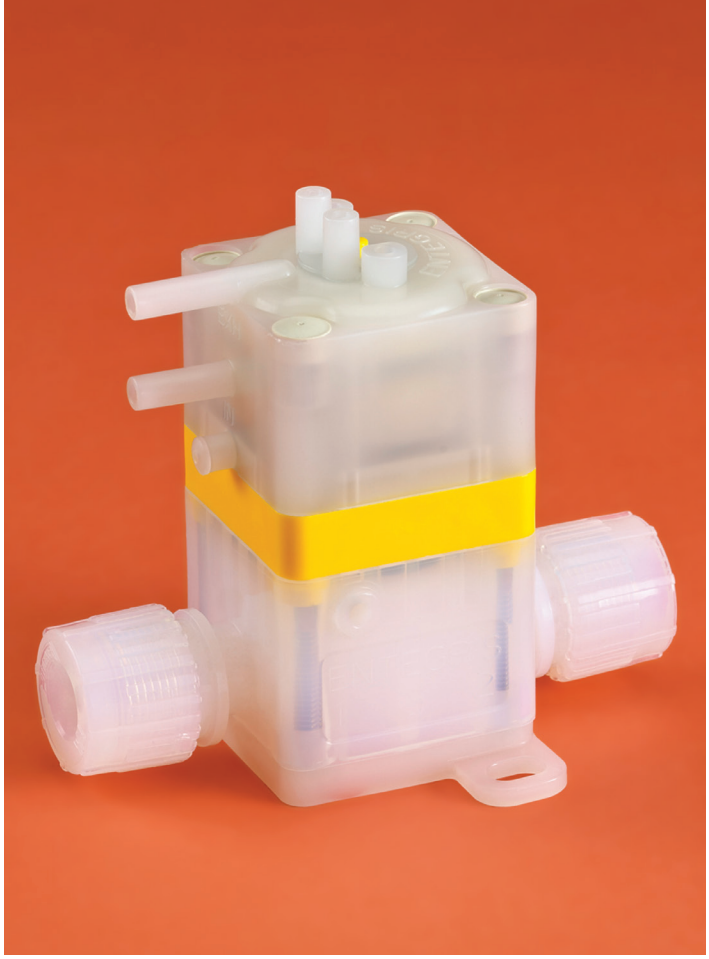
CH8 Series Pneumatic Valves

Reliable service in corrosive, ultrapure chemical applications up to 200°C



Entegris has added a high-temperature option to its successful line of corrosion-resistant (CR) valves. This valve is designed for two-way, pneumatic control of low-to-medium flow applications with flow factors ranging from 1.8 – 3.4 C_V. This high-temperature model is capable of handling media temperatures up to 200°C (392°F) at pressures up to 207 kPa (30 psig). The CH8 valve offers reliable performance and easy serviceability, with a footprint that is smaller than most ½" orifice valves.

This proven design is available with a variety of end connections, including PrimeLock®, PrimeLock "SpaceSaver", PureBond®, tube stub, and Super 300 Type Pillar®. With no exposed metal hardware, the valve is completely sealed, and protected from harsh chemical environments. These capabilities allow the CH8 valve to effectively handle high-temperature sulfuric and phosphoric acids in photoresist stripping applications.

The high-temperature CH8 valve is also ideal for use with Entegris Dymension® valve manifolds, which ultimately minimize footprint in fab equipment.

APPLICATIONS

- High-temperature, ultrapure, and corrosive chemical handling
- Photoresist stripping applications with high-temperature sulfuric and phosphoric acids
- Wet clean process chemical applications
- Chemical line sizes in ¼" – ½" pipe, and ½" – ¾" tube

FEATURES & BENEFITS

- Small footprint preserves valuable space on OEM equipment
- Available with normally closed or normally open actuators
- Capable of handling media temperatures up to 200°C (392°F) at pressures up to 207 kPa (30 psig)
- Unique modular design improves serviceability and enables manifold customization
- Tested to over 1 million cycles for increased reliability
- PrimeLock, PrimeLock "SpaceSaver," PureBond, tube stub, and Super 300 Type Pillar end connections provide flexibility in your fluid system design

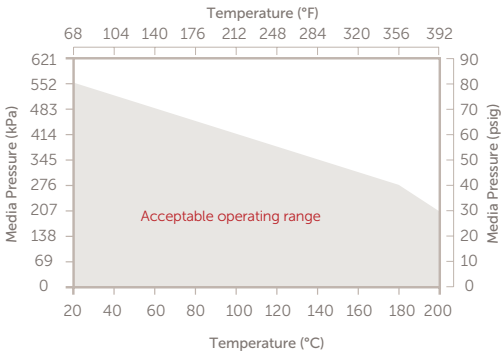
SPECIFICATIONS

Materials	All wetted parts	PFA, PTFE
	Exterior actuator parts	PVDF, Viton®
	Interior actuator parts	PVDF, SST, Viton, PTFE
	Mounting base	PVDF
Operating conditions	Media pressure (inlet/outlet): 913 mbar (27" Hg) vacuum to 552 kPa (80 psig) @ 21°C (70°F)* 206.9 kPa (30 psig) @ 200°C (392°F)* Actuation pressure: 414–552 kPa (60–80 psig) Temperature range: Ambient: 21°C–50°C (70°F–122°F) Fluid: 21°C–200°C (70°F–392°F)	
Pneumatic supply port	¼" tube stub or molded female Luer lug style	
Environmental compliance	RoHs, WEEE	

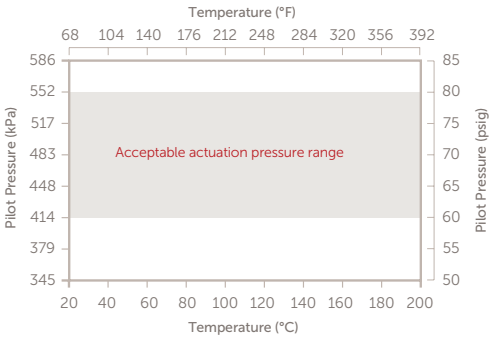
** Actual valve performance varies with pressure and temperature; refer to actual ratings in performance data.*

PERFORMANCE

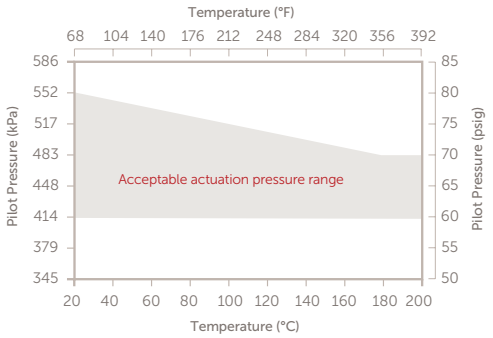
Media Temperature vs. Media Pressure



Media Temperature vs. Actuator Pilot Pressure - Normally Closed Valve



Media Temperature vs. Actuator Pilot Pressure - Normally Open Valve



VALVE RELIABILITY TEST RESULTS

Valve qualification testing

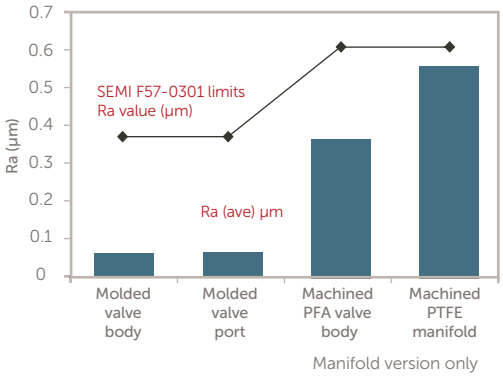
Test type	Test conditions	Acceptance criteria	Test results
Burst pressure	Hydraulic oil pressure increased until leakage detected	Burst pressure must be >2 times rated pressure	PASS
Pressure envelope	Hydraulic oil at 414 kPa (60 psig) @ 180°C (365°F) and at 310 kPa (45 psig) @ 200°C (392°F)	No external leakage failures for 1 million cycles @ 1.5 times rated pressure	PASS No external leakage
Actuation cycle testing	Hydraulic oil at 276 kPa (40 psig) @ 180°C (365°F) and at 207 kPa (30 psig) @ 200°C (392°F) for 500,000 cycles	No leakage in functional performance for up to 500K cycles in normally open valves	PASS No external or port-to-port leakage <0.050 cc H_2O/hr
	Hydraulic oil at 276 kPa (40 psig) @ 180°C (365°F) and at 207 kPa (30 psig) @ 200°C (392°F) for 1 million cycles	No leakage in functional performance for up to 1 million cycles in normally closed valves	PASS No external or port-to-port leakage <0.050 cc H_2O/hr

Valve test procedure in production

Test type	Test conditions	Acceptance criteria
External media leak	552 kPa (80 psig) CDA	Zero bubbles per minute through 1/32" ID tube immersed in DI water
Port-to-port valve test	552 kPa (80 psig) CDA to valve outlet	Less than 4 bubbles per minute through 1/32" ID tube immersed in DI water
Valve actuation	Pressure decay 552 kPa (80 psig) CDA	Less than 7 kPa (1 psig/min) pressure drop

SURFACE ROUGHNESS SPECIFICATIONS

Surface Roughness



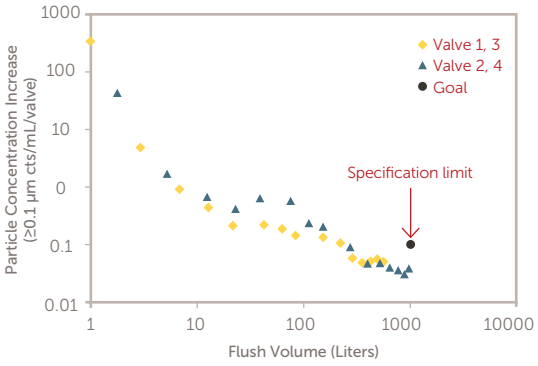
Surface roughness specification

Component Description	SEMI® F57-0301 Limits Ra Value	Typical Entegris Test Results Ra (ave)
Injection molded valve body	≤0.35 µm (≤14 µin)	0.07 µm 2.6 µin)
Machined PTFE diaphragm	≤0.35 µm (≤14 µin)	0.03 µm (1.3 µin)
Injection molded valve port	≤0.35 µm (≤14 µin)	0.07 µm (3.0 µin)
Machined PFA valve body	≤0.60 µm (≤24 µin)	0.37 µm (14.4 µin)
Machined PTFE manifold body	≤0.60 µm (≤24 µin)	0.57 µm (22.4 µin

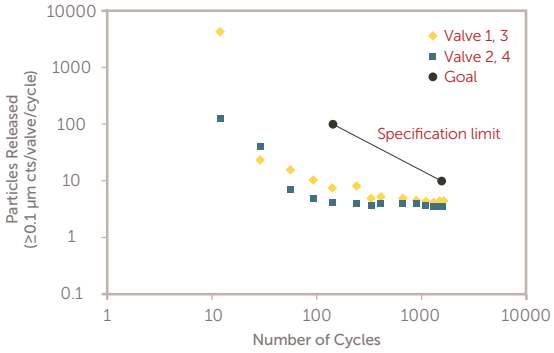
PARTICLE CONTRIBUTION SPECIFICATIONS

Entegris, Inc. certifies that the CR8/CH8 series valves comply with SEMI F57-0312 particle contribution specification. Testing per SEMI F104 has verified the CR8 series valve comply with the particle contribution specification.

Flushing Particle Contribution



Note: During initial flushing, the device must contribute <0.1 particle/mL (particle size ≥0.1 µm) within 300 liters of flushing. During operation, the device must release <100 particles/actuation (particles size ≥0.1 µm) within 500 cycles and <10 particles/actuation (particles size ≥0.1 µm) within 10000 cycles.

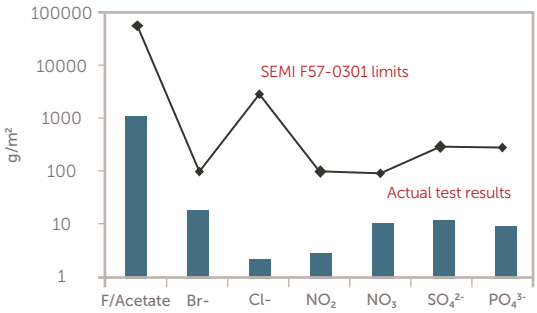


SURFACE EXTRACTABLE SPECIFICATION

Entegris, Inc. certifies that the CR8 series valves comply with the SEMI F57-0312 specification for Extractable Ionic and Metallic Contamination, Total Organic Carbon Contamination and Surface Roughness. Per SEMI F40 (section 12.1), the following test parameters were used:

- Test fluid used was ultrapure water and the tests were carried out at 85°C (185°F)
- Parts were leached after the prescribed rinse pretreatment
- Volumes of the test fluids used were 16.2 mL (0.54 oz)
- Soak time was 7 days
- Calculated wetted surface areas were 0.0077 m²

Extractable Ionic Contamination

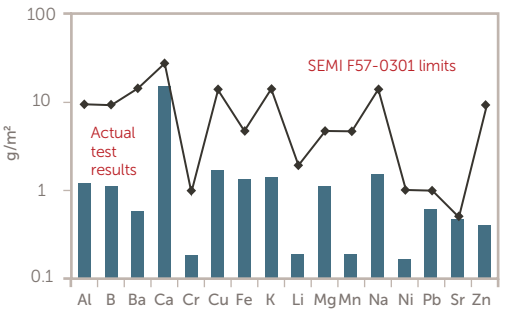


Surface extractable ionic contamination

Aqueous leachate anions (IC)	SEMI F57-0301 limits static value at 85 ±5°C for 7 days	Actual test results molded PFA CR8 valves
Fluoride (F^-/Acetate)	≤60000 µg/m²	1550.0 µg/m²
Bromide (Br^-)	≤100 µg/m²	38.0 µg/m²
Chloride (Cl^-)	≤3000 µg/m²	4.2 µg/m²
Nitrite (NO_2^-)	≤100 µg/m²	5.4 µg/m²
Nitrate (NO_3^-)	≤100 µg/m²	13.5 µg/m²
Sulfate (SO_4^{2-})	≤300 µg/m²	<21.0 µg/m²*
Phosphate (PO_4^{3-})	≤300 µg/m²	<10.0 µg/m²*

*Below detection limit

Extractable Metallic Contamination



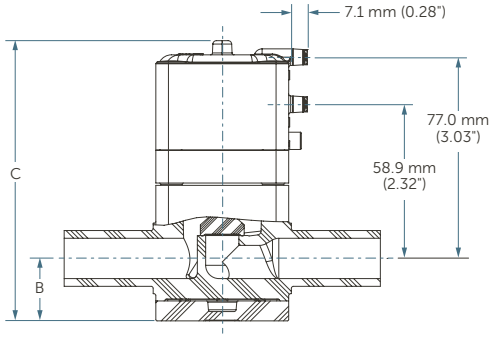
Surface extractable metallic contamination

Aqueous leachate trace metals valves (icp-ms)	SEMI F57-0301 limits static value at 85 ±5°C for 7 days	Actual test results molded PFA CR8 valves
Al	≤10.0 µg/m²	1.80 µg/m²
B	≤10.0 µg/m²	<1.40 µg/m²*
Ba	≤15.0 µg/m²	<0.79 µg/m²*
Ca	≤30.0 µg/m²	26.50 µg/m²
Cr	≤1.0 µg/m²	<0.34 µg/m²*
Cu	≤15.0 µg/m²	3.10 µg/m²
Fe	≤5.0 µg/m²	2.15 µg/m²
K	≤15.0 µg/m²	2.27 µg/m²
Li	≤2.0 µg/m²	<0.36 µg/m²*
Mg	≤5.0 µg/m²	1.40 µg/m²
Mn	≤5.0 µg/m²	<0.36 µg/m²*
Na	≤15.0 µg/m²	2.70 µg/m²
Ni	≤1.0 µg/m²	<0.30 µg/m²*
Pb	≤1.0 µg/m²	<0.81 µg/m²*
Sr	≤0.5 µg/m²	<0.71 µg/m²*
Zn	≤10.0 µg/m²	<0.65 µg/m²*

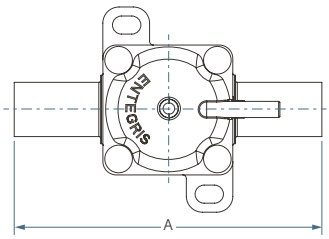
*Below detection limit

DIMENSIONS

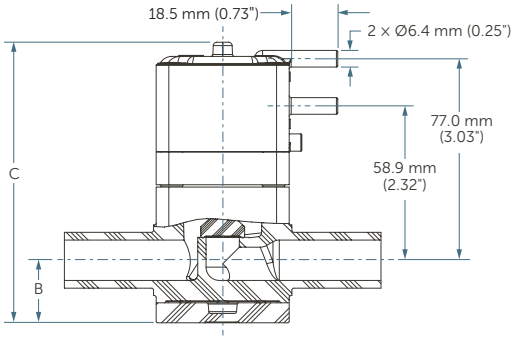
Front View – Luer



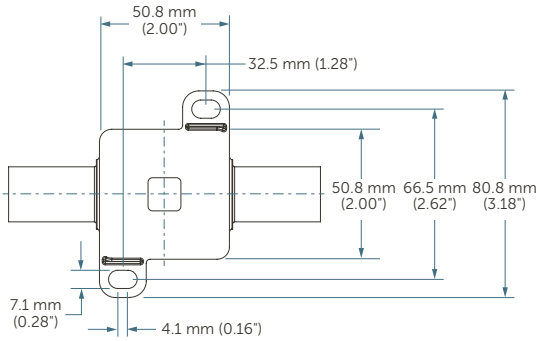
Top View



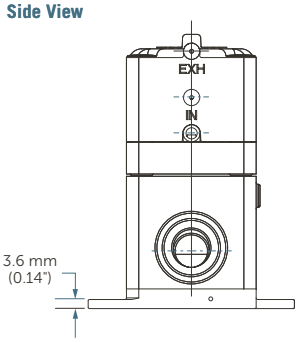
Front View – Tube



Bottom View



Side View



		DIMENSIONS		
Port connection	**Flow factor**	**A**	**B**	**C**
¼" PureBond*	1.8 C_V (25.7 K_V)	120.9 mm (4.76")*	17.5 mm (0.69")	100.8 mm (3.97")
½" Super 300 Type Pillar	2.4 C_V (34.3 K_V)	103.1 mm (4.06")	17.5 mm (0.69")	100.8 mm (3.97")
½" PrimeLock	2.4 C_V (34.3 K_V)	107.2 mm (4.22")	17.5 mm (0.69")	100.8 mm (3.97")
½" PureBond*	3.2 C_V (45.7 K_V)	120.9 mm (4.76")*	23.9 mm (0.94")	107.2 mm (4.22")
¾" Super 300 Type Pillar	3.4 C_V (48.6 K_V)	112.8 mm (4.44")	23.9 mm (0.94")	107.2 mm (4.22")
¾" PrimeLock	3.4 C_V (48.6 K_V)	120.9 mm (4.76")	23.9 mm (0.94")	107.2 mm (4.22")

**For PureBond CH8 valves with tube pilot port configurations, PureBond weld lengths less than standard weld lengths need to consider rotated tube pilot ports orientations not over the inlet or outlet ports.*

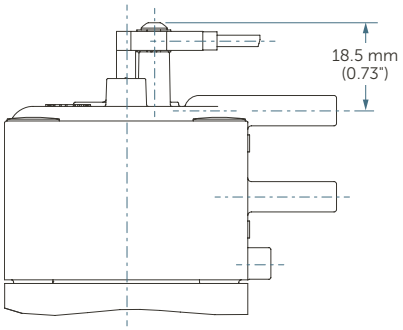
SENSING OPTION DIMENSIONAL INFORMATION

Remote Position Indication Option:

Electronic valve position sensing for monitoring valve open and closed positions.

NOTE: To enable the remote position indication option you must special order the Omron® sensor (-OM) on the valve. In addition, order the Omron Position Sensor Indicator (EE-SX771R or EE-SX771A), which is sold separately.

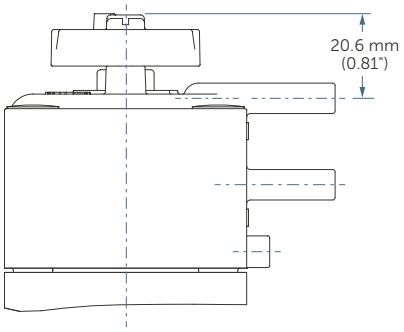
CH8 Valve with Omron Sensor



RESTRICTED OPEN/CLOSED DIMENSIONAL INFORMATION

Restricted Open or Restricted Closed

- Restricted open option allows for a manual variable limit control on the open travel of a pneumatically controlled valve
- Restricted closed option allows for a manual variable limit control on the closed travel of a pneumatically controlled valve
- Both options are offered in a normally closed and normally open pneumatic actuators



Note: Height dimension includes stem in open position.

ORDERING INFORMATION

CH8 Pneumatic Valves: part number

CH8– ___ – _____ – __

Special order

N = Pillar nuts, inserts and gauge rings included as standard*
P1 = Rotated actuator positions
RO = Restricted open
RC = Restricted closed
OM = Omron sensor
= N/A

Port configuration

4P8W = Port 1 (inlet) ¼" PureBond, Port 2 (outlet) ½" Super 300 Type Pillar
4P8K = Port 1 (inlet) ¼" PureBond, Port 2 (outlet) ½" PrimeLock
4PP = Port 1 (inlet), Port 2 (outlet) ¼" PureBond
8WW = Port 1 (inlet), Port 2 (outlet) ½" Super 300 Type Pillar
8W4P = Port 1 (inlet) ½" Super 300 Type Pillar, Port 2 (outlet) ¼" PureBond
8WP = Port 1 (inlet) ½" Super 300 Type Pillar, Port 2 (outlet) ½" PureBond
8WT = Port 1 (inlet) ½" Super 300 Type Pillar, Port 2 (outlet) ½" tube stub
8KK = Port 1 (inlet), Port 2 (outlet) ½" PrimeLock
8KV = Port 1 (inlet) ½" PrimeLock, Port 2 (outlet) ½" PrimeLock "SpaceSaver"
8K4P = Port 1 (inlet) ½" PrimeLock, Port 2 (outlet) ¼" PureBond
8KP = Port 1 (inlet) ½" PrimeLock, Port 2 (outlet) ½" PureBond
8VK = Port 1 (inlet) ½" PrimeLock "SpaceSaver", Port 2 (outlet) ½" PrimeLock
8VV = Port 1 (inlet), Port 2 (outlet) ½" PrimeLock "SpaceSaver"
8PW = Port 1 (inlet) ½" PureBond, Port 2 (outlet) ½" Super 300 Type Pillar
8P12W = Port 1 (inlet) ½" PureBond, Port 2 (outlet) ¾" Super 300 Type Pillar
8PK = Port 1 (inlet) ½" PureBond, Port 2 (outlet) ½" PrimeLock
8P12K = Port 1 (inlet) ½" PureBond, Port 2 (outlet) ¾" PrimeLock
8PP = Port 1 (inlet), Port 2 (outlet) ½" PureBond
8TW = Port 1 (inlet) ½" tube stub, Port 2 (outlet) ½" Super 300 Type Pillar
8TT = Port 1 (inlet), Port 2 (outlet) ½" tube stub, no nuts
12WW = Port 1 (inlet), Port 2 (outlet) ¾" Super 300 Type Pillar
12W8P = Port 1 (inlet) ¾" Super 300 Type Pillar, Port 2 (outlet) ½" PureBond
12WT = Port 1 (inlet) ¾" Super 300 Type Pillar, Port 2 (outlet) ¾" tube stub
12KK = Port 1 (inlet), Port 2 (outlet) ¾" PrimeLock
2KV = Port 1 (inlet) ¾" PrimeLock, Port 2 (outlet) ¾" PrimeLock "SpaceSaver"
12K8P = Port 1 (inlet) ¾" PrimeLock, Port 2 (outlet) ½" PureBond
12VK = Port 1 (inlet) ¾" PrimeLock "SpaceSaver", Port 2 (outlet) ¾" PrimeLock
12VV = Port 1 (inlet), Port 2 (outlet) ¾" PrimeLock "SpaceSaver"
12TW = Port 1 (inlet) ¾" tube stub, Port 2 (outlet) ¾" Super 300 Type Pillar
12TT = Port 1 (inlet), Port 2 (outlet) ¾" tube stub, no nuts

Actuator

2CT = 2-way normally closed tube pilot port
2UT = 2-way normally open tube pilot port
2CL = 2-way normally closed Luer pilot port
2UL = 2-way normally open Luer pilot port

**Pillar nuts, inserts and gauge rings included as standard.*

Note: Not all configurations are permitted. Consult Entegris if multiple special order features are required. Contact Entegris if "SpaceSaver" port connections are to be used in media containing a fluorinated surfactant.

FOR MORE INFORMATION

Please call your Regional Customer Service Center today to learn what Entegris can do for you. Visit entegris.com and select the Contact Us link to find the customer service 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 entegris.com and select the Terms & Conditions link in the footer.

Entegris
PURE ADVANTAGE

Corporate Headquarters
129 Concord Road
Billerica, MA 01821
USA

Customer Service
Tel +1 952 556 4181
Fax +1 952 556 8022
Toll Free 800 394 4083