

Type 21 True Union Ball Valves



SERIES: Type 21

SIZES: 3/8" – 4"

ENDS: Socket, Threaded, Combo⁶, Flanged, Butt¹ or ChemFlare™

SEATS: PTFE

SEALS²: EPDM, FKM (Viton®)



The Chemline **Type 21** True Union Ball valve incorporates state of the art features for long term performance. This is a full port, full blocking True Union valve pressure rated at 16 bar (230 psi)³. Double stem o-rings and Safety Shear stem design provide for a high degree of safety on hazardous fluid applications. All sizes have an ISO standard actuator mounting platform integral to the valve body. This provides for sturdy and secure mounting of pneumatic or electric actuators.

Features

Pressure rated to 230 psi³

- Provides a high factor of safety

Integral Actuator Mounting Platform

- Actuation is easy. Electric or pneumatic actuators may be mounted in the field.

Full Port

- High capacity and low pressure drops

Fully Blocking

- Downstream union nut may be safely disassembled for piping maintenance while valve is closed off under full system pressure

Built-In Spanner Wrench

- Top of the handle is designed to be used as a tool for accessing internal parts

Safety Shear Stem Design

- Stem has double o-rings
- Designed to hold full pressure even if stem breaks due to excessive torque

High Chemical Resistant Material

- PVC and CPVC compounds have an "A" chemical resistance rating as per ASTM D-1784. They have outperformed other PVC and CPVC compounds on aggressive chemicals.

CRN Registration numbers by province

- Ontario: OC11045.5
- Newfoundland: OC11045.50
- Saskatchewan/Manitoba/Quebec: OC11045.56
- New Brunswick: OC11045.57
- Nova Scotia: OC11045.58
- P.E.I.: OC11045.59
- British Columbia: not required
- Alberta: not required⁵

¹ Butt ends for fusion to Chemline metric PP, PVDF or ECTFE (Halar®) piping.

² Other materials are available.

³ PVC, CPVC and PVDF 1/2" to 2" are rated at 230 psi; 2-1/2" to 4" and all size PP valves are rated at 150 psi at 20°C.

⁴ PVC valves with EPDM or FKM (Viton®) seals are certified under NSF/ANSI Standard 61 for contact with drinking water.

⁵ Not required for non-expandable fluids.

⁶ PVC and CPVC valves 1/2" to 2" are available as Combo (threaded and socket ends).

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Features

Double Stem O-Rings – Safety Shear Design

- Upper o-ring groove is deeper than lower. In case of excessive stem torque, stem will shear at the upper groove, leaving the inner o-ring intact to seal against full line pressure.



PTFE Seats have Elastomer Cushions

- Improved sealing while lowering stem torques
- Self adjusts for seat wear



Built in Spanner Wrench

- For removing or tightening the seat carrier
- All parts are replaceable



Integral Actuator Mounting Platform

- Actuation is easy. Electric or pneumatic actuators may be mounted in the field. Simply pull off the handle to reveal a standard ISO 5211 mounting platform which accepts bolt-on hardware.



Fully Blocking

- Downstream pipe may be removed while upstream side is still pressurized. This may be done with valve installed in either direction.



Base Mounting Pad

- Optional threaded inserts allow valves to be securely anchored
- Supplied standard with actuated valves

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Options + Accessories

ChemFlare™ Ends

- For connection to PFA tube. Leak-free connections for difficult services such as sodium hypochlorite



One-piece moulded PVC and CPVC 6" socket ends

- Allows installation of 4" valve in 6" line
- Factory moulded, eliminates cementing separate reducer and coupling
- Fixed to valve mechanically just like the one-piece moulded factory flanges



Optional Lock-out Handle & Hasp

- To prevent unauthorized operation of the valve during maintenance shut-downs
- Padlocks go through holes in hasp

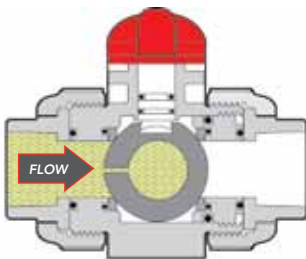


Gear Operators

- Deluxe FRP construction
- IP67 enclosure resists short term immersion

Chain Wheel Operators

- For overhead operation, with 7' of chain drop
- Cast iron or stainless steel



Vented Ball

- Recommended for all sodium hypochlorite services
- Valve shown in closed position



Valve Tags

- Stainless steel or plastic



Different Colour Handles

- Choose a handle colour other than standard red for colour coding different services



Municipal Operating Nut

- 2" square nut for operating valves below grade using a standard municipal "key"
- Stainless Steel for corrosion resistance



Manual Limit Switch

- Electrical feedback of manual valve position
- NEMA 4X enclosure, position indicator beacon, 2x SPDT or proximity switches, stainless steel hardware

Shaft Extensions

- Different materials and lengths are available
- Several designs:
 - with no housing for indoors
 - with waterproofed PVC housing for indoors or outdoors
 - with stainless steel housing for buried or actuated services



Type 21 True Union Ball Valves



Electric + Pneumatic Actuation

- A complete range of actuators and control accessories are available, mounted to valves using PPG plastic brackets and stainless steel couplings. Refer to separate data sheets.
- All actuators are CSA approved, have NEMA 4X enclosures, stainless steel hardware and permanently lubricated gear train



ERS Series Electric

- Type 21 ball valves up to 2"
- 180 in-lbs torque
- On-Off (3/2-wire), adjustable travel
- Visual feedback

E Series Electric

- Type 21 ball valves up to 4"
- Up to 885 in-lbs torque
- On-Off (3/2-wire), adjustable travel. Optional: failsafe, 3 position modulating
- Visual feedback and feedback switches. Optional: extra switches, feedback potentiometer and feedback transmitter



V Series Electric

(with optional Local Control Station)

- Type 21 ball valves up to 6"
- up to 8,850 in-lbs torque
- On-Off (2/3-wire), adjustable travel. Optional: failsafe, modulating, BUS
- Visual feedback, 2 feedback switches. Optional: 2 extra feedback switches, feedback potentiometer and feedback transmitter



PA Series Pneumatic

- Type 21 ball valves up to 6"
- up to 10,660 in-lbs torque
- industrial process submerged
- bleach/water washdown
- Rilsan-coated aluminum



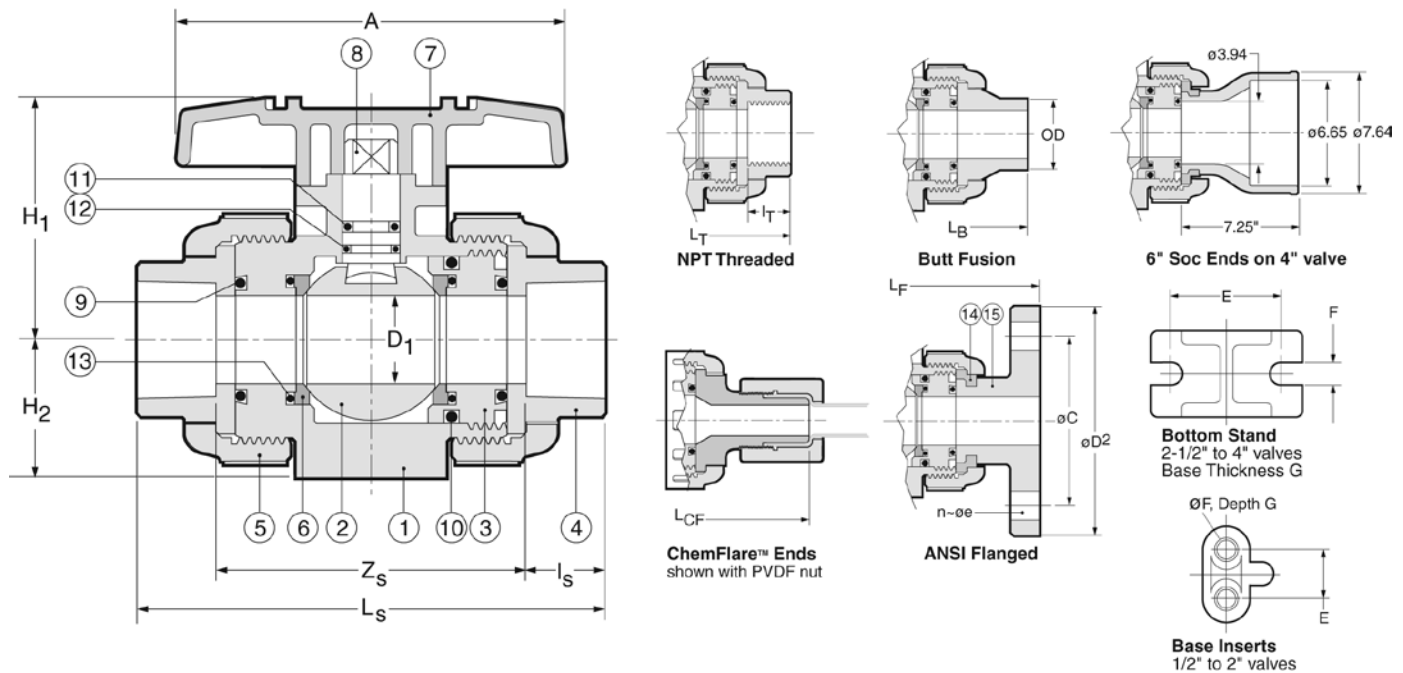
PP Series Pneumatic

- Type 21 ball valves up to 6"
- up to 1,335 in-lbs torque
- industrial process with minimal use of metal
- Glass-filled Polyamide

OTHER OPTIONS & ACCESSORIES

- **Alternate O-Ring Seals**
- **Stem Extensions** made to any length
- **Limit Switches** – for open and/or closed position indication
- **Municipal Operating Nut**
- **Lubrication-free Valves** – factory clean room assembled
- **Vented Ball** – for sodium hypochlorite applications

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PARTS

▲ Recommended Spare Parts

No.	Part	Pcs.	Materials
1	Body	1	PVC, CPVC, PP, PVDF
2	Ball	1	PVC, CPVC, PP, PVDF
3	Carrier ¹	1/2	PVC, CPVC, PP, PVDF
4	End Connector	2	PVC, CPVC, PP, PVDF
5	Union Nut	2	PVC, CPVC, PP, PVDF
6▲	Ball Seat	2	PTFE
7	Handle	1	ABS

¹ 1 carrier for sizes 1/2" to 2", 2 carriers for sizes 2-1/2" to 4"

² EPDM seals standard with PVC, CPVC, PP; FKM (Viton®) with PVDF valves

³ 2 pcs 1/2" to 2", 6 pcs 2-1/2" to 4"

PARTS

▲ Recommended Spare Parts

No.	Part	Pcs.	Materials
8	Stem	1	PVC, CPVC, PP, PVDF
9▲	Face O-Ring ²	2	EPDM, FKM (Viton®)
10▲	Carrier O-Ring ²	2	EPDM, FKM (Viton®)
11▲	Upper Thicker Stem O-Ring ²	1	EPDM, FKM (Viton®)
12▲	Lower Thinner Stem O-Ring ²	1	EPDM, FKM (Viton®)
13	Seat Cushion ²	2	EPDM, FKM (Viton®)
14	Flange Retainer ³	2/6	PVDF
15	Flange	2	PVC, CPVC, PP, PVDF

DIMENSIONS INCHES

Size	D				End Connections														Valve Base		
	Bore	A	H ₁	H ₂	Socket			Threaded		Factory Flanged					Butt		ChemFlare™		E	F ⁵	G
					L _s	Z _s	I _s	I _T	L _T	L _F	D ₂	C	n	e	L _B	OD	L _{CF}	Tube ⁴			
1/2"	.59	3.6	2.03	1.14	4.45	2.70	.875	.64	4.02	5.63	3.50	2.38	4	.62	4.88	.79	6.12	1/2"	.75	.29	.43
3/4"	.79	3.9	2.34	1.38	5.08	3.08	1.00	.65	4.72	6.77	3.88	2.75	4	.62	5.67	.98	6.52	3/4"	.75	.29	.43
1"	.98	4.3	2.68	1.54	5.75	3.50	1.13	.81	5.16	7.36	4.25	3.12	4	.62	6.06	1.26	7.26	1"	.75	.29	.43
1-1/4"	1.22	4.8	3.17	1.85	6.46	5.21	1.25	.85	5.91	7.48	4.62	3.50	4	.62	6.85	1.57	9.58	1-1/4"	1.18	.35	.59
1-1/2"	1.57	5.2	3.50	2.17	7.24	4.49	1.38	.85	6.42	8.35	5.00	3.88	4	.62	7.64	1.97	—	—	1.18	.35	.59
2"	2.01	6.3	4.02	2.60	8.23	5.23	1.50	1.90	7.76	9.21	6.00	4.75	4	.75	8.82	2.48	—	—	1.18	.35	.59
2-1/2"	2.28	7.87	4.96	2.83	9.45	5.95	1.75	1.21	8.46	10.20	7.00	5.49	4	.75	9.72	2.95	—	—	1.89	.35	.23
3"	2.70	9.45	5.51	3.35	11.10	7.35	1.88	1.30	10.39	11.97	7.50	6.00	4	.75	11.61	3.54	—	—	2.17	.43	.28
4"	3.54	11.81	7.01	4.33	13.88	9.87	2.00	1.38	14.17	14.65	9.00	7.50	8	.75	14.76	4.33	—	—	2.56	.43	.32
6" ⁶	3.54	11.81	7.01	4.33	23.15	17.09	3.03	—	—	—	—	—	—	—	—	—	—	—	2.56	.43	.32
6" ⁷	3.54	11.81	7.01	4.33	27.22	21.21	3.03	—	—	—	—	—	—	—	—	—	—	—	2.56	.43	.32

⁴ ChemFlare™ ends are available for reduced tube sizes down to 1/4"

⁵ Optional threaded inserts: 1/2" to 1" valves – UNC 1/4"-20; 1-1/4" to 2" valves – UNC 5/16"-18. 'Recoil' brand inserts require drilling before insertion.

⁶ 6" with factory moulded socket ends

⁷ 6" with fabricated socket ends

Type 21 True Union Ball Valves



WORKING PRESSURES PSI, Water, Non-Shock

VACUUM RATING • 29.9 inches mercury

Size	PVC			CPVC						PP			PVDF				
	20°C 68°F	40°C 104°F	50°C 122°F	20°C 68°F	40°C 104°F	50°C 122°F	60°C 140°F	80°C 176°F	90°C 194°F	20°C 68°F	60°C 140°F	80°C 176°F	20°C 68°F	40°C 104°F	60°C 140°F	80°C 176°F	100°C 212°F
1/2" – 2"	230	165	150	230	165	150	120	75	55	150	85	55	230	185	150	110	85
2-1/2" – 4"	150	150	150	150	150	150	120	75	55	150	70	40	150	150	150	110	85

Temperature Ranges: PVC 0 to 50°C (32 to 122°F), CPVC 0 to 90°C (32 to 194°F), PP –20 to 80°C (–4 to 176°F), PVDF –20 to 100°C (–20 to 212°F)

WEIGHTS LB. THREADED or SOCKET **WEIGHTS** LB. FLANGED

Size	PVC	CPVC	PP	PVDF	PVC	CPVC	PP	PVDF
1/2"	0.4	0.4	0.4	0.4	0.9	0.9	0.7	1.1
3/4"	0.7	0.7	0.7	0.9	1.3	1.5	1.1	1.5
1"	0.9	1.1	0.9	1.1	1.8	2.0	1.5	2.2
1-1/4"	1.5	1.5	1.3	1.8	2.6	2.9	2.0	3.3
1-1/2"	2.4	2.6	1.5	2.9	3.7	4.0	2.6	4.4
2"	4.0	4.4	2.6	4.9	5.5	6.0	4.0	8.2
2-1/2"	5.1	5.5	3.7	6.2	7.3	7.7	5.3	8.8
3"	8.2	8.8	5.5	9.9	10.1	11.0	7.5	12.6
4"	19.4	21.8	13.2	24.9	21.6	23.4	15.4	26.7

Cv VALUES VS. BALL ANGLE

Size	0%	25%	50%	75%	100%
1/2"	0	0.35	1.3	5.5	14.
3/4"	0	0.73	2.8	11.5	29.
1"	0	1.2	4.5	18.6	47.
1-1/4"	0	1.8	6.8	28.4	72.
1-1/2"	0	3.9	14.7	61.2	155.
2"	0	4.8	18.0	75.0	190.
2-1/2"	0	9.1	34.7	144.0	365.
3"	0	10.2	39.0	162.0	410.
4"	0	17.0	64.6	269.0	680.

SAMPLE SPECIFICATION

- All True Union Ball Valves in PVC, CPVC, PP or PVDF shall be Chemline Type 21 or equal sizes 1/2" to 2" in PVC, CPVC, and PVDF rated at 230 psi and in PP 150 psi maximum working pressure. Sizes 2-1/2", 3" and 4" rated at 150 psi maximum working pressure with EPDM or FKM (Viton®) seals. Ball seats shall be PTFE with elastomer cushions for closure with minimum stem torques.
- All valves will have Safety Shear stem design, blowout-proof with double o-rings for safety. The top o-ring groove shall be deeper so that if the stem breaks off under excessive torque the lower o-ring will remain intact and the valve will hold pressure.
- All valves shall be full port and two-way blocking design.
- All valves will be CRN (Canadian Registration Number) registered with TSSA.
- PVC valves with EPDM or FKM (Viton®) seals shall be certified under NSF/ANSI Standard 61 for contact with drinking water.
- All valves shall have chemical resistant labels permanently marked with manufacturing number to provide production level traceability.
- PVC compound shall have an ASTM cell classification 12454-A with a minimum suffix "A" designation for chemical resistance as per ASTM D-1784 (CSA report LO 4000-172).
- CPVC compound shall have an ASTM cell classification 23567-A with a minimum suffix "A" designation for chemical resistance as per ASTM D-1784.
- PP material will conform to ASTM D-4101 PP 021 B 67272 material requirements.
- PVDF material shall be unpigmented conforming to ASTM D-3222 material requirements and to be USDA Title 21 Chapter 1 Part 177. 2510 requirements for contact with food.
- Socket ends in PVC and CPVC shall be Schedule 80 and conform to ASTM D-2467.
- Threaded ends shall be Schedule 80 and conform to ASTM D-2464.
- Butt fusion ends in PP or PVDF will be compatible with Chemline PP or PVDF metric piping systems.
- Flanged ends shall be ANSI Class 150 one-piece factory moulded (not fabricated) to ensure maximum strength and close tolerance end to end dimensions.

ORDERING EXAMPLE

						for ChemFlare™ ends only			all other ends
Chemline True Union Ball Valves	21	A	005	E	V	–A	8N	–1	
Body Material	A – PVC B – PP	C – CPVC K – PVDF							
Size ¹	002 – 1/4" 010 – 1" 025 – 2-1/2"	003 – 3/8" 012 – 1-1/4" 030 – 3"	005 – 1/2" 015 – 1-1/2" 040 – 4"	007 – 3/4" 020 – 2" 060 – 6"					
Seals	E – EPDM V – FKM (Viton®)	N – Nitrile A – Aflas®							
ChemFlare™ End Connectors for valves 3/8" to 1-1/4"									
Material	A – PVC B – PP C – CPVC K – PVDF								
Tube Size ³	4N – 1/4" 6N – 3/8" 8N – 1/2" 12N – 3/4" 16N – 1" 20N – 1-1/4"								
Tube Nut	–1 – includes nut Blank – without nut								
Ends	S – Socket T – Threaded C – Combo ² F – Flanged B – Butt ³								

Example: Chemline Type 21 True Union Ball Valve, PVC, 1/2", with FPM (Viton®) seals, PVC ChemFlare™ end connectors, 1/2" tube size, including nuts.

¹ 1/4" is normally the 3/8" valve reduced. 6" is 4" valve with 6" end connections

² PVC and CPVC valves 1/2" to 2" are available as Combo (socket and threaded ends)

³ Tube size must be equal or smaller than the valve size

⁴ PP, PVDF and ECTFE (Halar®) metric butt fusion ends (1/2" to 4") connect to Chemline PP, PVDF and ECTFE (Halar®) piping systems