



Semiconductor

Swagelok® ALD7C Series

Engineered for the Demands of Advanced ALD

Precise dose control, corrosion resistance, and thermal performance to support next-generation semiconductor manufacturing

Alloy 22 material for strength and corrosion resistance

Valve and actuator fully immersible to 482°F (250°C) in a heated enclosure

Precise and robust valve construction for ultra high cycle life, consistent dose delivery, fast actuation time less than 2 ms, and valve C_V up to 0.7

Field flow adjustability allows up to a 35% decrease of C_V from factory flow set

Replaceable cartridge (diaphragm + seat) and compact design that enables 29.5 mm (1.16 in.) valve spacing

Product offering available in either single body or multi-valve additive manufactured manifolds

As semiconductor devices continue to scale, advanced atomic layer deposition (ALD) and atomic layer etching (ALE) processes require fluid delivery solutions capable of supporting precise dose control, process repeatability, and reliable operation under harsh conditions.

The Swagelok ALD7C valve is engineered to help manufacturers achieve reliable precursor delivery, consistent dose control, corrosion resistance, and flexible system integration—all while supporting throughput, maintainability, and future-ready tool designs.

The ALD7C valve delivers consistent dose delivery in demanding ALD applications with fast, repeatable actuation response time (<2 ms) and field flow adjustability, enabling flow tuning to support process optimization. Alloy 22 wetted surfaces and full immersion capability up to 482°F (250°C) support reliable operation with high-temperature, corrosive chemistries, while the compact, replaceable cartridge design simplifies maintenance and helps reduce total cost of ownership.

For equipment designers, additive-manufactured manifolds provide greater design flexibility and customer-specific flow architectures that support next-generation semiconductor tool development.

Whether enabling advanced precursor chemistries, supporting tighter process control, or simplifying next-generation tool design, the ALD7C valve delivers the durability, consistency, and flexibility manufacturers need to drive semiconductor technology forward.

The product is offered in a normally closed pneumatically actuated configuration with a variety of end connections.



swagelok.com

Technical Data

Working Pressure	Vacuum to 60 psig (4.2 bar)
Burst Pressure	> 3200 psig (220 bar)
Actuation Pressure	70 to 100 psig (4.8 to 6.9 bar)
Temperature (body and actuator)	50 to 482°F (10 to 250°C)
Flow Capacity (C_v)	Up to 0.7 C _v at 70°F (20°C)
Body Material	Alloy 22
Diaphragm Cartridge Material	Alloy 22
Seat Material	High-purity PFA Type II/D3307
Actuator Open/Close Response Time (open/close)	< 5 ms
Actuator Response Consistency	+/- 1 ms
Flow variation valve-to-valve (factory set)	+/- 1%
Flow variation over cycle life (in use)	2%

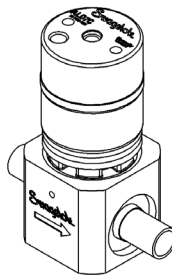
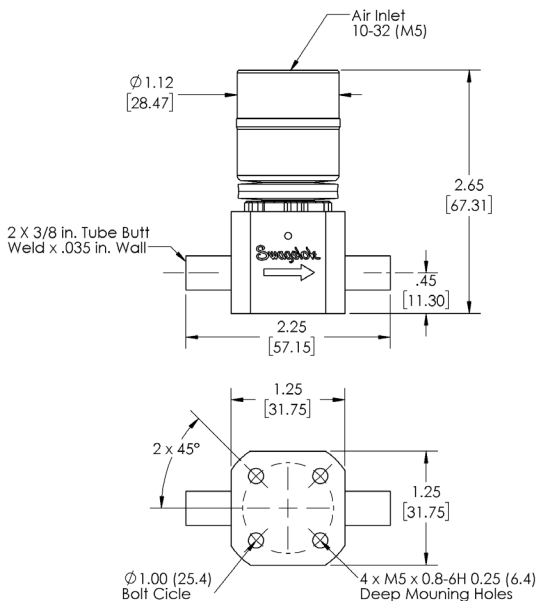
Refer to *ALD7C Technical Bulletin*, [MS-06-128](#) for additional performance data information.

End Connections

Type	VCR and "H" type VCR metal gasket face seal fittings, tube butt weld
Size	1/4, 3/8 and 1/2 (inches)

Dimensions

Dimensions, in inches (millimeters), are for reference only.
Dimensions shown are for ordering number C22-ALD7CBW6P-C.



Ordering Information

Ordering numbers are dependent on the configuration requested. Discuss your system needs with your authorized Swagelok sales and service representative to determine the correct ordering information.

Process Specifications

Ultrahigh-Purity Process Specification (SC-01)

- Ultrahigh-purity cleaning with a continuously monitored, deionized water, ultrasonic cleaning system
- Performed in ISO Class 4 work areas; valves are double bagged and vacuum sealed in cleanroom bags
- Wetted surface roughness (R_a): finished to an average of <5 $\mu\text{in.}$ (0.13 μm)

Testing

- 1×10^{-9} std cm^3/s envelope leak rate
- 1×10^{-7} std cm^3/s seat leak rate at 70°F (20°C)

Configurations

Single Valve

- Two-, three-, and four- port multiport configurations

Multivalve Manifold

- Additive manufactured; for review of configuration feasibility, contact your authorized Swagelok sales and service representative

Available Options

- Fixed flow configurations
- Factory-assembled electronic actuator-position sensors

Tools and Maintenance Kits

- Service tools to enable quick, precise valve tuning
- Replacement kits for field servicing of valves

Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok sales and service representative.

Safe Product Selection

When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

Swagelok has local fluid system specialists backed by a global team of technical experts. Contact your local authorized Swagelok sales and service center to learn more.

