



**CYNERGY® SYSTEM  
PRODUCT CATALOG**

*The only all-Teflon® PFA, steam-in-place capable system*





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## Fluid Management Solutions

Entegris, a worldwide leader in providing high performance, nonmetallic fluid handling components, provides solutions for corrosive environments and sensitive processes.

For more than 35 years, Entegris has been assuring materials integrity with quality products, systems and related services to the semiconductor and chemical processing industries. It is with this materials management expertise that we are able to meet the needs of biopharmaceutical, as well as bulk and finishing pharmaceutical industries – specifically in steam-in-place (SIP) and clean-in-place (CIP) applications.

Keeping pace with your market and technology demands, Entegris continually invests in next generation product development. One such investment is our on-site steam chamber where all Cynergy products are prequalified. Our extensive qualification testing guarantees product reliability and safety, so you can confidently sterilize Cynergy products using your standard SIP conditions.

Our state-of-the-art manufacturing facilities include Class 100 and Class 1000 cleanrooms, controlled manufacturing environments, sophisticated process control equipment, computerized in-process inspections and highly trained personnel. With manufacturing facilities in the United States, Germany and Japan, along with customer support on six continents, we are positioned to service your needs around the world.

## Cynergy Component CAD Library

2D and 3D CAD drawings of Cynergy valves and fittings are available online. To decrease system design time, visit Entegris' Web site at [www.entegrisfluidhandling.com](http://www.entegrisfluidhandling.com) for component specifications and CAD files.

## For Additional Information

To review our complete line of fluid handling products, log on to [www.entegrisfluidhandling.com](http://www.entegrisfluidhandling.com) or contact Entegris Customer Service for your free *Fluid Handling Products* catalog on CD-ROM.

## Industry Product Awards



*Cynergy products received the DuPont Plunkett Award for Innovation with Teflon material in 2000.*



**R&D 100 Award Winner**  
*Cynergy products have been recognized by R & D Magazine as one of the 100 most technologically significant new products of 1998.*







# Section 1: Introduction

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## Cynergy Sanitary Components

*Finally, a nonmetallic product line capable of withstanding regular SIP and CIP cycles.*

Constructed from Teflon® PFA, Cynergy products are excellent for handling your most corrosive applications, or where rouging may be a problem. Because of the inert and nonstick nature of Teflon PFA, Cynergy products are ideally suited to handle your most fragile and metal sensitive proteins and compounds. Teflon PFA is also easily cleaned, minimizing downtime, cross contamination and yield loss in your process.

All product-contact surfaces are manufactured from FDA approved materials. These materials comply with USDA and USP Class VI criteria, as well as 3-A Sanitary Standards. All products are also lot traceable via lot code or laser marking identification.

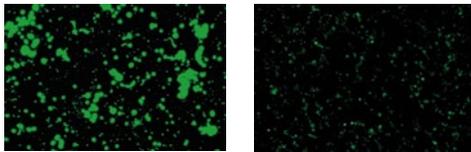
This exciting product line has been developed using all of Entegris' sophisticated resources summarized in this section.



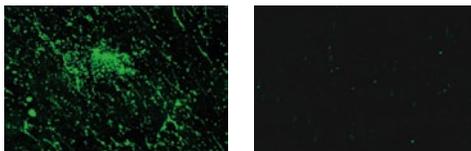
## Biofilm Removal

Biofilm growth and removal are influenced by surface finish, hydrophobicity and chemical composition. Experts specializing in biofilm research studied the adherence and removal of biofilms from stainless steel, PFA and other materials. Their comparison shows that PFA has significantly improved removal performance compared to 316L stainless steel with a 240 grit finish. See Figure 1.

Figure 1: Biofilm Removal Comparison



Biofilms on 316L stainless steel before and after cleaning.



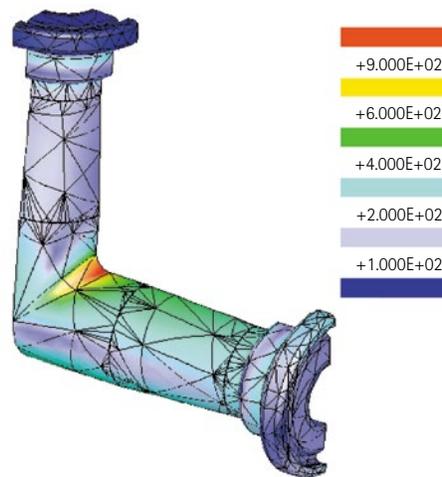
Biofilms on PFA before and after cleaning.

## Engineering

Securing an understanding of material and component requirements is essential to successful product design. That is why we design products in collaboration with you, our Customer. With the help of a dedicated design team and fully computerized, state-of-the-art design technology, Entegris uses finite element analysis (FEA) and mold flow analysis to evaluate potential product designs.

The use of FEA allows us to optimize the part design based on actual loading conditions and predict the part's performance before any mold work is started. This process reduces development time and potential costly redesigns. Mold flow analysis allows us to dial-in process parameters and evaluate the filling of the part before a final design is achieved – enabling us to adjust tool designs that reduce built-in stress before cutting a steel mold. See Figure 2.

Figure 2: FEA Identifies High Stress Areas



*During component design, Entegris uses finite element analysis to identify high stress areas, and then adjusts the component design to minimize the stress affects.*

## Materials Technology Laboratory

Material selection is the key element in designing a molded component. Entegris' trained material experts give you more than a material specification. Sophisticated laboratory equipment and inspection techniques enable our scientists to thoroughly analyze resins for temperature capability, chemical compatibility, structural tolerance and maximum strengths. We inspect each resin lot thoroughly. ISO 9001 certification and regular process audits assure material is consistent each time.



*Our Materials Technology Laboratory is staffed with material experts and sophisticated equipment like this ICP Mass Spectrometer.*

## Product Test Laboratory

Quality is an integral part of Entegris' corporate culture. Extensive qualification testing in Entegris' Product Test Laboratory fully characterizes products to ensure they meet reliability, safety, durability and functionality requirements for use in even the harshest environments – before the product ever arrives on site. Specific tests we perform include: hydraulic burst, tensile, operator cycle fatigue, pressure envelope cycle, crush, SIP, functional capability and thermal cycling.



*This steam chamber – located in Entegris' Product Test Laboratory – is used to prequalify products for SIP conditions.*



*Every week Entegris dedicates more than 300 technical staff hours and over 1000 equipment hours to the functional evaluation of our products.*

## Manufacturing Capability

Entegris has built a reputation as a leader in molding the most difficult materials to close tolerances. We run a wide variety of injection molding presses with capacities ranging from 60 to 710 tons. More than 100 different materials can be extruded, molded and machined.



*Through product sampling and the use of statistical process control (SPC) tools, Entegris documents process parameters to ensure consistent, high-quality, injection molded products.*



*An on-line laser measuring system continuously monitors the extrusion OD dimensions – ensuring dimensional specifications are met.*



*In our second operations area, more than 5000 different finished components are assembled by highly skilled technicians.*

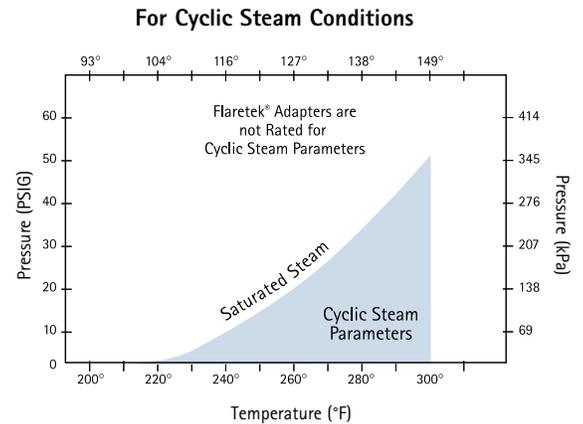
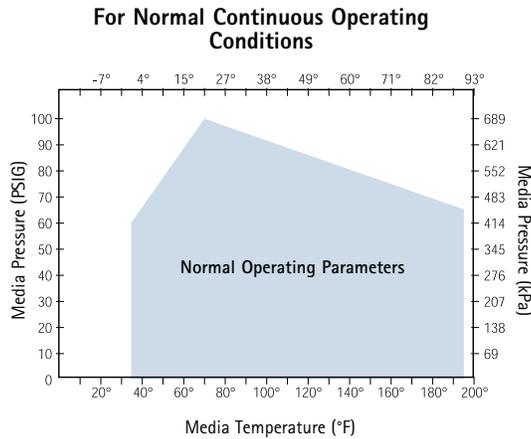


*Our dedicated beadless welding area uses Cynergy Weld-in-Place equipment to create custom Cynergy assemblies.*

## Performance Specifications

All Cynergy welds, valves, tubing and fitting products will perform as specified below whether clamped to an equivalent fitting or a stainless steel component.

**FIGURES 3 AND 4: PERFORMANCE SPECIFICATIONS FOR NORMAL AND CYCLIC STEAM OPERATING CONDITIONS**



### Autoclavability

Disassemble valves and unclamp connections before autoclaving. 124°C (255°F) is the maximum autoclave temperature.

### Cynergy PVDF Tube Adapter\*

Maximum pressure: 6 PSIG (41 kPa) @ room temperature

Maximum temperature: Room temperature

\*The silicone tubing dictates these product specifications. The working pressure of the PVDF tube adapter connection meets or exceeds performance specification of the silicone tubing.

### Vacuum

Full static vacuum capability at 149°C (300°F).

### Flaretek Glass Transition Fittings

Maximum pressure: 36 PSIG (2.5 bar) @ ambient temperature

Maximum temperature: 392°F (200°C) @ 1.5 PSIG (0.1 bar)

Vacuum rating: 29" Hg (1 TORR) @ ambient temperature

## Gasket and Clamp Recommendations

Laboratory testing of Cynergy clamp fittings shows performance reliability is dependent on the type of clamp and gasket used. Entegris strongly recommends the use of Tri-Clamp® two-piece clamps for ¼", ½" and ¾" sizes, and Tri-Clamp three-piece clamps for 1", 1½" and 2" sizes. Entegris also recommends the use of EPDM sanitary gaskets by Tri-Clover® or Newman with Entegris' Cynergy clamp fittings. In-house testing has been performed on other high performance gasket materials with favorable results. Contact your local Entegris distributor or Entegris, Inc. for a recommendation.

**TABLE 1: GASKET AND CLAMP RECOMMENDATIONS**

Cynergy Clamp Connection Size	Rubber Fab Tuf-Flex® PTFE/EPDM Gasket Number	Entegris Part Number for Tuf-Flex Gasket	Tri-Clover EPDM Gasket Part Number	Entegris EPDM Gasket Part Number	Tri-Clamp Clamp Number	Entegris Part Number for Tri-Clamp	Clamp-Torque N•m (in-lbs)
¼"	—	—	0-42MP-E-1/4*	1333-022	13MHHS-3/4-S	01-008141	1.7 (15)
½"	A42MPGR-TF-050-E	01-1014718	42MP-E-1/2	01-008136	13MHHS-3/4-S	01-008141	1.7 (15)
¾"	A42MPGR-TF-075-E	01-1014351	42MP-E-3/4	01-008137	13MHHS-3/4-S	01-008141	1.7 (15)
1"	A40MPGR-TF-100-E	01-034815	40MP-E-1	01-008138	13MHHS-11/2-S	01-008142	2.8 (25)
1½"	A40MPGR-TF-150-E	01-034816	40MP-E-1 1/2	01-008139	13MHHS-11/2-S	01-008142	2.8 (25)
2"	A40MPGR-TF-200-E	01-034817	40MP-E-2	01-008140	13MHHS-2-S	01-008143	2.8 (25)

\*Newman EPDM Gasket Part Number

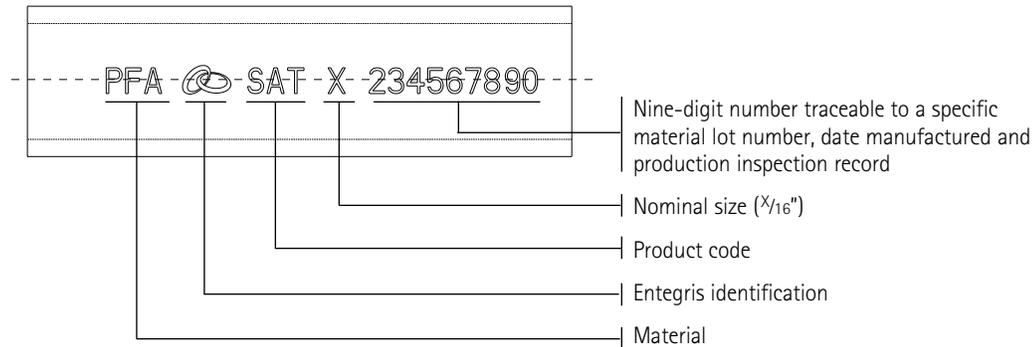
**Product and Material Lot Traceability**

Cynergy sanitary products made from Teflon PFA are coded with a lot number. This nondestructive, noncontaminating serial marking allows 100% traceability to a specific material lot, production date and production inspection record.

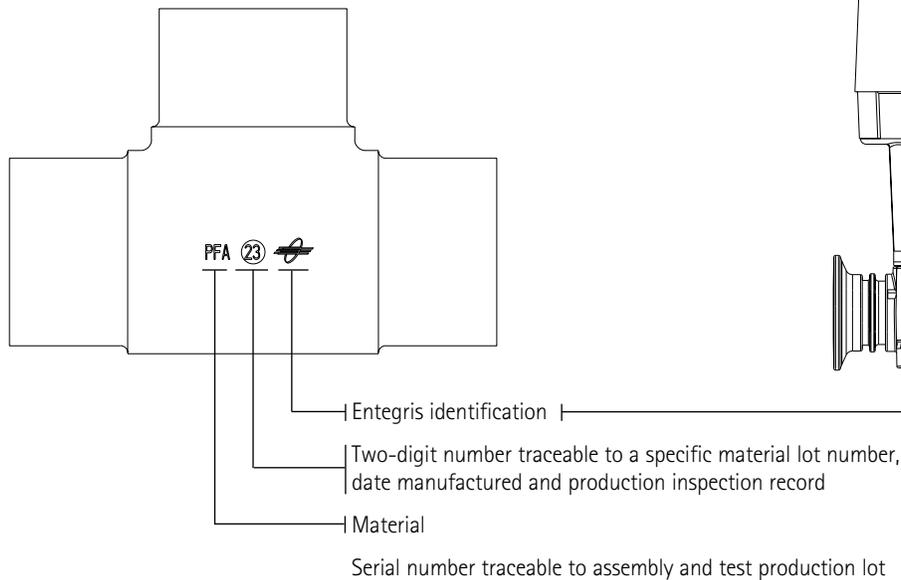
Extruded tubing has a nine-digit code that is laser marked onto the tube. See Figure 5.

Injection molded products have a unique two-digit code molded into the body. This code changes with every production lot. See Figures 6 and 7.

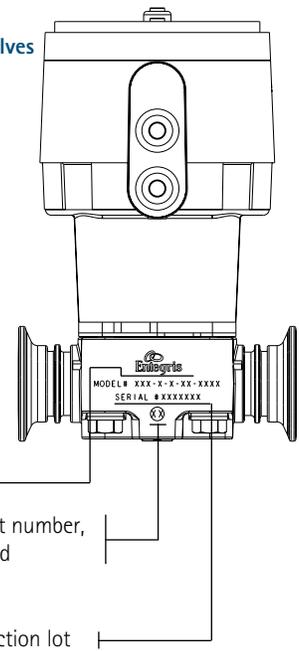
**Figure 5: Laser Marking on Extruded Tubing**



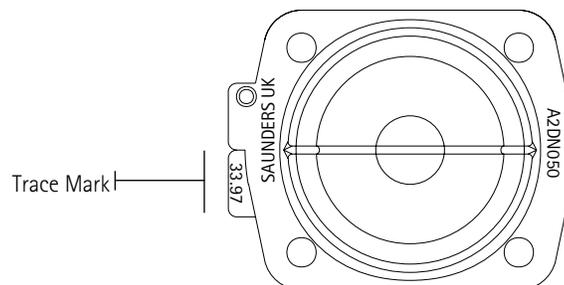
**Figure 6: Marking on Fittings**



**Figure 7: Marking on Valves**



**Figure 8: Marking on Saunders® PTFE/EPDM Backed 1" and 2" Diaphragms**



## Drainability

All products with Cynergy clamp or Cynergy welded ends are fully drainable at a 2% (1°) slope.

## Entegris Test Standards and Protocols

Entegris follows numerous qualification testing standards for all new fluid handling products. In conjunction with these standards, Entegris has developed many other specific testing programs to accommodate our unique product designs and materials. Refer to Section 2 of the *Cynergy System Technical Guide* for specific test standards and protocols.

## Custom Product Capability

Entegris has a dedicated facility with focused, expert personnel to provide customized products for your application.

Our custom fabrication process includes:

- **Identify Need**

Working closely with you, our Customer, Entegris will translate your need into a timely solution. The custom or customized product will be thoroughly reviewed and analyzed by our experienced staff.

- **Provide Quotation**

After complete evaluation of your needs, Entegris will develop a quotation. Your quotation will include a detailed drawing for your approval, price, lead time, engineering costs, prototype development (if required), testing and packaging.

- **Fabrication**

After receipt of your signed approval and purchase order, fabrication begins. Experienced technicians precisely create the component to match your requirements within the quoted lead time.

- **Final Product**

The product you require is now ready. From identifying your need at the beginning of the process to delivering your solution at the end of the process, we use only the highest quality materials and workmanship in designing and manufacturing a product for your special needs.

Custom products are not subjected to Entegris' new product testing protocol. Testing requirements for custom products will be addressed in the quotation.

## Materials

All Cynergy products are made from specially chosen resins that meet industry needs for handling highly corrosive environments, saturated steam and cleaning chemicals.

All internal wetted surfaces are made from resins that comply with FDA regulation 21 CFR 177.1550 (perfluorocarbon resins as articles or components of articles intended for use in contact with food). These resins also comply with the criteria in 3-A Standards for Multiple-use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-17, and USP Class VI Biologics Criteria.

External surfaces may also include PEEK™ and PES materials, high performance, FDA approved engineering grade polymers that are well suited to meet your application requirements.

For complete chemical compatibility and mechanical capabilities, refer to Section 1 in the *Cynergy System Technical Guide*.





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## Cynergy Valves

Cynergy valves are ideal for a full range of applications from utilities to your most demanding validated processes. Whether your applications involve ultrapure water, corrosive chemistries or biotechniques, Cynergy valves have a beadless weld connection or an industry standard clamp interface for adaptability to existing equipment and comply with cGMP standards. Furthermore, all product contact surfaces are manufactured from FDA approved materials, and comply with USP Class VI and USDA criteria, as well as 3-A Sanitary Standards.

### Injection Molded PFA Valve

Cynergy valves transcend standard technology and efficiently handle your most demanding processes. The valve bodies are injection molded from PFA material so they will never rouge or pit. The injection molding process eliminates pinholes, unwanted surface variations and nonuniformity common with coated or lined products. In addition, it creates a mirror-smooth surface. The inert, nonstick surfaces are easily cleaned minimizing downtime, cross contamination and yield loss in your process.

Entegris overmolds the PFA bodies with a strong, lightweight polyethersulfone (PES) material. PES has excellent chemical resistance and is fully autoclavable. This innovative design increases the strength of the bodies so they maintain performance capability at elevated temperatures and steam conditions. The valves' flat mounting surfaces are designed to easily accept the preformed mounting bracket or an adjustable level. The flat-bottom design facilitates installation and ensures correct orientation angle with either mounting method.



*Constructed from Teflon PFA, Cynergy valves will never rouge or pit. All contact surfaces are made from FDA-approved materials.*



*Cynergy valves, with injection molded PFA bodies, transcend standard valve technology.*

### Crane Valve Partnership

To ensure we provide the highest quality valve available, we have teamed with Saunders Biopharm Division of Crane Valves, a leader in aseptic valve technology. Saunders has produced a complete range of reliable diaphragms, bonnet and actuator assemblies for the biopharm industry, which we have incorporated into our Cynergy valve design.

#### Saunders Diaphragms

Saunders weir-type diaphragms are molded in the normally opened position. This assures that during the opening cycle, stress concentration around the diaphragm stud is minimized for enhanced reliability particularly in the PTFE diaphragms, pneumatically actuated valves and vacuum system applications. During the closing cycle, the diaphragm is completely supported by the compressor, distributing stem thrust evenly across the diaphragm.

#### Saunders Bonnet Assemblies

Saunders 1" and 2" manual bonnet assemblies are made from PES material. The 1/2" manual bonnets are made from polyphenylenesulphide (PPS) material. A shrouded diaphragm sealed bonnet provides maximum containment for critical applications. Unique bonnet features include:

- O-ring seal prevents both product escape and the potential ingress of contaminants
- Limit stop provides greater process control
- High integrity handwheel with ergonomic design ensures comfortable, precise control
- Suitable for steam-in-place (SIP)
- Meets FDA requirements

## Crane Valve Partnership (continued)

### Saunders Pneumatic Actuator Assemblies

Saunders EC piston actuators are injection molded from PES. Design and materials are suitable for sterilization. Field conversion of manual valves to power actuation is readily achieved in-line without special tools or modification. Saunders sanitary pneumatic actuators offer unrivaled design features such as:

- Corrosion-resistant construction suitable for autoclaving or chemical cleaning
- Most compact, lightweight design available
- Modular direct mounted totally enclosed limit switch option
- Visual position indication is a standard feature

## Specifications

Pneumatic supply pressure:	80 to 116 PSIG (552 to 800 kPa)		
Pneumatic supply port:	1/8" FNPT		
Drain angle:	<b>Orifice</b>	<b>Port Connection</b>	<b>Drain Angle with 1° slope</b>
	1/2"	1/2"	22°
	1"	1"	29°
	2"	1 1/2"	34°
	2"	2"	23°
Slope orientation:	2% (1°)		
Materials:	All wetted surfaces are Teflon PFA and PTFE		
Typical flow factor:	<b>Orifice</b>	<b>Port Connection</b>	<b>C<sub>v</sub> (K<sub>v</sub>)</b>
	1/2"	1/2"	1.1 (15.7)
	1"	1"	11.3 (161.4)
	2"	1 1/2"	35.7 (509.8)
	2"	2"	43.8 (625.5)

### Diaphragm Valve Weight Comparison

Cynergy PFA valves are considerably lighter than valves with stainless steel bodies. The lightweight design facilitates installation and removal when manual cleaning is required.

	Cynergy PFA Valve (lbs)	Comparable Stainless Steel Valve (lbs)
<b>Manual Valves</b>		
1/2" orifice	0.3	0.5
1" orifice	2.2	3.7
2" orifice	5.9	11.0
<b>Pneumatic Valves Normally Open</b>		
1/2" orifice	0.7	0.9
1" orifice	3.6	5.1
2" orifice	9.0	14.1
<b>Normally Closed</b>		
1/2" orifice	0.8	0.9
1" orifice	3.9	5.4
2" orifice	13.0	18.1



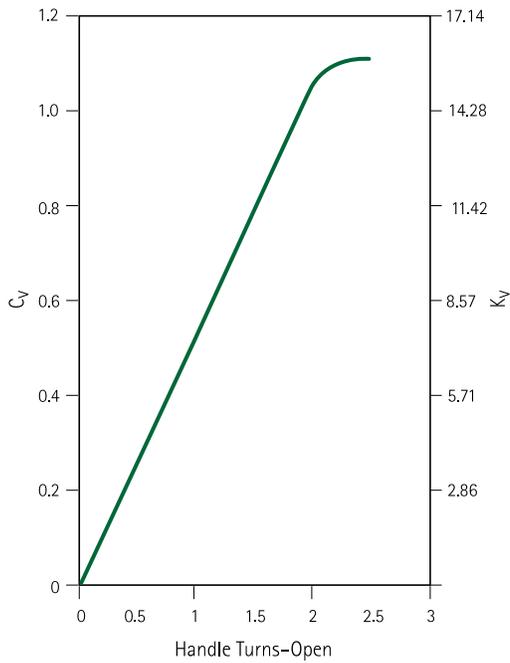
*Cynergy PFA valves are considerably lighter than valves with stainless steel bodies.*

## Performance Data

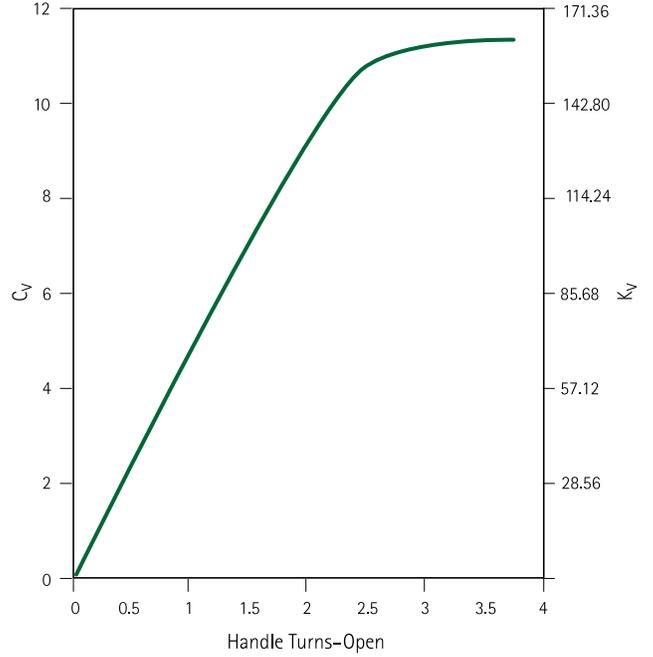
### $C_V$ ( $K_V$ ) vs. Handle Turn

Section 2: Performance Data

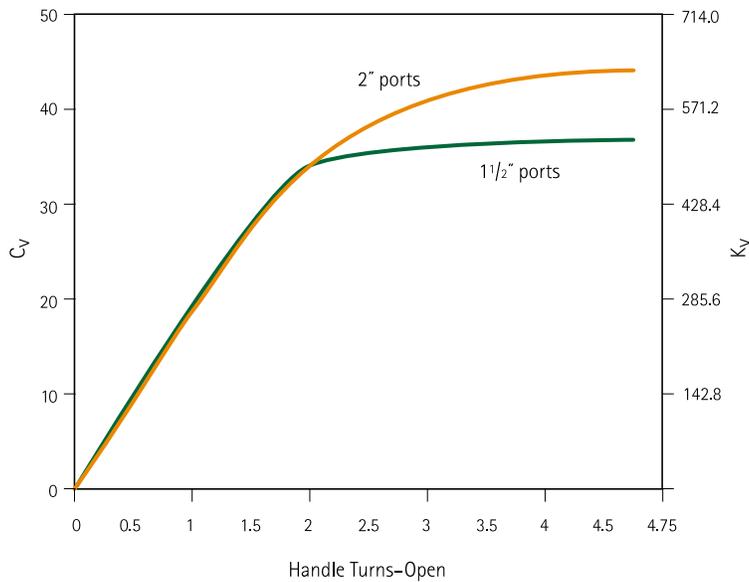
1/2" Manual Valve with 1/2" Ports



1" Manual Valve with 1" Ports

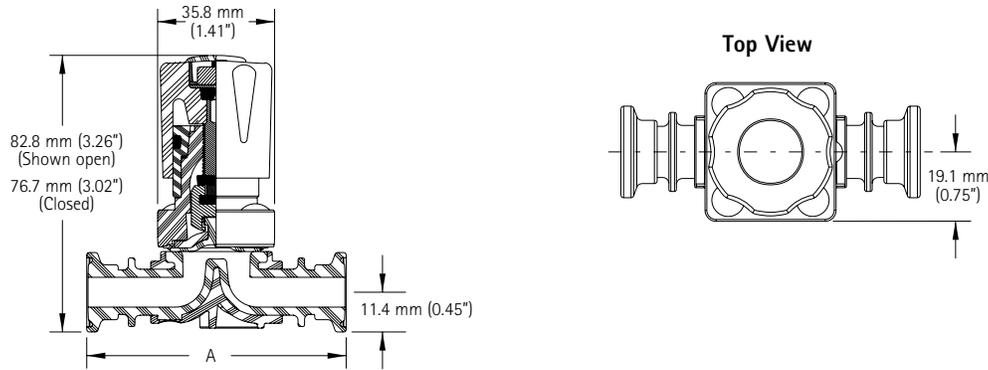


2" Manual Valve with 1 1/2" and 2" Ports



## Cynergy Manual Valves

### 1/2" Orifice, Sanitary Clamp and Beadless Weld

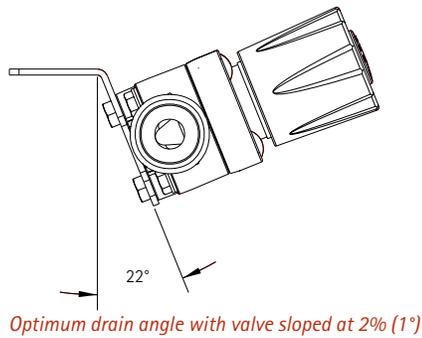
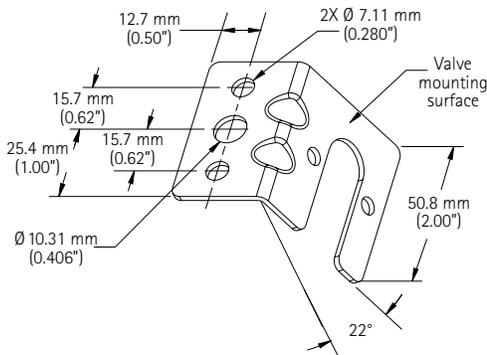


**TABLE 2: MANUAL VALVES 1/2" ORIFICE**

Part Number	Flow Factor Cv (Kv)	Diaphragm	Port Connection	Dimension A
CW8-1-A-01-SA8	1.1 (15.7)	PTFE/EPDM	1/2" sanitary clamp	81.5 mm (3.21")
CW8-1-A-02-SA8	1.1 (15.7)	PTFE/EPDM steam grade	1/2" sanitary clamp	81.5 mm (3.21")
CW8-1-A-01-BW8	1.1 (15.7)	PTFE/EPDM	1/2" sanitary beadless weld	88.9 mm (3.50")
CW8-1-A-02-BW8	1.1 (15.7)	PTFE/EPDM steam grade	1/2" sanitary beadless weld	88.9 mm (3.50")
CW8-1-A-01-SB8	1.1 (15.7)	PTFE/EPDM	1/2" sanitary clamp x 1/2" sanitary beadless weld	85.3 mm (3.36")
CW8-1-A-02-SB8	1.1 (15.7)	PTFE/EPDM steam grade	1/2" sanitary clamp x 1/2" sanitary beadless weld	85.3 mm (3.36")

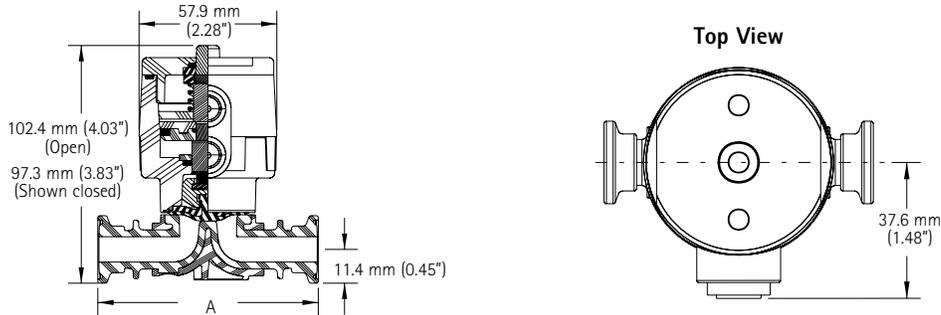
### Mounting bracket

To facilitate installation, the mounting brackets are preformed to the correct mounting drain angle. A mounting bracket is included with each valve.



## Cynergy Pneumatic Valves

### 1/2" Orifice, Sanitary Clamp and Beadless Weld



**TABLE 3: MANUAL VALVES 1/2" ORIFICE**

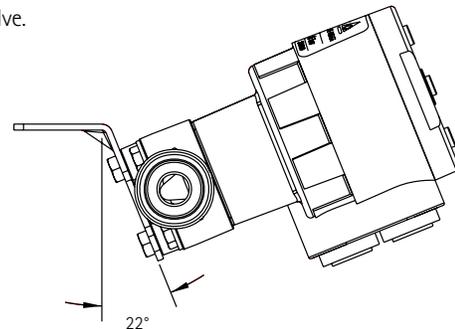
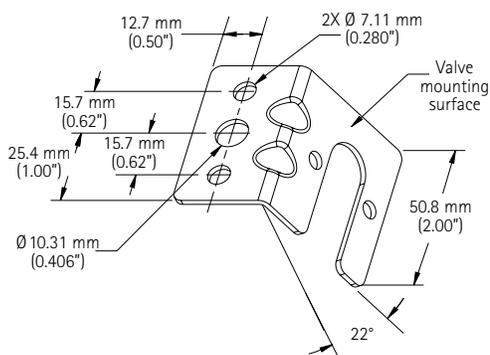
Part Number	Flow Factor $C_v$ ( $K_v$ )	Valve Type	Diaphragm	Port Connection	Dimension A
CW8-1-C-01-SA8	1.1 (15.7)	normally open	PTFE/EPDM	1/2" sanitary clamp	81.5 mm (3.21")
CW8-1-C-02-SA8	1.1 (15.7)	normally open	PTFE/EPDM steam grade	1/2" sanitary clamp	81.5 mm (3.21")
CW8-1-D-01-SA8	1.1 (15.7)	normally closed	PTFE/EPDM	1/2" sanitary clamp	81.5 mm (3.21")
CW8-1-D-02-SA8	1.1 (15.7)	normally closed	PTFE/EPDM steam grade	1/2" sanitary clamp	81.5 mm (3.21")
CW8-1-C-01-BW8	1.1 (15.7)	normally open	PTFE/EPDM	1/2" sanitary beadless weld	88.9 mm (3.50")
CW8-1-C-02-BW8	1.1 (15.7)	normally open	PTFE/EPDM steam grade	1/2" sanitary beadless weld	88.9 mm (3.50")
CW8-1-D-01-BW8	1.1 (15.7)	normally closed	PTFE/EPDM	1/2" sanitary beadless weld	88.9 mm (3.50")
CW8-1-D-02-BW8	1.1 (15.7)	normally closed	PTFE/EPDM steam grade	1/2" sanitary beadless weld	88.9 mm (3.50")
CW8-1-C-01-SB8	1.1 (15.7)	normally open	PTFE/EPDM	1/2" sanitary clamp x 1/2" sanitary beadless weld	85.3 mm (3.36")
CW8-1-C-02-SB8	1.1 (15.7)	normally open	PTFE/EPDM steam grade	1/2" sanitary clamp x 1/2" sanitary beadless weld	85.3 mm (3.36")
CW8-1-D-01-SB8	1.1 (15.7)	normally closed	PTFE/EPDM	1/2" sanitary clamp x 1/2" sanitary beadless weld	85.3 mm (3.36")
CW8-1-D-02-SB8	1.1 (15.7)	normally closed	PTFE/EPDM steam grade	1/2" sanitary clamp x 1/2" sanitary beadless weld	85.3 mm (3.36")

### Specifications

Pneumatic supply pressure: 552 to 800 kPa (80 to 116 PSIG) Pneumatic supply port: 1/8" FNPT

### Mounting bracket

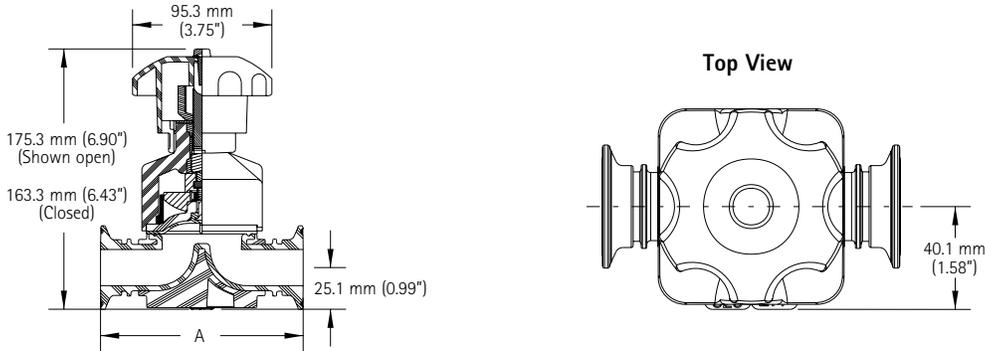
To facilitate installation, the mounting brackets are preformed to the correct mounting drain angle. A mounting bracket is included with each valve.



Optimum drain angle with valve sloped at 2% (1°)

## Cynergy Manual Valves

### 1" Orifice, Sanitary Clamp and Beadless Weld

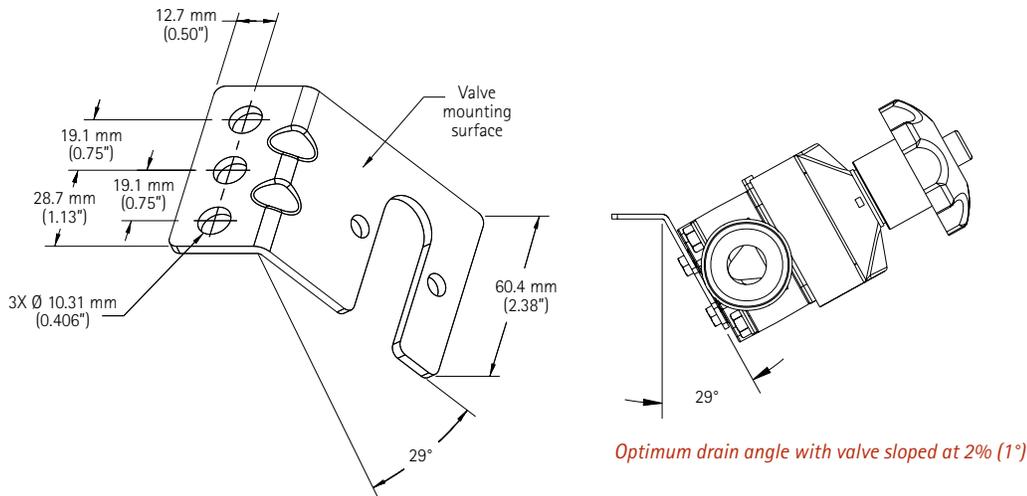


**TABLE 4: MANUAL VALVES 1" ORIFICE**

Part Number	Flow Factor $C_v$ ( $K_v$ )	Diaphragm	Port Connection	Dimension A
CW16-1-A-01-SA16	11.3 (161.4)	PTFE/EPDM	1" sanitary clamp	121.9 mm (4.80")
CW16-1-A-02-SA16	11.3 (161.4)	PTFE/EPDM steam grade	1" sanitary clamp	121.9 mm (4.80")
CW16-1-A-01-BW16	11.3 (161.4)	PTFE/EPDM	1" sanitary beadless weld	136.7 mm (5.38")
CW16-1-A-02-BW16	11.3 (161.4)	PTFE/EPDM steam grade	1" sanitary beadless weld	136.7 mm (5.38")

### Mounting bracket

To facilitate installation, the mounting brackets are preformed to the correct mounting drain angle. A mounting bracket is included with each valve.



## Cynergy Pneumatic Valves

### 1" Orifice, Sanitary Clamp and Beadless Weld

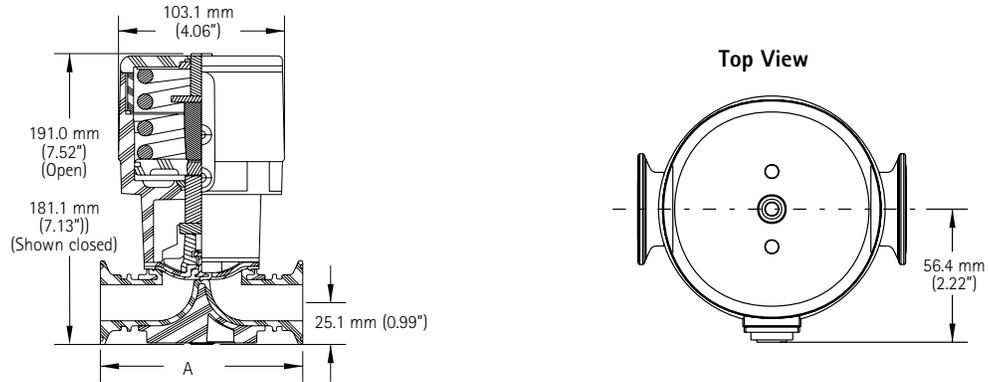


TABLE 5: PNEUMATIC VALVES 1" ORIFICE

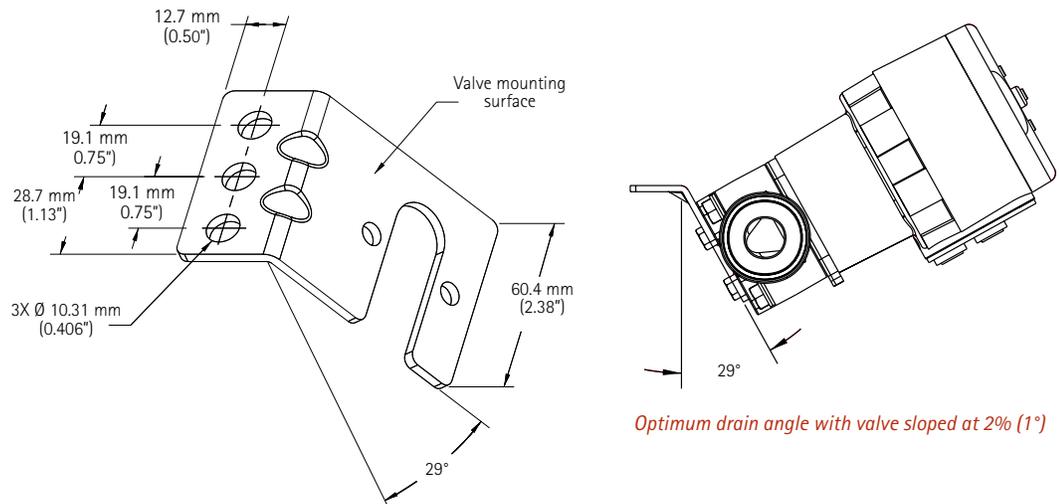
Part Number	Flow Factor $C_v$ ( $K_v$ )	Valve Type	Diaphragm	Port Connection	Dimension A
CW16-1-C-01-SA16	11.3 (161.4)	normally open	PTFE/EPDM	1" sanitary clamp	121.9 mm (4.80")
CW16-1-C-02-SA16	11.3 (161.4)	normally open	PTFE/EPDM steam grade	1" sanitary clamp	121.9 mm (4.80")
CW16-1-D-01-SA16	11.3 (161.4)	normally closed	PTFE/EPDM	1" sanitary clamp	121.9 mm (4.80")
CW16-1-D-02-SA16	11.3 (161.4)	normally closed	PTFE/EPDM steam grade	1" sanitary clamp	121.9 mm (4.80")
CW16-1-C-01-BW16	11.3 (161.4)	normally open	PTFE/EPDM	1" sanitary beadless weld	136.7 mm (5.38")
CW16-1-C-02-BW16	11.3 (161.4)	normally open	PTFE/EPDM steam grade	1" sanitary beadless weld	136.7 mm (5.38")
CW16-1-D-01-BW16	11.3 (161.4)	normally closed	PTFE/EPDM	1" sanitary beadless weld	136.7 mm (5.38")
CW16-1-D-02-BW16	11.3 (161.4)	normally closed	PTFE/EPDM steam grade	1" sanitary beadless weld	136.7 mm (5.38")

### Specifications

Pneumatic supply pressure: 552 to 800 kPa (80 to 116 PSIG) Pneumatic supply port: 1/8" FNPT

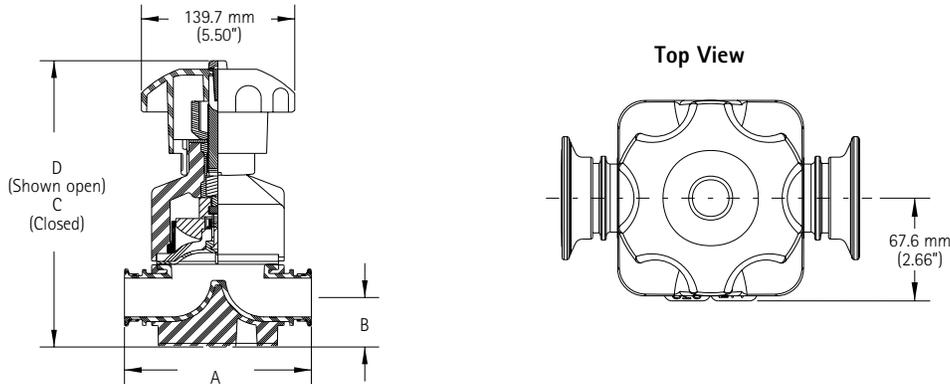
### Mounting bracket

To facilitate installation, the mounting brackets are preformed to the correct mounting drain angle. A mounting bracket is included with each valve.



## Cynergy Manual Valves

### 2" Orifice, Sanitary Clamp and Beadless Weld



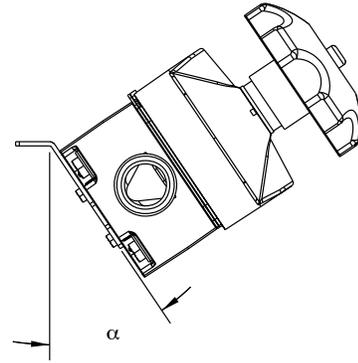
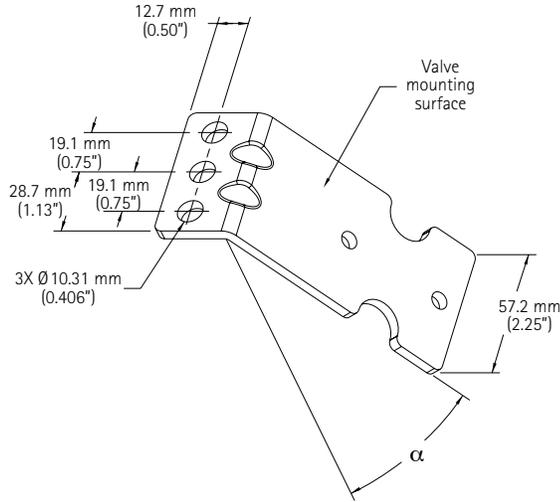
**TABLE 6: MANUAL VALVES 2" ORIFICE**

Part Number	Flow Factor $C_v$ ( $K_v$ )	Diaphragm	Port Connection
CW32-1-A-01-SA24	35.7 (509.8)	PTFE/EPDM	1½" sanitary clamp
CW32-1-A-02-SA24	35.7 (509.8)	PTFE/EPDM steam grade	1½" sanitary clamp
CW32-1-A-01-BW24	35.7 (509.8)	PTFE/EPDM	1½" sanitary beadless weld
CW32-1-A-02-BW24	35.7 (509.8)	PTFE/EPDM steam grade	1½" sanitary beadless weld
CW32-1-A-01-SA32	43.8 (625.5)	PTFE/EPDM	2" sanitary clamp
CW32-1-A-02-SA32	43.8 (625.5)	PTFE/EPDM steam grade	2" sanitary clamp
CW32-1-A-01-BW32	43.8 (625.5)	PTFE/EPDM	2" sanitary beadless weld
CW32-1-A-02-BW32	43.8 (625.5)	PTFE/EPDM steam grade	2" sanitary beadless weld

Part Number	Dimensions			
	A	B	C (closed)	D (open)
CW32-1-A-01-SA24	165.6 mm (6.52")	43.9 mm (1.73")	224.8 mm (8.85")	252.7 mm (9.95")
CW32-1-A-02-SA24	165.6 mm (6.52")	43.9 mm (1.73")	224.8 mm (8.85")	252.7 mm (9.95")
CW32-1-A-01-BW24	177.8 mm (7.00")	43.9 mm (1.73")	224.8 mm (8.85")	252.7 mm (9.95")
CW32-1-A-02-BW24	177.8 mm (7.00")	43.9 mm (1.73")	224.8 mm (8.85")	252.7 mm (9.95")
CW32-1-A-01-SA32	165.6 mm (6.52")	50.3 mm (1.98")	237.5 mm (9.35")	265.4 mm (10.45")
CW32-1-A-02-SA32	165.6 mm (6.52")	50.3 mm (1.98")	237.5 mm (9.35")	265.4 mm (10.45")
CW32-1-A-01-BW32	184.2 mm (7.25")	50.3 mm (1.98")	237.5 mm (9.35")	265.4 mm (10.45")
CW32-1-A-02-BW32	184.2 mm (7.25")	50.3 mm (1.98")	237.5 mm (9.35")	265.4 mm (10.45")

### Mounting bracket

To facilitate installation, the mounting brackets are preformed to the correct mounting drain angle. A mounting bracket is included with each valve.

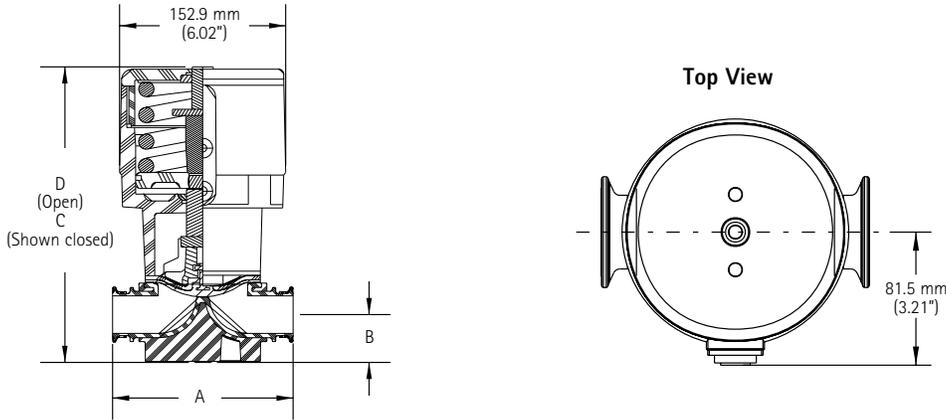


*Optimum drain angle with valve sloped at 2% (1°)*

Port Connection	Drain Angle $\alpha$
1 1/2"	34°
2"	23°

## Cynergy Pneumatic Valves

### 2" Orifice, Sanitary Clamp and Beadless Weld



**TABLE 7: PNEUMATIC VALVES 2" ORIFICE**

Part Number	Flow Factor $C_v$ ( $K_v$ )	Valve Type	Diaphragm	Port Connection
CW32-1-C-01-SA24	35.7 (509.8)	normally open	PTFE/EPDM	1½" sanitary clamp
CW32-1-C-02-SA24	35.7 (509.8)	normally open	PTFE/EPDM steam grade	1½" sanitary clamp
CW32-1-D-01-SA24	35.7 (509.8)	normally closed	PTFE/EPDM	1½" sanitary clamp
CW32-1-D-02-SA24	35.7 (509.8)	normally closed	PTFE/EPDM steam grade	1½" sanitary clamp
CW32-1-C-01-BW24	35.7 (509.8)	normally open	PTFE/EPDM	1½" sanitary beadless weld
CW32-1-C-02-BW24	35.7 (509.8)	normally open	PTFE/EPDM steam grade	1½" sanitary beadless weld
CW32-1-D-01-BW24	35.7 (509.8)	normally closed	PTFE/EPDM	1½" sanitary beadless weld
CW32-1-D-02-BW24	35.7 (509.8)	normally closed	PTFE/EPDM steam grade	1½" sanitary beadless weld
CW32-1-C-01-SA32	43.8 (625.5)	normally open	PTFE/EPDM	2" sanitary clamp
CW32-1-C-02-SA32	43.8 (625.5)	normally open	PTFE/EPDM steam grade	2" sanitary clamp
CW32-1-D-01-SA32	43.8 (625.5)	normally closed	PTFE/EPDM	2" sanitary clamp
CW32-1-D-02-SA32	43.8 (625.5)	normally closed	PTFE/EPDM steam grade	2" sanitary clamp
CW32-1-C-01-BW32	43.8 (625.5)	normally open	PTFE/EPDM	2" sanitary beadless weld
CW32-1-C-02-BW32	43.8 (625.5)	normally open	PTFE/EPDM steam grade	2" sanitary beadless weld
CW32-1-D-01-BW32	43.8 (625.5)	normally closed	PTFE/EPDM	2" sanitary beadless weld
CW32-1-D-02-BW32	43.8 (625.5)	normally closed	PTFE/EPDM steam grade	2" sanitary beadless weld

Part Number	Dimensions			
	A	B	C (closed)	D (open)
CW32-1-C-01-SA24	165.6 mm (6.52")	43.9 mm (1.73")	262.6 mm (10.34")	286.5 mm (11.28")
CW32-1-C-02-SA24	165.6 mm (6.52")	43.9 mm (1.73")	262.6 mm (10.34")	286.5 mm (11.28")
CW32-1-D-01-SA24	165.6 mm (6.52")	43.9 mm (1.73")	262.6 mm (10.34")	286.5 mm (11.28")
CW32-1-D-02-SA24	165.6 mm (6.52")	43.9 mm (1.73")	262.6 mm (10.34")	286.5 mm (11.28")
CW32-1-C-01-BW24	177.8 mm (7.00")	43.9 mm (1.73")	262.6 mm (10.34")	286.5 mm (11.28")
CW32-1-C-02-BW24	177.8 mm (7.00")	43.9 mm (1.73")	262.6 mm (10.34")	286.5 mm (11.28")
CW32-1-D-01-BW24	177.8 mm (7.00")	43.9 mm (1.73")	262.6 mm (10.34")	286.5 mm (11.28")
CW32-1-D-02-BW24	177.8 mm (7.00")	43.9 mm (1.73")	262.6 mm (10.34")	286.5 mm (11.28")

**TABLE 7: PNEUMATIC VALVES 2" ORIFICE (CONTINUED)**

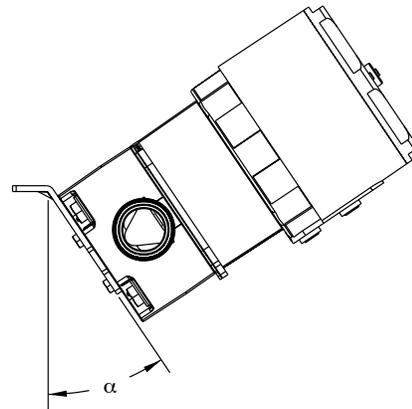
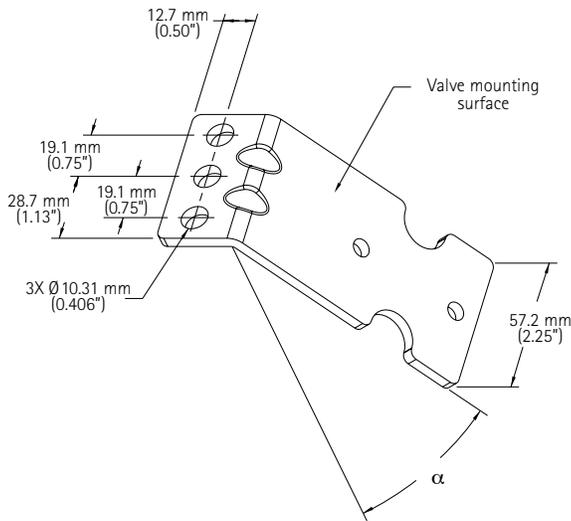
Part Number	Dimensions			
	A	B	C (closed)	D (open)
CW32-1-C-01-SA32	165.6 mm (6.52")	50.3 mm (1.98")	275.3 mm (10.84")	299.2 mm (11.78")
CW32-1-C-02-SA32	165.6 mm (6.52")	50.3 mm (1.98")	275.3 mm (10.84")	299.2 mm (11.78")
CW32-1-D-01-SA32	165.6 mm (6.52")	50.3 mm (1.98")	275.3 mm (10.84")	299.2 mm (11.78")
CW32-1-D-02-SA32	165.6 mm (6.52")	50.3 mm (1.98")	275.3 mm (10.84")	299.2 mm (11.78")
CW32-1-C-01-BW32	184.2 mm (7.25")	50.3 mm (1.98")	275.3 mm (10.84")	299.2 mm (11.78")
CW32-1-C-02-BW32	184.2 mm (7.25")	50.3 mm (1.98")	275.3 mm (10.84")	299.2 mm (11.78")
CW32-1-D-01-BW32	184.2 mm (7.25")	50.3 mm (1.98")	275.3 mm (10.84")	299.2 mm (11.78")
CW32-1-D-02-BW32	184.2 mm (7.25")	50.3 mm (1.98")	275.3 mm (10.84")	299.2 mm (11.78")

**Specifications**

Pneumatic supply pressure: 552 to 800 kPa (80 to 116 PSIG) Pneumatic supply port: 1/8" FNPT

**Mounting bracket**

To facilitate installation, the mounting brackets are preformed to the correct mounting drain angle. A mounting bracket is included with each valve.

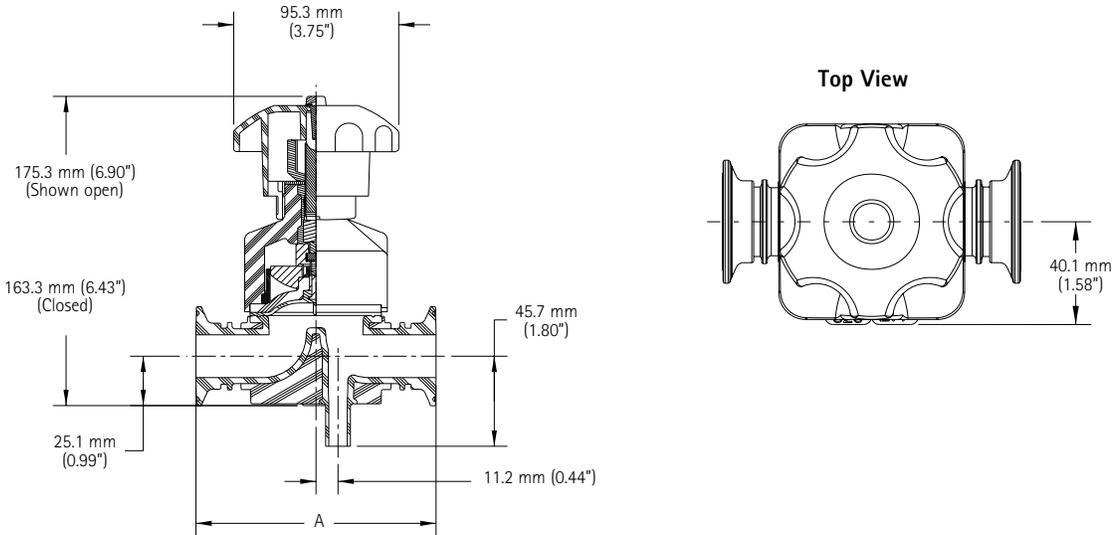


*Optimum drain angle with valve sloped at 2% (1°)*

Port Connection	Drain Angle $\alpha$
1 1/2"	34°
2"	23°

## Cynergy Manual Access Port Valves

### 1" Orifice, 1/2" Beadless Weld Access Port, Sanitary Clamp and Beadless Weld



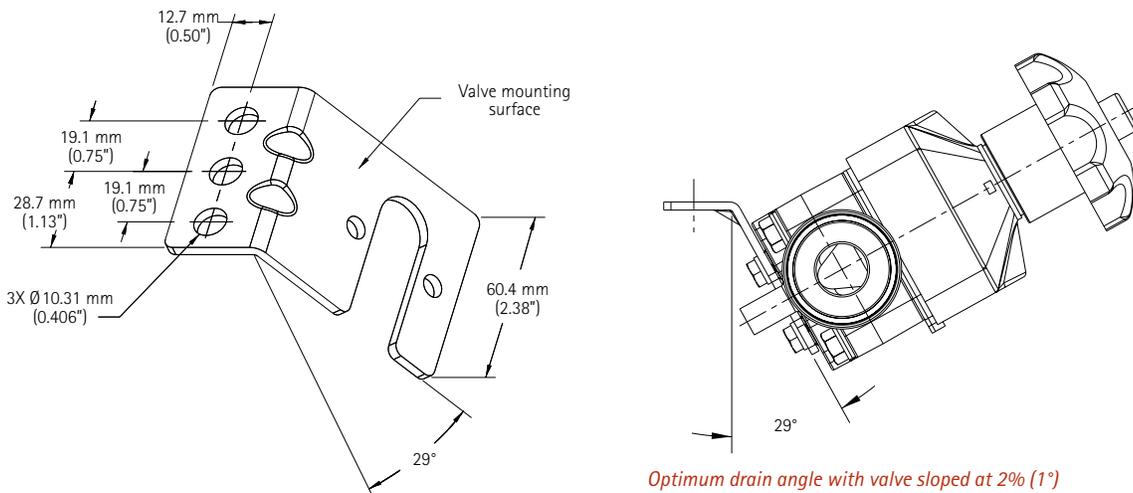
**TABLE 8: MANUAL ACCESS PORT VALVES 1" ORIFICE**

Part Number	Flow Factor $C_v$ ( $K_v$ )	Diaphragm	Port Connection	Dimension A
CW16-2-A-01-SA16	11.3 (161.4)	PTFE/EPDM	1" sanitary clamp	121.9 mm (4.80")
CW16-2-A-02-SA16	11.3 (161.4)	PTFE/EPDM steam grade	1" sanitary clamp	121.9 mm (4.80")
CW16-2-A-01-BW16	11.3 (161.4)	PTFE/EPDM	1" sanitary beadless weld	136.7 mm (5.38")
CW16-2-A-02-BW16	11.3 (161.4)	PTFE/EPDM steam grade	1" sanitary beadless weld	136.7 mm (5.38")

**Note:** Valves are available with only 1/2" sanitary beadless weld access ports.

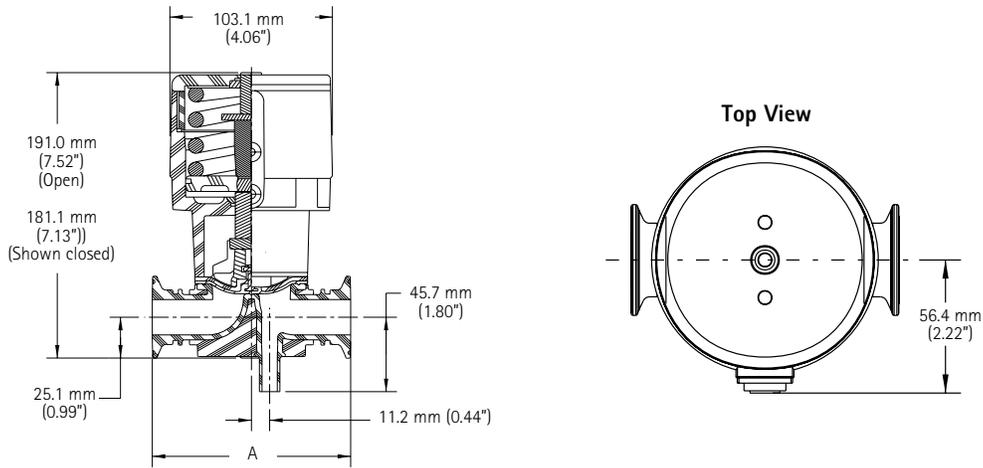
### Mounting bracket

To facilitate installation, the mounting brackets are preformed to the correct mounting drain angle. A mounting bracket is included with each valve.



## Cynergy Pneumatic Access Port Valves

### 1" Orifice, 1/2" Beadless Weld Access Port, Sanitary Clamp and Beadless Weld



**TABLE 9: PNEUMATIC ACCESS PORT VALVES 1" ORIFICE**

Part Number	Flow Factor $C_v$ ( $K_v$ )	Valve Type	Diaphragm	Port Connection	Dimension A
CW16-2-C-01-SA16	11.3 (161.4)	normally open	PTFE/EPDM	1" sanitary clamp	121.9 mm (4.80")
CW16-2-C-02-SA16	11.3 (161.4)	normally open	PTFE/EPDM steam grade	1" sanitary clamp	121.9 mm (4.80")
CW16-2-D-01-SA16	11.3 (161.4)	normally closed	PTFE/EPDM	1" sanitary clamp	121.9 mm (4.80")
CW16-2-D-02-SA16	11.3 (161.4)	normally closed	PTFE/EPDM steam grade	1" sanitary clamp	121.9 mm (4.80")
CW16-2-C-01-BW16	11.3 (161.4)	normally open	PTFE/EPDM	1" sanitary beadless weld	136.7 mm (5.38")
CW16-2-C-02-BW16	11.3 (161.4)	normally open	PTFE/EPDM steam grade	1" sanitary beadless weld	136.7 mm (5.38")
CW16-2-D-01-BW16	11.3 (161.4)	normally closed	PTFE/EPDM	1" sanitary beadless weld	136.7 mm (5.38")
CW16-2-D-02-BW16	11.3 (161.4)	normally closed	PTFE/EPDM steam grade	1" sanitary beadless weld	136.7 mm (5.38")

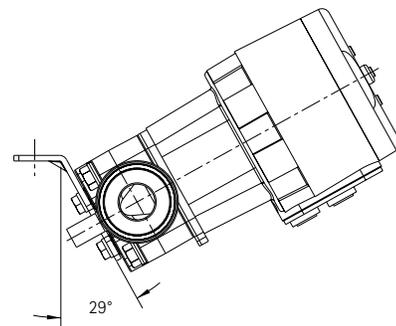
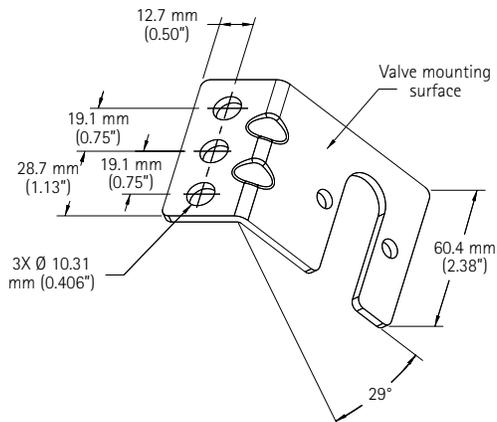
**Note:** Valves are available with only 1/2" sanitary beadless weld access ports.

### Specifications

**Pneumatic supply pressure:** 552 to 800 kPa (80 to 116 PSIG) **Pneumatic supply port:** 1/8" FNPT

### Mounting bracket

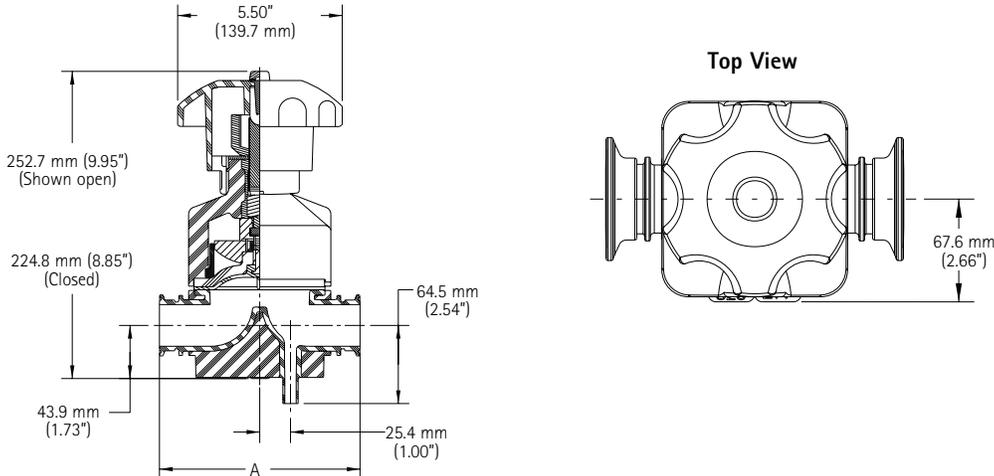
To facilitate installation, the mounting brackets are preformed to the correct mounting drain angle. A mounting bracket is included with each valve.



*Optimum drain angle with valve sloped at 2% (1°)*

## Cynergy Manual Access Port Valves

### 2" Orifice, 1/2" Beadless Weld Access Port, Sanitary Clamp and Beadless Weld



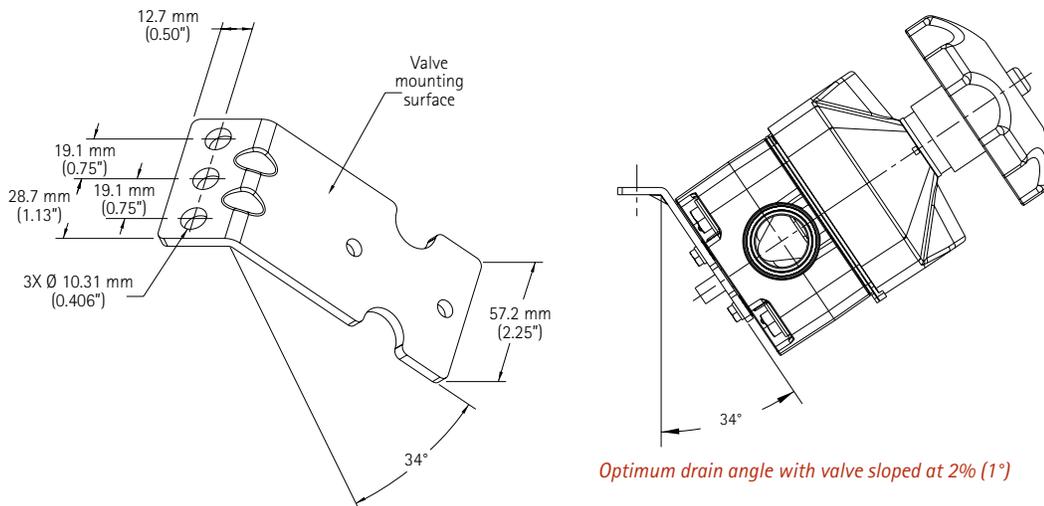
**TABLE 10: MANUAL ACCESS PORT VALVES 2" ORIFICE**

Part Number	Flow Factor $C_v$ ( $K_v$ )	Diaphragm	Port Connection	Dimension A
CW32-2-A-01-SA24	35.7 (509.8)	PTFE/EPDM	1/2" sanitary clamp	165.6 mm (6.52")
CW32-2-A-02-SA24	35.7 (509.8)	PTFE/EPDM steam grade	1/2" sanitary clamp	165.6 mm (6.52")
CW32-2-A-01-BW24	35.7 (509.8)	PTFE/EPDM	1/2" sanitary beadless weld	177.8 mm (7.00")
CW32-2-A-02-BW24	35.7 (509.8)	PTFE/EPDM steam grade	1/2" sanitary beadless weld	177.8 mm (7.00")

**Note:** Valves are available with only 1/2" sanitary beadless weld access ports.

### Mounting bracket

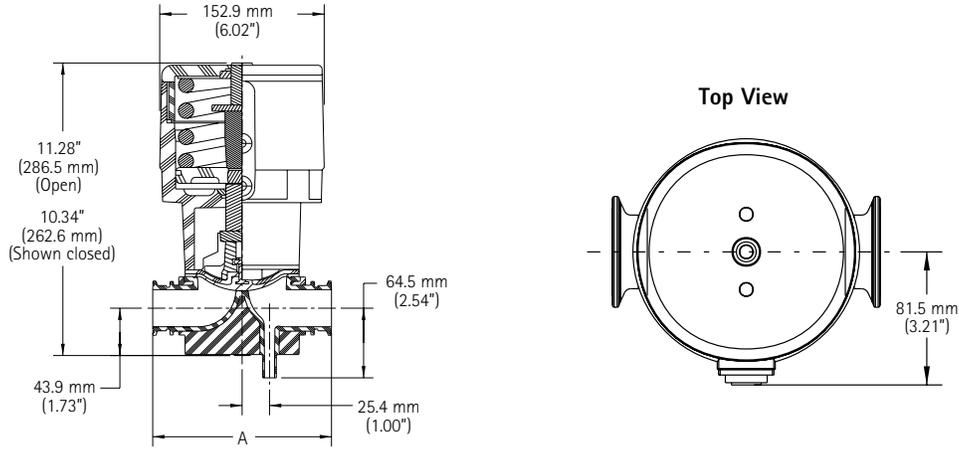
To facilitate installation, the mounting brackets are preformed to the correct mounting drain angle. A mounting bracket is included with each valve.



Section 2: Manual Access Port Valves

## Cynergy Pneumatic Access Port Valves

### 2" Orifice, 1/2" Beadless Weld Access Port, Sanitary Clamp and Beadless Weld



**TABLE 11: PNEUMATIC ACCESS PORT VALVES 2" ORIFICE**

Part Number	Flow Factor $C_v$ ( $K_v$ )	Valve Type	Diaphragm	Port Connection	Dimension A
CW32-2-C-01-SA24	35.7 (509.8)	normally open	PTFE/EPDM	1/2" sanitary clamp	165.6 mm (6.52")
CW32-2-C-02-SA24	35.7 (509.8)	normally open	PTFE/EPDM steam grade	1/2" sanitary clamp	165.6 mm (6.52")
CW32-2-D-01-SA24	35.7 (509.8)	normally closed	PTFE/EPDM	1/2" sanitary clamp	165.6 mm (6.52")
CW32-2-D-02-SA24	35.7 (509.8)	normally closed	PTFE/EPDM steam grade	1/2" sanitary clamp	165.6 mm (6.52")
CW32-2-C-01-BW24	35.7 (509.8)	normally open	PTFE/EPDM	1/2" sanitary beadless weld	177.8 mm (7.00")
CW32-2-C-02-BW24	35.7 (509.8)	normally open	PTFE/EPDM steam grade	1/2" sanitary beadless weld	177.8 mm (7.00")
CW32-2-D-01-BW24	35.7 (509.8)	normally closed	PTFE/EPDM	1/2" sanitary beadless weld	177.8 mm (7.00")
CW32-2-D-02-BW24	35.7 (509.8)	normally closed	PTFE/EPDM steam grade	1/2" sanitary beadless weld	177.8 mm (7.00")

**Note:** Valves are available with only 1/2" sanitary beadless weld access ports.

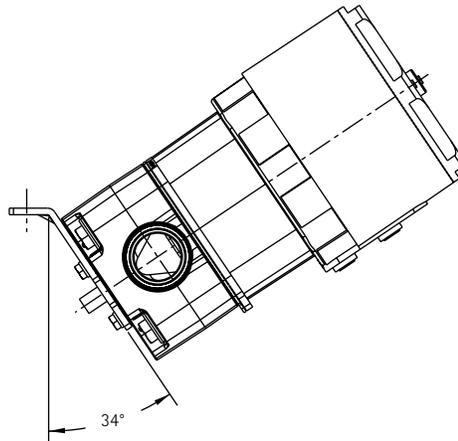
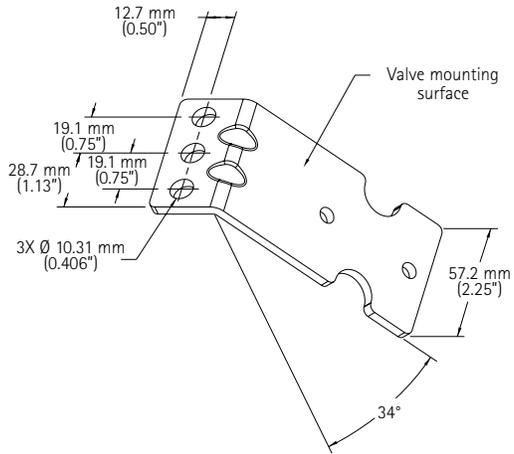
#### Specifications

Pneumatic supply pressure: 552 to 800 kPa (80 to 116 PSIG)

Pneumatic supply port: 1/8" FNPT

## Mounting bracket

To facilitate installation, the mounting brackets are preformed to the correct mounting drain angle. A mounting bracket is included with each valve.



*Optimum drain angle with valve sloped at 2% (1°)*

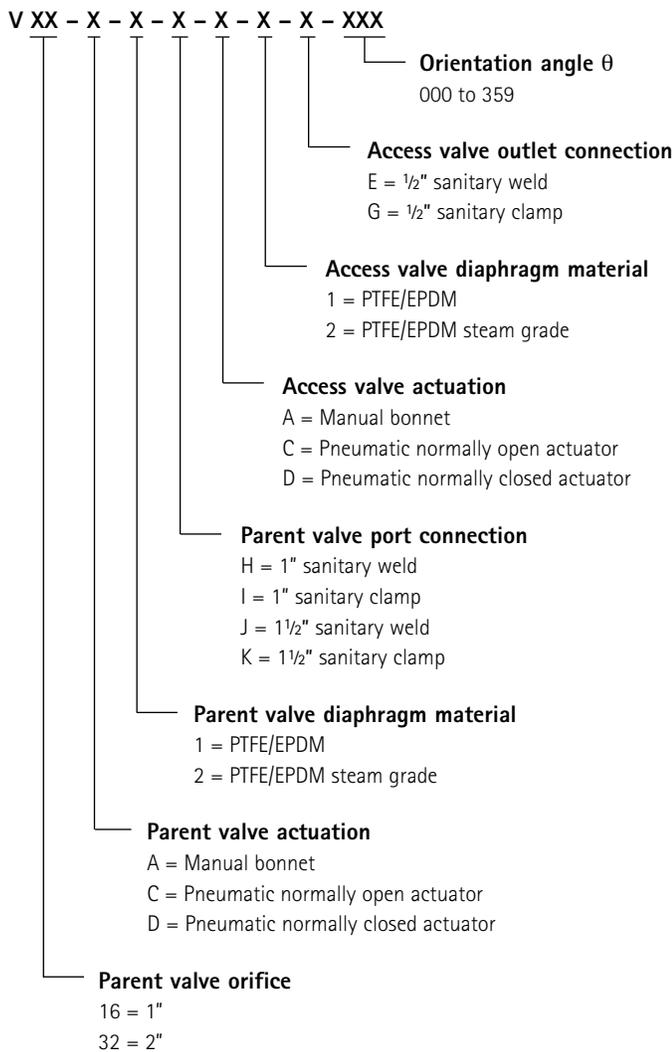
## Cynergy Access Port Valve Assemblies

Cynergy access port valve assemblies allow users to drain condensate from process lines during SIP operations as well as sample product and/or inject intermediates – such as nutrients or catalysts – directly into the process stream. The Cynergy access port valve assembly (prefabricated at the factory)

offers ½" access off parent 1" or 2", two-way valves. Users can clamp the assembly into place or install it using the Cynergy Weld-in-Place equipment that minimizes dead leg volume created off the access port valve, and produces smooth, beadless welds free of bacteria-harboring cracks and crevices.

### Ordering Information

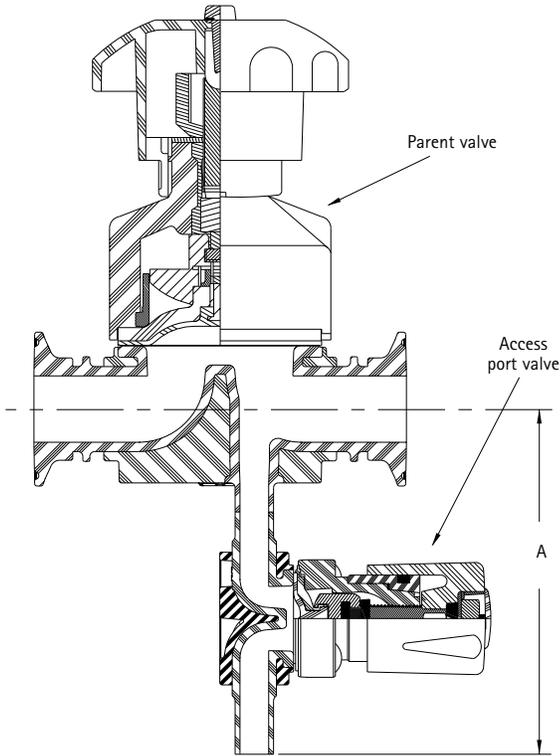
#### Cynergy Access Port Valve Assembly



Section 2: Access Port Valve Assemblies

# Cynergy Access Port Valve Dimensions

## Dimensions



Parent Valve Orifice	Port Connection	Access Port Valve Orifice	Port Connection	Dimension A
1"	1" weld	1/2"	1/2" weld	112.8 mm (4.44")
1"	1" weld	1/2"	1/2" clamp	109.0 mm (4.29")
1"	1" clamp	1/2"	1/2" weld	112.8 mm (4.44")
1"	1" clamp	1/2"	1/2" clamp	109.0 mm (4.29")
2"	1 1/2" weld	1/2"	1/2" weld	131.6 mm (5.18")
2"	1 1/2" weld	1/2"	1/2" clamp	127.8 mm (5.03")
2"	1 1/2" clamp	1/2"	1/2" weld	131.6 mm (5.18")
2"	1 1/2" clamp	1/2"	1/2" clamp	127.8 mm (5.03")

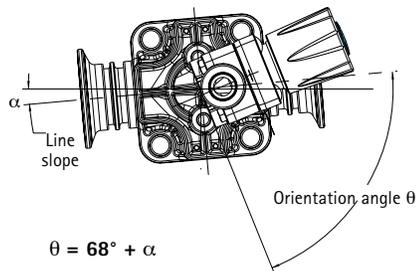
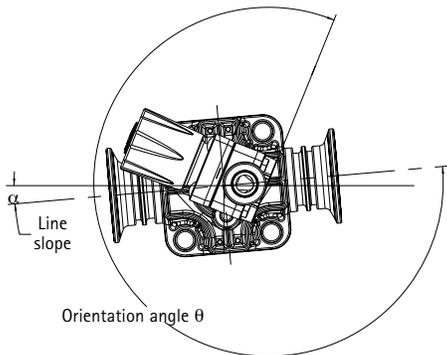
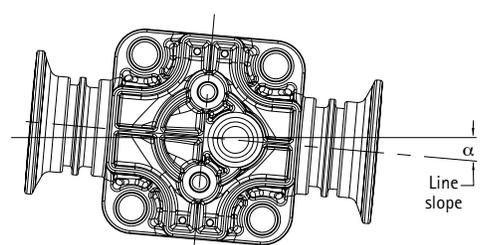
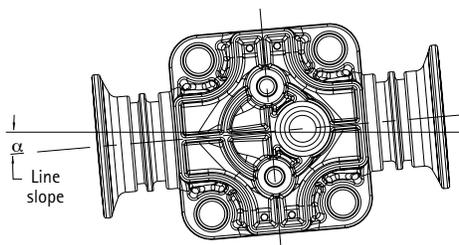
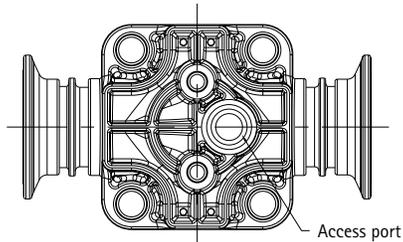
Section 2: Access Port Valve Assemblies

## Right Oriented Access Port

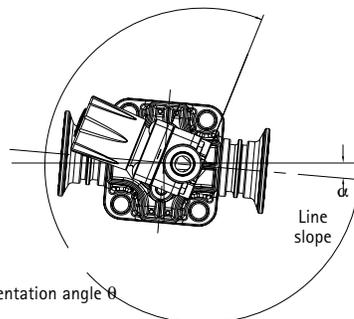
Bottom View

### Orientation Angle Calculation

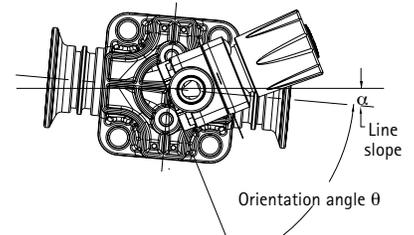
The following drawings illustrate the possible parent/ access valve orientations recommended to maintain drainability of the valve assembly. The calculated access valve orientation angle ( $\theta$ ), based on a piping line slope of  $\alpha$  degrees, is used in building access port valve assembly part numbers.



If  $\alpha < 68^\circ$  then  $\theta = 292^\circ + \alpha$   
If  $\alpha \geq 68^\circ$  then  $\theta = \alpha - 68^\circ$

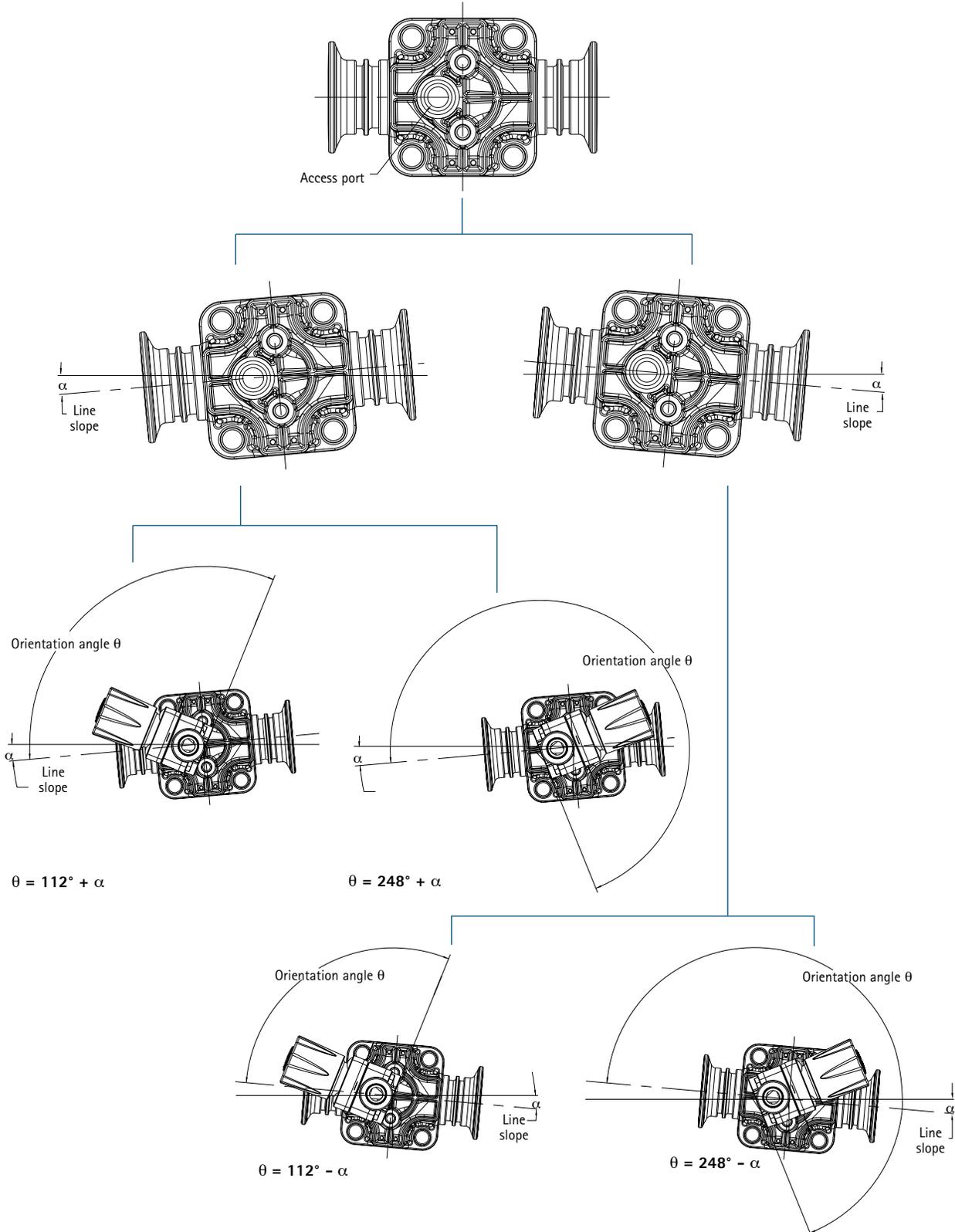


$\theta = 292^\circ - \alpha$



If  $\alpha \leq 68^\circ$  then  $\theta = 68^\circ - \alpha$   
If  $\alpha > 68^\circ$  then  $\theta = 428^\circ - \alpha$

**Left Oriented Access Port**  
**Bottom View**



## Cynergy Clamp Fittings

Patented Cynergy clamp fittings are constructed from FDA approved Teflon PFA. The end connection is overmolded with PEEK material, a high-performance, FDA approved engineered polymer, which provides a durable clamp surface and enhances fitting performance during SIP operations. Cynergy clamp fittings are compatible with existing stainless steel sanitary

clamp connections used in utility line and process applications. Unlike other polymer fittings, Cynergy clamp fittings can be routinely steam sterilized without discoloration or embrittlement. For Entegris recommended gaskets and clamps, refer to the *Performance Specifications* section of this catalog.

### Sweep Elbows

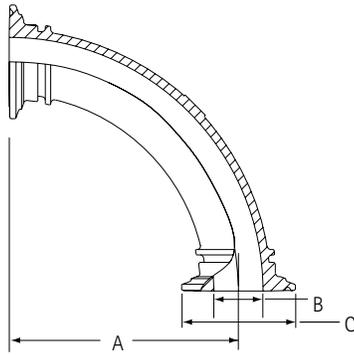


TABLE 12: CLAMP FITTINGS – SWEEP ELBOWS

Part Number	Cynergy Clamp Connection Size	Dimensions		
		A	B	C
E4	1/4"	50.8 mm (2.00")	6.35 mm (0.250")	24.99 mm (0.984")
E8	1/2"	50.8 mm (2.00")	9.40 mm (0.370")	24.99 mm (0.984")
E12	3/4"	101.6 mm (4.00")	15.75 mm (0.620")	24.99 mm (0.984")
E16	1"	101.6 mm (4.00")	21.74 mm (0.856")	50.39 mm (1.984")
E24	1 1/2"	101.6 mm (4.00")	34.44 mm (1.356")	50.39 mm (1.984")
E32	2"	101.6 mm (4.00")	47.14 mm (1.856")	63.91 mm (2.516")

### Tees

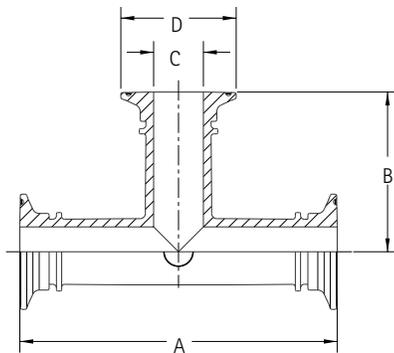
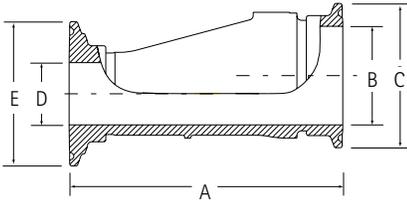


TABLE 13: CLAMP FITTINGS – TEES

Part Number	Cynergy Clamp Connection Size	Dimensions			
		A	B	C	D
TE4	1/4"	95.3 mm (3.75")	47.8 mm (1.88")	6.35 mm (0.250")	24.99 mm (0.984")
TE8	1/2"	95.8 mm (3.77")	48.0 mm (1.89")	9.40 mm (0.370")	24.99 mm (0.984")
TE12	3/4"	96.5 mm (3.80")	48.3 mm (1.90")	15.75 mm (0.620")	24.99 mm (0.984")
TE16	1"	138.9 mm (5.47")	69.6 mm (2.74")	21.74 mm (0.856")	50.39 mm (1.984")
TE24	1 1/2"	139.4 mm (5.49")	69.9 mm (2.75")	34.44 mm (1.356")	50.39 mm (1.984")
TE32	2"	177.3 mm (6.98")	88.6 mm (3.49")	47.14 mm (1.856")	63.91 mm (2.516")

### Eccentric Reducers

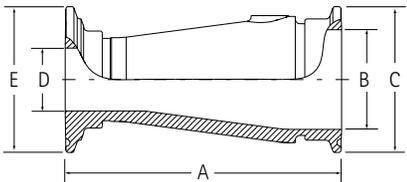


**TABLE 14: CLAMP FITTINGS – ECCENTRIC REDUCERS**

Part Number	Cynergy Clamp Connection Size	Dimensions				
		A	B	C	D	E
RE84	1/2" x 1/4"	51.8 mm (2.04")	9.40 mm (0.370")	24.99 mm (0.984")	6.35 mm (0.250")	24.99 mm (0.984")
RE128	3/4" x 1/2"	64.5 mm (2.54")	15.75 mm (0.620")	24.99 mm (0.984")	9.40 mm (0.370")	24.99 mm (0.984")
RE1612	1" x 3/4"	67.8 mm (2.67")	21.74 mm (0.856")	50.39 mm (1.984")	15.75 mm (0.620")	24.99 mm (0.984")
RE2416	1 1/2" x 1"	95.3 mm (3.75")	34.44 mm (1.356")	50.39 mm (1.984")	21.74 mm (0.856")	50.39 mm (1.984")
RE3224	2" x 1 1/2"	96.0 mm (3.78")	47.14 mm (1.856")	63.91 mm (2.516")	34.44 mm (1.356")	50.39 mm (1.984")

**Note:** Custom jump reducers are available. Contact your local Entegris representative to discuss your specific needs.

### Concentric Reducers

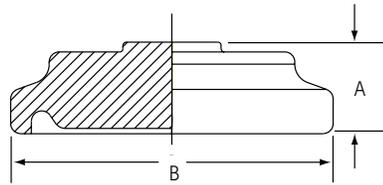


**TABLE 15: CLAMP FITTINGS – CONCENTRIC REDUCERS**

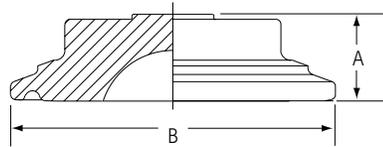
Part Number	Cynergy Clamp Connection Size	Dimensions				
		A	B	C	D	E
RC84	1/2" x 1/4"	51.8 mm (2.04")	9.40 mm (0.370")	24.99 mm (0.984")	6.35 mm (0.250")	24.99 mm (0.984")
RC128	3/4" x 1/2"	64.5 mm (2.54")	15.75 mm (0.620")	24.99 mm (0.984")	9.40 mm (0.370")	24.99 mm (0.984")
RC1612	1" x 3/4"	67.8 mm (2.67")	21.74 mm (0.856")	50.39 mm (1.984")	15.75 mm (0.620")	24.99 mm (0.984")
RC2416	1 1/2" x 1"	95.3 mm (3.75")	34.44 mm (1.356")	50.39 mm (1.984")	21.74 mm (0.856")	50.39 mm (1.984")
RC3224	2" x 1 1/2"	96.0 mm (3.78")	47.14 mm (1.856")	63.91 mm (2.516")	34.44 mm (1.356")	50.39 mm (1.984")

**Note:** Custom jump reducers are available. Contact your local Entegris representative to discuss your specific needs.

**End Caps**



**CAP12**

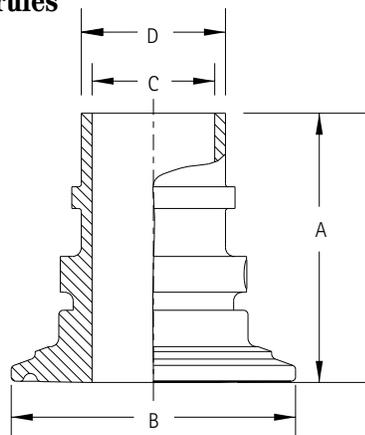


**CAP24, CAP32**

**TABLE 16: CLAMP FITTINGS – END CAPS**

Part Number	Cynergy Clamp Connection Size	Dimensions	
		A	B
CAP12	1/4", 1/2", 3/4"	7.1 mm (0.28")	24.99 mm (0.984")
CAP24	1", 1 1/2"	13.7 mm (0.54")	50.39 mm (1.984")
CAP32	2"	21.3 mm (0.84")	63.91 mm (2.516")

**Ferrules**

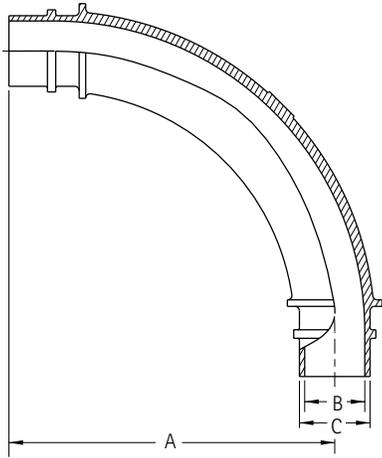


**TABLE 17: CLAMP FITTINGS – FERRULES**

Part Number	Cynergy Clamp Connection Size	Dimensions			
		A	B	C	D
FER4	1/4"	38.6 mm (1.52")	24.99 mm (0.984")	6.35 mm (0.250")	9.53 mm (0.375")
FER8	1/2"	38.6 mm (1.52")	24.99 mm (0.984")	9.40 mm (0.370")	12.57 mm (0.495")
FER12	3/4"	38.6 mm (1.52")	24.99 mm (0.984")	15.75 mm (0.620")	18.92 mm (0.745")
FER16	1"	47.8 mm (1.88")	50.39 mm (1.984")	21.74 mm (0.856")	25.55 mm (1.006")
FER24	1 1/2"	47.8 mm (1.88")	50.39 mm (1.984")	34.44 mm (1.356")	40.28 mm (1.586")
FER32	2"	50.4 mm (1.99")	63.91 mm (2.516")	47.14 mm (1.856")	55.12 mm (2.170")

# Cynergy Beadless Weld Fittings

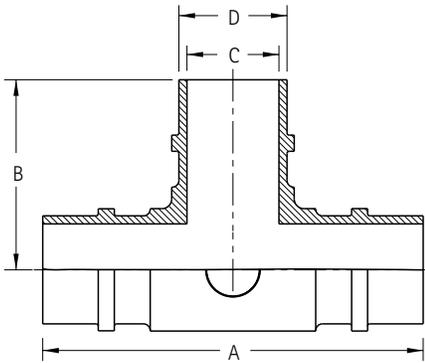
## Sweep Elbows



**TABLE 18: BEADLESS WELD FITTINGS – SWEEP ELBOWS**

Part Number	Cynergy Weld Connection Size	Dimensions		
		A	B	C
EW16	1"	117.9 mm (4.64")	21.74 mm (0.856")	25.55 mm (1.006")
EW24	1½"	117.9 mm (4.64")	34.44 mm (1.356")	40.28 mm (1.586")
EW32	2"	117.9 mm (4.64")	47.14 mm (1.856")	55.12 mm (2.170")

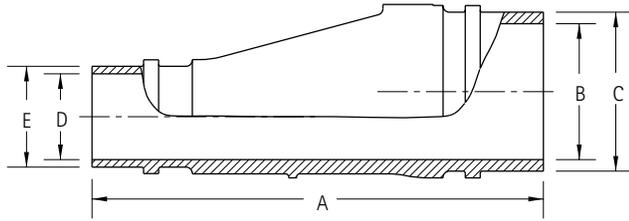
## Tees



**TABLE 19: BEADLESS WELD FITTINGS – TEES**

Part Number	Cynergy Weld Connection Size	Dimensions			
		A	B	C	D
TW4	¼"	61.5 mm (2.42")	30.7 mm (1.21")	6.35 mm (0.250")	9.53 mm (0.375")
TW8	½"	65.0 mm (2.56")	32.5 mm (1.28")	9.40 mm (0.370")	12.57 mm (0.495")
TW12	¾"	71.1 mm (2.80")	35.6 mm (1.40")	15.75 mm (0.620")	18.92 mm (0.745")
TW16	1"	88.9 mm (3.50")	44.5 mm (1.75")	21.74 mm (0.856")	25.55 mm (1.006")
TW24	1½"	103.6 mm (4.08")	51.8 mm (2.04")	34.44 mm (1.356")	40.28 mm (1.586")
TW32	2"	124.2 mm (4.89")	62.1 mm (2.45")	47.14 mm (1.856")	55.12 mm (2.170")

### Eccentric Reducers

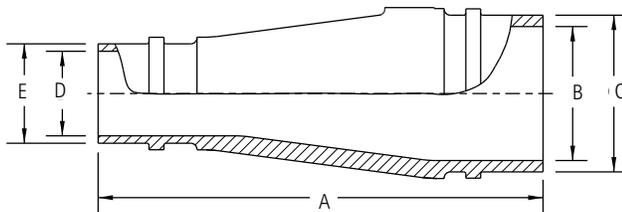


**TABLE 20: BEADLESS WELD FITTINGS – ECCENTRIC REDUCERS**

Part Number	Cynergy Weld Connection Size	Dimensions				
		A	B	C	D	E
REW84	1/2" x 1/4"	64.8 mm (2.55")	9.40 mm (0.370")	12.57 mm (0.495")	6.35 mm (0.250")	9.53 mm (0.375")
REW128	3/4" x 1/2"	77.5 mm (3.05")	15.75 mm (0.620")	18.92 mm (0.745")	9.40 mm (0.370")	12.57 mm (0.495")
REW1612	1" x 3/4"	83.1 mm (3.27")	21.74 mm (0.856")	25.55 mm (1.006")	15.75 mm (0.620")	18.92 mm (0.745")
REW2416	1 1/2" x 1"	113.8 mm (4.48")	34.44 mm (1.356")	40.28 mm (1.586")	21.74 mm (0.856")	25.55 mm (1.006")
REW3224	2" x 1 1/2"	117.0 mm (4.61")	47.14 mm (1.856")	55.12 mm (2.170")	34.44 mm (1.356")	40.28 mm (1.586")

**Note:** Custom jump reducers are available. Contact your local Entegris representative to discuss your specific needs.

### Concentric Reducers



**TABLE 21: BEADLESS WELD FITTINGS – CONCENTRIC REDUCERS**

Part Number	Cynergy Weld Connection Size	Dimensions				
		A	B	C	D	E
RCW84	1/2" x 1/4"	64.8 mm (2.55")	9.40 mm (0.370")	12.57 mm (0.495")	6.35 mm (0.250")	9.53 mm (0.375")
RCW128	3/4" x 1/2"	77.5 mm (3.05")	15.75 mm (0.620")	18.92 mm (0.745")	9.40 mm (0.370")	12.57 mm (0.495")
RCW1612	1" x 3/4"	83.1 mm (3.27")	21.74 mm (0.856")	25.55 mm (1.006")	15.75 mm (0.620")	18.92 mm (0.745")
RCW2416	1 1/2" x 1"	113.8 mm (4.48")	34.44 mm (1.356")	40.28 mm (1.586")	21.74 mm (0.856")	25.55 mm (1.006")
RCW3224	2" x 1 1/2"	117.0 mm (4.61")	47.14 mm (1.856")	55.12 mm (2.170")	34.44 mm (1.356")	40.28 mm (1.586")

**Note:** Custom jump reducers are available. Contact your local Entegris representative to discuss your specific needs.

## Cynergy Beadless Weld Tubing

Entegris offers Teflon PFA weldable tubing that can withstand routine SIP and CIP cycles. The all-PFA construction is translucent so you can observe the flow in your tubing, whether the tubing is wet or dry.

A beadless internal surface enables a smooth fluid flow that continuously sweeps the surface. Suitable for Cynergy component welding only. We do not recommend Cynergy weldable tubing for flare applications.

**TABLE 22: BEADLESS WELD TUBING**

Part Number	Nominal Tube Size	OD	ID	Wall Thickness	Length	Bend Radius
SAT4	¼"	9.53 mm (0.375")	6.35 mm (0.250")	1.59 mm (0.063")	≤100'	48 mm (1.9")
SAT8-VIII	½"	12.57 mm (0.495")	9.40 mm (0.370")	1.59 mm (0.063")	8' straight	63 mm (2.5")
SAT8-X	½"	12.57 mm (0.495")	9.40 mm (0.370")	1.59 mm (0.063")	10' straight	63 mm (2.5")
SAT12-VIII	¾"	18.92 mm (0.745")	15.75 mm (0.620")	1.59 mm (0.063")	8' straight	190 mm (7.5")
SAT12-X	¾"	18.92 mm (0.745")	15.75 mm (0.620")	1.59 mm (0.063")	10' straight	190 mm (7.5")
SAT16-VIII	1"	25.55 mm (1.006")	21.74 mm (0.856")	1.91 mm (0.075")	8' straight	NA
SAT16-X	1"	25.55 mm (1.006")	21.74 mm (0.856")	1.91 mm (0.075")	10' straight	NA
SAT24-VIII	1½"	40.28 mm (1.586")	34.44 mm (1.356")	2.92 mm (0.115")	8' straight	NA
SAT24-X	1½"	40.28 mm (1.586")	34.44 mm (1.356")	2.92 mm (0.115")	10' straight	NA
SAT32-VIII	2"	55.12 mm (2.170")	47.14 mm (1.856")	3.99 mm (0.157")	8' straight	NA
SAT32-X	2"	55.12 mm (2.170")	47.14 mm (1.856")	3.99 mm (0.157")	10' straight	NA

NA = Not applicable

## Cynergy Weld-in-Place Equipment

Cynergy Weld-in-Place (WIP) equipment is breakthrough technology (patent-pending) for welding ½" up to 2" diameter Teflon PFA systems on-site. The equipment easily creates a seamless Teflon PFA weld joint without internal or external beads. With each weld you get a high-purity joint free of cracks, crevices or bacteria-harboring areas.

- Microprocessor-based controller is easy to use and yields repeatable, precise welds
- Compact, handheld weld head is portable, enabling welding in place
- 25' remote weld head location allows welding in tight, hard-to-access areas
- Fully automated weld data collection facilitates weld validation
- Compact design makes the equipment easy to transport
- Bench mount adapter base allows easy subassembly welding on bench

### CE Marked



CE Directives 73/23/EEC,  
89/336/EEC  
Standards EN60335-2-45,  
EN55011, EN61000-6-2



**TABLE 23: WELD-IN-PLACE (WIP) EQUIPMENT**

Equipment Part Number	Description
WIPC-2000	Process controller kit*
WIPH8	½" heater head kit†
WIPH12	¾" heater head kit†
WIPH16	1" heater head kit†
WIPH24	1½" heater head kit†
WIPH32	2" heater head kit†

\*The process controller kit (WIPC-2000) includes microprocessor-based controller, 25' process control cable, bench mount fixture and tube cutter. The kit operates the heater head kits (WIPH8, WIPH12, WIPH16, WIPH24 and WIPH32).

†Heater head kits include heater head, gauging tool, fitting and tube clamps, hex wrench, 10 Kapton wraps, 10 silicone sleeves, PEEK insert and reel assembly.

TABLE 24: CONSUMABLE PRODUCTS FOR WIP EQUIPMENT

Consumable Products Part Number	Description
WRK8-10	Kapton® wrap for 1/2" and 3/4" components (10 in package)
INR8-10	1/2" silicone sleeve (10 in package)
INR12-10	3/4" silicone sleeve (10 in package)
WRK16-10	1" Kapton wrap (10 in package)
INR16-10	1" silicone sleeve (10 in package)
WRK24-10	1 1/2" Kapton wrap (10 in package)
INR24-10	1 1/2" silicone sleeve (10 in package)
WRK32-10	2" Kapton wrap (10 in package)
INR32-10	2" silicone sleeve (10 in package)

TABLE 25: CONSUMABLE PRODUCTS FOR WIP EQUIPMENT

Replacement Parts Part Number	Description
PKC8	1/2" insert and reel assembly
PKC8-V	Unique insert for 1/2" valves
PKC12	3/4" insert and reel assembly
PKC16	1" insert and reel assembly
PKC24	1 1/2" insert and reel assembly
PKC32	2" insert and reel assembly
PKC32-V	Unique insert for 2" valves
01-008504	Insert screw assembly for PKC8
01-008505	Insert screw assembly for PKC12
01-008498	Insert screw assembly for PKC16, PKC24, PKC32 and PKC32-V
01-008173	Tube cutter blade

TABLE 26: LEASE INFORMATION FOR WIP EQUIPMENT

Lease Information Part Number	Description
WIPC2000R	Process controller kit
WIPH8R	1/2" heater head kit
WIPH12R	3/4" heater head kit
WIPH16R	1" heater head kit
WIPH24R	1 1/2" heater head kit
WIPH32R	2" heater head kit

## Cynergy Support System

Because Cynergy tubing differs from stainless steel tubing it requires unique installation and support requirements. The fluoropolymer resin used in Cynergy tubing has a greater coefficient of thermal expansion than stainless steel tubing. Consequently, a greater change in length results when exposed to

the same thermal variation. The tubing also becomes pliable during elevated temperature conditions. Due to these unique characteristics, Entegris recommends using patented Cynergy tube racks with Cynergy tubing. Detailed Cynergy tube rack assembly procedures are included with each tube clamp kit.

Support System

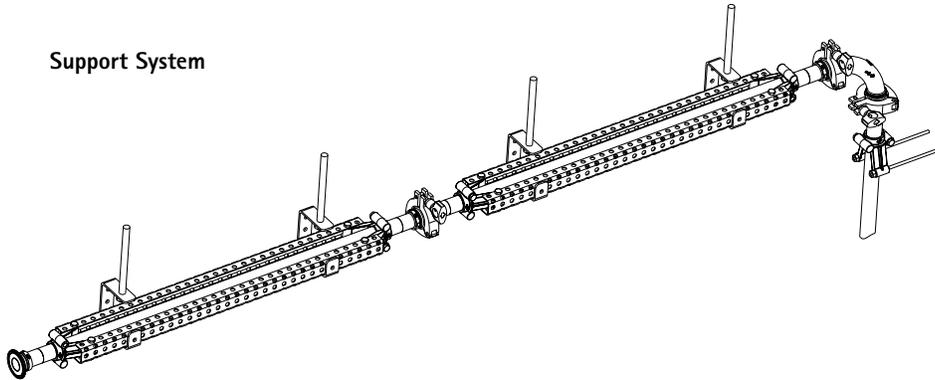


TABLE 27: SUPPORT SYSTEM

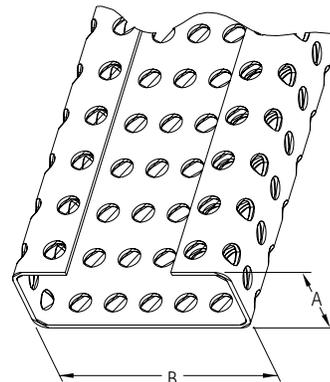
Nominal Tube Size	Cynergy Tubing Part Number	Tube Rack Part Number	Tube Clamp Kit Part Number	Hanger Part Number	Dimensions	
					A	B
3/4"	SAT12-*	TR12-X	TC12-H	HG12	23.1 mm (0.91")	72.6 mm (2.86")
1"	SAT16-*	TR16-X	TC16-H	HG16	29.7 mm (1.17")	78.7 mm (3.10")
1 1/2"	SAT24-*	TR24-X	TC24-H	HG24	44.5 mm (1.75")	114.9 mm (4.52")
2"	SAT32-*	TR32-X	TC32-H	HG32	59.2 mm (2.33")	150.6 mm (5.93")

Replace "\*" with "X" for 10 foot length, or "VIII" for 8 foot lengths.

### Notes

- Tube rack and hangers are 304 stainless steel materials
- Tube racks are available in 10 foot lengths
- Tube clamp kit comes with two tube clamp halves and mounting hardware
- Hangers are to be installed at a maximum of 8 foot intervals
- Hangers are designed to be used with standard 3/8" threaded rod

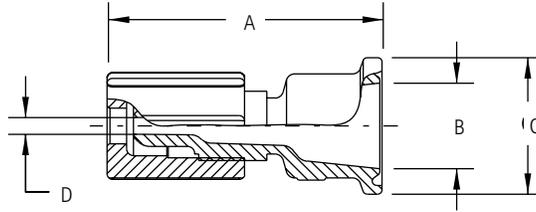
Refer to *Cynergy System Technical Guide* for installation instructions.



## Complementary Fittings

### PVDF Tube Adapters

PVDF adapters transition between standard clamp fittings and silicone tubing. These fittings reduce the entrapment areas barb fittings create. And, unlike permanently crimped hose assemblies, these fittings allow easy field replacement of silicone tubing – minimizing the risk of cross contamination. These adapters are made from FDA approved PVDF material.



**TABLE 28: COMPLEMENTARY FITTINGS – PVDF TUBE ADAPTERS**

Part Number	Cynergy Clamp Connection Size	Flaretek PVDF Tube Adapter Size	Dimensions			
			A	B	C	D
SA8-4DFN-1	1/2"	1/4"	48.0 mm (1.89")	9.40 mm (0.370")	24.99 mm (0.984")	3.2 mm (0.13")
SA8-6DFN-1	1/2"	3/8"	51.1 mm (2.01")	9.40 mm (0.370")	24.99 mm (0.984")	6.4 mm (0.25")
SA8-8DFN-1	1/2"	1/2"	53.6 mm (2.11")	9.40 mm (0.370")	24.99 mm (0.984")	9.5 mm (0.38")
SA12-4DFN-1	3/4"	1/4"	48.0 mm (1.89")	15.75 mm (0.620")	24.99 mm (0.984")	3.2 mm (0.13")
SA12-6DFN-1	3/4"	3/8"	51.1 mm (2.01")	15.75 mm (0.620")	24.99 mm (0.984")	6.4 mm (0.25")
SA12-8DFN-1	3/4"	1/2"	53.6 mm (2.11")	15.75 mm (0.620")	24.99 mm (0.984")	9.5 mm (0.38")
SA12-12DFN-1	3/4"	3/4"	57.9 mm (2.28")	15.75 mm (0.620")	24.99 mm (0.984")	15.9 mm (0.63")

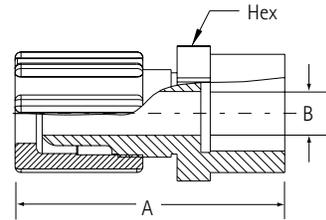
### Recommended Silicone Tubing Sizes

**TABLE 29: RECOMMENDED SILICONE TUBING SIZES**

PVDF Tube Adapter	Silicone Tubing OD	Silicone Tubing ID
SA8-4DFN-1	0.250"	0.125"
SA8-6DFN-1	0.375"	0.250"
SA8-8DFN-1	0.500"	0.375"
SA12-4DFN-1	0.250"	0.125"
SA12-6DFN-1	0.375"	0.250"
SA12-8DFN-1	0.500"	0.375"
SA12-12DFN-1	0.750"	0.625"

## Flaretek Glass Transition Fittings

Using reliable Flaretek fitting technology, this fitting provides a connection between threaded glass components and flexible Teflon material tubing. The inside diameter of the glass and PFA are closely matched – maximizing flow during distillate separations. All fittings are made from FDA approved material and accommodate DIN168 standard glass threads. The o-ring seal for the threaded glass is made from PFA encapsulated Viton material.



**TABLE 30: FLARETEK GLASS TRANSITION FITTINGS**

Part Number	Glass Thread (DIN168)	Flaretek Adapter Connection Size	Dimensions		
			A	B	Hex
FC6-14GLN-1	GL14	3/8"	55.9 mm (2.20")	6.4 mm (0.25")	7/8"
FC8-18GLN-1	GL18	1/2"	56.4 mm (2.22")	9.5 mm (0.38")	1"
FC12-25GLN-1	GL25	3/4"	57.7 mm (2.27")	15.9 mm (0.63")	1 1/4"

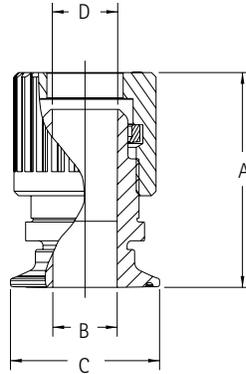
## Cynergy Adapter Fittings

The following products feature standard Entegris fitting end connections used in conjunction with Cynergy clamp fittings. For a full line of stand-alone Flaretek flared fittings, FlareLock II premier flare fittings and PureBond fusible pipe fittings, refer to Entegris' *Fluid Handling Products* catalog.

Also refer to the reference manual for information on PureBond pipe, FluoroLine® tubing and usage with these adapters.

### Cynergy Clamp-to-FlareLock II Adapter

Cynergy clamp-to-FlareLock II adapters provide a clean, single-fitting transition from your sanitary system to other Entegris fluid handling products used in utility line and process applications. These adapters can be routinely steam sterilized, are easily reconfigured, and provide a smooth, low dead volume connection. They are ideal for hose applications requiring routine SIP operations.



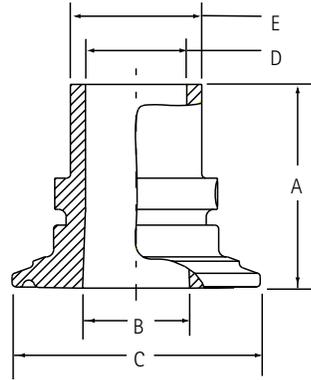
**TABLE 31 : CLAMP-TO-FLARELOCK II ADAPTER**

Part Number	Cynergy Clamp Connection Size	FlareLock II Adapter Connection Size	Dimensions			
			A	B	C	D
SA4-4FN-II	1/4"	1/4"	47.2 mm (1.86")	6.35 mm (0.250")	24.99 mm (0.984")	3.2 mm (0.13")
SA4-6FN-II	1/4"	3/8"	51.6 mm (2.03")	6.35 mm (0.250")	24.99 mm (0.984")	6.4 mm (0.25")
SA8-8FN-II	1/2"	1/2"	52.6 mm (2.07")	9.40 mm (0.370")	24.99 mm (0.984")	9.5 mm (0.38")
SA12-12FN-II	3/4"	3/4"	57.2 mm (2.25")	15.75 mm (0.620")	24.99 mm (0.984")	15.9 mm (0.63")
SA16-12FN-II	1"	3/4"	60.2 mm (2.37")	21.74 mm (0.856")	50.39 mm (1.984")	15.9 mm (0.63")
SA16-16FN-II	1"	1"	70.1 mm (2.76")	21.74 mm (0.856")	50.39 mm (1.984")	22.1 mm (0.87")
SA24-16FN-II	1 1/2"	1"	70.4 mm (2.77")	34.44 mm (1.356")	50.39 mm (1.984")	22.1 mm (0.87")

**Note:** Refer to pages 45-46 for groove and flare tools required for FlareLock II fitting make-up.

### Cynergy Clamp-to-PureBond Adapter

PureBond fittings provide a high purity, butt-welded connection to Schedule 40 PFA pipe. Using the patented welding process creates a rigid, leak-free, permanent connection. These fittings can withstand routine steam sterilization and CIP operations common in utility line and process applications.

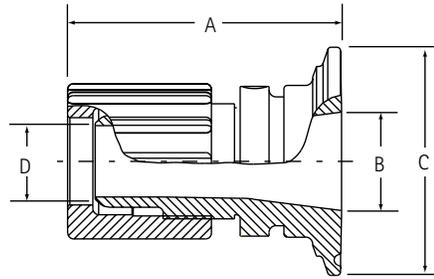


**TABLE 32: CLAMP-TO-PUREBOND ADAPTER**

Part Number	Cynergy Clamp Connection Size	PureBond Adapter Connection Size	Dimensions				
			A	B	C	D	E
WSA4-4P	1/4"	1/4"	38.6 mm (1.52")	6.35 mm (0.250")	24.99 mm (0.984")	8.99 mm (0.354")	13.72 mm (0.540")
WSA8-4P	1/2"	1/4"	38.6 mm (1.52")	9.40 mm (0.370")	24.99 mm (0.984")	8.99 mm (0.354")	13.72 mm (0.540")
WSA8-8P	1/2"	1/2"	38.6 mm (1.52")	9.40 mm (0.370")	24.99 mm (0.984")	15.42 mm (0.607")	21.34 mm (0.840")
WSA12-12P	3/4"	3/4"	38.6 mm (1.52")	15.75 mm (0.620")	24.99 mm (0.984")	20.55 mm (0.809")	26.67 mm (1.050")
WSA16-12P	1"	3/4"	41.4 mm (1.63")	21.74 mm (0.856")	50.39 mm (1.984")	20.55 mm (0.809")	26.67 mm (1.050")
WSA24-16P	1 1/2"	1"	41.4 mm (1.63")	34.44 mm (1.356")	50.39 mm (1.984")	26.26 mm (1.034")	33.40 mm (1.315")
WSA32-32P	2"	2"	60.5 mm (2.38")	47.14 mm (1.856")	63.91 mm (2.516")	52.12 mm (2.052")	60.33 mm (2.375")

## Cynergy Clamp-to-Flaretek Adapter

Using reliable Flaretek fitting technology, these adapters provide a clean, single-fitting transition to other Entegris fluid handling products used in ambient temperature utility line and process applications. Maximum temperature and pressure ratings are size dependent for the Flaretek fitting connection. For complete ratings information, consult the *Performance Specifications* section of this catalog.



**TABLE 33: CLAMP-TO-FLARETEK ADAPTER**

Part Number	Cynergy Clamp Connection Size	Flaretek Adapter Connection Size	Dimensions			
			A	B	C	D
SA4-4FN-1	1/4"	1/4"	46.7 mm (1.84")	6.35 mm (0.250")	24.99 mm (0.984")	3.2 mm (0.13")
SA4-6FN-1	1/4"	3/8"	49.8 mm (1.96")	6.35 mm (0.250")	24.99 mm (0.984")	6.4 mm (0.25")
SA8-8FN-1	1/2"	1/2"	52.3 mm (2.06")	9.40 mm (0.370")	24.99 mm (0.984")	9.5 mm (0.38")
SA12-12FN-1	3/4"	3/4"	59.9 mm (2.36")	15.75 mm (0.620")	24.99 mm (0.984")	15.9 mm (0.63")
SA16-12FN-1	1"	3/4"	59.9 mm (2.36")	21.74 mm (0.856")	50.39 mm (1.984")	15.9 mm (0.63")
SA16-16FN-1	1"	1"	66.8 mm (2.63")	21.74 mm (0.856")	50.39 mm (1.984")	22.1 mm (0.87")
SA24-16FN-1	1 1/2"	1"	66.8 mm (2.63")	34.44 mm (1.356")	50.39 mm (1.984")	22.1 mm (0.87")

Cynergy Clamp-to-Flaretek adapters are not recommended for cyclic steam conditions.

**Note:** Refer to pages 45-46 for groove and flare tools required for Flaretek fitting make-up.

## Tools

### Tube Cutters

**TABLE 34: TOOLS – TUBE CUTTERS**

Part Number	OD Tube Size	Replacement Blade Part Number
213-14	1/16" to 1/2"	—
213-16	1/16" to 3/4"	1311-001
213-30	1/8" to 1 1/2"	1223-021



213-14



213-16



213-30

### FlareLock II Groove Tools

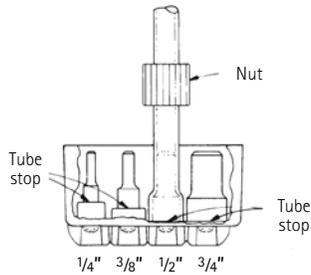
**TABLE 35: TOOLS – FLARELOCK II GROOVE TOOLS**

Part Number	Tubing Size
GTII-4F	1/4"
GTII-6F	3/8"
GTII-8F	1/2"
GTII-12F	3/4"
GTII-16F	1"

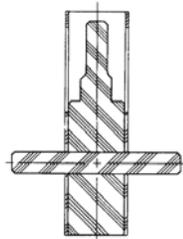


## Flaretek and FlareLock II Flare Tools

### Universal Tool (213-81)



### Flaring Mandrel

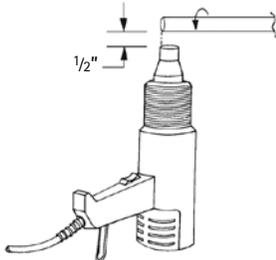


**TABLE 36: FLARETEK AND FLARELOCK II FLARE TOOLS**

Part Number	Description
213-81	Universal Tool (includes 1/4", 3/8", 1/2" and 3/4" sizes and tube grip pad)
213-58	1/4" tube flaring mandrel
213-59	3/8" tube flaring mandrel
213-60	1/2" tube flaring mandrel
213-61	3/4" tube flaring mandrel
213-82	1" tube flaring mandrel
213-73	Tube grip (rubber pad to help grip the tube for manual flaring)

## Flaretek and FlareLock II Heating Tools and Replacement Kits

### Hot Air Gun



### Infrared Tube Heater



**TABLE 37: HEATING TOOLS AND INFRARED TUBE HEATER KITS**

Part Number	Description
213-79	Hot Air Gun Tube Heater 115V-60Hz
213-74	Infrared Tube Heater Kit 115V-60Hz
213-76	Infrared Tube Heater Kit 240V-50Hz

**TABLE 38: REPLACEMENT KITS FOR INFRARED TUBE HEATER**

Part Number	Description	Tube Size	Voltage
213-75	Regular Replacement Element Kit for 213-74	1/4" to 3/4"	115
213-77	Regular Replacement Element Kit for 213-76	1/4" to 3/4"	240
213-91	Large Replacement Element Kit for 213-74	1"	115
213-92	Large Replacement Element Kit for 213-76	1"	240

For information on Cynergy beadless welding equipment or PureBond butt-weld equipment, contact your local Entegris distributor or Entegris, Inc.

## Custom Fabrication Service

Entegris can fabricate your unique product, whether the product involves plastic machining, welding, bonding and/or general fabrication. We can develop all types of specialty plastic products within a fluid handling network and modify existing Entegris products. These include, but are not limited to, such products as:

- Fittings and special connection devices
- Flexible hose assemblies
- Valve products such as valve manifolds or two different connection styles on the same valve body
- Cynergy component fused subassemblies
- Caps, covers or special closures
- Pressure vessels
- Chemical containers

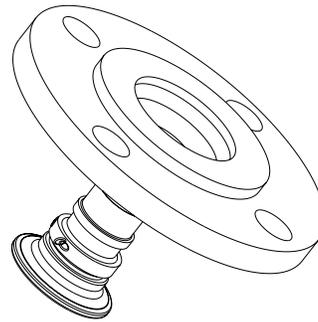
To discuss your specific needs, contact your local Entegris representative or Entegris, Inc.

### Custom Examples

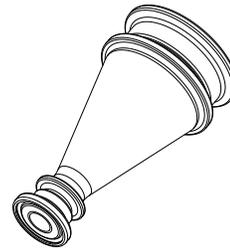
Flexible convoluted hose assembly



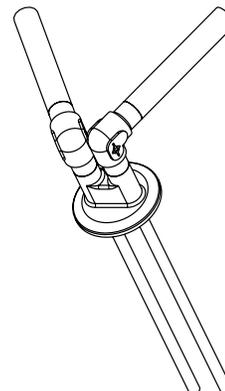
150# ANSI flange adapter



Concentric jump reducer



Dual downtube

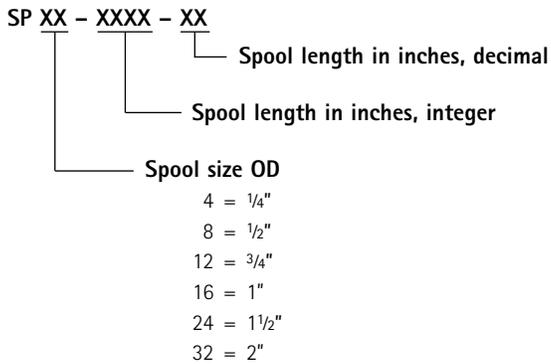


## Cynergy Beadless Weld Spools and Subassemblies

In addition to our clamped Cynergy connections, Entegris offers welded components for applications requiring a more permanent connection. The smooth beadless weld reduces the number of connections and potential leak points. And because the products are welded at Entegris to your specifications, installation is easy – you simply clamp the spools in place.

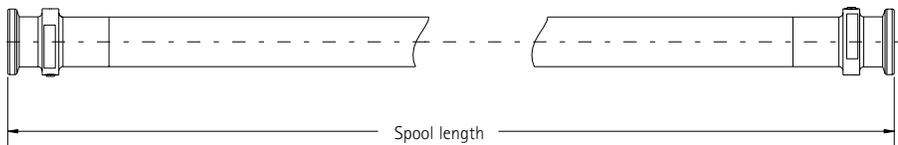
### Ordering Information

#### Cynergy Beadless Weld Spool

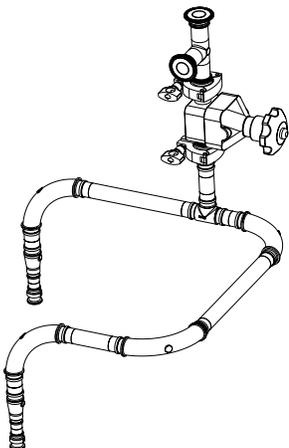


#### Note:

Spools 3 feet and shorter have a +0.12", -0.0" tolerance.  
Spools longer than 3 feet have a +0.25", -0.0" tolerance.



#### Beadless subassembly example







# Section 3: Corporate Policies

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## Ordering Information

### How to Order Entegris Products

Contact your local Entegris distributor or Entegris, Inc.:

Customer Service Tel. 952-556-4181

Customer Service Fax 952-556-8022

Customer Service e-mail: [webrequest@entegris.com](mailto:webrequest@entegris.com)

Please use complete part numbers when placing an order.

To the best of our knowledge the information contained in this catalog is accurate; however, we do not assume any liability for the accuracy or completeness of such information.

To the extent that any hazardous materials may have been mentioned in this catalog, we neither suggest nor guarantee that those hazards are the only ones that exist when using our components. Final determination of the suitability of any information or product for the use contemplated by any user, and the manner of that use is the sole responsibility of the user. In critical applications, the complete installation should be tested before attempting use.

We recommend that anyone intending to rely on any recommendation or to use any parts or material mentioned in this catalog should satisfy themselves as to such suitability and that all applicable safety and health standards are met.

## Product Changes

Entegris, Inc. reserves the right to make design changes for the improvement of a product.

## Technical Support Services

Entegris has technical service personnel who are always ready to assist you with your questions and concerns about Entegris products and your specific application. We are committed to being your resource for quality products and efficient technical service.

## Special Order

Special configurations are available. Quantities are determined on an individual basis. Contact your local Entegris distributor or Entegris, Inc. for information.

### Fittings

50-piece minimum quantity. Set-up/tooling/engineering charge. No set-up charge if above 250 pieces.

- A signed, approved print of the requested product must be sent to Entegris prior to initial production. A revised and approved drawing must accompany any revisions.
- No special product will be inventoried unless a blanket order is placed indicating future requirement. A penalty will be assessed if blanket quantities are not taken in the specified time.
- Delivery date will be determined when the quotation is sent after drawing approval.
- Returns for credit will be accepted only if parts do not meet product specifications on drawings.

## Patents

Certain products in this catalog are registered with the United States Patent Office for Entegris, Inc.

- PureBond fusion U.S. patent number 4,929,293
- Cynergy support system U.S. and France patent numbers 5,871,182 and 20759140, respectively
- Cynergy clamp fitting U.S. patent number 5,837,180
- Cynergy welding patent pending

Other U.S. and foreign patents are pending.

## Environmental Statement

Entegris, Inc. is dedicated to the conservation of the earth's resources to ensure that future generations may also enjoy the beauty and diversity of the natural environment.



Please contact Entegris for information on recycling your plastic products.

## For More Information

Please call your Regional Customer Service Center today to learn what Entegris can do for you. Visit [www.entegris.com](http://www.entegris.com) and select the Customer Service link for the center nearest you.

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## Product Warranties

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