resistance of all system components, including, but not limited to, plastic components, solvent cements or thread pastes (if applicable), elastomeric seals, all valve components and lubricants. Testing under field conditions may be the best way to ensure selected materials will work in a particular application.
- Consult the Chemtrol Thermoplastic Piping Technical Manual for additional design and installation requirements for Chemtrol products.

Reference Data

Metric Equivalent Charts

Linear Conversion Table From Fractional Inches to Millimeters

inches		mm	inches		mm
1/64	.016	.397	33/64	.516	13.097
1/32	.031	.794	17/32	.531	13.494
3/64	.047	1.191	35/64	.547	13.891
1/16	.063	1.588	9/16	.563	14.288
5/64	.078	1.984	37/64	.578	14.684
3/32	.094	2.381	19/32	.594	15.081
7/64	.109	2.778	39/64	.609	15.478
1/8	.125	3.175	5/8	.625	15.875
9/64	.141	3.572	41/64	.641	16.272
5/32	.156	3.969	21/32	.656	16.669
11/64	.172	4.366	43/64	.672	17.066
3/16	.188	4.763	11/16	.688	17.463
13/64	.203	5.159	45/64	.703	17.859
7/32	.219	5.556	23/32	.719	18.256
15/64	.234	5.953	47/64	.734	18.653
1/4	.250	6.350	3/4	.750	19.050
17/64	.266	6.747	49/64	.766	19.447
9/32	.281	7.144	25/32	.781	19.844
19/64	.297	7.541	51/64	.797	20.241
5/16	.313	7.938	13/16	.813	20.638
21/64	.328	8.334	53/64	.828	21.034
11/32	.344	8.731	27/32	.844	21.431
23/64	.359	9.128	55/64	.859	21.828
3/8	.375	9.525	7/8	.875	22.225
25/64	.391	9.922	57/64	.891	22.622
13/32	.406	10.319	29/32	.906	23.019
27/64	.422	10.716	59/64	.922	23.416
7/16	.438	11.113	15/16	.938	23.813
29/64	.453	11.509	61/64	.953	24.209
15/32	.469	11.906	31/32	.969	24.606
31/64	.484	12.303	63/64	.984	25.003
1/2	.500	12.700	1	1.000	25.400

1 inch = 25.4 millimeters

English to Metric Conversion Table

Units	Change to	Multiply by
Inches	Millimeters	25.40
Inches	Centimeters	2.54
Inches	Meters	.0254
Feet	Meters	.3048
Miles	Kilometers	1.609347
Sq. Inches	Sq. Centimeters	6.452
Sq. Feet	Sq. Meters	.0929
Cu. Inches	Cu. Centimeters	16.3872
Cu. Feet	Cu. Meters	.02832
U.S. Gallons	Liters	3.7854
Pounds	Kilograms	.45359

Metric to English Conversion Table

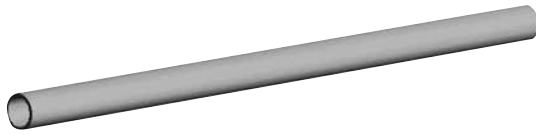
Units	Change to	Multiply by
Millimeters	Inches	.03937
Centimeters	Inches	.39371
Meters	Inches	39.371
Meters	Feet	3.281
Kilometers	Miles	.62137
Sq. Centimeters	Sq. Inches	.1550
Sq. Meters	Sq. Feet	10.7649
Cu. Centimeters	Cu. Inches	.061
Cu. Meters	Cu. Feet	35.314
Liters	U.S. Gallons	.26417
Kilograms	Pounds	2.20462

Physical Properties of Thermoplastic Piping Materials

ASTM Test Methods	Properties	Material			
		PVC 12454-B	CPVC 23447-B	PVDF	Polypropylene
General					
D792	Specific Gravity	1.38	1.50	1.76	.905
D570	Water Absorption % 24 Hrs. @ 73°F	.05	.05	.04	.02
Mechanical					
D638	Tensile Strength psi @ 73°F	7,300	7,200	6,000	4,600
D638	Modulus of Elasticity in Tension psi @ 73°F x 10 ⁵	4.2	3.7	2.1	2.0
D790	Flexural Strength psi	14,500	15,600	9,700	7,000
D256	Izod Impact Strength @ 73°F (Notched)	1.1	2.0	3.8	.8
Thermal					
D696	Coefficient of Thermal Expansion in/in/°F x 10 ⁻⁵	3.0	3.8	7.9	5.0
C177	Thermal Conductivity BTU/HR/Sq. Ft./°F/in	1.2	.95	.79	1.2
D648	Heat Distortion Temp. °F @ 66 psi	NA	NA	284	195
D648	Heat Distortion Temp. °F @ 264 psi	163	212	194	140
	Resistance to Heat °F at Continuous Drainage	140	210	280	180
Flammability					
D2863	Limiting Oxygen Index (%)	43	60	44	17
E84	Flame Spread	< 25	< 25	< 25	NA
E84	Smoke Generation Underwriters Lab Rating (Sub. 94)	> 250	< 250	< 50	> 450
		94V-0	94V-0	94V-0	94HB

Reference Data

Dimensions and References

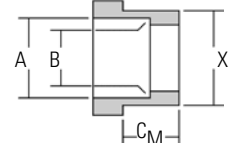
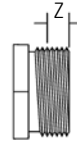
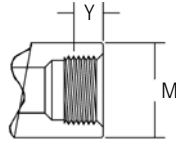
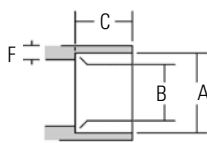


Pipe¹ 20 ft. Lengths

Nominal Pipe Size	Approximate Weight per 100 ft.				Nom. Outside Diameter (In.)	Nom. Inside Diameter (In.)	Wall Thickness (in.)		Cross-sectional Area (in. ²)	Internal Area (in. ²)	Fluid Capacity (gal/100ft.)	Outside Surf. Area (ft ² /100ft)	Threshold Flow ² (GPM)
	PVC	CPVC	Polypropylene	PVDF			Nom.	Min.					
1/4	10.1	11.9	—	—	.540	.282	.129	.119	.167	.062	.32	14.14	.97
1/2	20.5	24.3	14.0	24.4	.840	.526	.157	.147	.337	.217	1.13	21.99	3.39
3/4	27.8	32.9	18.9	33.0	1.050	.722	.164	.154	.457	.409	2.13	27.49	6.38
1	40.4	48.5	27.1	48.7	1.315	.936	.1895	.179	.670	.688	3.57	34.43	10.72
1 1/4	56.7	66.9	37.9	—	1.660	1.255	.2025	.191	.927	1.237	6.43	43.46	19.28
1 1/2	68.9	81.1	44.8	81.4	1.900	1.476	.212	.200	1.124	1.711	8.89	49.74	26.67
2	94.9	108.5	62.3	112.6	2.375	1.913	.231	.218	1.556	2.874	14.93	62.18	44.79
2 1/2	144.9	165.4	—	—	2.875	2.290	.2925	.276	2.373	4.119	21.40	75.27	64.19
3	193.8	221.3	126.6	256.4	3.500	2.864	.318	.300	3.179	6.442	33.47	91.63	100.40
4	283.3	323.4	185.2	357.0	4.500	3.786	.357	.337	4.647	11.258	58.48	117.81	175.44
6	541.1	616.8	359.9	714.3	6.625	5.709	.458	.432	8.873	25.598	132.98	173.44	398.93
8	821.9	905.8	—	—	8.625	7.565	.530	.500	13.479	44.948	233.49	225.80	700.48
10	1227.7	—	—	—	10.750	9.493	.6285	.593	19.985	70.778	367.68	281.43	1103.02
12	1710.4	—	—	—	12.750	11.294	.726	.687	27.495	100.181	520.79	333.79	1562.36

1 Dimensions shown are listed in ASTM D1785 and F441 for PVC and CPVC Schedule 80 plastic pipe, respectively.

2 Upper threshold rate of flow = 5 ft./sec. fluid velocity.



Fittings¹

Size	IPS Dia	Solvent Socket (S)			Female Threads (FPT)		Male Threads (MPT)	Male End (SPG)		Wall Thickness	
		A ³	B ³	C ⁴ Nom	Y ²	M ⁵ Min	Z ²	X	Cm ⁴ Nom	F ⁴ Min	E ⁴ Min
1/4	.540	.552	.536	.640	.311	.840	.311	.540	.655	.149	.119
1/2	.840	.848	.836	.890	.427	1.280	.427	.840	.905	.185	.147
3/4	1.050	1.058	1.046	1.015	.446	1.500	.446	1.050	1.030	.195	.154
1	1.315	1.325	1.310	1.140	.530	1.810	.530	1.315	1.155	.225	.179
1 1/4	1.660	1.670	1.655	1.265	.550	2.200	.550	1.660	1.280	.240	.191
1 1/2	1.900	1.912	1.894	1.390	.550	2.500	.550	1.900	1.405	.250	.200
2	2.375	2.387	2.369	1.515	.566	2.375	.566	2.375	1.530	.275	.218
2 1/2	2.875	2.889	2.868	1.780	.870	3.560	.870	2.875	1.810	.345	.276
3	3.500	3.516	3.492	1.905	.954	4.300	.954	3.500	1.933	.375	.300
4	4.500	4.518	4.491	2.280	1.032	5.430	1.032	4.500	2.310	.420	.337
6	6.625	6.647	6.614	3.030	—	—	—	6.625	3.060	.540	.432
8	8.625	8.655	8.610	4.500	—	—	—	8.625	4.590	.625	.500
10	10.750	10.780	10.735	5.500	—	—	—	10.750	5.590	.741	.593
12	12.750	12.780	12.735	6.500	—	—	—	12.750	6.590	.859	.687

1 With exception of thread lengths, dimensions shown are listed in ASTM D2467 and F439 for PVC and CPVC socket-type Schedule 80 fittings, respectively.

2 Dimensions shown are typical male component engagement, hand-tight (L, in ANSI B1.20.1 thread spec.) plus 1 1/2 turns lightening.

3 Dimensions shown are not applicable for polypropylene or PVDF. Socket diameters in these materials are designed for Chemtrol thermo-seal socket fusion joining.

4 Chemtrol® fittings may exceed certain minimum ASTM dimensional requirements in order to ensure functional satisfaction.

5 Dimensions are listed in ASTM D2464 and F437 for PVC and CPVC threaded Schedule 80 fittings, respectively.

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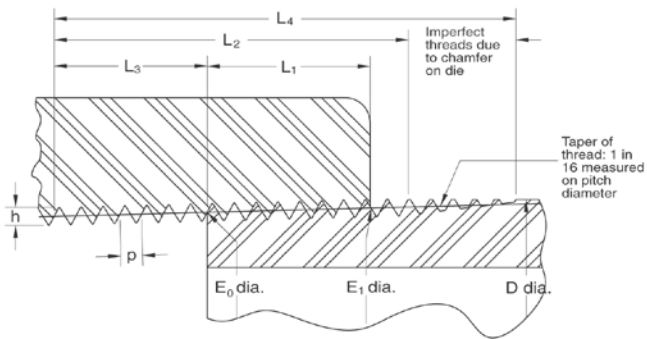
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Reference Data

Dimensions and References

National (American) Standard Taper Pipe Thread, NPT (excerpt from ANSI B1.20.1)

Nominal Size	Outside Diameter D	Number of Threads Per Inch n	Pitch of Thread p	Normal Engagement By Hand L ₁	Length of Effective Thread L ₂	Wrench Makeup Length for Internal Thread L ₃	Total Length: End of Pipe to Vanish Point L ₄	Pitch Diameter at Beginning of External Thread E ₀	Pitch Diameter at Beginning of Internal Thread E ₁	Height of Thread (Max.) h
in.	in.		in.	in.	in.	in.	in.	in.	in.	in.
1/4	0.540	18	.05556	.228	.4018	.1667	.5946	.47739	.49163	.04444
1/2	0.840	14	.07143	.320	.5337	.2143	.7815	.75843	.77843	.05714
3/4	1.050	14	.07143	.339	.5457	.2143	.7935	.96768	.98887	.05714
1	1.315	11 1/2	.08696	.400	.6828	.2609	.9845	1.21363	1.23863	.06957
1 1/4	1.660	11 1/2	.08696	.420	.7068	.2609	1.0085	1.55713	1.58338	.06957
1 1/2	1.900	11 1/2	.08696	.420	.7235	.2609	1.0252	1.79609	1.82234	.06957
2	2.375	11 1/2	.08696	.436	.7565	.2609	1.0582	2.26902	2.29627	.06957
2 1/2	2.875	8	.12500	.682	1.1375	.2500	1.5712	2.71953	2.76216	.10000
3	3.500	8	.12500	.766	1.2000	.2500	1.6337	3.34062	3.38850	.10000
4	4.500	8	.12500	.844	1.3000	.2500	1.7337	4.33438	4.38712	.10000



Do not thread Schedule 40 pipe.

Pressure Factors

Pressure measurements are based on the standardized weight of water expressed in a variety of English and metric units.

1 psig (gauge)	= 2.3068	foot of water head
	= 2.036	inch of mercury head
	= 0.0689	bar
	= 0.0703	kgm/cm ² (kilograms/centimeter ²)
	= 6894.757	N/m ² (newton/meter ²)
	= 6.8948	kPa (kilopascal)
1 foot of water	= 0.4335	psig
	= 0.0305	kgm/cm ² (kilograms/centimeter ²)
	= 2988.8837	N/m ² (newton/meter ²)
	= 0.33457	kPa (kilopascal)
	= 0.02989	bar
1 bar	= 100000.0	N/m ² (newton/meter ²)
	= 14.50377	psig
	= 100.0	kPa (kilopascal)
	= 10197.1621	kgm/cm ² (kilograms/centimeter ²)
	= 33.456	foot of water head
1 N/m ² (newton/meter ²)	= 1.0	Pa (pascal) = 0.001 kPa (kilopascal)
	= 0.000010197	kgm/cm ²
	= 0.000145	psig (gauge)
1 kilogram/centimeter ²	= 98066.5	N/m ² (newton/meter ²)
	= 14.2233	psig

ANSI B16.5 Dimensional Data – Flanges and Flanged Fittings

Nominal Pipe Size (In.)	Outside Diameter (In.)	Number of Holes	Drilling	
			Diameter of Bolt (In.)	Diameter of Bolt Circle (In.)
1/2	3.50	4	1/2	2.38
3/4	3.88	4	1/2	2.75
1	4.25	4	1/2	3.12
1 1/4	4.62	4	1/2	3.50
1 1/2	5.00	4	1/2	3.88
2	6.00	4	5/8	4.75
2 1/2	7.00	4	5/8	5.50
3	7.50	4	5/8	6.00
4	9.00	8	5/8	7.50
6	11.00	8	3/4	9.50
8	13.50	8	3/4	11.75
10	16.00	12	7/8	14.25
12	19.00	12	7/8	17.00

† Dimensions and bolts conform to ANSI B16.5 for 150 lb. steel flanges. Bolt holes are 1/8" larger in diameter than the required bolts.

Vacuum Factors

Vacuum may be thought of as the absence of pressure. It is the measure of negative pressure between standardized atmospheric pressure and a theoretically perfect vacuum.

1 Std. Atmosphere	= 14.6959	psia (absolute)
	= 760.0	mm (millimeter) of mercury head
	= 1.0332276	kgm/cm ² (kilograms/centimeter ²)
	= 1.01325	bar
	= 101.325	kPa (kilopascal)
1 mm	= 0.03937	inch
1 micron of mercury	= 0.001	mm (millimeter) of mercury head
	= 0.000019336	psig (gauge)
1 mm of mercury	= 1000.0	micron of mercury head
1 inch	= 25.4	mm (millimeter)
1 inch of mercury	= 25400.0	micron of mercury head
	= 0.4912	psig
1 inch of water	= 0.0361	psig
	= 1868.2742	micron of mercury head
1 psig (gauge)	= 27.6817	inch of water head

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Reference Data

Pressure Ratings of Chemtrol Products

Pipe and Fittings

In order to determine the pressure rating for product system, first find the plastic material and schedule (wall thickness—see Reference Data—Schedule 80 components for additional information) of pipe and fittings in the heading of the Maximum Nonshock Operating Pressure table below. Then, locate the selected joining method in the subheading of the table and go down the column to the value across from a particular pipe size, listed in the far left column. This will be the maximum non-shock operating pressure at 73° F for the defined product system.

Maximum Nonshock Operating Pressure (psi) at 73° F¹

Nom. Pipe Size	Schedule 40		Schedule 80		Schedule 80		Schedule 80	
	CPVC	PVC & CPVC	PVC & CPVC	Polypropylene	Polypropylene	PVDF (Kynar®)	PVDF (Kynar®)	
	Socket End	Socket End	Threaded End	Thermo-Seal Joint	Thermo-Seal Joint	Threaded End	Threaded End	
1/2	600	850	420	410	20	580	290	
3/4	480	690	340	330	20	470	230	
1	450	630	320	310	20	430	210	
1 1/4	370	520	260	260	20	-----	-----	
1 1/2	330	470	240	230	20	326	160	
2	280	400	200	200	20	270	140	
2 1/2	300	420	210	-----	-----	-----	-----	
3	260	370	190	190	20	250	N.R.	
4	220	320	160	160	20	220	N.R.	
6	180	280	N.R.	140	N.R.	190	N.R.	
8	160	250 ²	N.R.	-----	-----	-----	-----	
10	140	230	N.R.	-----	-----	-----	-----	
12	130	230	N.R.	-----	-----	-----	-----	

- For more severe service, an additional correction factor may be required.
 - 8° CPVC Tee, 90° ELL and 45° ELL rated at 1/2 of value shown.
 - Recommended for intermittent drainage pressure not exceeding 20 psi. Not available in natural polypropylene.
- N.R. Not Recommended and NOT WARRANTED by manufacturer.

As implied by the preceding, the pressure for all thermoplastic piping is a function of temperature. For pipe and fitting applications above 73° F, refer to the table at the top of the next column for the Temperature Correction Factors. To determine the maximum non-shock pressure rating at an elevated temperature, simply multiply the base pressure rating obtained from the upper table by the correction factor from the upper table in the next column. Below 73° F the pressure rating will be the same as the base pressure in the table above.

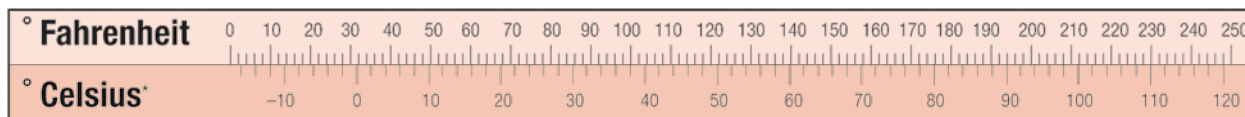
Temperature Correction Factors

Operating Temperature (° F)	Factors PVC	CPVC	PP	Kynar® PVDF
70	1.00	1.00	1.00	1.00
80	0.90	0.96	0.97	0.95
90	0.75	0.92	0.91	0.87
100	0.62	0.85	0.85	0.80
110	0.50	0.77	0.80	0.75
115	0.45	0.74	0.77	0.71
120	0.40	0.70	0.75	0.68
125	0.35	0.66	0.71	0.66
130	0.30	0.62	0.68	0.62
140	0.22	0.55	0.65	0.58
150	N.R.	0.47	0.57	0.52
160	N.R.	0.40	0.50	0.49
170	N.R.	0.32	0.26	0.45
180	N.R.	0.25	*	0.42
200	N.R.	0.18	N.R.	0.36
210	N.R.	0.15	N.R.	0.33
240	N.R.	N.R.	N.R.	0.25
280	N.R.	N.R.	N.R.	0.18

* Recommended for intermittent drainage pressure not exceeding 20 psi. N.R. Not Recommended and NOT WARRANTED by manufacturer.

Temperature Conversion

$$F = C \times 1.8 + 32 \quad C = (F - 32) \div 1.8$$



* Formerly known as Centigrade

Reference Data

Pressure Ratings of Chemtrol Products

Valves, Unions, and Flanges

As with all other thermoplastic piping components, the maximum pressure rating for all Chemtrol® valves, unions and flanges, regardless of size, is related to temperature as per the chart below.

Maximum Non-Shock Operating Pressure (psi) vs. Temperature

Operating Temperature (° F)	Model D Ball Valve		All Other Valves, Unions & Flanges			
	PVC	CPVC	PVC	CPVC	PP	PVDF
70	250	250	150	150	150	150
80	250	250	150	150	150	150
90	225	250	150	150	150	150
100	200	240	150	150	150	150
110	180	220	135	140	140	150
120	165	190	125	130	130	150
130	140	180	110	120	118	150
140	130	170	50	110	105	150
150	N.R.	160	N.R.	100	93	140
160	N.R.	150	N.R.	90	80	133
170	N.R.	140	N.R.	80	70	125
180	N.R.	130	N.R.	70	50	115
200	N.R.	65	N.R.	50	N.R.	97
210	N.R.	30	N.R.	25	N.R.	85
220	N.R.	N.R.	N.R.	N.R.	N.R.	75
240	N.R.	N.R.	N.R.	N.R.	N.R.	55
260	N.R.	N.R.	N.R.	N.R.	N.R.	40
280	N.R.	N.R.	N.R.	N.R.	N.R.	25

N.R. Not Recommended and NOT WARRANTED by manufacturer.

Chemtrol® Valve Construction and Performance Standards

For over 55 years, the construction and performance standards on plastic valves have traditionally been set by Chemtrol products for the industry to follow. Specifying engineers should know that:

1. Chemtrol valves are 100% seat and shell tested.
2. The sockets of PVC and CPVC Chemtrol valves conform to the dimensional requirements of ASTM Standards D2467 (PVC) and F439 (CPVC) for Schedule 80 Socket pressure fittings. For dimensional details please reference the data on the preceding pages.
3. The threaded end connections of all Chemtrol valves meet ANSI B1.20.1 (was ASA B2.1) requirements for National (American) Standard Pipe Taper Threads and conform to the dimensional requirements of ASTM Standards D2464 (PVC) and F437 (CPVC) for Schedule 80 Threaded pressure fittings.
4. The flanges attached to all Chemtrol valves meet the outside diameter and bolt hole requirements of ANSI B16.5 for 150 lb. Steel Pipe Flanges.
5. The physical and chemical properties of PVC and CPVC are classified and grouped into characteristic materials by ASTM Standard D1784. The materials, used in domestically produced Chemtrol Valves, exceed the rigid requirements set forth for cell class 12454 (PVC) and 23447 (CPVC). These are the respective materials stipulated for use in pipes which merit the highest Hydrostatic Design Stress rating (2000 psi) and the maximum corrosion resistance.
6. Independent third party tested and certified PVC and CPVC Chemtrol Valves are regularly tested for compliance with NSF/ANSI 14 "Plastic Piping System Components and Related Materials" requirements establishing minimum physical, performance, and health effect requirements for the protection of public health and the environment.

Valve Pressure-Loss Calculations

As an aid to system design, fluid flow coefficients (C_v values) are shown for all Chemtrol valves. C_v is defined as the flow, in GPM, through a valve which will produce a pressure drop of 1.0 PSI when the medium is water at 60°F.

To determine the pressure drop for a given condition, the following formula may be used:

$$\Delta P = \frac{Q^2 S.G.}{C_v^2}$$

Where ΔP = Pressure drop across the valve in psi
 Q = Flow through the valve in gpm
 $S.G.$ = Specific gravity of the liquid (water = 1.0)
 C_v = Fluid flow coefficient

The solution of an example problem follows. Refer to the product description page in this Valve Guide for C_v values of specific valves.

Example

Find the pressure drop across a 1 1/2" Ball Check Valve with a water flow rate of 50 gpm.

The C_v for the Chemtrol® Check Valve is 56, as shown on page 11.

$$\Delta P = \frac{(50)^2 \times 1.0}{(56)^2}$$

$$\Delta P = \left(\frac{50^2}{56^2} \right)$$

$$\Delta P = .797 \text{ psi}$$

Standards

Many commercial, industrial, and governmental standards or specifications are available to assist the design engineer in specifying plastic piping systems. Standards most frequently referred to and most commonly called out in plastic piping specifications are ASTM Standards. These standards also often form the basis of other standards in existence. Below is a list and description of those standards most typically applied to industrial plastic piping.

ASTM D1784

(American Society for Testing and Materials)

This specification covers rigid PVC and CPVC compounds intended for general purpose use in extruded or molded form including pressure piping applications and nonpressure piping applications composed of poly(vinyl chloride), chlorinated poly(vinyl chloride), or vinyl chloride copolymers containing at least 80% vinyl chloride, and the necessary compounding ingredients.

ASTM D1785 and F441

These standards cover the specification and quality of Schedule 40, 80, and 120 PVC (D1785) and CPVC (F441) pressure pipe. Outlined in these standards are dimensional specifications, burst, sustained, and maximum operating pressure requirements and test procedures for determining pipe quality with respect to workmanship and materials.

ASTM D2466

This standard covers Schedule 40 PVC threaded and socket pressure fittings. Stipulated in the standard are thread and socket specifications, by lengths, wall thickness, burst, material, quality, and identification requirements.

ASTM D2467 and F439

These standards cover Schedule 80 PVC (D2467) and CPVC (F439) Socket Type and Threaded Pressure Fittings. Dimensions, burst strength, resin compound stipulation, and scheme of product identification requirements are specified.

ASTM D2564 and F493

These standards set forth requirements for PVC (D2564) and CPVC (F493) Solvent Cement. The specification identifies the resin compound to be used and stipulates minimum resin content, solution viscosities, and physical performance qualities.

ASTM F656

This specification covers requirements for primers for use with poly(vinyl chloride) (PVC) pipe and fittings that are to be joined by PVC solvent cements meeting the requirements of Specification.

ASTM F1970

This specification covers special engineered fittings or appurtenances for use in PVC or CPVC systems. Flanges, unions, and valves not included in the scope of other ASTM specifications are specifically referenced. Minimum requirements are identified for testing, materials, dimensions, marking, and in-plant quality control.

ASTM F1498

This specification adapts the General Purpose American Pipe Thread Specification, ASME B1.20.1, to taper pipe threads for use on plastic pipe and fittings with machined or molded threads. The standard covers dimensions and gaging of plastic tapered National Pipe Threads (NPT) for leak-tight joints, and it is now referenced in all ASTM Standards for plastic piping products.

ASTM D2855

This standard describes the procedure for making joints with PVC pipe and fittings by means of solvent cementing.

ASTM D4101 (Formerly D2146)

This specification covers polypropylene materials suitable for injection molding and extrusion. Polymers consist of homopolymer, copolymers, and elastomer compounded with or without the addition of impact modifiers (ethylene-propylene rubber, polyisobutylene rubber, and butyl rubber), colorants, stabilizers, lubricants, or reinforcements.

ASTM D1599

This standard covers the test method for establishing the short-term hydraulic failure pressure of thermoplastic pipe, tubing, and fitting under specific temperature, time, and method of loading conditions. These test techniques are normally used for quality control.

ASTM D1598

This test method covers the determination of the time-to-failure of both thermoplastic and reinforced thermosetting/resin pipe under constant internal pressure.

ASTM D2837

This standard describes the procedure for obtaining the Hydrostatic Design Basis for all known thermoplastic pipe materials and for any practical temperature and medium. This was achieved by evaluating stress rupture data, taken from tests conforming to ASTM D1598, for the subject material and involved specified treatment and analysis of data.

ASTM D2657

This standard covers the procedure for heat-fusion bonding of polyolefin materials.

ASTM D3222

This standard covers the polymerization method and physical properties of PVDF (polyvinylidene fluoride) Fluoroplastic Materials for molding and extrusion.

Organizations other than ASTM issue standards that are commonly encountered in industrial thermoplastic piping design. The most important of these are described below.

ASME B1.20.1 (was B2.1)

This specification details the dimensions and tolerance for tapered pipe threads. This standard is referenced in the ASTM standards for threaded fittings mentioned above. See Reference Data for details.

ASME B16.5

This specification sets forth standards for bolt holes, bolt circles, and overall dimensions for steel 150# flanges. See Reference Data for details.

Technical Service

Technical assistance regarding standards, applications, product performance, design, and installation tips is available from Technical Services Technical Information Hotline: (888) 446-4226 phone; (888) 336-4226 fax.

Product Specifications

Polypropylene (PP) Schedule 80 Industrial Pipe and Fittings

Scope:

This specification establishes the manufacturing requirements for black and Chem-Pure® Schedule 80 polypropylene piping components intended for use in industrial, pressure-rated, fluid-handling systems for applications at 180° F or less, where resistance to corrosion are of prime importance.

Materials:

Rigid PP (polypropylene) used in the manufacture of Schedule 80 piping components shall be one of the following:

Black Polypropylene:

- Pipe-material shall be Cell Class PP0110-A2-1510 as per ASTM D4101. Fittings material shall be Cell Class PP0110-M30-A10120 (glass bead material) and Cell Class PP0110-B67154 (unfilled material) as per ASTM D4101. These materials shall be pigmented jet black.

Chem-Pure (Natural) Polypropylene:

- Pipe material shall be Cell Class PP0110-A2-1510 as per ASTM D4101. Fitting material shall be Cell Class PP0210-B45145 as per ASTM D4101. These materials shall be unpigmented.

Dimensions/Design (IPS Size):

Socket-end connections suitable for heat-fusion welding shall have socket lengths and wall thicknesses as required for Schedule 80 fittings in ASTM D2467. Socket diameters shall be in accordance with the manufacturer's recommendations for an interference fit with the pipe as prescribed in ASTM D2657; taper pipe threaded-ends shall have lengths, diameters, and configuration in accordance with ASTM D2467 for Schedule 80 fittings.

Pipe shall have diameters and wall thicknesses in conformance with ASTM D1785 for Schedule 80 pipe.

Fittings shall be industrial, heavy-duty, hub style.

Flanges shall be one-piece design utilizing the tapered-, serrated-, and full-face gasket technique for joining, with bolt pattern compatible with ASME B16.5 Class 150 metal flanges.

Unions shall have an O-ring seal and components interchangeable with true union valves for maximum system versatility.

Transition unions, unions intended for joining dissimilar materials, shall utilize components of the two dissimilar materials, joined with an elastomeric seal to absorb the thermal-expansion coefficient differential.

Pressure Ratings:

Pipe and fittings joined by the heat-fusion technique shall be rated according to the following pressures for a given nominal size at 73° F water service.

1/2 – 410 psi	1 – 310 psi	2 – 200 psi	4 – 160 psi
3/4 – 330 psi	1-1/2 – 230 psi	3 – 190 psi	6 – 140 psi

NOTE: Threaded pipe and fittings shall be rated at 20 psi maximum for all sizes at 73° water service.

Heat-fusion valves, unions, and flanges shall be rated at 150 psi for non-shock water service at 73° F and have a minimum 60 second burst requirement of 3.2 times the rated pressure.

Markings:

Fittings and pipe shall be clearly marked with the manufacturer's name or trademark, nominal size, material designation, and country of manufacture.

Installation/Maintenance:

Installation and operation shall be as specified by the manufacturer's printed instructions. Specialized joining equipment shall be as recommended by the manufacturer.

Polyvinylidene Fluoride (PVDF) (KYNAR®) Schedule 80 Industrial Pipe and Fittings

Scope:

This specification establishes the manufacturing requirements for red and natural PVDF Schedule 80 piping components intended for use in industrial, pressure-rated, fluid-handling systems of 280° F or less where resistance to corrosion are of prime importance.

Materials:

Rigid PVDF (polyvinylidene fluoride) used in the manufacture of Schedule 80 piping components shall conform to requirements in ASTM D3222 for Type I homopolymers. Pipe and fitting components shall be manufactured from one of the following:

Red Kynar®:

PVDF compound with a minimum of 1.7% red pigment content for opacity to UV radiation.

Natural Kynar®:

Unpigmented 700 series PVDF compound of the highest purity.

Dimensions/Design:

Socket-end connections suitable for heat-fusion welding shall have socket lengths and wall thicknesses conforming to ASTM D2467 and socket diameters shall be in accordance with the manufacturer's printed recommendations to provide an interference-fit with the pipe; taper pipe threaded-ends shall have thread lengths, diameters, and configurations in conformance with ASTM D2467.

Pipe shall be manufactured to the same tolerances for outside diameter and wall thicknesses as outlined in ASTM D1785 for Schedule 80 pipe.

Fittings shall be industrial, heavy-duty, hub style.

Unions shall have an O-ring seal and components interchangeable with true union valves for maximum system versatility.

Transition unions, unions intended for joining dissimilar materials, shall utilize components of the two dissimilar materials, joined with an elastomeric seal to absorb the thermal-expansion coefficient differential.

Pressure Ratings:

Pipe and fittings joined by the heat-fusion technique shall be rated according to the following pressures for a given nominal size at 73° F water service.

1/2 – 580 psi	1 – 430 psi	2 – 270 psi	4 – 220 psi
3/4 – 470 psi	1-1/2 – 320 psi	3 – 260 psi	6 – 190 psi

NOTE: Threaded pipe and fittings shall be rated at 50% of the values given for socket ends.

Valves, unions, and flanges (either socket or threaded end) shall be pressure rated at 150 psi non-shock water service at 73° F and have a minimum 60 second burst requirement of 3.2 times the rated pressure.

Markings:

All pipe, fittings, and valves shall be clearly marked with the manufacturer's name or trademark, nominal size, and country of manufacture.

Installation:

Installation and operation shall be as specified by the manufacturer's printed instructions. Specialized joining equipment shall be as recommended by manufacturer.

Product Specifications

150 PSI Tru-Bloc® True Union Ball Valves, Model C

Scope:

This specification establishes the manufacturing requirements for dual-blocking (Tru-Bloc) and downstream-only blocking (true union) quarter-turn ball valves of PP and PVDF materials intended for use in industrial, commercial, and residential pressure-piping systems, where cost-effective, long-term resistance to corrosion is of prime importance, and the service temperature does not exceed: PP, 180° F; PVDF, 280° F.

Major component parts shall be constructed from one of the following:

NPS 1/2 – 4 PP (polypropylene) Cell Class PP0110-M30-A10120 (glass-filled material) and Cell Class PP0110-B67157 (unfilled material) as per ASTM D4101. These materials shall be pigmented jet black. Valve style shall be full-port True Union.

NPS 1/2 – 4 Chem-Pure® (natural polypropylene) Cell Class PP0210-B45145 as per ASTM D4101. Materials shall be unpigmented and of the highest purity. Valve style shall be full-port True Union.

NPS 1/2 – 4 PVDF (polyvinylidene fluoride) Type I compound per ASTM D3222. The material shall be red Kynar® (pigmented red) for maximum UV opacity, and the valve style shall be full-port Tru-Bloc, TU or True Union.

NPS 1/2 – 4 PVDF (polyvinylidene fluoride) Type I compound per ASTM D3222. The material shall be natural (unpigmented) 700 Series Kynar® of the highest purity and the valve style shall be full-port Tru-Bloc, TU or True Union.

Dimensions/Valve Design:

PP and PVDF socket-end connections shall be suitable for heat-fusion welding as specified in ASTM D2567 Technique I.

All threaded-end connections shall conform to the requirements of ASTM D2467 and F439 as well as ASTM F1498 for tapered pipe threads.

Performance:

Valves shall be rated for 150 psi non-shock water service at 73° F water and have a minimum burst rating of 3.2 times the rated working pressure.

Markings:

Valves shall be clearly marked with the manufacturer's name or trademark, nominal size, material designation, ASTM number or equivalent symbol indicating compliance with applicable standards, and country of manufacture.

Installation:

Installation and operation shall be as specified by the manufacturer's printed instructions.

150 PSI Ball Check and Foot Valves

Scope:

This specification establishes the manufacturing requirements for PP and PVDF ball check valves intended for use in industrial, commercial, and residential pressure-piping systems, where cost-effective, long-term resistance to corrosion is of prime importance. Maximum service temperatures are: PP, 180° F; PVDF, 280° F.

Materials:

Major component parts shall be constructed from one of the following:

NPS 1/2 – 2 PP (polypropylene) Cell Class PP0110-M30-A10120 (glass-filled material) and Cell Class PP0110-B67157 (unfilled material) as per ASTM D4101. These materials shall be pigmented jet black.

NPS 1-1/2 – 2 Chem-Pure® (natural polypropylene) Cell Class PP0210-B45145 as per ASTM D4101. Materials shall be unpigmented and of the highest purity.

NPS 1/2 – 2 PVDF (polyvinylidene fluoride) Type I compound per ASTM D3222. The material shall be pigmented red for maximum UV opacity.

NPS 1/2 – 2 PVDF (polyvinylidene fluoride) Type I compound per ASTM D3222. The material shall be natural (unpigmented) 700 Series Kynar® of the highest purity.

Dimensions/Valve Design:

PP and PVDF socket-end connections shall be suitable for heat-fusion welding as specified in ASTM D2567 Technique I. All threaded-end connections shall conform to the requirements of ASTM D2467 and F439 as well as ASTM F1498 for tapered pipe threads.

The valve design shall be full port with full flow around the rib-guided ball.

The valve seat shall be an elastomeric seal that will permit seating at low-head pressure, and an arrow shall be molded on the valve body for permanent visibility to indicate the intended direction of flow.

Markings:

Valves shall be clearly marked with the manufacturer's name or trademark, nominal size, material designation, ASTM number or equivalent symbol indicating compliance with applicable standards, and county of manufacture.

Performance:

Valves shall be rated for 150 psi service at 73° F non-shock water service and have a minimum burst rating of 3.2 times the rated working pressure.

Installation:

Installation and operation shall be as specified by the manufacturer's printed instructions.

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