

SUMITOMO RECOMMENDED PROCEDURE

SRP SP-F04-032



SEALING PROCEDURES FOR FUTUREFLEX TUBE CABLES LOCATED IN CLASS I, DIVISION 1 & 2 ENVIRONMENTS

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	ADDENDUM A – Master Encapsulant Container Template (2 copies)

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1.0 General

1.1 This procedure describes the special techniques to seal empty tubes and the open spaces between the tubes and between the tubes and cable jacket inside FutureFLEX tube cables to prevent the transfer of flammable gases or vapors from Classified (hazardous) locations to Non-Classified locations. **See Fig. 1.**

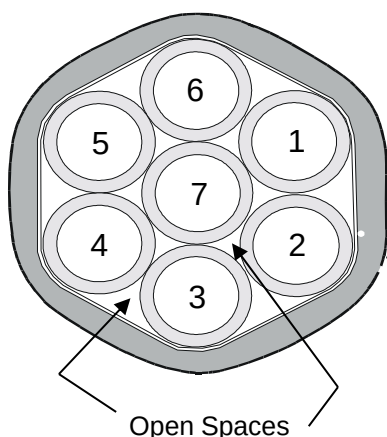


Figure 1
Open Spaces Between Tubes
That Must be Sealed

Note: Special techniques to seal individual tubes filled with fiber bundle are described in Sumitomo Recommended Procedure, Sealing Procedures For FutureFLEX Tubes Located In Class I, Division 1 & 2 Environments, SRP SP-F04-033.

1.2 Hazardous (Classified) locations are defined as those areas where fire or explosive hazards may exist due to the presence of flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers or flyings. (Consult the NEC for more detailed descriptions / definitions.)

1.2.1 Class I hazardous locations are defined as those areas in which flammable gases or vapors are or may be present in the air in sufficient quantities to produce explosive or ignitable mixtures. Petroleum refinery facilities are typical Class I locations.

1.2.2 Division 1 locations are defined as those areas where flammable gases or vapors may be present due to normal everyday operations.

1.2.3 Division 2 locations are defined as those areas where flammable gases or vapors may be present due to abnormal conditions caused by an accidental failure, rupture, or breakdown.

1.3 Empty tube and tube cable sealing procedures shall take place at the designated Class I boundary of the facility. This location must be specified by appropriate authority such as the Refinery's Safety Department.

1.4 Empty tube and tube cable sealing procedures will normally be accomplished inside an appropriately rated Tube Distribution Unit (TDU) such as a pedestal- or wall-mounted NEMA-4 or -4X outdoor enclosure.

1.5 A minimum of two (2) personnel are required to perform this procedure.

1.6 The recommended procedures presented in this SRP are designed to produce an effective gas blocking seal based on three (3) key steps.

1.6.1 First, *preferably*, tube cables should be routed to the Class I boundary TDU so they enter from the bottom of the enclosure and be secured to it with Liquid-Tight Kellems® Grips.

1.6.2 Second, empty tubes are sealed with Tube Caps.

1.6.3 Third, an epoxy sealant is injected between the tubes and between the tubes and cable jacket to create a complete and effective gas blocking seal of the open tube cable end.

1.7 Due to the low viscosity nature of the recommended epoxy sealant, it must be applied and allowed to cure with the tube cable in a vertical position.

1.8 Tube cables may be routed to enter the TDU from the top or sides. However, the epoxy sealant must still be applied and allowed to cure with the tube cable in a vertical position. Therefore, enough temporary length must be made available to turn / bend the tube cable end upward into a vertical position before applying the epoxy sealant. After the tube cable end is sealed, the tube cable and / or its tubes must then be stored / coiled within the enclosure. *Plan accordingly.*

1.9 Inside the Class I boundary TDU it is ...

- 1) **Mandatory** to seal all empty tubes coming from the Classified Area and going to the Non-Classified Area
- 2) **Mandatory** to seal all tube cable ends coming from the Classified Area and
- 3) **Recommended** to also seal the end of any tube cables going to the Non-Classified area.

1.10 For reference, the *recommended tube cable installation sequence* follows:

- Ensure tube cable ends are properly sealed before being pulled in. Use a Heat Shrink End Cap for this purpose. Refer to Sumitomo Recommended Procedure, *FutureFLEX Tube & Tube Cable Sealing Procedures*, SRP SP-F04-019.
- Pull tube cable to the Class I boundary TDU; *preferably* for bottom entry.
- Install Liquid-Tight Kellems Grip components on tube cable before epoxy sealant application process is started.
- Loosely install tube cable inside TDU to determine jacket strip length.
- Remove tube cable from TDU, strip tube cable jacket, and re-install.
- Do not cut or couple individual tubes yet. Leave them long and uncoupled. To keep out contamination and to maintain a gas blocking seal, simply trim tube ends and install Tube Caps to seal empty tubes.

- Complete Liquid-Tight Kellems Grip installation.

- Prepare for and inject epoxy sealant to seal tube cable end.

- Perform tube pressure and obstruction tests on tube cable segments.

2.0 Safety Precautions:

2.1 The use of safety equipment (safety glasses, safety shoes, cut-resistant Kevlar gloves) is recommended during this installation procedure.

2.2 The use of epoxy sealant / encapsulant Loctite® Hysol E-00CL presents certain hazards. Always follow specific manufacturer's recommended installation instructions and safety precautions. Also refer to Material Safety Data Sheet (MSDS) for Loctite P/N 29289; available at www.loctite.com.

3.0 Reference Documents

3.1 Sumitomo Recommended Procedure, *FutureFLEX Tube Cable Installation Procedures*, SRP SP-F04-008.

3.2 Sumitomo Recommended Procedure, *FutureFLEX Tube & Tube Cable Sealing Procedures*, SRP SP-F-04-019.

3.3 Sumitomo Recommended Procedure, *FutureFLEX Tube Pressure Testing Procedure*, SRP SP-F04-003.

3.4 Sumitomo Recommended Procedure, *FutureFLEX Tube Obstruction Testing Procedure*, SRP SP-F04-004.

3.5 Sumitomo Recommended Procedure, *FutureFLEX Grounding & Bonding Metallic Tube Cable Procedures*, SRP SP-F04-030.

3.6 Sumitomo Recommended Procedure, *Sealing Procedures For FutureFLEX Tubes Located In Class I, Division 1 & 2 Environments*, SRP SP-F04-033.

4.0 Equipment / Tools Required

The following equipment, tools, and materials, are required to complete this procedure:

Note: Liquid-Tight Kellems Grip Kits are available for the different ABF tube cable types and sizes. Kits are supplied with metal clad Sealing O-Rings and Locknuts.

4.1 **See TABLE 1** for Liquid-Tight Kellems Grip Part Numbers and Recommended Knockout Hole Sizes.

4.2 Tube Cable Adapter Bushings are required (DE02TOX,DE04TOD,DE12TOX,DE24TOX) if installing standard 2-,4-,12-, or 24-tube cables TC02MSOS/TC02TOX, TC04TOD/TC04MSOS, TC12TOX/TC12MSOS, TC24TOX; Adapter Bushing must be ordered separately.

4.3 Aluminum End Caps (if required to seal empty Liquid-Tight Kellems Grips before tube cable is installed)

- DE5KCAP for Kit DELTKG1
- DE6KCAP for Kits DELTKG2, DELTKG3, DELTKG4, DELTKG5, and DELTKG6
- DE7KCAP for Kit DELTKG7

4.4 Utility Knife with Hook Blade

4.5 10-inch (or larger) Adjustable Wrenches

4.6 Strap Wrench or Channel Lock Pliers

4.7 Hammer

4.8 Hole Punch Set for Knockout Holes

4.9 Felt Tip Pen / Marker

4.10 Tape Measure

4.11 Utility scissors

4.12 Vinyl Electricians Tape

4.13 Polyethylene Encapsulant Container Template (from Addendum A in this SRP)

TABLE 1
Liquid-Tight Kellems Grips

If Installing Tube Cable SEL P/N	Use Liquid-Tight Kellems Grip SEL P/N	Recommended Knockout Hole Size (inches)
TC02MSOS TC02TOX	DELTKG1 Also see Para. 4.2	1.719 – 1.766
TC04MSOS TC04TOD	DELTKG1 Also see Para. 4.2	1.719 – 1.766
TC07MSOS TC07TOX	DELTKG1	1.719 – 1.766
TC02MSOS-2 TC02TOX-2	DELTKG2	1.719 – 1.766
TC04MSOS-2 TC04TOD-2	DELTKG3	1.969 – 2.016
TC19MSOS	DELTKG4	2.453 – 2.500
TC07MSOS-2 TC07TOX-2	DELTKG5	2.453 – 2.500
TC12TOX TC12MSOS	DELTKG5 also see para 4.2	2.453 – 2.500
TC19TOX	DELTKG6	2.453 – 2.500
TC12TOX-2 TC12MSOS-2	DELTKG6 also see para 4.2	2.453 – 2.500
TC19MSOS-2 TC19TOX-2	DELTKG7	2.953 – 3.000
TC24TOX	DELTKG7 also see para 4.2	2.953-3.000

4.14 Fine-tip Sharpie®; metallic silver or other light, bright color recommended

4.15 Tube Cable Cutter (BETL03)

4.16 Tubing Cutter (BETC001)

4.17 Tube Cap (DE08MA)

4.18 Loctite E-00CL Hysol® 50ml Dual Cartridge Epoxy Adhesive / sealant (DEGBTC01). **See Fig. 5a.**

Note: For information, Loctite E-00CL Hysol is a fast-setting, low viscosity, low odor, clear-drying, industrial grade two-part epoxy adhesive dispensed with a Dual Cartridge automatic mixing squeeze-type applicator gun.

Note: One (1) 50ml Epoxy Cartridge will seal about:

- Four (4) 2-tube cable ends
- Three (3) 4-tube cable ends
- Two (2) 7-tube cable ends
- One (1) 19-tube cable end

Note: Once activated, Loctite E-00CL Hysol's:

- Working Life is about 5 minutes
- Setting Time is about 30 minutes
- Full Cure Time is about 24 hours

4.19 Loctite 50ml 1:1 Ratio Static Mixer (DEGBTC02). Static Mixer is a long nozzle that attaches to the Dual Cartridge. The Static Mixer is only good for limited applications / uses as the two-part epoxy hardens quickly inside the Mixer tube. **See Fig. 5a.**

4.20 Loctite 50ml Dual Cartridge Manual Applicator (DEGBTC03). Squeeze type applicator gun supplied with a 50ml 1:1 Ratio Plunger. **See Fig. 5a.**

4.21 Polyethylene sheet (DEGBTC04). Black, 16" W x 48" L x 1/32" thick.

4.22 Disposable polyethylene gloves recommended (Installer provided).

5.0 Equipment Layout

5.1 **See Fig. 2 and Fig. 3** for a typical Liquid-Tight Kellems Grip layout.

5.2 **See Fig. 4** for a typical equipment layout where a Liquid-Tight Kellems Grip secures a bottom-entry tube cable to a Class I boundary TDU and epoxy sealant is applied between the tubes and between the tubes and cable jacket.

5.3 **See Figs. 5a thru 5d** for the epoxy sealant applicator components.

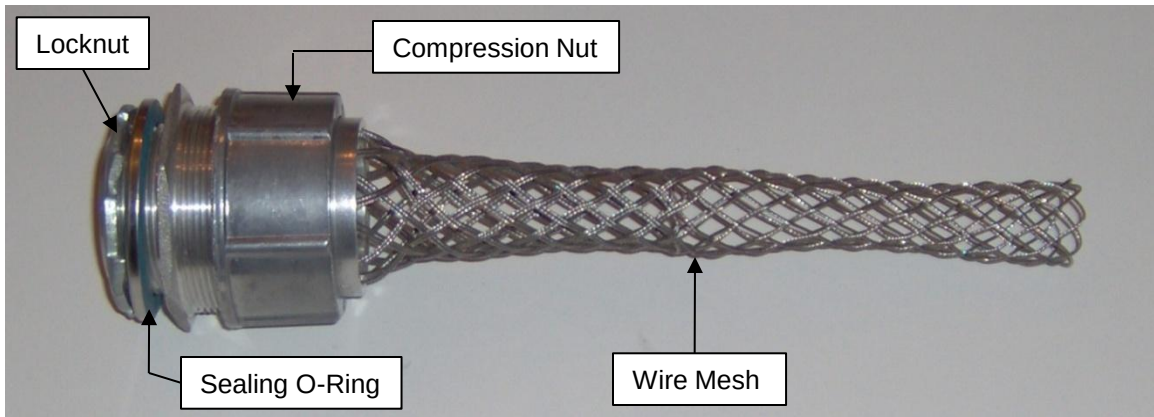


Figure 2
Liquid-Tight Kellems Grip - Assembled

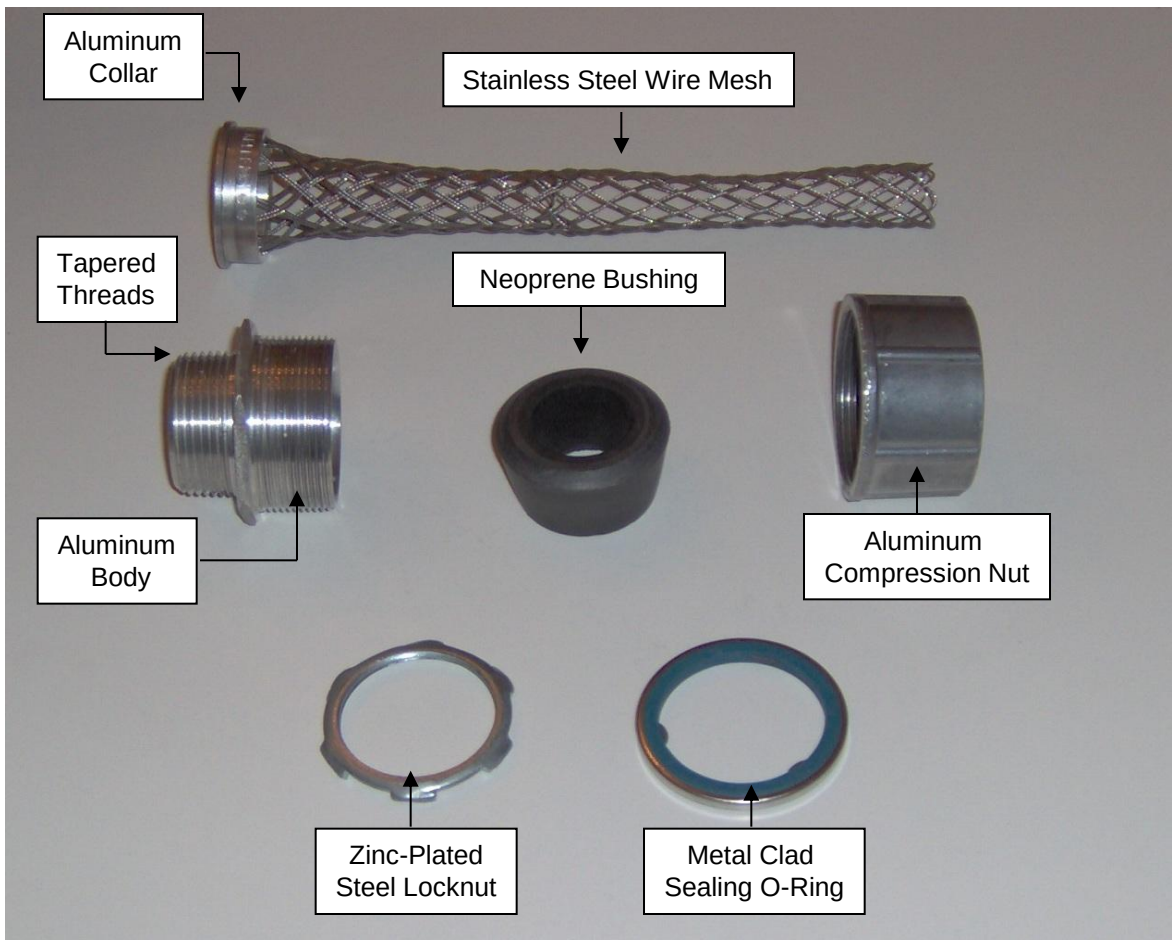


Figure 3
Liquid-Tight Kellems Grip - Straight Male Components

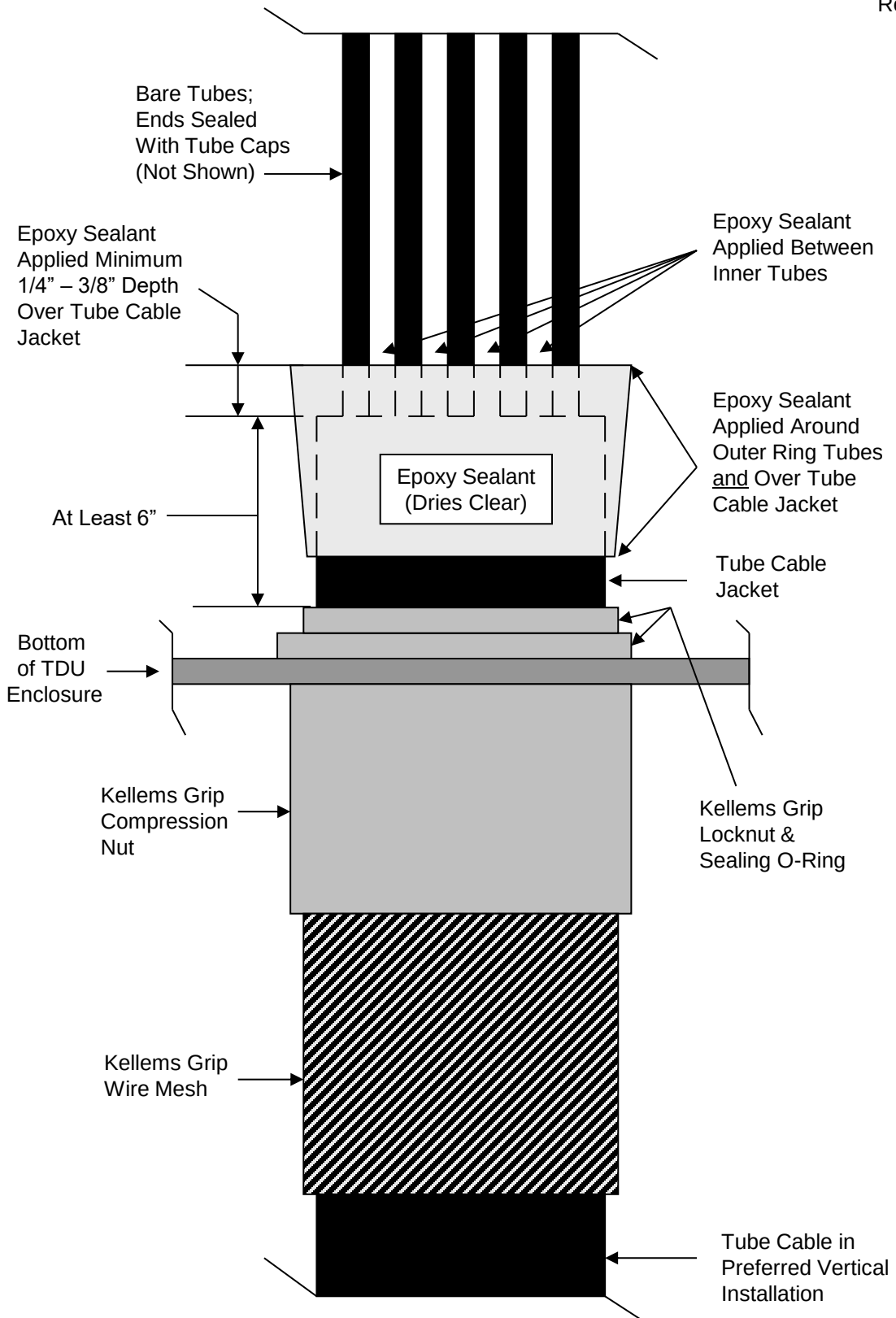


Figure 4
Equipment Layout for Sealing Tube Cable Ends
In Class I, Division 1 & 2 Environments

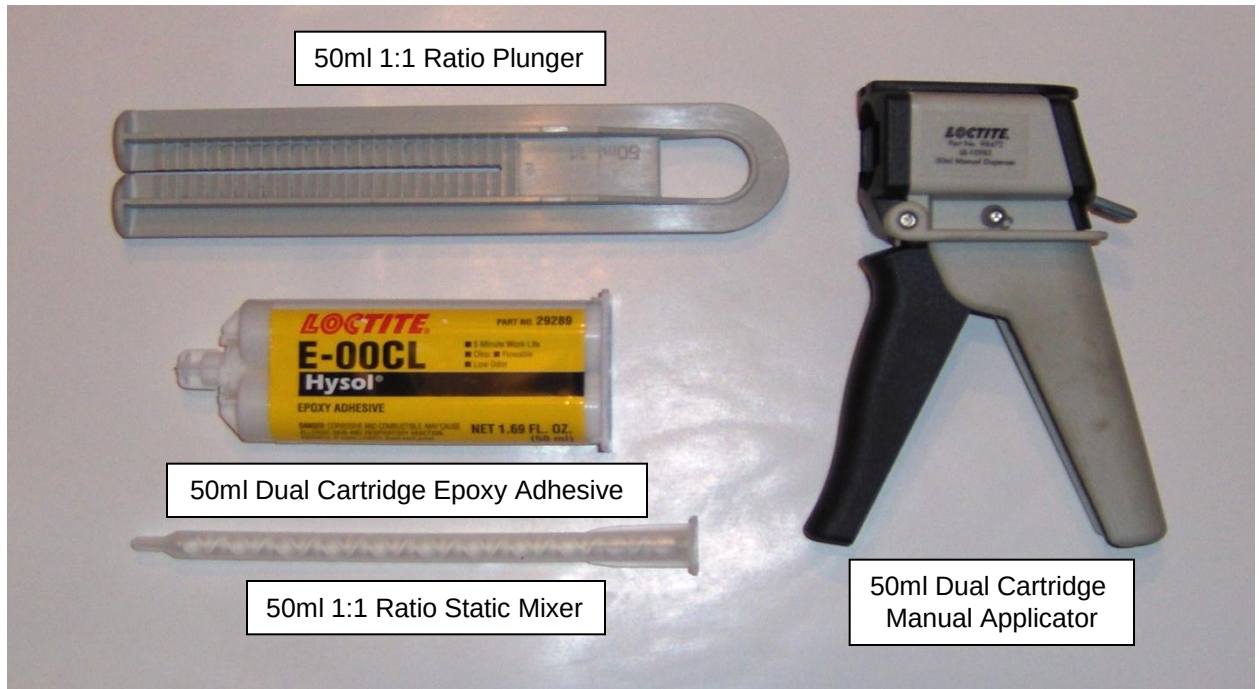


Figure 5a
Components of Epoxy Sealant Applicator

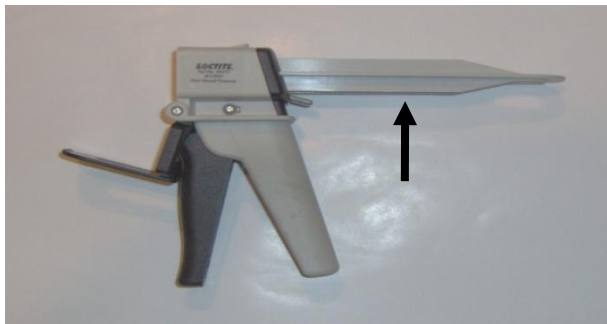


Figure 5b
Plunger Installed in Manual Applicator

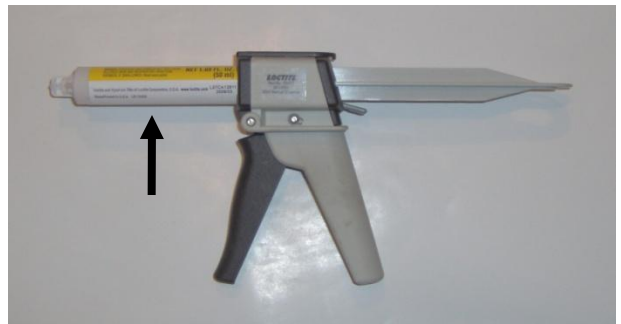


Figure 5c
Dual Cartridge Installed in Manual Applicator



Figure 5d
Static Mixer Installed on Dual Cartridge

6.0 Preparing the TDU Enclosure

6.1 Refer to **TABLE 1** and identify Recommended Knockout Hole Size based on the Liquid-Tight Kellems Grip to be used.

6.2 Prepare TDU enclosure by selecting and marking tube cable entry point locations. To best optimize TDU capacity, it is recommended to stagger tube cable entry locations if possible. See **Fig. 6a** and **Fig. 6b**.

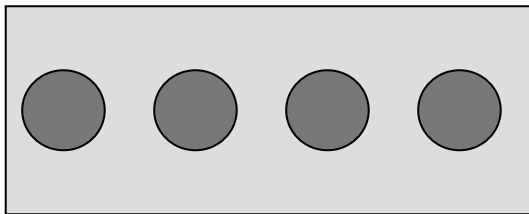


Figure 6a
Inline Tube Cable Entry Locations
Acceptable but Fails to Optimize
TDU Capacity

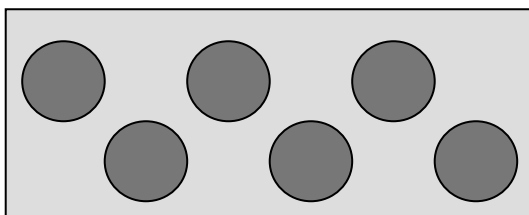


Figure 6b
Staggered Tube Cable Entry Locations
Preferred Method to Optimize
TDU Capacity

6.3 Use appropriate size hole punch and create opening in TDU.

6.4 Install Kellems Grip body into entry point hole.

6.5 Install Sealing O-Ring over tapered threads of body so rubber seal is against inner wall of TDU.

Note: If an airtight seal is required, apply an appropriate sealant (such as RTV Silicone, etc.) between inner wall of TDU and Sealing O-ring.

6.6 Install and hand-tighten Locknut.

6.7 Use appropriate size wrenches and tighten Locknut to firmly secure Kellems Grip body to TDU. See **Fig. 7**.

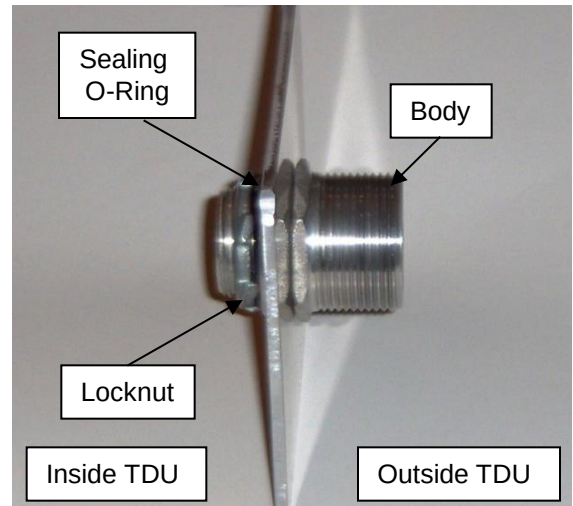


Figure 7
Body Installed in TDU Knockout Hole
O-Ring Installed and Locknut Tighen

7.0 Preparing the Tube Cable

Important Note: Once epoxy sealant is applied and allowed to cure, the tube cable's end diameter will be too large to allow installation of certain key Kellems Grip components. Therefore, before epoxy sealant application process begins, slide Kellems Grip Body, Bushing, Compression Nut, and Collar with Wire Mesh onto tube cable first.

7.1 Slide Kellems Grip compression nut onto end of tube cable.

7.2 Compress wire mesh and slide onto end of tube cable.

7.3 Place tube cable into TDU enclosure and mark jacket in two (2) places. See **Fig. 8**.

7.3.1 Make first mark at least 6" beyond tapered end of Kellems Grip body.

Note: If tube cable is armored, the metallic element must be grounded and bonded. Make first mark about 10" beyond tapered end of Kellems Grip body. See SRP SP-F04-030.

7.3.2 Second mark must be determined on-site. Measure distance required to route individual tubes from the first mark to the farthest tube connection point inside TDU and make second mark.

7.4 Remove tube cable from TDU enclosure. Use Tube Cable Cutter (BETL03) to cut tube cable at second mark.

7.5 Use Hook Blade Knife to lightly score tube cable jacket at first mark. Pull ripcord and strip jacket away to expose individual tubes.

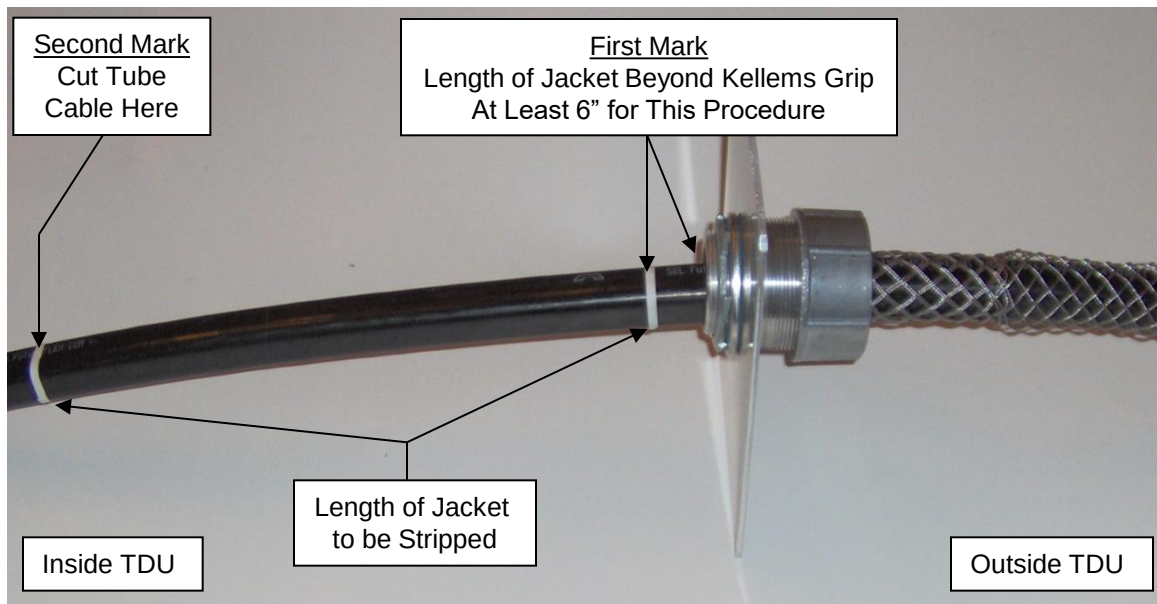


Figure 8
Measuring and Marking Tube Cable

8.0 Completing Liquid-Tight Kellems Grip Assembly

8.1 Slide Kellems Grip neoprene bushing over exposed inner tubes and tube cable jacket.

Note: If installing 2-, 4-, 12-, or 24-tube cables, discard neoprene bushing supplied with Kellems Grip, and replace with appropriate Adapter Bushing identified in TABLE I. Refer to SRP SP-F04-024 for additional details.

8.2 Install exposed inner tubes and tube cable through Kellems Grip body and into TDU.

8.3 Continue feeding tube cable through body until at least 6" of jacket extends beyond tapered end of Kellems Grip body.

8.4 Slide neoprene bushing, wire mesh, and compression nut forward until they mate with body's threads. **See Fig. 9.**

8.5 Lightly hand-tighten the compression nut onto body at this time; adjust position of wire mesh and neoprene bushing to ensure proper fit.

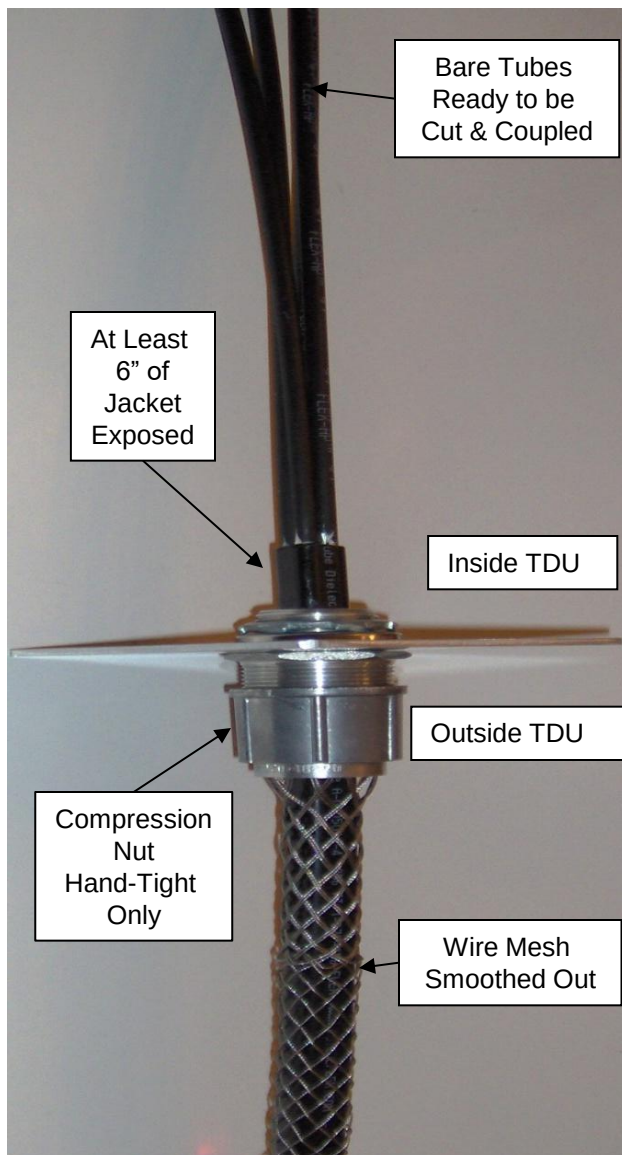


Figure 9

Tube Cable and Kellems Grip Installed Vertically and Ready for Epoxy Sealant Application

Special Note: If tube cable entry into the Class I boundary TDU is from the top or sides, be sure enough temporary tube cable length is made available to turn / bend the tube cable end upward into a vertical position to apply the epoxy sealant.

9.0 Sealing Empty Tubes with Tube Caps

9.1 Once individual tubes are exposed inside the Class I boundary TDU, they must be sealed to keep out contamination and to establish an effective gas blocking seal.

9.2 After tube cable is installed through Kellems Grip, leave tube length long; do not cut short at this time. Use Tubing Cutter to trim / clean cut ends of all incoming and outgoing tubes.

9.3 Install Tube Caps on all exposed tubes. The Tube Cap is a push-fit device so ensure it is fully seated and firmly attached to the tube end. *Tube Caps shall remain on all incoming and outgoing tubes inside the Class I boundary TDU until the tubes are filled with fiber bundle. See Fig. 10.*

Important Note: Verify all empty tubes located inside a Class I boundary TDU remain sealed with Tube Caps and not coupled. This step is critical as a gas blocking seal of the tubes must be maintained at all times.

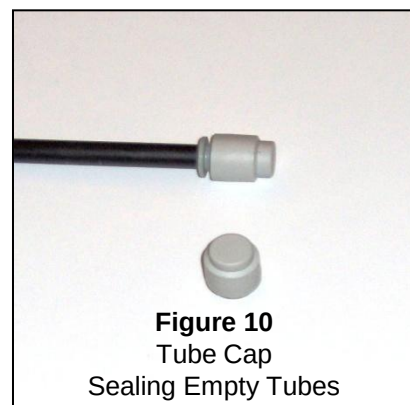


Figure 10
Tube Cap
Sealing Empty Tubes

10.0 Preparing Encapsulant Container Template

10.1 The epoxy sealant Encapsulant Container is made from a polyethylene sheet material (DEGBTC04) formed into a funnel-like piece and placed around the end of the tube cable. It is used to contain the epoxy sealant injected around the outer ring tubes and tube cable jacket. It is strongly recommended to use the material specified because the epoxy sealant will not stick to it making for a neater appearing job when the Container is removed.

10.2 To make the correct size Encapsulant Container for the different 2-, 4-, 7-, and 19-size tube cables, refer to the master “template” provided in **Addendum A** of this SRP. It is drawn to actual / full size.

10.3 Remove the template page from the SRP and make enough copies for the project at hand. (Be sure to replace the template page back into the SRP for the next project.)

10.4 Cut polyethylene sheet into an approximate 9-3/4" x 6-3/4" size rectangle and tape to a flat work surface with glossy side down.

10.5 Cut out paper template and tape it to the polyethylene sheet rectangle. **See Fig. 11.**

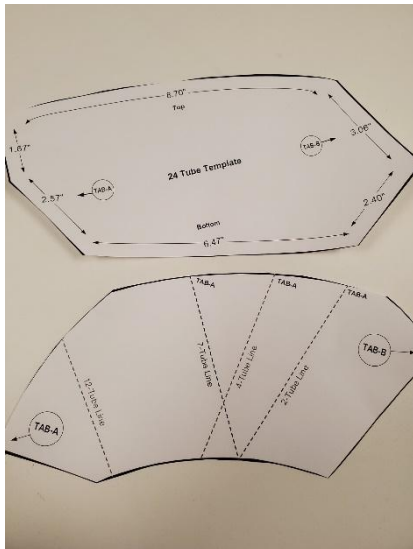


Figure 11

Paper Template cut to be used as stencil for Polyethylene sheet

10.6 Trace outline of paper template onto polyethylene sheet with a fine-tip metallic silver Sharpie or similar light, bright colored indelible marker. Also mark polyethylene sheet tracing with the corresponding text: “Top,” “Bottom,” “Tab A,” and “Tab B” to match the paper template. **See Fig. 12.**

10.7 If sealing a 19-tube cable, cut the full template tracing from the polyethylene sheet on the inside of the marked lines. If sealing smaller 2-, 4-, or 7-tube cables, cut on the appropriate lines.

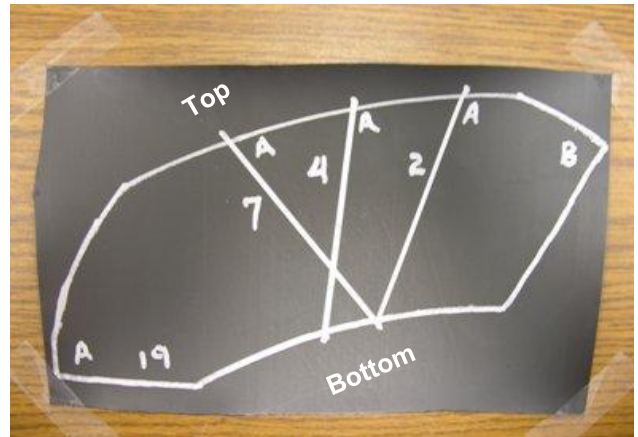


Figure 12

Paper Template Outline Traced onto Polyethylene Sheet and Edges / Tabs Marked

11.0 Preparing Tube Cable for Encapsulation

11.1 If epoxy sealant application will be accomplished inside the Class I boundary TDU, ensure the tube cable is installed vertically through Kellems Grip and there is at least 6" of cable jacket extending beyond Kellems Grip Locknut.

11.2 If epoxy sealant application will be accomplished outside the Class I boundary TDU, such may be the case with a top or side entry cable installation, ensure there is enough cable length available to turn / bend tube cable end upward into a vertical position and verify that it can be safely secured in that position for at least 30 minutes (minimum setting time for epoxy sealant).

11.3 Complete the Kellems Grip installation. Use appropriate size wrenches and tighten compression nut to obtain a liquid-tight, dust-tight seal.

Note: Wrench tightening may cause tube cable to twist within wire mesh. To relieve twisting, compress wire mesh while turning compression nut. Remove all slack from the installed mesh by smoothing it tight to the tube cable jacket.

Note: It is recommended that these components be re-tightened after 24 hours to ensure the seal is maintained.

11.4 If grounding and bonding are required, install shield connector assembly or grounding clamps to the tube cable's metallic jacketing. See SRP SP-F04-030.

12.0 Installing Encapsulant Container

Note: The following steps explain how to properly position the Encapsulant Container on the tube cable end to ensure adequate epoxy sealant coverage around the outer ring tubes / tube cable jacket interface.

12.1 With glossy side of Encapsulant Container facing the tube cable jacket, position bottom edge of Container around circumference of tube cable. See Fig. 13.

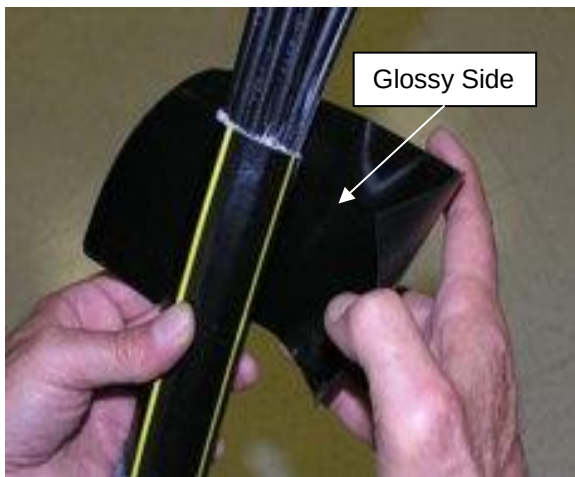


Figure 13

Glossy Side of Encapsulant Container Facing Tube Cable Jacket

12.2 Hold Tab A edge in place and wrap Container around jacket. Insert Tab B edge under Tab A edge to form a cone-shaped enclosure around tube cable. See Fig. 14.

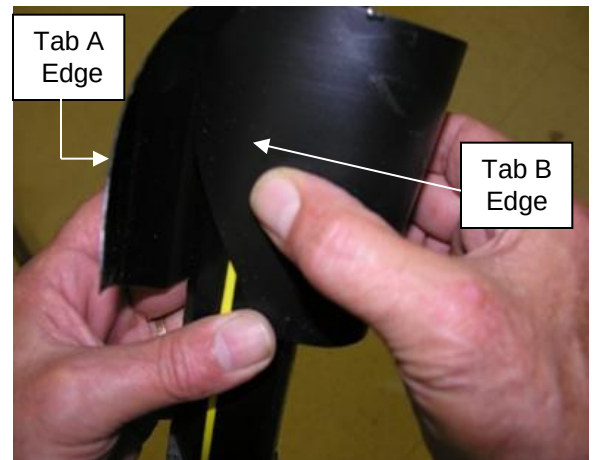


Figure 14

Placing Tab B Edge Under Tab A Edge

12.3 Adjust bottom edge of Container so that it is snug and even around jacket.

12.4 While holding Container edges together, slide Container up until its top edge is about 1/2" to 3/4" above end of tube cable jacket.

12.5 While holding Container in place, adjust top edge so that there is about a 1/4" even gap or separation between it and tube cable jacket. See Fig. 15.



Figure 15

Final Positioning of Encapsulant Container Before Taping in Place

12.6 Starting at the bottom, wrap tube cable jacket and entire Container with vinyl electricians tape making 1/2 width overlaps.

12.7 Verify 1/4" gap or separation between top edge of Container and cable jacket. Verify top edge of Container is still 1/2" to 3/4" above end of tube cable jacket. If necessary, make adjustments to obtain / maintain these measurements. **See Fig. 16.**



Figure 16

Encapsulant Container Installed Properly

13.0 Injecting Epoxy Sealant

13.1 Assemble epoxy sealant applicator components (DEGBTC01, DEGBTC02, and DEGBTC03) per manufacturer's instructions. Insert Plunger into Applicator Gun. Insert Dual Cartridge into Applicator Gun. Insert Static Mixer nozzle onto Dual Cartridge. **Refer to Figs. 5a thru 5d.**

13.2 Once activated, epoxy sealant has about a 5 minute working life; i.e.: epoxy still fluid. If all preparatory steps after been accomplished correctly, this is enough time to complete an injection.

Note: It is strongly recommended to have an extra Dual Cartridge tube of epoxy sealant handy and be prepared to move the Static Mixer nozzle to a new tube. In the event of multi-cable encapsulations, this will optimize time, epoxy supply, and Static Mixer nozzles.

Note: Recommended sealing procedures for a 19-tube cable are explained / shown in this SRP. Procedures for smaller 2-, 4-, and 7-tube cables are similar.

13.3 Work in an logical back-to-front organized manner. Separate the five (5) rear outer tubes and carefully pull remaining tubes forward. Inject epoxy sealant between and on either side of these five (5) rear tubes. **See Fig. 17.**



Figure 17

Injecting Epoxy Sealant
Between & Around Rear Tubes

13.4 Separate and push two (2) more tubes toward rear of cable. Inject epoxy sealant between and on either side of these two (2) tubes. **See Fig. 18.**



Figure 18

Injecting Epoxy Sealant Between & Around
Next Tubes (Working Forward)

13.5 Repeat this process for remaining tubes until all open spaces between and around all tubes have been thoroughly filled with injected epoxy sealant. **See Fig. 19.**



Figure 19
Epoxy Sealant Injected
Between & Around All Tubes

13.6 After epoxy sealant has been completely and thoroughly injected between and around all tubes, group tubes together and apply more sealant into space between outer ring tubes and Encapsulant Container. **See Figs. 20a and 20b.**

13.6.1 Apply sealant evenly and to a depth of about 1/4" – 3/8".

13.6.2 Because the Encapsulant Container is in a cone-shape around the tube cable end, epoxy sealant will also coat the tube cable's outer jacket to create a complete and effective gas blocking seal. **Refer to Fig. 4.**

13.7 **Important:** Allow epoxy sealant to set for at least 30 minutes before any tube cable handling is attempted.

13.8 After 30 minutes, tube cable can be handled with care. Remove electricians tape and peel Encapsulant Container from tube cable.

13.9 Full cure time for epoxy sealant is 24 hours.



Figure 20a
Injecting Epoxy Sealant in Open Space
Between Outer Ring Tubes
and Encapsulant Container



Figure 20b
Completing the Epoxy Sealant Application

14.0 Testing Tube Cables in Classified Areas

14.1 After tube cables have been properly installed and their ends sealed inside a Class I boundary TDU, all tubes must be pressure and obstruction tested.

14.2 Normally, tube testing is performed on a tube cable span using an end-to-end test method. This requires that incoming and outgoing tubes within TDUs be coupled with standard Tube Couplings to complete the span.

14.3 However, for tube cables installed in Classified areas, it is most critical that a gas blocking seal be maintained at all times. This requires that all empty tubes located inside a Class I boundary TDU remain sealed with Tube Caps and not coupled.

14.4 Therefore, pressure and obstruction testing must be accomplished on tube cable segments instead of on tube cable spans.

14.5 Perform standard tube testing techniques as described in Sumitomo Recommended Procedures, *FutureFLEX Tube Pressure Testing Procedure*, SRP SP-F04-003 and *FutureFLEX Tube Obstruction Testing Procedure*, SRP SP-F04-004 with the following exceptions.

14.6 At the Class I boundary TDU, test all tubes in the tube cable segment installed from the Class I boundary TDU to the Classified area.

14.6.1 Remove Tube Caps and conduct tests.

14.6.2 After testing is complete, re-install Tube Caps to re-seal empty tubes in this tube cable segment.

14.7 At the Class I boundary TDU, test all tubes in the tube cable segment installed from the Class I boundary TDU to the Non-Classified area.

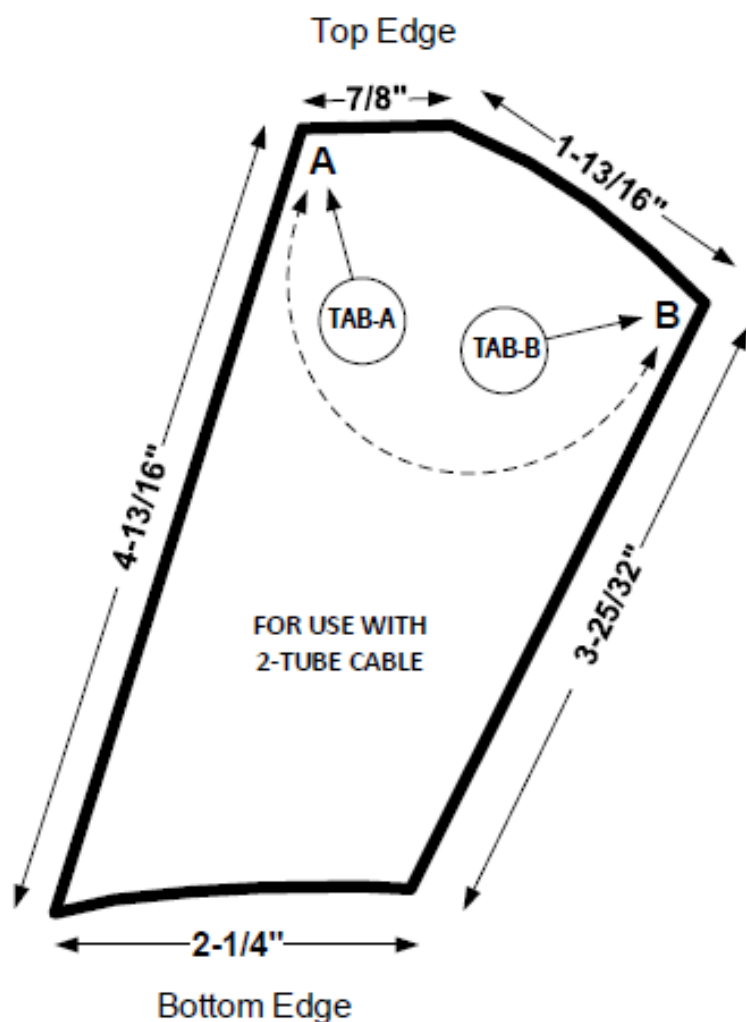
14.7.1 Remove Tube Caps and conduct tests.

14.7.2 After testing is complete, re-install Tube Caps to re-seal empty tubes in this tube cable segment.

Note: For convenience, **two (2) identical** Master Encapsulant Container Templates are provided in Addendum A. Be sure to make extra copies too.

EPOXY COLLAR TEMPLATE FOR (2)-TUBE ABF CABLES

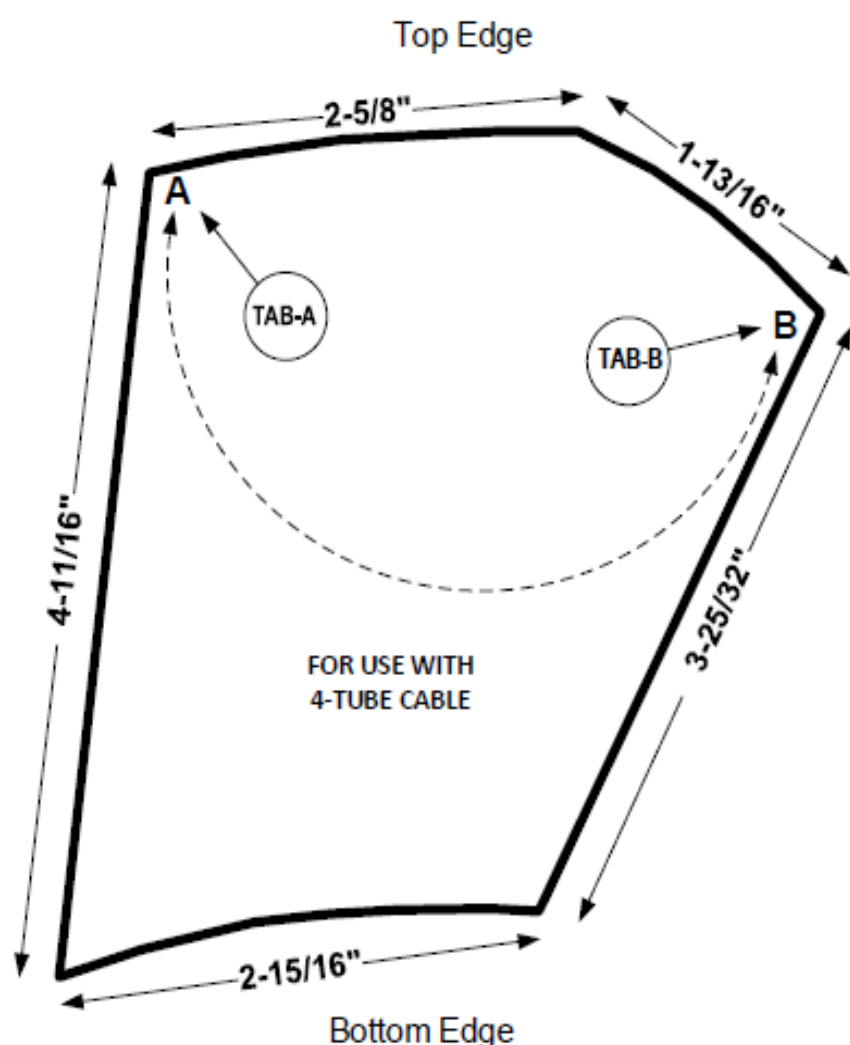
(Used to Permanently Adhere a 2 Tube Core Cable to a
Kellems Connector Housing - Eliminate Cable Pistoning)



REFER SUMITOMO RECOMMENDED PROCEDURES (SRP): SP-F04-032

EPOXY COLLAR TEMPLATE FOR (4)-TUBE ABF CABLES

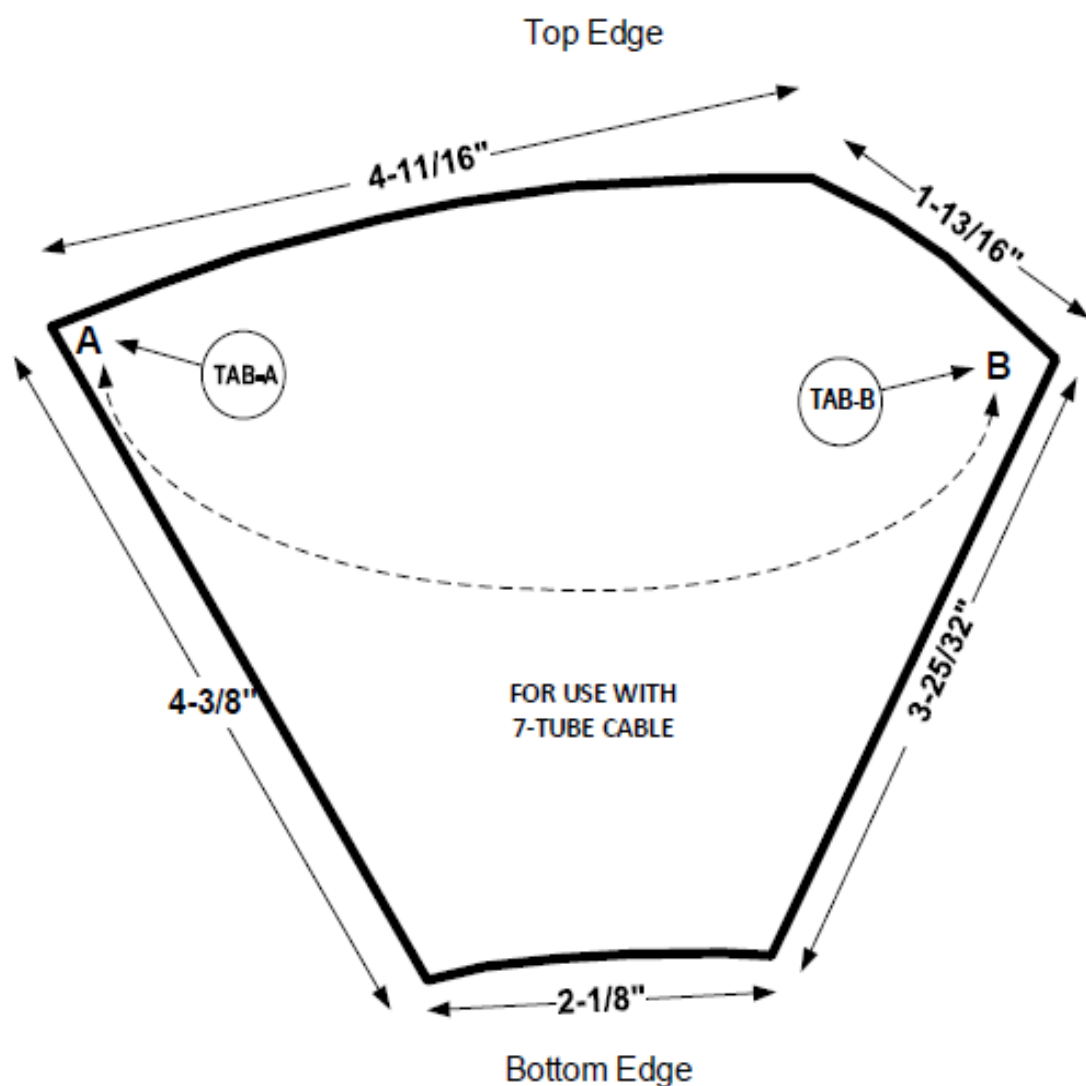
(Used to Permanently Adhere a 4 Tube Core Cable to a
Kellems Connector Housing - Eliminate Cable Pistoning)



REFER SUMITOMO RECOMMENDED PROCEDURES (SRP): SP-F04-032

EPOXY COLLAR TEMPLATE FOR (7)-TUBE ABF CABLES

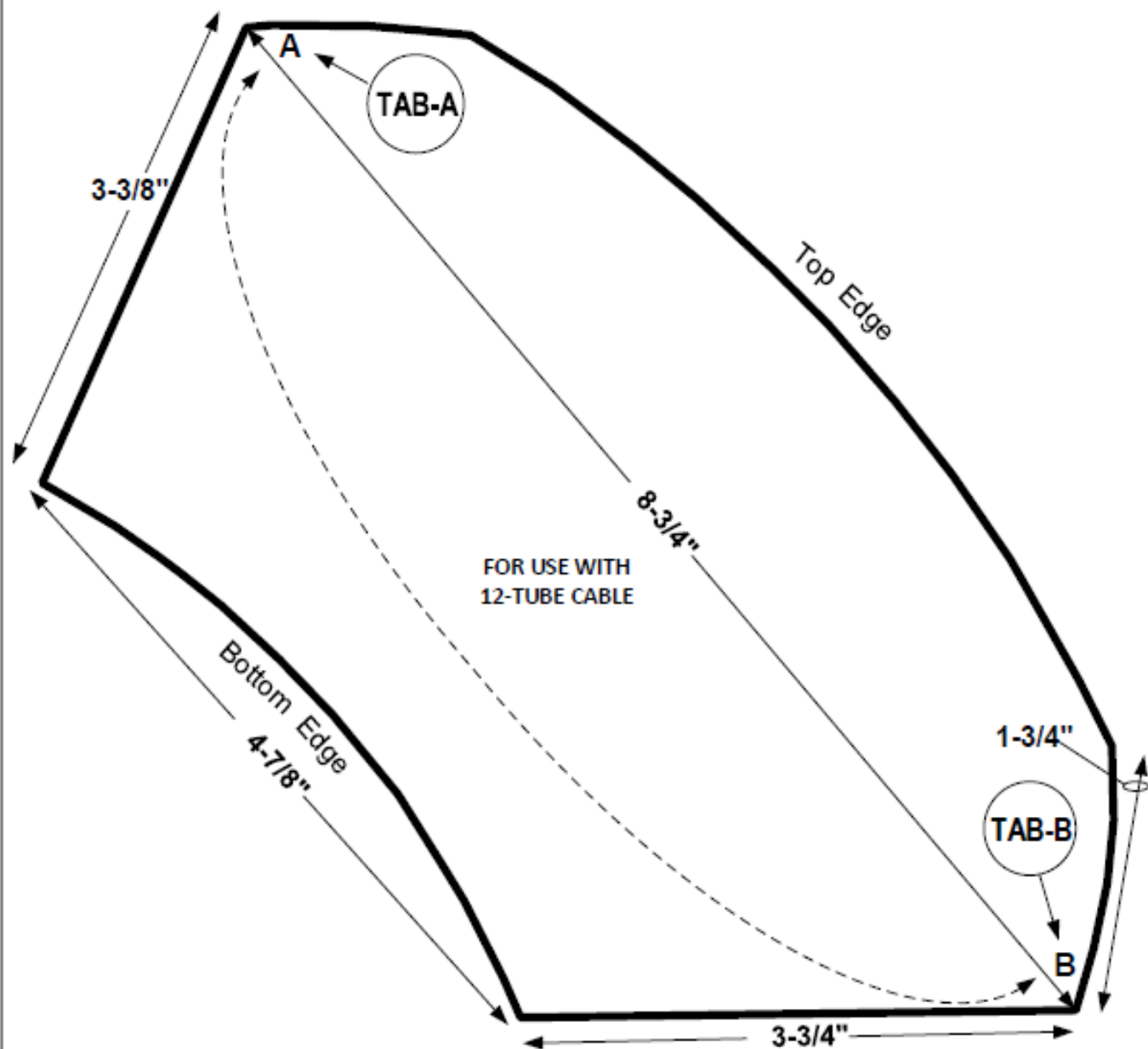
(Used to Permanently Adhere a 7 Tube Core Cable to a
Kellems Connector Housing - Eliminate Cable Pistoning)



REFER SUMITOMO RECOMMENDED PROCEDURES (SRP): SP-F04-032

EPOXY COLLAR TEMPLATE FOR (12)-TUBE ABF CABLES

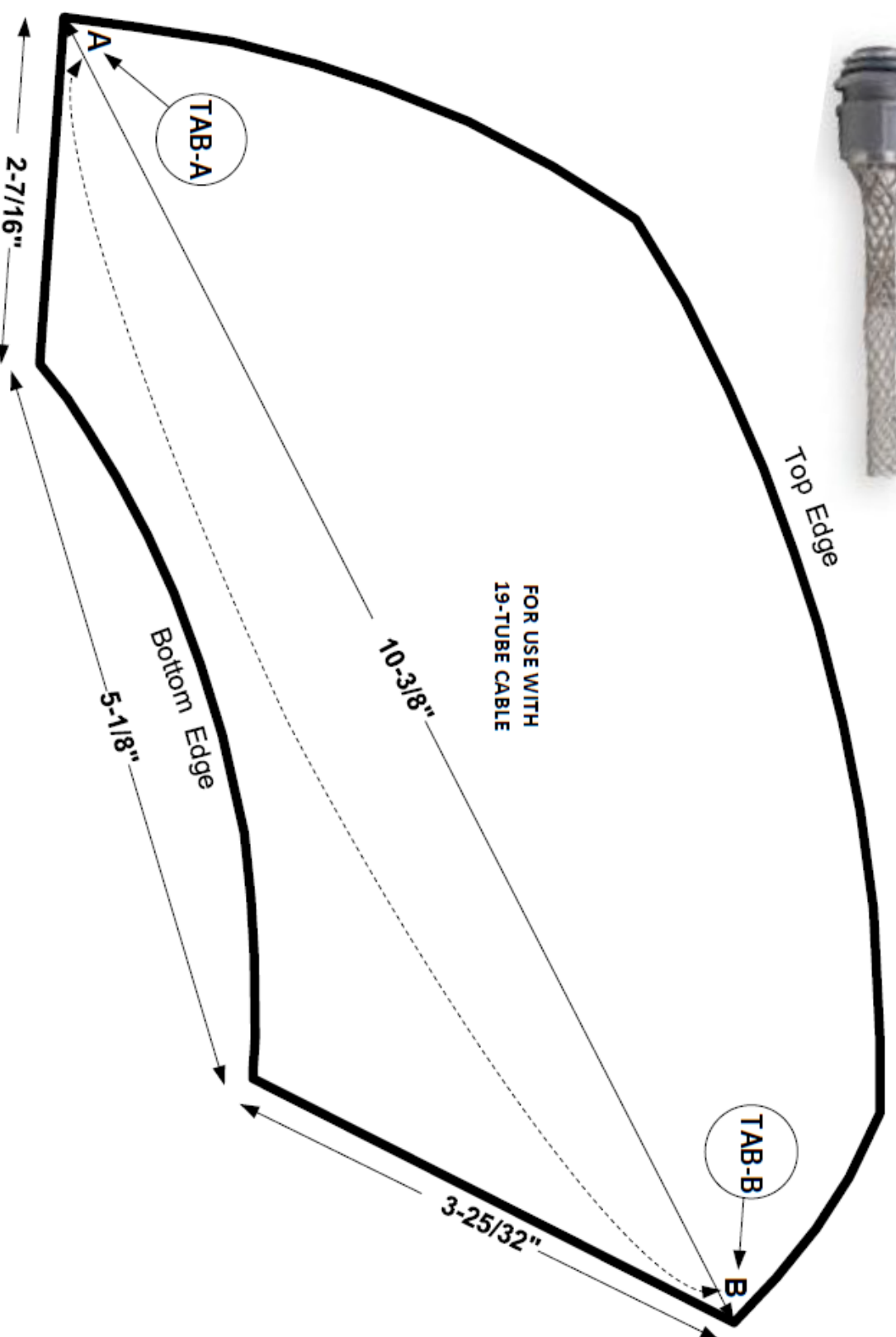
(Used to Permanently Adhere a 12 Tube Core Cable to a Kellems Connector Housing - Eliminate Cable Pistoning)



REFER SUMITOMO RECOMMENDED PROCEDURES (SRP): SP-F04-032

EPOXY COLLAR TEMPLATE FOR (19)-TUBE ABF CABLES

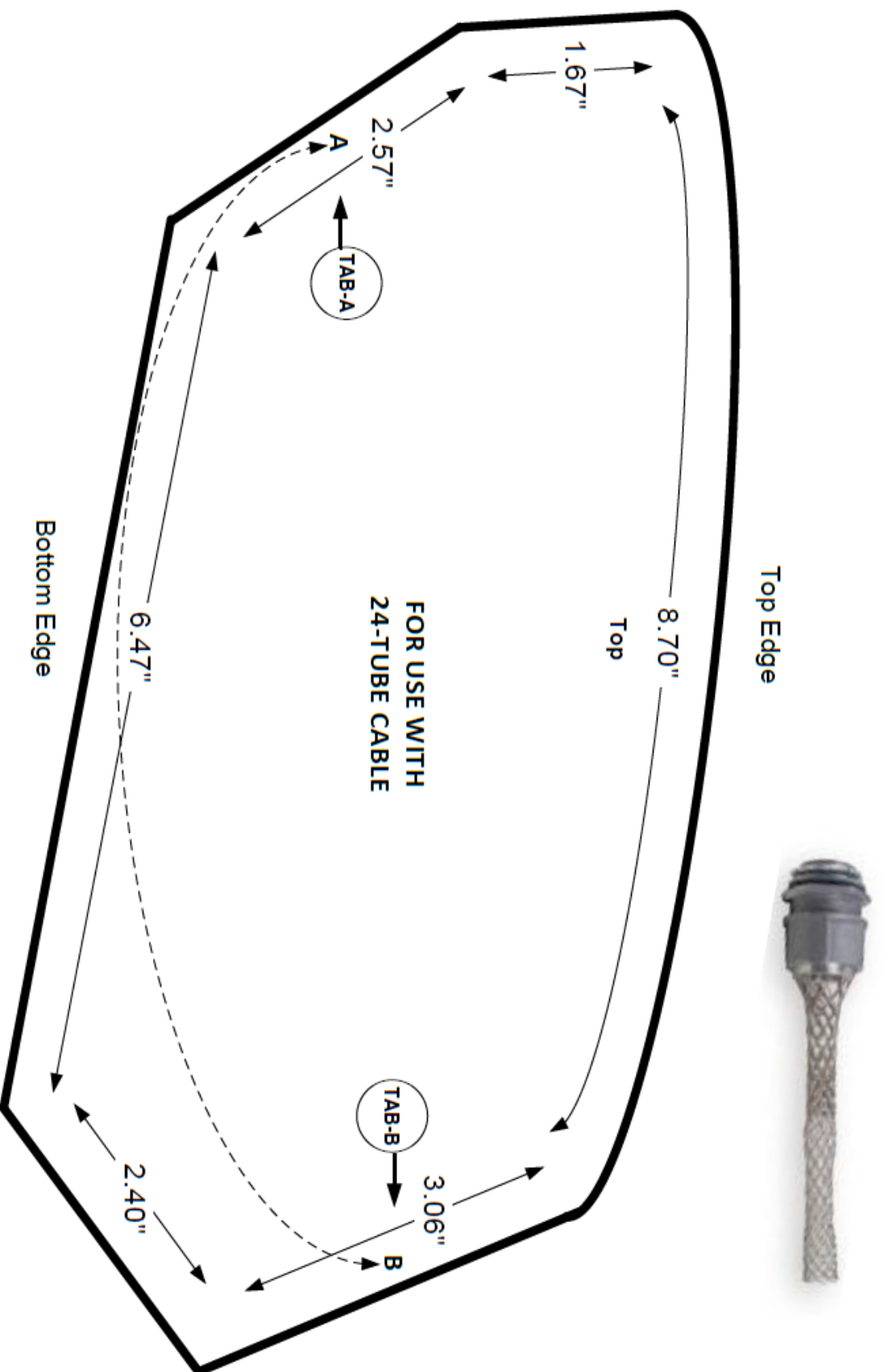
(Used to Permanently Adhere a 19 Tube Core Cable to a Kellems Connector Housing - Eliminate Cable Pistoning)



REFER SUMITOMO RECOMMENDED PROCEDURES (SRP): SP-F04-032

EPOXY COLLAR TEMPLATE FOR (24)-TUBE ABF CABLES

(Used to Permanently Adhere a 24 Tube Core Cable to a Kellems Connector Housing - Eliminate Cable Pistoning)



REFER SUMITOMO RECOMMENDED PROCEDURES (SRP): SP-F04-032