



Cold Shrink Splicing Kit QS-III

Instructions

IEEE Std. 404

46 kV Class

250 kV BIL



Selection Chart

| 3M™ Kit Number | Cable Insulation O.D. Range | Conductor Size Range |
|----------------|--|--|
| 5545A | 1.24" to 2.07" (31,5 mm to 52,6 mm) | 4/0 - 1000 kcmil* (120 - 500 mm ^{2*}) |

* Splices (including size transitions) can be made to smaller or larger conductors, provided both cables are within the Insulation O.D. Range and the connector meets the dimensional requirements shown below.

* 4/0 AWG and 250 kcmil cable may be used with Aluminum Connectors ONLY - do not use 4/0 AWG or 250 kcmil Copper Connectors.

Connector Dimensional Requirements

| | Minimum Inches (mm) | Maximum Inches (mm) |
|-----------------------------------|---------------------|---------------------|
| Outside Diameter | 0.87" (22,1 mm) | 2.07" (52,6 mm) |
| Length Aluminum (Al/Cu) | ----- | 7.50" (191 mm) |
| Length Copper | ----- | 8.25" (210 mm) |



3M™ Cold Shrink
Splicing Kit QS-III
5545A

78-8126-9058-0-A

CAUTION

Working around energized electrical systems may cause serious injury or death. Installation should be performed by personnel familiar with good safety practice in handling electrical equipment. De-energize and ground all electrical systems before installing product.

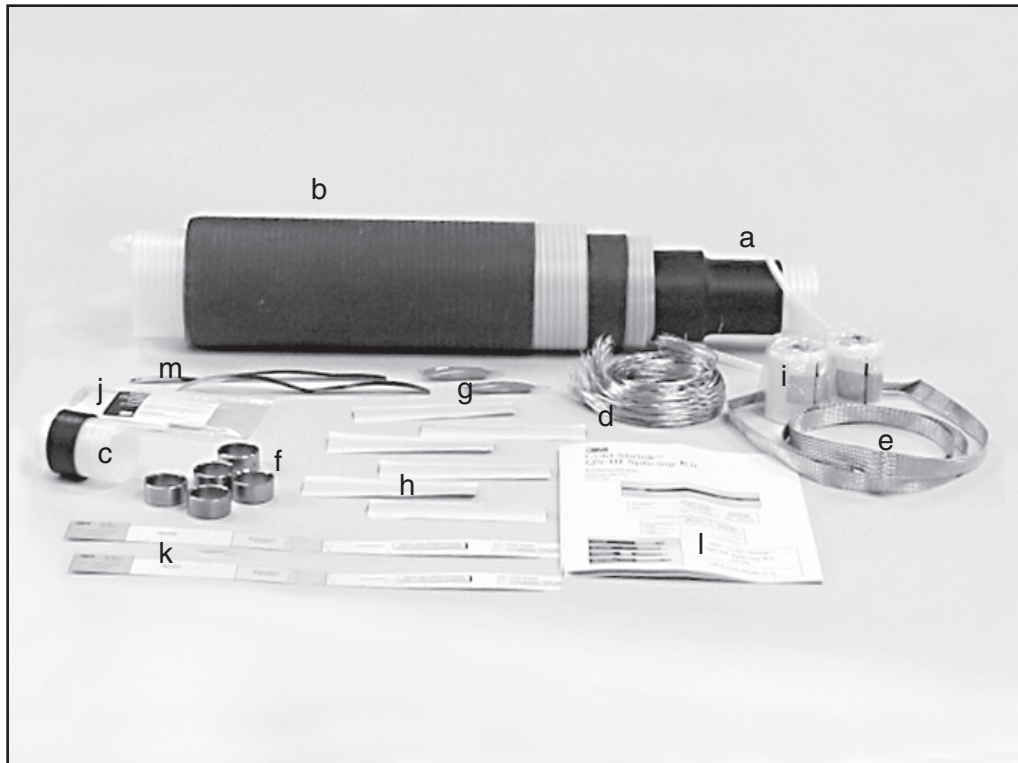
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1.0 Kit Contents:

1.1 Kit Contents are as follows:

- a) 3M™ Cold Shrink Silicone Rubber Splice Body 5477A (1 ea.)
- b) Cold Shrink Jacketing Tube (1 ea.)
- c) Cold Shrink Adapter Tube (2 ea.)
- d) Shielding Sleeve, 1/3 Neutral maximum (1 ea.)
- e) Ground Strap (1 ea.)
- f) Constant Force Spring Ground Connectors (5 ea.)
- g) Red Compound Tubes (non-silicone grease) (2 ea.)
- h) Scotch® Mastic Sealing Strips 2230, 6" length (6 ea.)
- i) Scotch Rubber Mastic Tape Rolls 2228 (2 ea.)
- j) 3M™ Cable Cleaning Pads CC-3 (1 ea.)
- k) Cable Preparation Templates (2 ea.)
- l) Instruction Booklet (1 ea.)
- m) Copper Foil Tape, 1/2" x 10" (2 ea.)

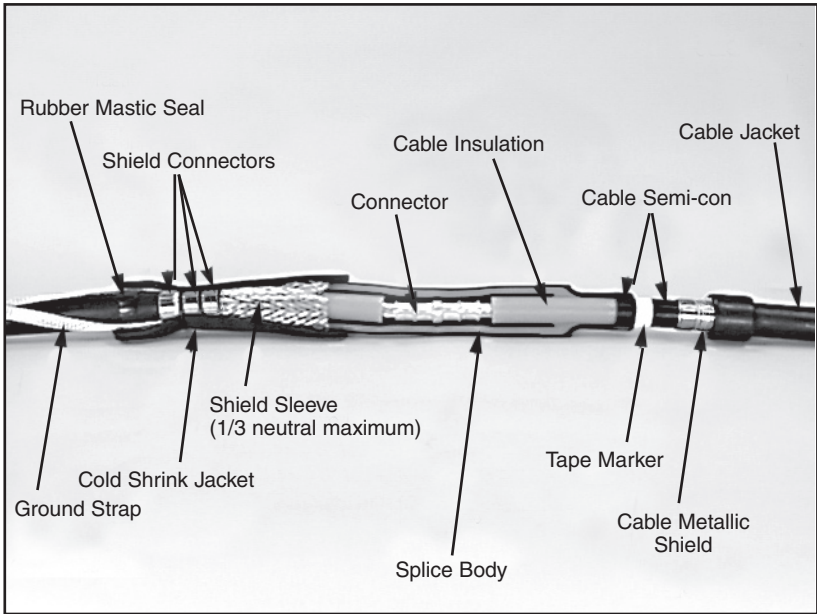
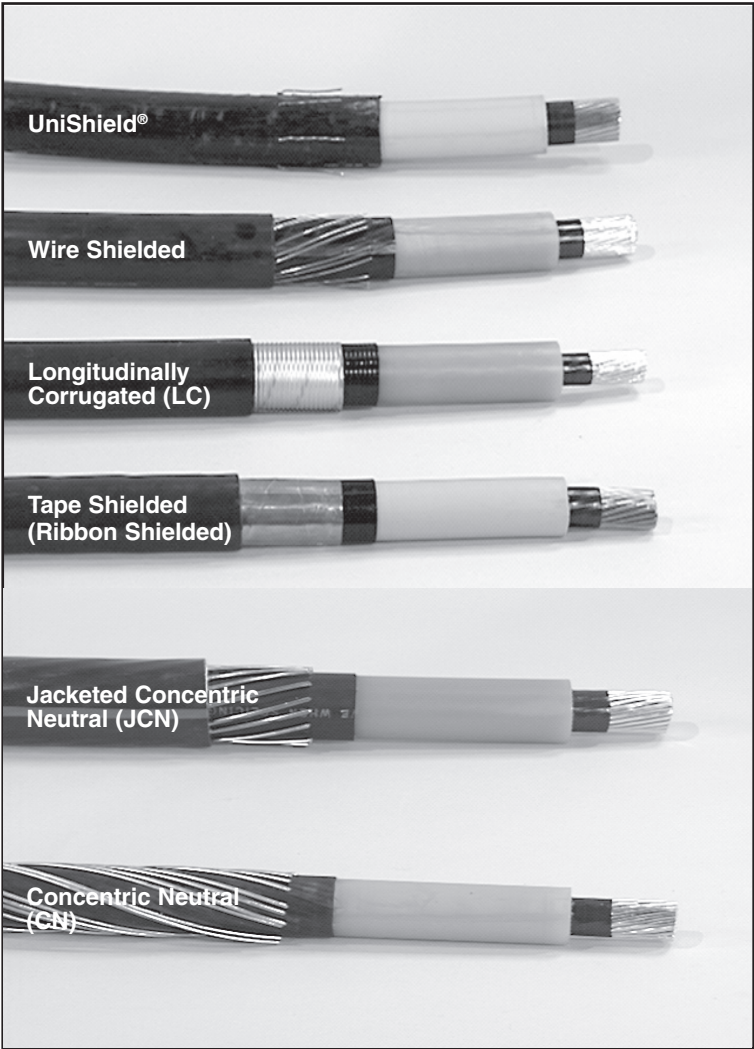


Note: Connector not shown, but if included in the kit, it is indicated on the packaging label.

Note: Item "C," Cold Shrink Adapter Tube, may not be included in all kits.

Note: Kits contain either 1 or 2 of item "K," Cable Preparation Template, as needed per conductor size.

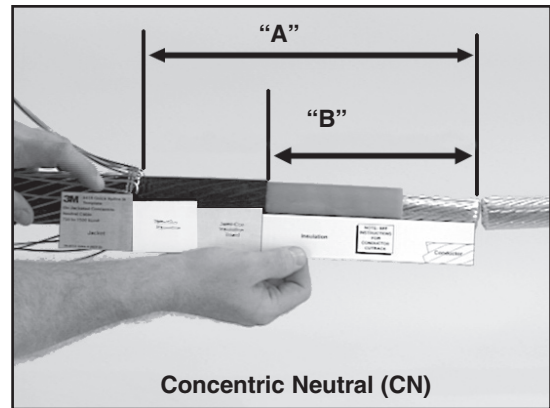
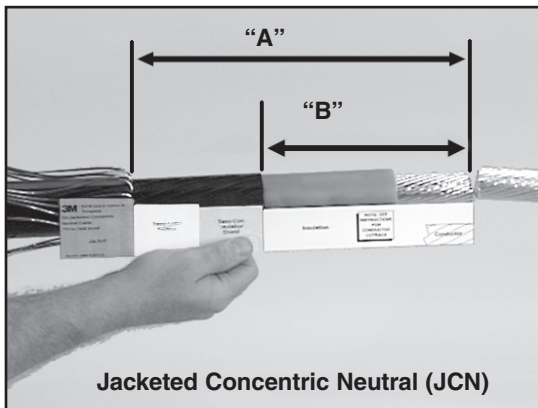
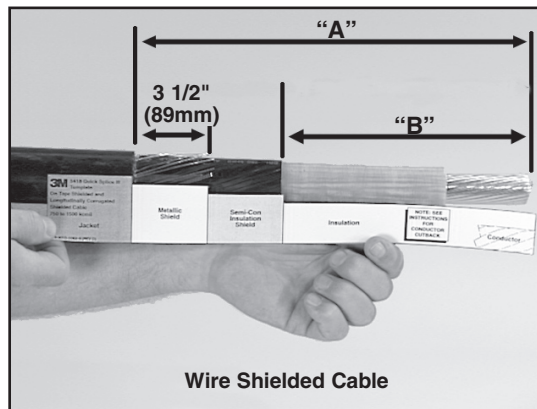
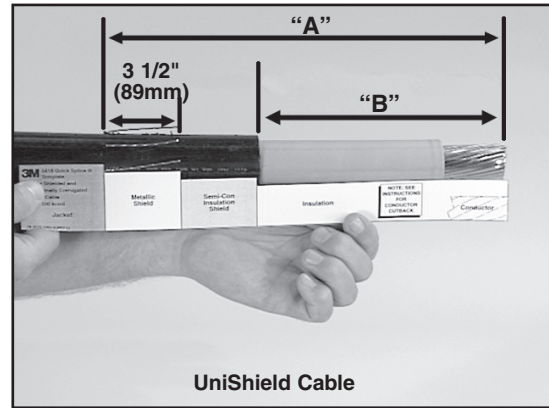
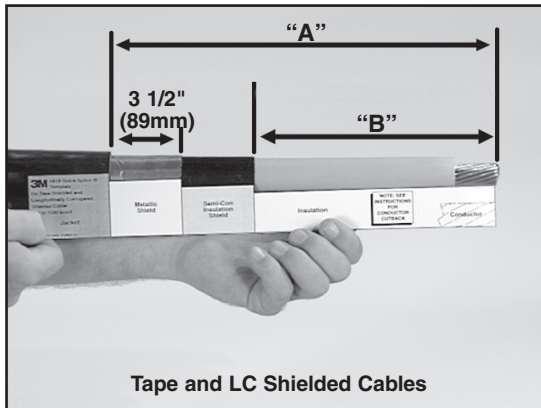
2.0 Instructions for Splicing Tape, Wire, UniShield® and Longitudinally Corrugated (LC) Shielded Cables or Transitions to Concentric Neutral (CN)/Jacketed Concentric Neutral (JCN) Cables



Cutaway view (LC)

2.1 Prepare Cables

2.1.1 Prepare cables according to standard procedures. Refer to template provided for tape shielded, wire shielded, UniShield®, Longitudinally Corrugated (LC), Concentric Neutral (CN), and Jacketed Concentric Neutral (JCN) cables or illustration below for proper dimensions. Do not cut neutral wires on JCN and CN cables.



| Typical Conductor Size* kcmil (mm ²) | Insulation OD Range Inches (mm) | Jacket Cutback "A" Inches (mm) | Semi-con Cutback "B" Inches (mm) |
|--|---------------------------------------|---|---|
| 4/0***-500 (120-300) | 1.24-1.70 (31,5-43,2) | 15 3/4 (400) | 9 1/4 (235) |
| 750-1000** (325-500) | 1.59-2.07 (40,4-52,6) | 15 1/4 (387) | 8 3/4 (222) |

* For 100% and 133% insulation levels, Insulation OD is the final determining factor.

** Cables must be within the Insulation OD Range of the splice kit and the connector must meet the dimensional requirements shown on the front page.

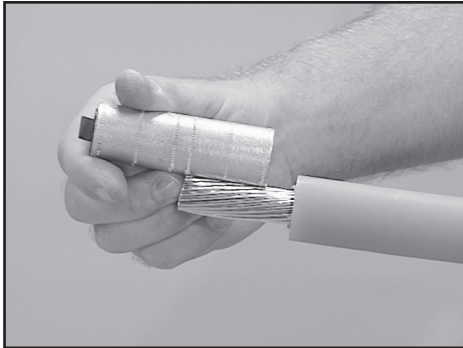
*** 4/0 AWG and 250 kcmil cables may be used with Aluminum Connectors ONLY - do not use 4/0 AWG or 250 kcmil Copper Connectors.

2.1.2 Remove cable insulation for 1/2 connector length plus an allowance * for increases in connector length due to crimping. Insulation removal length shall not exceed 4 1/8" (105 mm) from conductor end.

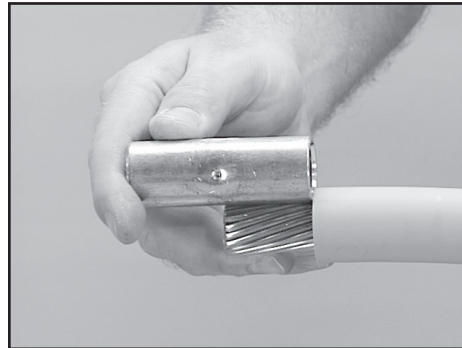
Do not install connector now.

**Note: This assumes that the installer has determined the increased length of an aluminum connector crimped with a specific tool and die.*

**Note: 4/0 AWG and 250 kcmil cable may be used with Aluminum Connectors ONLY - do not use 4/0 AWG or 250 kcmil Copper Connectors.*



Aluminum Connector (Al / Cu)



Copper Connector (Cu)

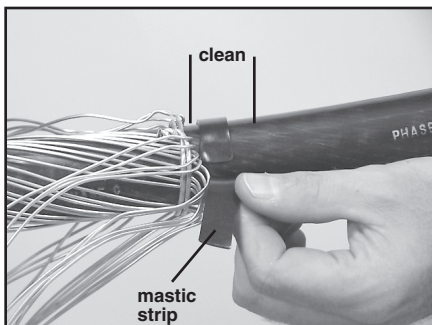
Aluminum (Al/Cu) Connector Growth Chart

| Conductor Size | Typical growth allowance (per end) |
|---------------------|------------------------------------|
| 4/0 AWG - 500 kcmil | 1/4" (6 mm) |
| 750 - 1000 kcmil | 3/8" (10 mm) |

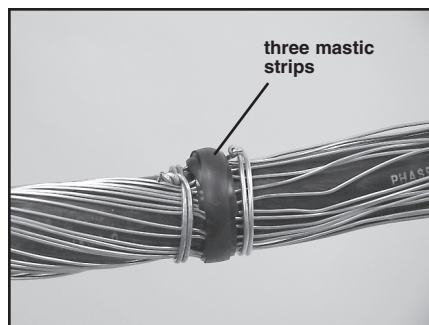
| | |
|---------------------|--------------|
| 4/0 AWG - 500 kcmil | 1/4" (6 mm) |
| 750 - 1000 kcmil | 3/8" (10 mm) |

*Notes: 1) Copper connectors do not require a length change allowance.
2) Maximum aluminum connector crimped length allowed is 8.25" (210 mm).*

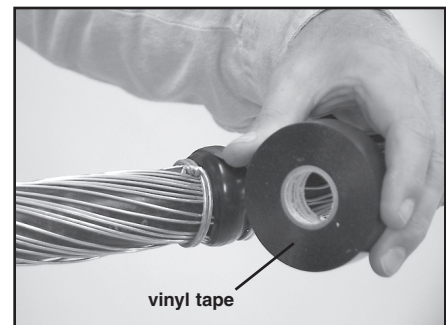
- 2.1.3 **Tape shield and LC shield:** Temporarily secure end of each metallic shield with a copper tape strip.
- Wire shield and UniShield®:** Carefully bend drain wires back over cable jackets and temporarily secure with vinyl tape.
- JCN:** Carefully bend neutral wires back over edge of cable jacket and temporarily secure with vinyl tape.
- CN: (as shown below)** Clean cable semi-con as shown. Place a strip of mastic around cable semi-con next to neutral binder. Fold neutrals into mastic and place another binder wire on the other side of the mastic. Wrap two additional strips of mastic over the first one and cover with two half lapped layers of vinyl tape. Fold neutrals over mastic seal and temporarily secure ends with vinyl tape.



CN Cable



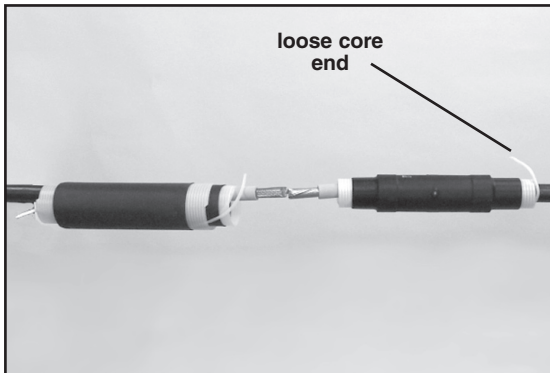
CN Cable



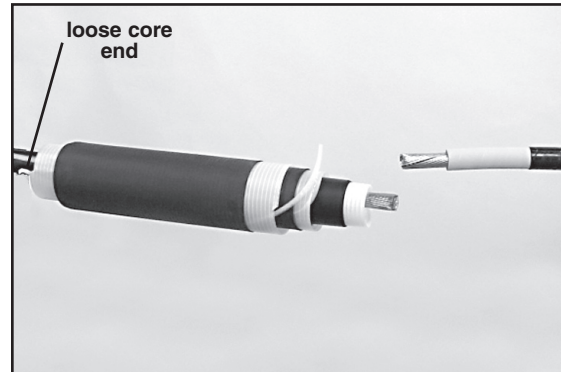
CN Cable

Note: *Jacketing is not optional. Cold shrink jacketing tube must be installed.*

2.1.4 Clean or cover cable jacket if necessary, for cold shrink parking position. Slide the jacketing tubes onto one cable end. Slide splice body onto opposite cable, loose core end first.



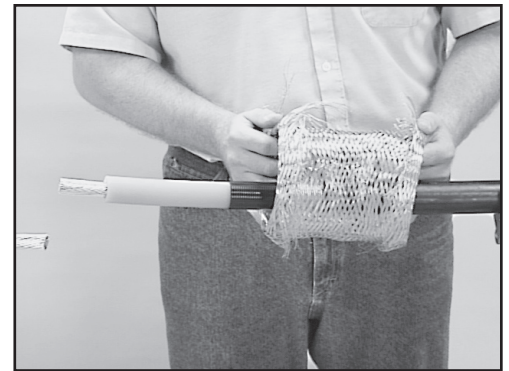
Normal Installation



* Stacked for limited space

***Note:** *If space is limited, the jacketing tube and splice body can be put onto one cable stacked inside each other.*

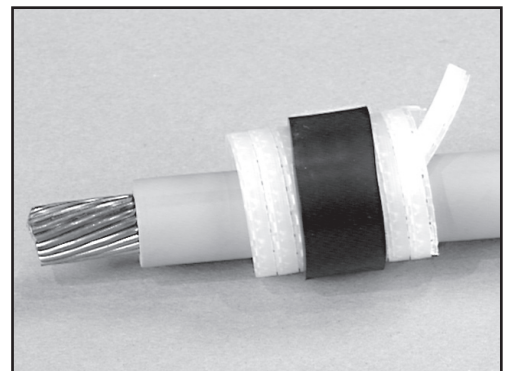
2.1.5 Position the expanded shield sleeve onto one cable. The shield sleeve is designed to carry up to 1/3 neutral current.



2.1.6 For 350 through 1000 kcmil copper connectors, 4/0 AWG through 750 kcmil aluminum connectors, or connectors with an O.D. between 0.87 - 1.60" (22,1 - 40,6 mm):

Slide cold shrink adapter tube onto cable insulation.

***Note:** *4/0 AWG and 250 kcmil cable may be used with Aluminum Connectors ONLY - do not use 4/0 AWG or 250 kcmil Copper Connectors.*



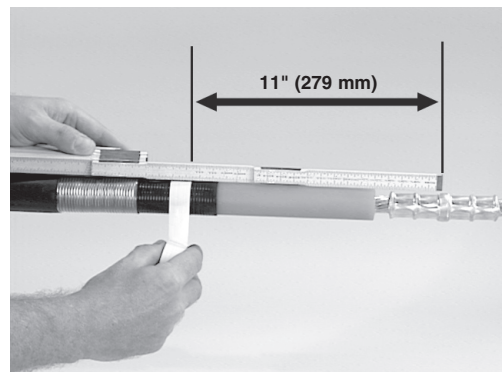
2.2 Install Splice

- 2.2.1 Install connector. See table (on cover) for proper connector dimensions. (For standard 3M™ Connectors, refer to table at the end of this instruction for crimping information). Remove any excess oxidation inhibitor from connector ends if using an aluminum connector.



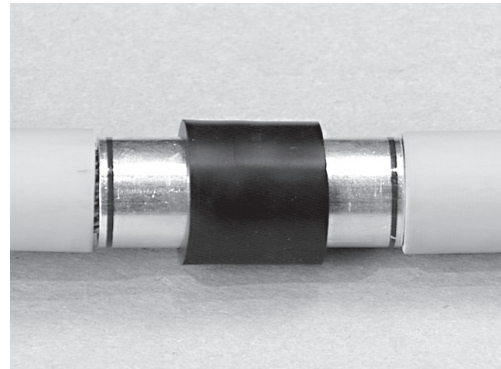
- 2.2.2 Apply a tape marker to semi-con insulation shield on cable which does not contain splice.

Measure 11" (279 mm) from center of connector.



- 2.2.3 **If using cold shrink adapter tube:**

Position adapter tube over the connector. Shrink adapter near center of connector by pulling and unwinding the loose core end in a counter-clockwise direction.

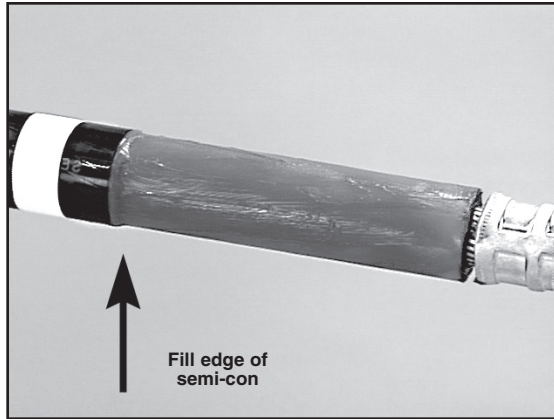


- 2.2.4 Clean cables using standard practice:

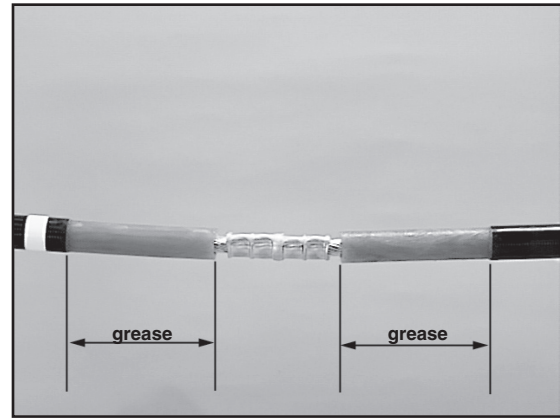
- Do not use solvent or abrasive on cable semi-conductive insulation shield.
- If abrasive is used on cable insulation, do not reduce diameter below the 1.24" (31,5 mm) minimum specified for the splice.

2.2.5 Apply red compound on cable insulation, making certain to fill in edge of cable semi-cons.

Do not use silicone grease.



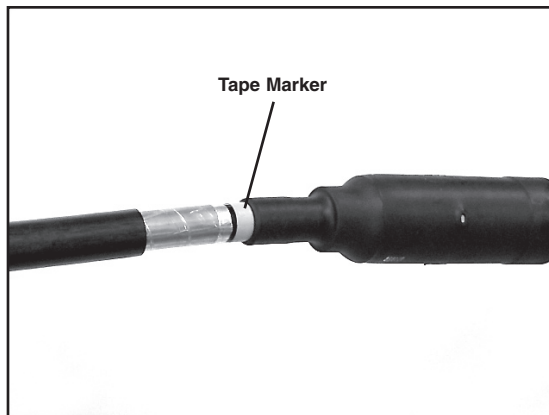
Compound filled at edge of semi-cons



Greased areas as noted

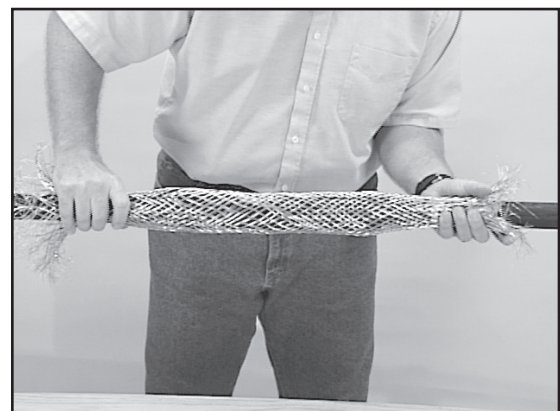
2.2.6 Position the splice body over connector area, aligning its end at the center of the tape marker. Slowly start to remove the splice core by pulling and unwinding the loose end counterclockwise, allowing only 1/4" (6 mm) of the splice to shrink onto the tape marker. Carefully slide the body off of the tape by pulling and twisting until the entire tape marker is exposed. Continue removing core to complete the splice body installation.

Note: *The splice body ends must overlap onto the semi-conducting layer of each cable by at least 1/2" (12,7 mm).*



Note: *Do not push the splice body towards the tape marker, as this may cause the end to roll under. If the end does roll under, DO NOT use sharp edged tools to pull it out as this could cut and damage the splice.*

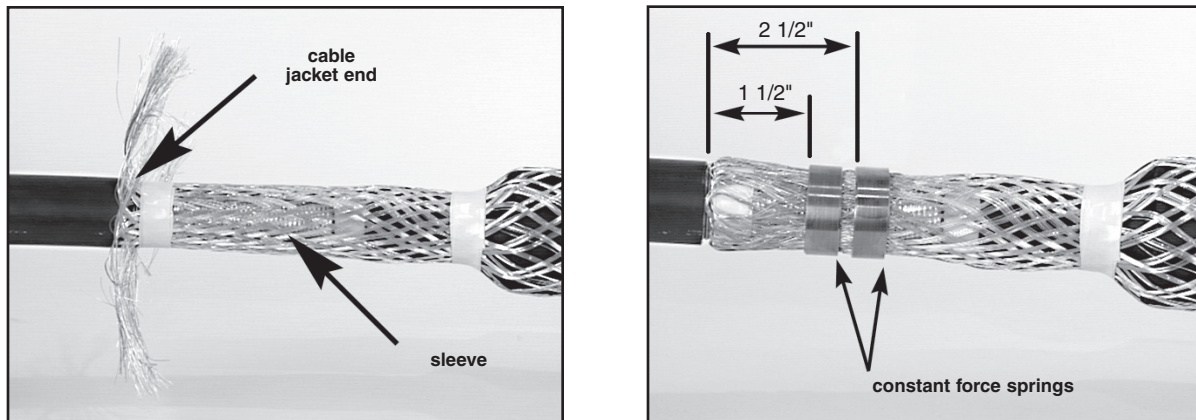
2.2.7 Center the expanded shield sleeve over splice body. Hand tighten sleeve from splice center outward in both directions.



2.2.8 Make shield sleeve connections at each cable end per the appropriate cable type.

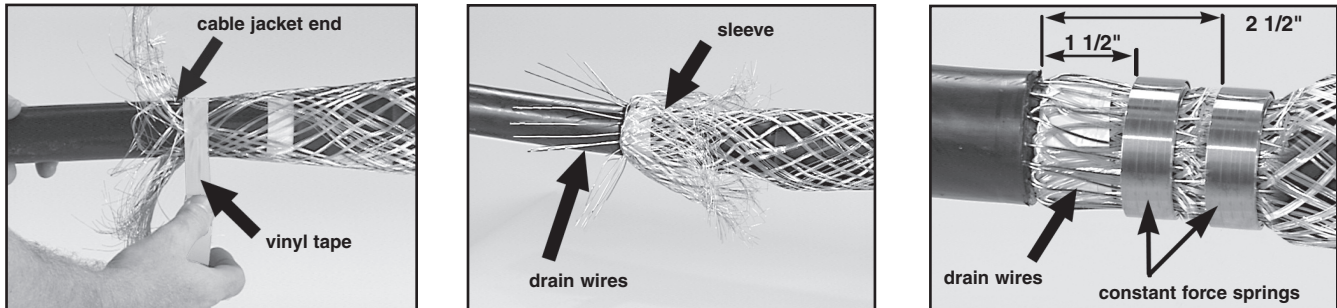
Tape Shielded / LC Shielded

Secure sleeve to cable metallic shield next to each cable jacket using two wraps of vinyl tape. Bend ends of sleeve back over vinyl tape and secure with constant force springs at 1 1/2" (38mm) and 2 1/2" (64mm) from jacket end. Trim off excess sleeve 1/2" (13mm) from springs, if necessary. Wrap two layers of stretched vinyl tape over springs.



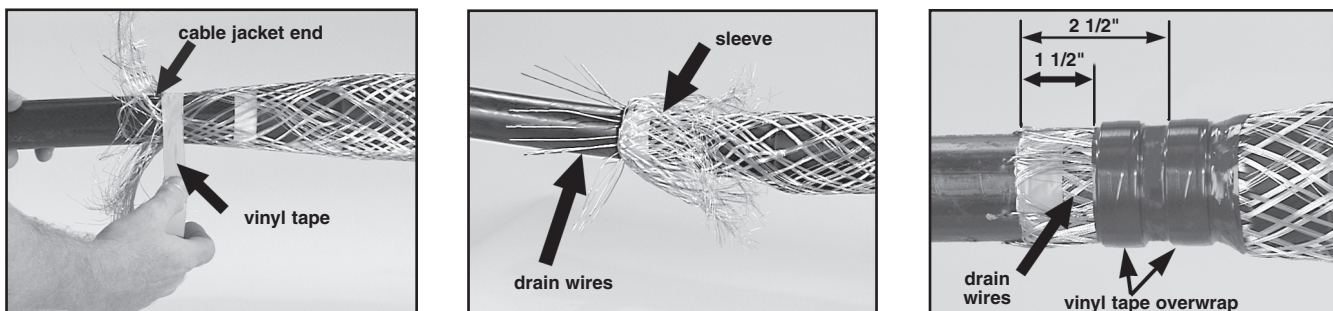
Wire Shielded

Carefully remove vinyl tape from drain wires. Secure sleeve to cable semi-conducting layer next to each cable jacket using two wraps of vinyl tape. Bend ends of sleeve back over vinyl tape. Position drain wires over the shield sleeve and secure with constant force springs at 1 1/2" (38mm) and 2 1/2" (64mm) from jacket end. Trim off excess sleeve 1/2" (13mm) from springs, if necessary. Wrap two layers of stretched vinyl tape over springs.



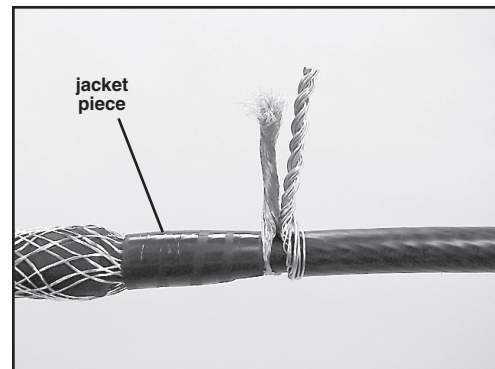
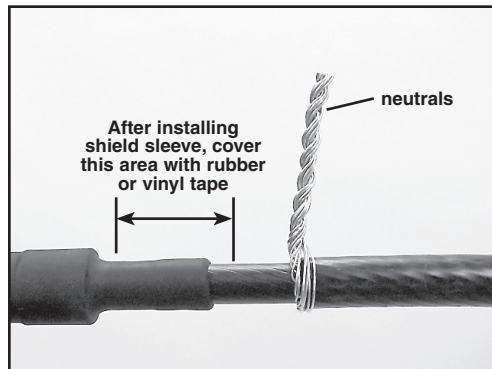
UniShield

Carefully remove vinyl tape from drain wires. Secure sleeve to cable semi-con jacket next to bent-back shield drain wires using two wraps of vinyl tape. Bend ends of sleeve back over vinyl tape. Carefully position drain wires over the shield sleeve. Secure with constant force springs 1 1/2" (38mm) and 2 1/2" (64mm) onto drain wires. Trim off excess sleeve 1/2" (13mm) from springs, if necessary. Wrap two layers of stretched vinyl tape over springs.

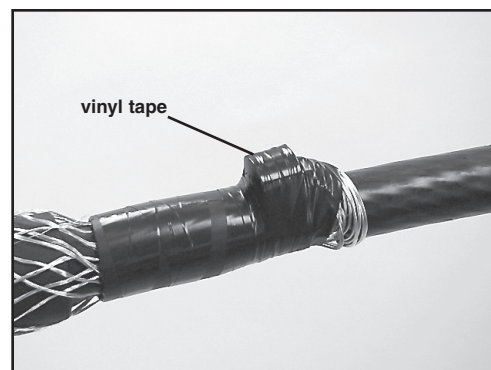
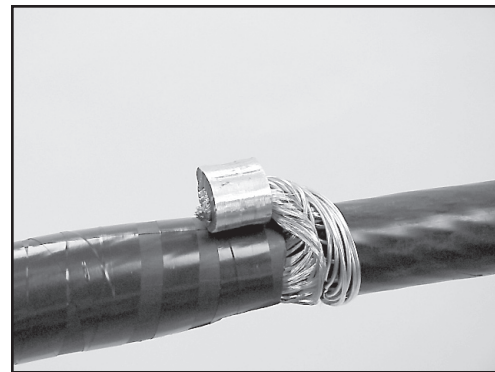


CN and JCN

Connect shield sleeve to metallic (LC, etc.) shield first. Remove vinyl tape from neutral wires and route neutral wires upward next to end of cable jacket (or CN binder), see illustration. Secure sleeve to cable semi-con next to neutral wires using two wraps of vinyl tape. Cover the end of the splice body (as shown below) with two half-lapped layers of rubber or vinyl tape. Place a 3-4" piece of cable jacket over the rubber or vinyl tape and cable semi-con as shown below.



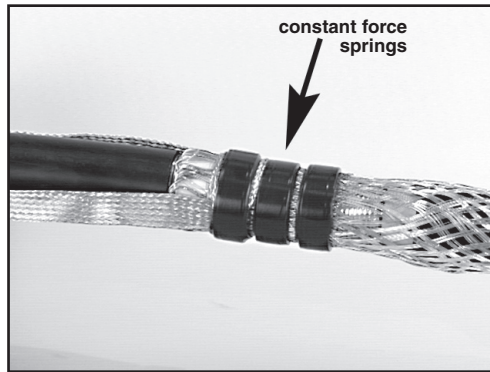
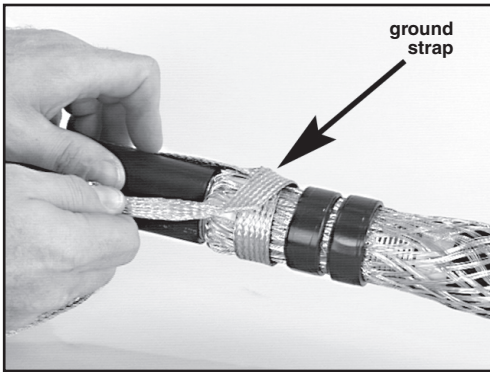
Keeping the connector as close as possible to the cable, connect shield sleeve and neutrals together, using a suitable compression connector. ("INLINE", "C", or "H" type). Crimp connector following the connector manufacturer's recommendation. Trim excess neutral wires and sleeve extending beyond the connector. Fold connector over shield sleeve and secure with vinyl tape.



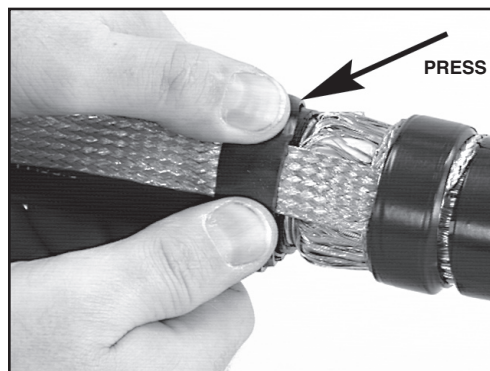
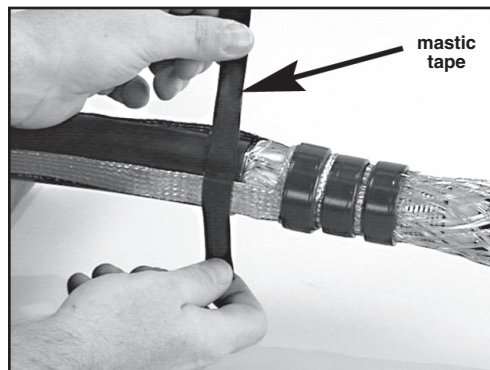
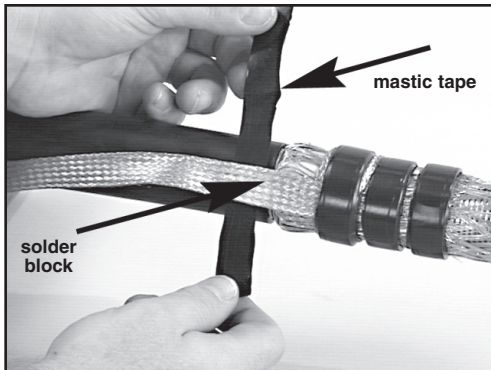
2.3 Grounding (Optional)

Note: Use these instructions if circuit grounding is required at this location.

2.3.1 On metallic shielded (non-neutral) cable, wrap the ground strap around the shield sleeve (between the cable jacket and constant force spring) with the tails towards the cable jacket. Secure using a constant force spring. Wrap two layers of stretched vinyl tape over spring.



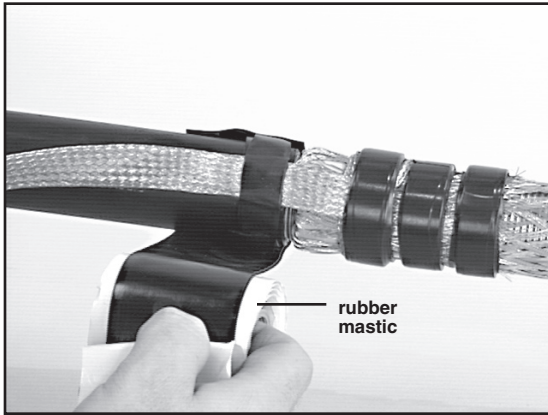
2.3.2 Place one mastic sealing strip on the cable jacket under the solder blocks of the ground strap. Place other strip over the solder blocks. Press the mastic strips around the solder block and to the cable jacket. If tails overlap at the solder blocks, place a piece of mastic between them.



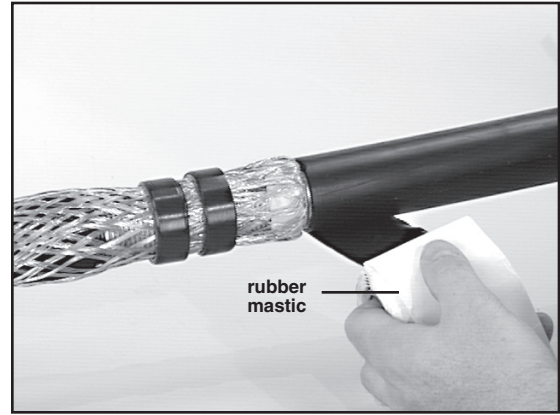
2.4 Install Jacket

Note: *Jacketing is not optional.*

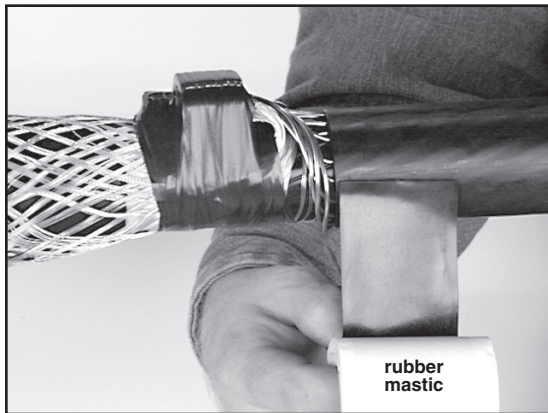
2.4.1 Apply one roll of slightly stretched rubber mastic tape around each jacket end (tacky side toward cable). Stretch and tear off the end of the rubber mastic as shown below. If ground strap was applied, tape over mastic sealing strips. For CN cable, cover mastic seal next to binder.



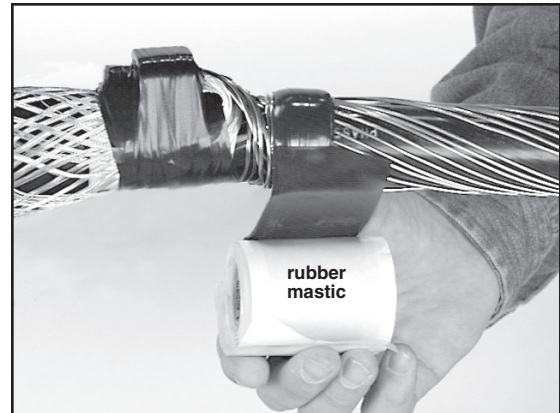
Tape, LC, UniShield, Wire Shield with ground strap



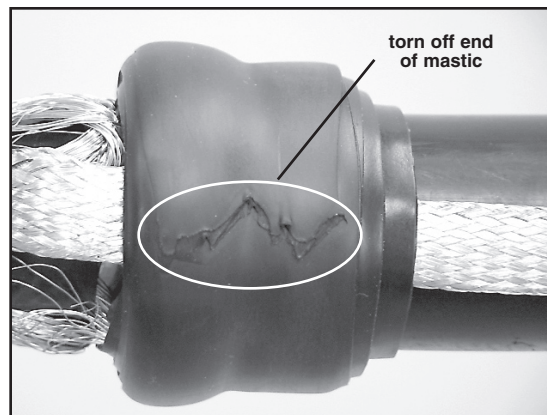
Tape, LC, UniShield, Wire Shield without ground strap



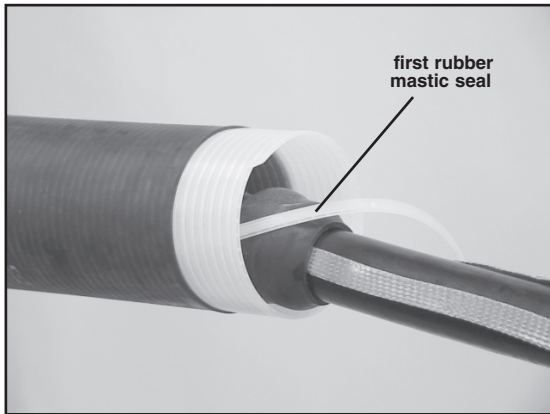
JCN cable



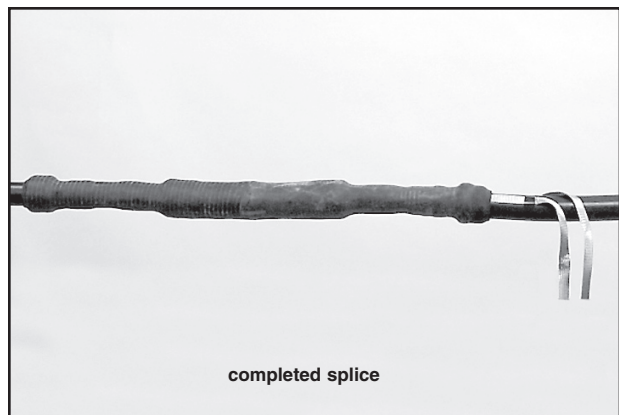
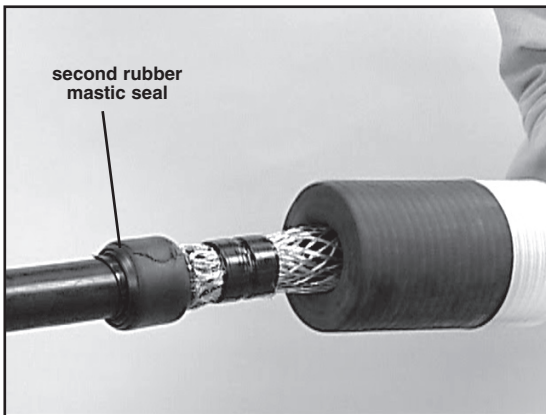
CN cable



2.4.2 Begin to install the cold shrink tube by completely covering the rubber mastic, and slowly pulling and unwinding the inner core counterclockwise toward the splice body. The outer core should remain relatively stationary while unwinding the inner core. If the outer core begins to move towards the first mastic seal, gently pull the outer core and jacketing tube towards the second mastic seal and continue unwinding the inner core.



2.4.3 Continue to install the cold shrink tube over the rubber mastic on the other cable by slowly pulling and unwinding the outer core counterclockwise. This portion of the cold shrink tube installs differently than typical cold shrink products in that as the tube shrinks, the end rolls under. The tube may need a slight push to get over the second mastic seal.



Note: *In applications where the splice is regularly exposed to high levels of ultra-violet radiation (i.e. direct sunlight), wrap two half-lapped layers of Scotch® Super 33+™ Vinyl Electrical Tape or Scotch Vinyl Electrical Tape Super 88 over the re-jacketing tubes.*

Note: *Connect optional grounding.*

Crimping Tool - Die Sets (number of crimps/end)

| 3MT™ Connector Number | Conductor Size (AWG or kcmil) | Burndy | | | | Thomas & Betts Corp. | | | Square D Co. Anderson Div. | | Kearney | |
|-----------------------|-------------------------------|----------|---------|-----------|----------------------|----------------------|-----------|----------|----------------------------|---------------------|---------|---------|
| | | MD6 | MY29 | Y34A | Y35, Y39, Y45*, Y46* | Y1000** | TBM 8 | TBM 12 | TBM 15 | VC6-3** VC6-FT** | | VC8C** |
| 20008 (AL/Cu) | 4/0 | W660 (4) | 4/0 (2) | A28AR (2) | U28ART (2) | (1) | White (4) | - | 66 (4) | (2) | - | 840 (4) |
| CI-4/0 (AL/Cu) | 4/0 | W249 (3) | - | - | U28ART (2) | - | Blue (4) | - | 76 (2) | (2) | - | 840 (4) |
| 20009 (AL/Cu) | 250 | W249 (3) | - | A29AR (2) | U29ART (2) | (1) | - | 71H (2) | 71H (2) | (3) | - | - |
| CI-250 (AL/Cu) | 250 | - | - | - | U31ART (2) | - | - | 87H (2) | 87H (2) | (2) | - | - |
| 20010 (AL/Cu) | 300 | - | - | A30AR (2) | U30ART (2) | (1) | - | 76H (3) | 76 (1) | (2) | - | - |
| CI-300 (AL/Cu) | 300 | - | - | - | U31ART (2) | - | - | 87H (2) | 87H (2) | (2) | - | - |
| 10011 (Cu) | 350 | - | - | A31R (2) | U31 R T (2) | - | Red (3) | - | 71H (3) | (2) | - | - |
| 20011 (Al/Cu) | 350 | - | - | - | U31 A RT (2) | (1) | - | 87H (3) | 87H (3) | (2) | - | - |
| 11011 (Cu) | 350 | - | - | A31R (3) | U31 R T (3) | - | Red (4) | - | 71H (4) | (3) | - | - |
| CI-350 (Al/Cu) | 350 | - | - | - | U31 A RT (2) | - | - | 87H (2) | 87H (2) | (3) | - | - |
| 20012 (Al/Cu) | 400 | - | - | - | U 32 A RT (4) | (1) | - | 94H(4) | 94H (4) | (2) | (2) | - |
| 10014 (Cu) | 500 | - | - | A34R (2) | U34 R T (2) | - | Brown (3) | - | 87H (3) | (2) | - | - |
| 20014 (Al/Cu) | 500 | - | - | - | U 34 A RT (4) | (1) | - | 106H (3) | 106 H (4) | (2) | (2) | - |
| 11014 (Cu) | 500 | - | - | A34R (4) | U34 R T (3) | - | Brown (4) | - | 87H (4) | (3) | - | - |
| CI-500 (Al/Cu) | 500 | - | - | - | U34 A RT (3) | - | - | - | 106 H (3) | (3) | - | - |
| 20016 (Al/Cu) | 600 | - | - | - | U 36 A RT (4) | (1) | - | - | 115 H (3) | (3) | (3) | - |
| 10019 (Cu) | 750 | - | - | - | U3 9 RT (3) | - | - | - | 106 H (3) | - | - | - |
| 20019 (Al/Cu) | 750 | - | - | - | U 39 A RT (4) | - | - | - | 125 H (5) | (3) | (3) | - |
| 11019 (Cu) | 750 | - | - | - | U3 9 RT (5) | - | - | - | 106 H (4) | - | - | - |
| CI-750 (Al/Cu) | 750 | - | - | - | U39 A RT (3) | - | - | - | 125 H (3) | (3) | - | - |

*Y45 and Y46 accept all Y35 dies ("U Series"). For Y45, use PT6515 adapter. For Y46, use PUADP adapter.

**Anderson VC6-3, VC6-FT, VC8C and Burndy Y1000 require no die set.

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*Note: The core material being removed from the Splice Body and Jacket
Tubes are mixed polymers and can be recycled with other waste.*



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