



TORRENTO® X SERIES FILTERS

High-performance filters enabling breakthrough particle protection and superior cleanliness in advanced wet etch and clean applications



breakthrough particle protection and unsurpassed cleanliness

Overview

Entegris delivers the ultimate in contamination control performance with the addition of the Torrento® X series filters. Featuring advanced technologies that improve flow rate performance, cleanliness and particle control, Torrento X series filters meet the critical demands in advanced wet etch and clean technology nodes.

Superior Particle Protection

Torrento X series filters utilize a nondewetting-membrane that delivers a high flow rate and low pressure drop for its retention rating. This membrane technology achieves superior particle protection in advanced semiconductor fabs, and enables precise, yield-enabling filtration in sub-24 nm device geometry applications.

Features and Benefits

Features	Benefits
Superior particle protection	Yield enabling at smaller geometries Reliable, field-proven, nondewetting membrane technology
Ultra cleanliness	UCM capabilities remove the most challenging contaminants in advanced processes <ul style="list-style-type: none"> • UCM: Comes standard with Torrento X series filters • X-UCM: Optional with 10 nm filters for a higher level of cleanliness
Aqueous-based chemical compatibility	Recommended for ambient and elevated temperatures including H ₂ SO ₄ , H ₃ PO ₄ , HNO ₃ , HCl, NH ₄ OH, H ₂ O ₂ , SC2 and various strips

Ultra Cleanliness

Torrento's ultra clean membrane (UCM) capabilities remove the most challenging contaminants in advanced processes and improve startup time:

- UCM: Comes standard with Torrento X series filters
- X-UCM: Optional with 10 nm filters for a higher level of cleanliness

Applications

- Sub-24 nm device nodes fabs for 300 mm and 450 mm tools
- Critical FEOL, MEOL and BEOL processes
- Single wafer and batch tools for advanced nodes
- Critical chemical manufacturing and delivery systems

Torrento X Series 1000/1500/3000 Disposable Filters

Specifications

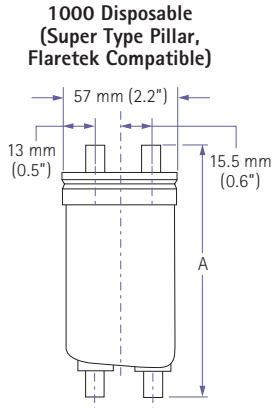
		Torrento X Series Small Disposables 1000/1500	Torrento X Series Small Disposables 3000
Materials:	Membrane, supports, shell	PFA	
Retention rating:	10 nm		
Surface area:	1000 type – 0.10 m ² (1.1 ft ²)	0.44 m ² (4.74 ft ²)	
	1500 type – 0.19 m ² (2.05 ft ²)		
Maximum operating conditions:	Maximum operating pressure	0.59 MPa (5.9 bar; 86 psi) @ 25°C (77°F)	
		0.19 MPa (1.9 bar, 28 psi) @ 95°C (203°F)	
	Maximum forward differential pressure	0.39 MPa (3.9 bar; 57 psi) @ 25°C (77°F)	
	Maximum reverse pressure	0.29 MPa (2.9 bar; 42 psi) @ 25°C (77°F)	
	Maximum operating temperature	95°C (203°F)	
Metallic extractables:	X-UCM clean	Testing conducted for 23 metals	
Other extractables:	X-UCM clean	TOC, Cl, F	TOC, Cl, F (for 10 nm)

All Torrento X series product configurations are PFOA free.

Dimensions

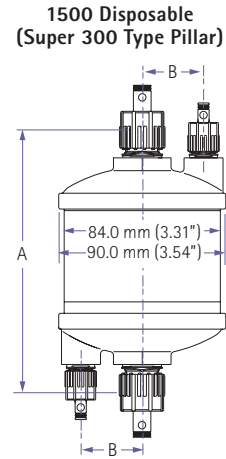
SMALL DISPOSABLE FILTERS 1000/1500/3000

These drawings represent the small disposable filters (1000, 1500 and 3000). Refer to the accompanying tables for specific dimensional information.



NOMINAL DIMENSIONS – SMALL DISPOSABLES 1000

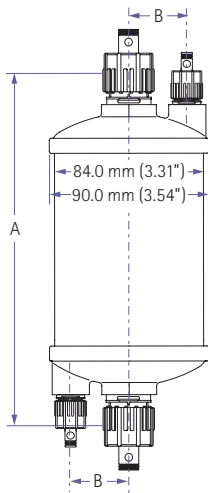
Fitting Types	Dimension	
	A	
Super Type Pillar fittings	120 mm (4.72")	
Flaretek-compatible fittings	147 mm (5.79")	



NOMINAL DIMENSIONS – SMALL DISPOSABLES 1500

Fitting Types	Dimension	
	A	B
8 mm Super 300 Type Pillar	135 mm (5.32")	31 mm (1.22")
3/8" Super 300 Type Pillar	141 mm (5.55")	31 mm (1.22")

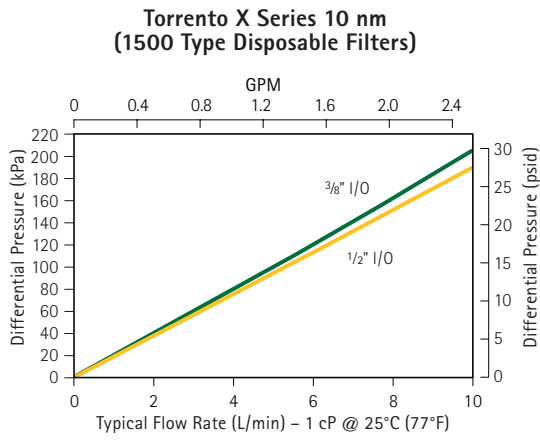
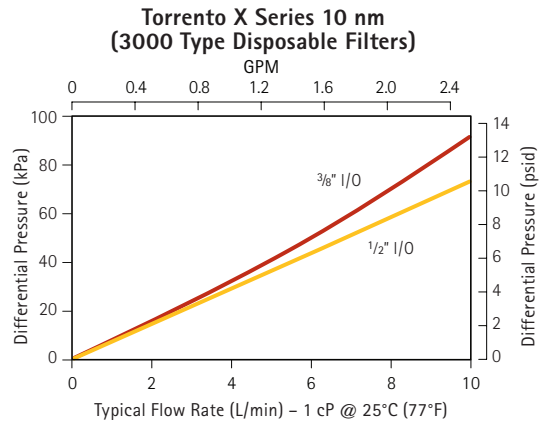
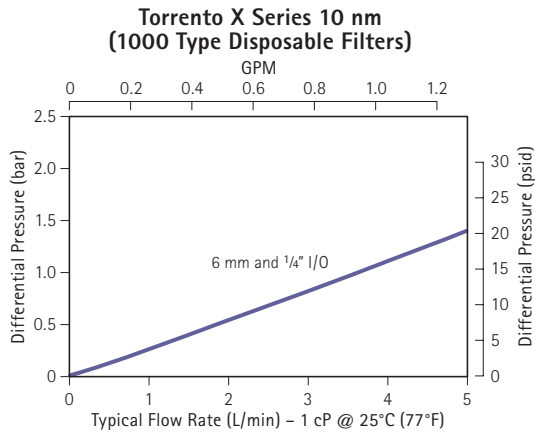
3000 Disposable (Super 300 Type Pillar)



NOMINAL DIMENSIONS – SMALL DISPOSABLES 3000

Fitting Types	Dimension	
	A	B
1/2" Super Type Pillar	204 mm (8.03")	32 mm (1.26")
8 mm Super 300 Type Pillar	189 mm (7.44")	31 mm (1.22")
3/8" Super 300 Type Pillar	194.0 mm (7.64")	31 mm (1.22")
1/2" Super 300 Type Pillar	199.0 mm (7.84")	31 mm (1.22")

Performance Data

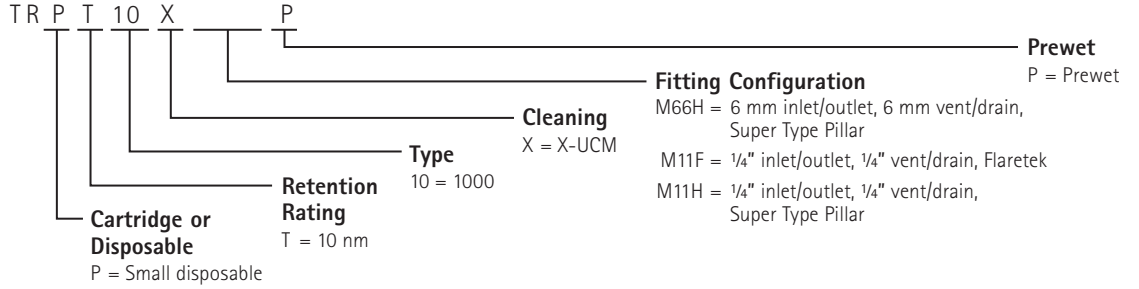


Ordering Information

This information serves as a guide. Please contact your local representative to confirm part numbers.

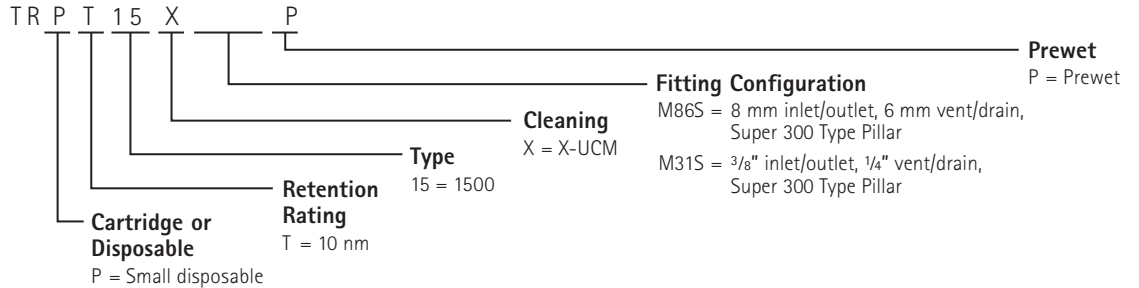
TorrenTO X Series Small Disposable 1000 Filters

Part Number



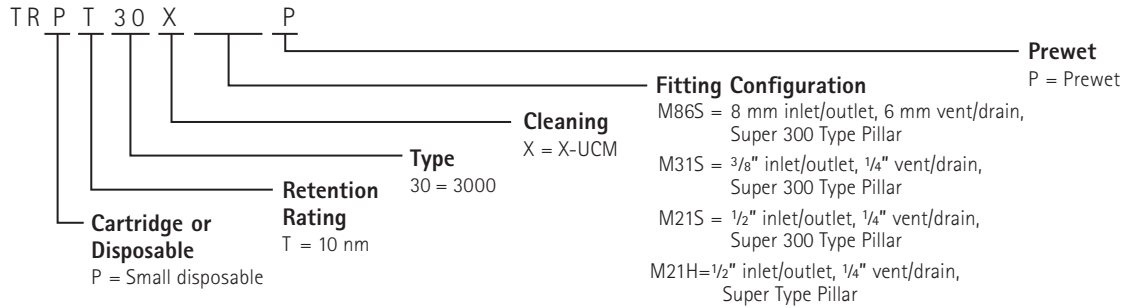
TorrenTO X Series Small Disposable 1500 Filters

Part Number



TorrenTO X Series Small Disposable 3000 Filters

Part Number



Specifications

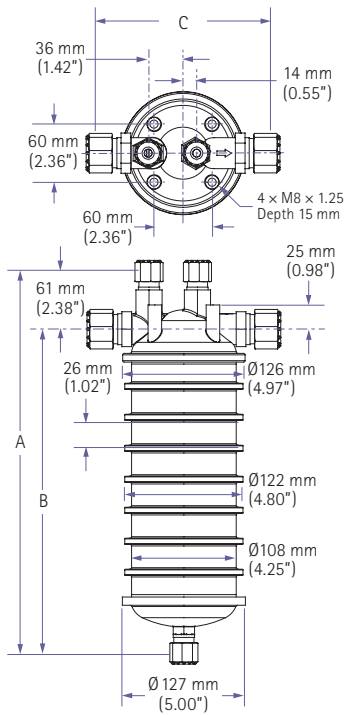
		Torrento X Series ATE/AT3 Chem-Line™ I and II	Torrento X Series ATE/AT3 Cartridges
Materials:	Membrane	Prewet, nondewetting PTFE	
	Supports, shell	PFA	
	Cartridge o-ring options	E-FKM, E-ETP, Kalrez® (6375UP)	—
Retention rating:	10 nm		
Membrane area:		ATE 10"	2 m ² (21 ft ²)
		AT3 10"	3 m ² (32 ft ²)
Cartridge connections:	Code 0 (2-222) o-rings		
Maximum operating conditions:	Maximum operating pressure	0.58 MPa (5.8 bar; 84 psi) @ 25°C (77°F)	
		0.097 MPa (0.97 bar; 14 psi) @ 200°C (392°F)	
	Maximum forward differential pressure	0.44 MPa (4.4 bar; 64 psi) @ 25°C (77°F)	
		0.05 MPa (0.52 bar; 7.5 psi) @ 200°C (392°F)	
	Maximum reverse pressure	0.34 MPa (3.45 bar; 50 psi) @ 25°C (77°F)	
Maximum operating temperature	200°C (392°F)		
Metallic extractables:	UCM clean	Testing conducted for 16 metals	
	X-UCM clean*	Testing conducted for 23 metals	
Other extractables:	UCM clean	TOC, Cl	
	X-UCM clean*	TOC, Cl, F	

All Torrento X series 10 nm product configurations are PFOA free.

Torrento X Series Chem-Line I and Chem-Line II Disposable Filters

Dimensions

CHEM-LINE I T-LINE WITH STANDARD VENT (T02H)



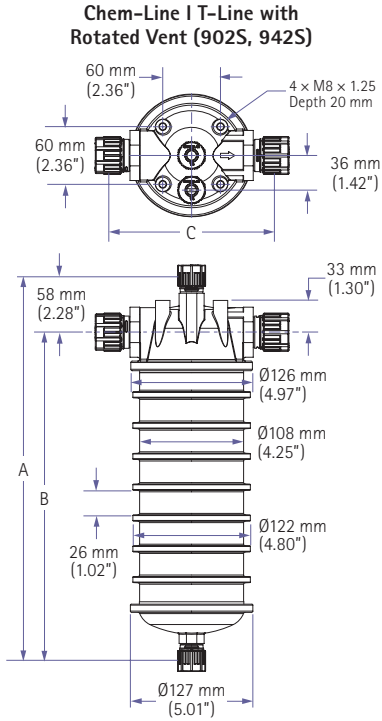
NOMINAL DIMENSIONS FOR CHEM-LINE I WITH STANDARD VENT - T-LINE

Disposable Type	Configuration	A		
		(Overall Height)	B (Height: Bottom Fitting to Centerline Inlet Fitting)	C (Inlet to Outlet)
T02H: 3/4" inlet/outlet, 1/2" vent/drain, Super Type Pillar fittings	ATE/AT3 10"	396 mm (15.58")	335 mm (13.19")	180 mm (7.09")

Dimensions (continued)

CHEM-LINE I DISPOSABLE FILTERS WITH ROTATED VENT

This drawing represents the Chem-Line I disposable filters with rotated vent. Refer to the accompanying table for specific dimensional information.



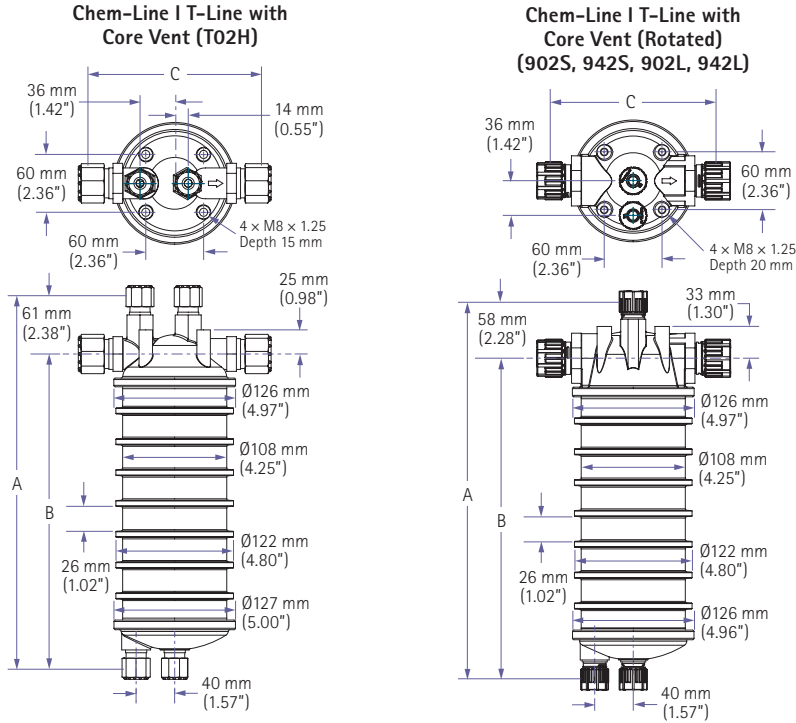
NOMINAL DIMENSIONS FOR CHEM-LINE I WITH ROTATED VENT - T-LINE

Disposable Type	Configuration	A (Overall Height)	B	C
			(Height: Bottom Fitting to Centerline Inlet Fitting)	(Inlet to Outlet)
902S: 3/4" inlet/outlet, 1/2" vent/drain, Super 300 Type Pillar fittings	ATE/AT3 10"	399 mm (15.70")	341 mm (13.43")	172 mm (6.77")
942S: 1" inlet/outlet, 1/2" vent/drain, Super 300 Type Pillar fittings	ATE/AT3 10"	399 mm (15.70")	341 mm (13.43")	182 mm (7.17")

Dimensions (continued)

CHEM-LINE I DISPOSABLE FILTERS WITH CORE VENT AND CORE VENT (ROTATED)

These drawings represent the Chem-Line I disposable filters with core vent and core vent (rotated). Refer to the tables for specific dimensional information.



NOMINAL DIMENSIONS FOR CHEM-LINE I WITH CORE VENT - T-LINE

Disposable Type	Configuration	A		
		(Overall Height)	B (Height: Bottom Fitting to Centerline Inlet Fitting)	C (Inlet to Outlet)
T02H: 3/4" inlet/outlet, 1/2" vent/drain, Super Type Pillar fittings	ATE/AT3 10"	388 mm (15.26")	327 mm (12.87")	180 mm (7.09")

NOMINAL DIMENSIONS FOR CHEM-LINE I WITH CORE VENT (ROTATED) - T-LINE

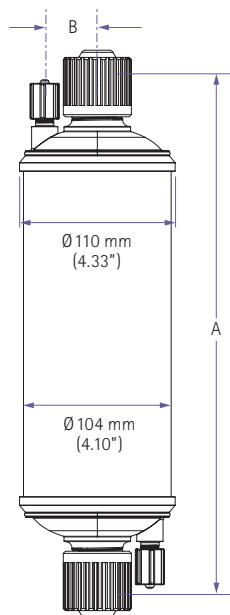
Disposable Type	Configuration	A		
		(Overall Height)	B (Height: Bottom Fitting to Centerline Inlet Fitting)	C (Inlet to Outlet)
902S: 3/4" inlet/outlet, 1/2" vent/drain, Super 300 Type Pillar fittings	ATE/AT3 10"	391 mm (15.37")	333 mm (13.11")	172 mm (6.77")
942S: 1" inlet/outlet, 1/2" vent/drain, Super 300 Type Pillar fittings	ATE/AT3 10"	391 mm (15.37")	333 mm (13.11")	182 mm (7.17")
902L: 3/4" inlet/outlet, 1/2" vent/drain, PrimeLock fittings	ATE/AT3 10"	424 mm (16.68")	349 mm (13.74")	215 mm (8.48")
942L: 1" inlet/outlet, 1/2" vent/drain, PrimeLock fittings	ATE/AT3 10"	424 mm (16.68")	349 mm (13.74")	243 mm (9.58")

Dimensions (continued)

CHEM-LINE II DISPOSABLE FILTERS

This drawing represents the Chem-Line II disposable filters. Refer to the accompanying tables for additional information. The first table cross-references the inlet/outlet (I/O) sizes with each fitting type, and the second table provides specific dimensional information.

**Chem-Line II
(Flaretek, Super 300 Type Pillar,
PrimeLock)**



INLET/OUTLET (I/O) SIZES FOR CHEM-LINE II FITTING TYPES

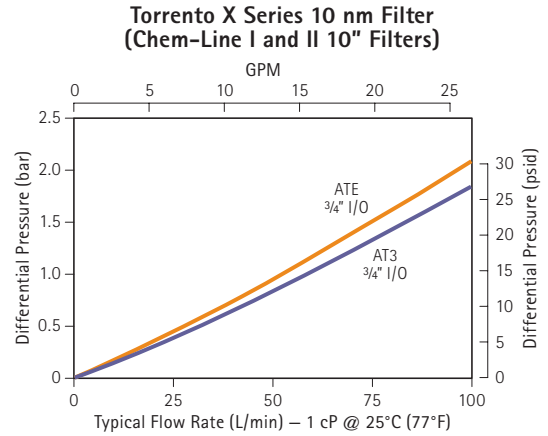
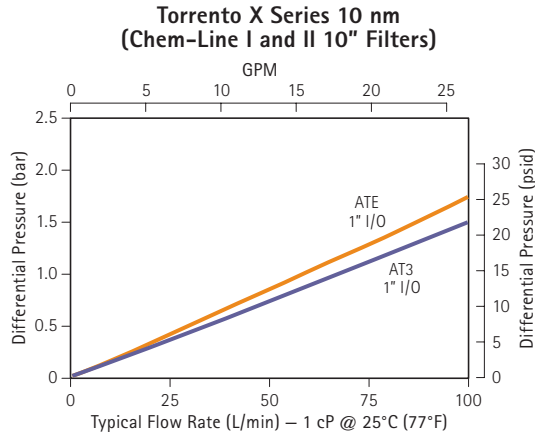
Fitting Types	Vent/Drain	Inlet/Outlet			
		3/8"	1/2"	3/4"	1"
Flaretek	1/4"	X	X	X	X
Flaretek (offset)	1/2"	–	–	X	X
Super 300 Type Pillar	1/4"	–	X	X	X
Super 300 Type Pillar (offset)	1/2"	–	–	X	X
Super 300 Type Pillar (female)	1/4"	–	–	X	–
PrimeLock	1/4"	X	X	X	–
PrimeLock (offset)	1/4"	–	–	–	X

NOMINAL DIMENSIONS FOR CHEM-LINE II

Fittings		Flaretek Fittings		Super 300 Type Pillar Fittings (Female)		Super 300 Type Pillar Fittings (Male)		PrimeLock Fittings	
Inlet/Outlet	Vent/Drain	B	A	B	A	B	A	B	A
		10"		10"		10"		10"	
3/8"	1/4"	37 mm (1.46")	343 mm (13.51")	–	–	–	–	37 mm (1.46")	356 mm (14.02")
1/2"	1/4"	37 mm (1.46")	356 mm (14.03")	–	–	37 mm (1.46")	341 mm (13.41")	37 mm (1.46")	361 mm (14.20")
3/4"	1/4"	37 mm (1.46")	359 mm (14.13")	37 mm (1.46")	358 mm (14.09")	37 mm (1.46")	350 mm (13.76")	37 mm (1.46")	373 mm (14.68")
3/4"	1/2"	41 mm (1.63")	363 mm (14.30")	–	–	41 mm (1.63")	349 mm (13.74")	–	–
1"	1/4"	37 mm (1.46")	368 mm (14.47")	–	–	37 mm (1.46")	383 mm (15.07")	41 mm (1.63")	388 mm (15.24")
1"	1/2"	41 mm (1.63")	376 mm (14.82")	–	–	41 mm (1.63")	380 mm (14.97")	–	–

A = Overall height B = Centerline fitting length

Performance Data

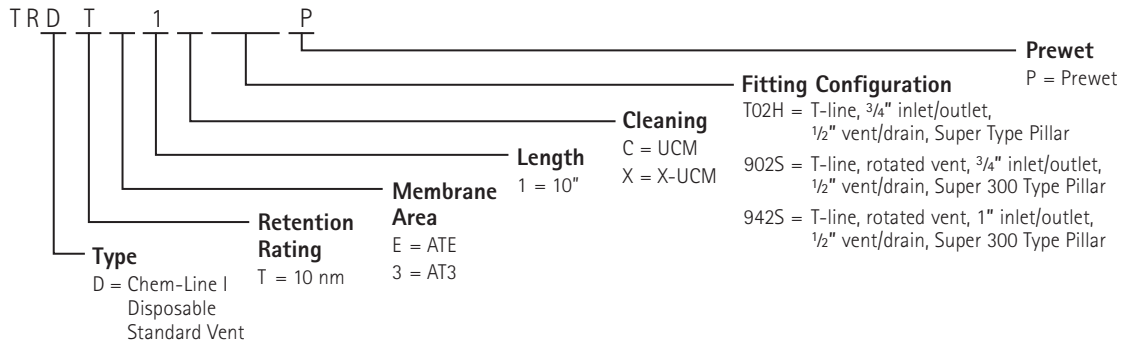


Ordering Information

This information serves as a guide. Please contact your local representative to confirm part numbers.

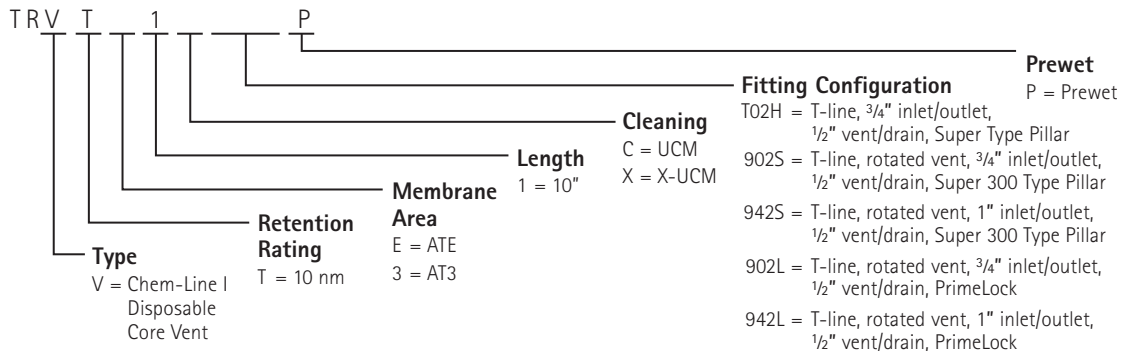
Torrento X Series Chem-Line I Disposable Filters Standard Vent

Part Number



Torrento X Series Chem-Line I Disposable Filters Core Vent

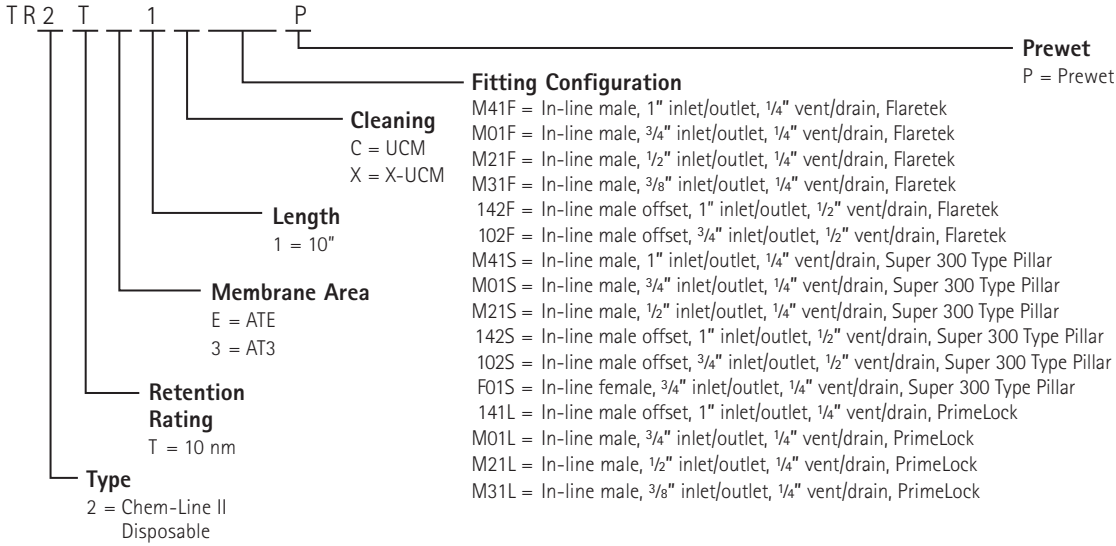
Part Number



Ordering Information (continued)

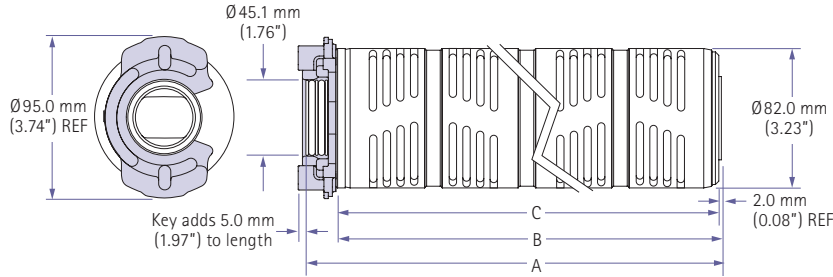
Torrento X Series Chem-Line II Disposable Filters

Part Number



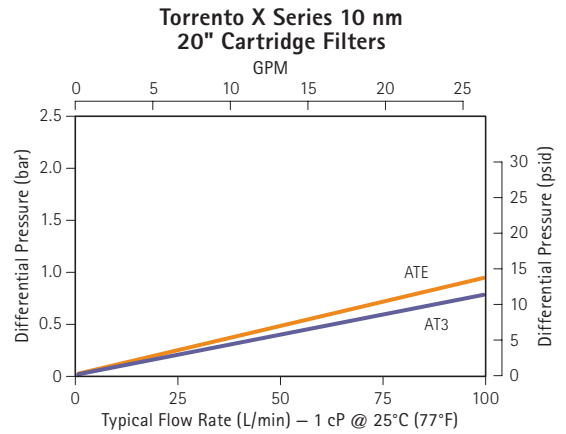
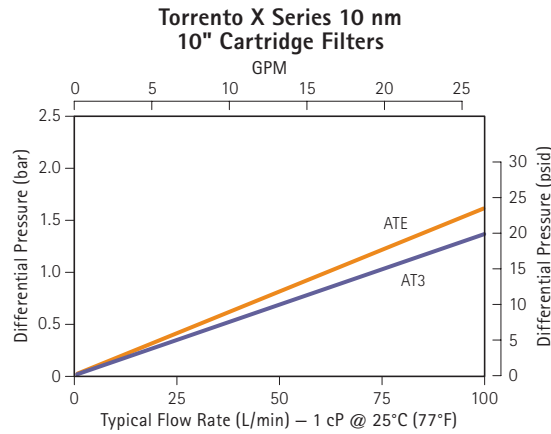
Torrento X Series Cartridge Filters

Dimensions



Length	A (Overall)	B (Control)	C (Shoulder)
10"	244.0 mm (9.61")	227.0 mm (8.94")	225.0 mm (8.86")
20"	471.0 mm (18.54")	454.0 mm (17.87")	452.0 mm (17.80")
30"	699.5 mm (27.54")	682.0 mm (26.85")	681.0 mm (26.81")

Performance Data

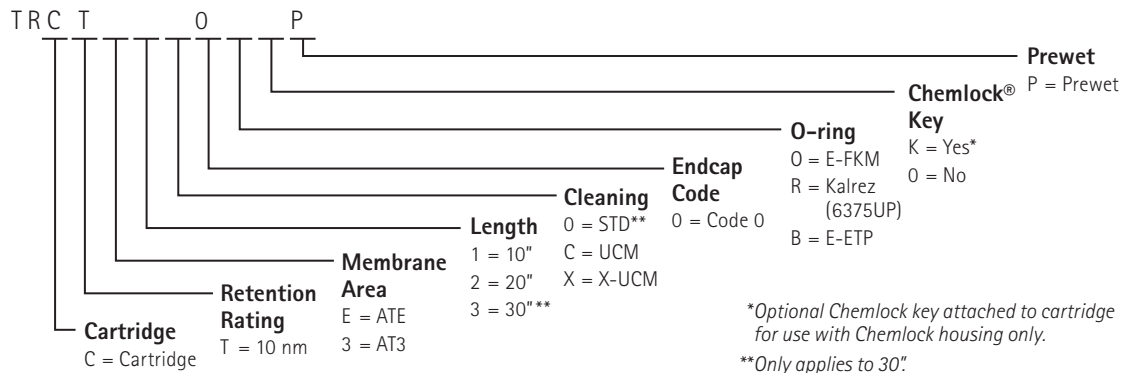


Ordering Information

This information serves as a guide. Please contact your local representative to confirm part numbers.

Torrento X Series Cartridge Filters

Part Number



For More Information

Please call your Regional Customer Service Center today to learn what Entegris can do for you. Visit www.entegris.com and select the Customer Service link for the center nearest you.

Terms and Conditions of Sale

All purchases are subject to Entegris' Terms and Conditions of Sale. To view and print this information, visit www.entegris.com and select the Legal Notices link from the footer.

Entegris®, the Entegris Rings Design®, Creating a Material Advantage®, Toronto®, Flaretek®, PrimeLock®, Chemlock® and Chem-Line™ are trademarks of Entegris, Inc. Kalrez® is a trademark of E.I. du Pont de Nemours and Company. Pillar® is a registered trademark of Nippon Pillar Packing Company, Ltd.

ENTEGRIS, INC.

Corporate Headquarters | 129 Concord Road | Billerica, MA 01821 USA
Customer Service Tel. +1 952 556 4181 | Customer Service Fax +1 952 556 8022
In North America 800 394 4083 | www.entegris.com