Cynergy® Clamp-to-Flaretek® Adapter Assembly Procedures

PRODUCT SPECIFICATIONS

Maximum operating pressures:

- 689 kPa (100 psig) at ambient temperature
- 449 kPa (65 psig) @ 90°C (194°F)
- 414 kPa (60 psig) @ 2°C (35°F)

The versatile Cynergy® clamp adapter enables you to connect any standard sanitary clamp fitting to Entegris PFA tubing via the Flaretek® end connection.

FLARETEK ADAPTER CONNECTION

The flaring process provides a permanent expansion (flare) of the tubing end, allowing insertion of the Flaretek fitting body. Proper tube flaring and Flaretek fitting assembly results in a secure tubing connection.

Entegris recommends these procedures for flaring standard wall FluoroLine® ultrapure or industrial grade PFA tubing only (0.062" wall thickness for ⅜", ½", ¾", and 1" OD, 0.047" wall thickness for ¼"). This flaring process is not recommended on Cynergy tubing.

NOTE: The tubing cools rapidly, so please read and understand all instructions before flaring your tubing.

TUBING PREPARATION

1. Cut the tubing end squarely (0.070" maximum squareness tolerance) using an Entegris tube cutter (part number 213-14, 213-16, or 213-30-1).
2. Insert the cut end of the tubing through the nonthreaded end of the nut.

⚠ WARNING: If you do not put the nut on the tube now, you will not be able to put it on after you complete the flare.

⚠ WARNING: Flaretek fittings are specifically designed, tested, and characterized to work together with specific Flaretek fitting components manufactured by Entegris. Customer assumes the risk of connection integrity if Flaretek fittings, body and/or nut components are attached to components manufactured by third parties.

HEAT FLARING INSTRUCTIONS

1. If using an Entegris hot air gun (part number 213-79), set the hot air gun on "high" (Figure 1). Hold the PFA tubing ½" to ¾" above the heater and slowly rotate the tubing 360° for the approximate time specified in Table 1 or until a fine, clear line appears around the tubing.

NOTE: It is very important to fully rotate the tubing over the heat source so all surface areas receive an equal amount of heat. Uniform heating is essential to making a good flare.

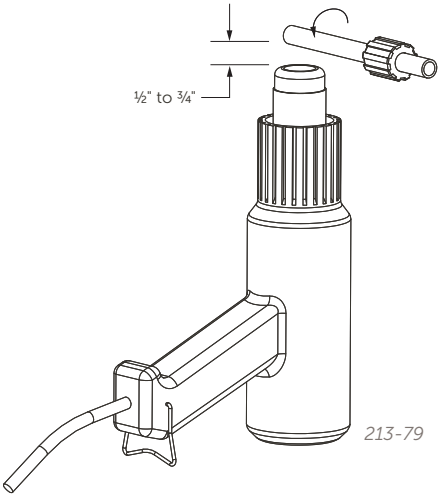

Figure 1.

Table 1

Tubing and fitting size	¼"	⅜"	½"	¾"	1"
Heating time for PFA (sec) – Air gun	15	25	25	25	25
Hold tubing on flare mandrel (sec)	20	20	20	20	25
Minimum cooling time on mandrel (min)	2	2	3	3	3

2. Remove the PFA tubing from the heat source. **Immediately** push the flaring mandrel into the tubing until the end of the tubing reaches the tube stop (Figure 2). Refer to *www.entegris.com* for available mandrel configurations.

NOTE: Flaring ¼" tubing is the most challenging because of its small size. To get a firm grip on the small tube diameter, we recommend using the grip pad that is included in the mandrel kit (for additional grip pad, order part number 213-73).

3. Firmly hold the tubing onto the mandrel for the time specified in Table 1.
4. Let the flared tubing continue to cool on the mandrel for the time specified in Table 1.
5. The flaring process is now complete and the tubing may be removed from the mandrel.

FLARETEK FITTING ASSEMBLY INSTRUCTIONS

1. Push the flared tubing end onto the Flaretek fitting body until the end of the fitting body contacts the flare shoulder of the tube (Figure 3). The maximum gap between the tube end and fitting shoulder should be 0.080–0.150."
2. Tighten the nut onto the fitting body until handtight.

CYNERGY CLAMP CONNECTION ASSEMBLY

1. Clean the Cynergy clamp fitting face with isopropyl alcohol (IPA) to remove surface contaminants and particles.
2. Select the recommended sanitary gasket and clamp as specified in Table 2.
3. Place the appropriate gasket between the two sanitary flanges (Figure 4).
4. While holding the flanges together, place the clamp around them and secure the clamp. Tighten the clamp to the torque specification shown in Table 2.

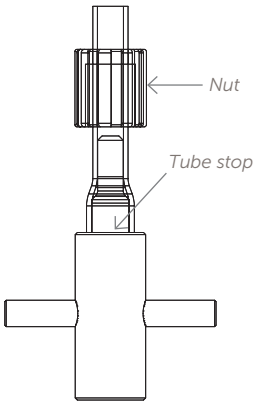

Figure 2.

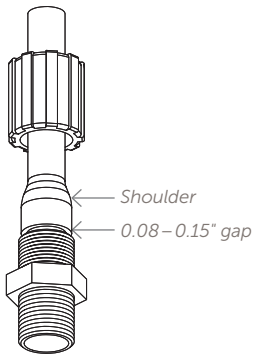

Figure 3.

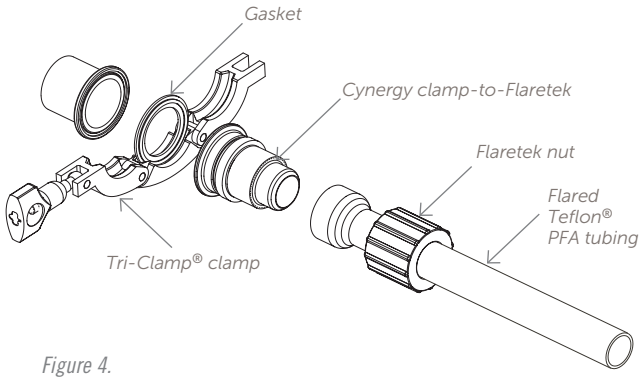

Figure 4.

NOTE: 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 three-piece clamps for 1", 1½", and 2" sizes and Tri-Clamp two-piece clamps for ¼", ½", and ¾" 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 2. 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-11/2	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.*

TROUBLESHOOTING

Flaretek tubing fitting assembly

Problem	Possible cause	Solution
After flaring the tubing, one side of the expanded portion of the tubing is wrinkled and shorter than its original length.	The tubing was not heated evenly.	The wrinkles can be avoided by rotating and moving the tubing through the heat source with more uniformity. Cut off the flared tubing end and reflare.
	The wrinkled areas were overheated.	
The tubing kinks when pushing it onto the flaring mandrel.	The tubing was not heated properly before flaring.	½" to ¾" of the tubing needs to be heated. Closely follow the recommended heating times in Table 1. Cut off the flared tubing end and reflare.
When the flared tubing is pushed onto the fitting body, the tubing is more than 0.150" away from the threaded area of the fitting body.	The tubing was not pushed onto the flaring mandrel all the way or the tubing was removed from the mandrel before it was cool.	Tubing may need longer heating time or longer cooling time on the flaring mandrel. Cut off the flared tubing end and reflare.
The flared tubing will not fit onto the fitting body.	The tubing was removed from the mandrel before it was cool.	Reheat and reflare the undersized flared tubing end. Allow adequate cooling time prior to removing from the flare mandrel. **Or** Cut off the flared tubing end and reflare. Be sure the tubing is cool before removing it from the mandrel.
Changes need to be made to a line after chemical has been run through the system. There is potential for vapor explosion in the line or hazard to the operator.		Heated flaring should only be attempted with tubing that has not been exposed to chemical.

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