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## **Installation Procedure and Inspection Criteria for SolderSleeve Coaxial Cable Terminators on Coaxial Cables Rated For At Least 125°C.**

### **1.0 Scope**

This standard contains the procedures for terminating the shield and conductor of coaxial cables rated for at least 125°C with Raychem Series D-181 Coax terminators.

### **2.0 References**

- 2.1 Raychem Specification Control Drawings:  
Series D-181

### **3.0 Recommended Raychem Application Equipment**

(1 Tool Required):

#### **A. Convection Heaters**

1. AA-400 Super Heater with Mini SolderSleeve reflector.
2. CV-5000 ThermoGun Model TG-500 with TG-14 reflector.
3. MiniGun with SolderSleeve reflector.

#### **B. Infrared Heaters**

1. IR-500 with RG-2 or RG-11 reflector.
2. IR-550 with RG-2 or RG-11 reflector.
3. MiniRay Series Infrared heaters.

#### **C. Semi-Automatic Heaters**

1. IR-1813
2. IR-1038
3. IR-1156

#### **NOTE:**

Semi-automatic heaters may require special set-up instructions.  
Consult Raychem.

### **4.0 General Information**

#### **4.1 Termination Information**

- 4.1.1 Cable constraints. The various terminators covered by this specification are designed for use on cables having tin or silver-plated shields and conductors. Bare copper shields and conductors may be used if the cable is prepared for termination immediately prior to installation of the solder device. It is further recommended that bare copper conductors be pre-tinned with Sn63 solder.

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4.1.2 Solderability of Shields and Conductors. The shield and center conductor of the cable to be terminated must meet the solderability requirements of MIL-STD-454, Requirement 5 or IPC-S-815.

4.1.3 Terminator Description. The Raychem D-181 series coaxial cable terminators are designed for use in attaching a ground lead to the shield and splicing a second lead to the center conductor of coaxial cables rated for at least 125°C. The terminators are supplied as two separate sleeves, the primary splice sleeve and the shield termination sleeve. These sleeves may be installed in separate steps or may be snapped together and installed as a single unit. Those parts having black ground leads may be installed with convection heat only. All other sleeves may be installed with either convection or infrared heating.

4.1.4 Part Identification.

4.1.4.1 See the appropriate Raychem Devices Specification Control Drawing for exact construction details.

4.1.4.2 Part Numbering System:

The D-181 Series Coax Cable Terminators are identified by a multi-digit, alpha-numeric system which identifies the size and construction of the device.

D-181- <u>A</u>	A numeric character designating the size (ID) of the device.
D-181- <u>AB</u>	A numeric character designating the type of insulation on the pre-installed lead.
D-181- <u>ABCC</u>	Numeric characters designating the gauge (AWG) of the pre-installed lead.
D-181- <u>ABCC-D(D)/E</u>	Numeric characters designating the color of the ground lead (D) and conductor lead (E).

4.1.4.2.1 Sleeve size (Diameters of primary splice sleeve and shield termination sleeve.)

A. Diameters

1. 2.28 and 3.68 (0.090 and 0.145)
2. 3.05 and 4.45 (0.120 and 0.175)
3. 3.94 and 5.00 (0.155 and 0.205)

4.1.4.2.2 B. Pre-installed lead type

X

Lead Type

- 2 Raychem 55A0111. Tinplated, stranded, copper (MIL-W-22759/32).
- 5 Raychem 35CO211. Tinplated, stranded, copper.
- 6 Bus wire. Solder-plated solid copper.
- 7 MIL-W-81822/6 PTFE insulated, Silver coat solid OFHC.
- 8 MIL-W-81822/13. ETFE insulated, Silver coated solid OFHC.

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## 4.1.4.2.3 Preinstalled lead gauge

<u>Lead Type</u>	<u>Available Gauges (Stranding)</u>
2	20 (19/32), 22 (19/34), 24 (19/36), 26 (19/38), 28 (7/36)
5	22 (19/34), 24 (19/36)
6	20, 22, 24, 26 all solid conductors.
7 & 8	24, 26, 30 all solid conductors.

## 4.1.4.2.4 D/E - Preinstalled lead insulation color

Standard Colors: Primary splice lead, 9 - white  
Ground Lead

<u>Wire Type</u>	<u>Standard Colors</u>
2	90 - white with black stripe
5	6 - blue
7 & 8	6 - blue

## Examples of Part Identification:

D-181-1222-90/9: D-181 Series Coax Termination Sleeve having as supplied I.D. is of 2.28 (0.090) and 3.68 (0.145), a pre-installed ground lead conforming to M22759/32-22-90 and a pre-installed primary lead conforming to M22759/32-22-9.

D-181-3726-6/9: D-181 Series Coax Termination Sleeve having as supplied I.D.'s of 3.94 (0.155) and 5.01 (0.205), a preinstalled ground lead conforming to MIL-W- 81822/6-26-6 and a preinstalled primary lead conforming to MIL-W- 81822/6-26-9.

## 4.1.5 Selection of Termination Sleeve

To select the correct size D-181 Series Coax Termination Sleeve you must know the following information.

## A. Your coaxial cable:

- a. Primary conductor gauge
- b. Dielectric diameter (D.O.D.)
- c. Shield diameter (S.O.D.)
- d. Jacket diameter (J.O.D.)

## B. Type, gauge and color of preinstalled leads required. Make selection from section 4.1.4.2.

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### *Selection Guide - Coax Cable Size*

<b>D-181-A</b>	<b>Conductor Gauge</b>	<b>D.O.D.</b>	<b>S.O.D.</b>	<b>J.O.D.</b>
1	30 - 24	0.64 - 2.29 (0.025 - 0.090)	1.14 - 3.18 (0.045 - 0.125)	1.52 - 3.56 (0.060 - 0.140)
2	30 - 24	0.89 - 3.00 (0.035 - 0.118)	1.52 - 3.56 (0.060 - 0.140)	1.91 - 4.32 (0.075 - 0.170)
3	24 - 20	1.40 - 3.89 (0.055 - 0.153)	2.16 - 4.57 (0.085 - 0.180)	2.54 - 5.21 (0.100 - 0.205)

## **5.0 Procedure**

### **5.1 Cable Preparation**

- Strip cable to expose  $6.35 \pm 0.64$  ( $0.250 \pm 0.025$ ) of conductor, dielectric, and shield. Pre-tin conductor if bare copper.
- It is not necessary nor recommended to fold the shield back over the cable jacket, however if it is desired to do so the dimensions shown above must be maintained to ensure correct alignment of sleeves and cable.

### **5.2 Installation of Terminator**

#### **NOTE**

The use of a Raychem AD-1319 holding fixture will aid in keeping leads aligned during installation.

The two components of the D-181 termination sleeve can be installed separately or snapped together and installed as a unit.

#### **5.2.1 Two-step Operation**

- Insert the cable into the primary splice sleeve so that the dielectric stops at the shoulder in the sleeve and the conductor extends through the solder preform.
- Apply heat, using one of the recommended heat sources (see section 3), to the solder preform until it has completely melted and formed a fillet between the preinstalled lead and the cable conductor.
- Position the shield termination sleeve so that the inside end of the front insert (lead end) is aligned with the end of the cable dielectric. This should position the solder preform over the exposed shield.

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- d. Heat this sleeve.
  - i. Position sleeve so that the solder preform is centered in reflector opening; heat until the solder melts and forms a fillet between the lead and shield.
  - ii. Apply heat to lead-end of sleeve until it recovers and the sealing ring completely melts.
  - iii. Apply heat to cable end of sleeve until it recovers and the sealing ring completely melts.

### 5.2.2 Single-unit Installation.

- a. Assemble the two components into a single unit as follows:
  1. Pass the lead of the primary splice sleeve through the shield termination sleeve from the larger diameter end.
  2. Pull on this lead until the primary sleeve stops against the front insert of the shield sleeve.
  3. When properly positioned the “belled” end of the primary sleeve will be between the center and front inserts of the shield sleeve and its solder preform will be beyond the front end of the shield sleeve.
- b. Insert the cable into the unit so that the two solder preforms are over the exposed conductor and shield of the cable.
- c. Apply heat, using one of the recommended heat sources (see Section 3), to the primary splice solder reform until it has melted and formed a fillet between the preinstalled lead and the cable conductor. Then move heat to shield solder preform and heat until solder melts and forms a fillet between the preinstalled lead and the shield. If needed, apply heat to the front and rear inserts of the shield termination sleeve.

## 6.0 Inspection

Full color photographs showing accept/reject criteria are available from Raychem. Also, the inspection criteria of MIL-STD-454, Requirement 5 may be used.

### 6.1 Assembly

1. Conductor Splice
  - a. The primary lead conductor must overlap the cable conductor by at least 5.08 (0.200 inch).
  - b. The primary lead must not extend over the dielectric.
2. Shield Termination
  - a. The ground lead conductor must overlap the stripped portion of the shield by at least 5.08 (0.200 inch).
  - b. The ground lead must not extend over the cable jacket.
  - c. The insulation sleeve must completely cover the stripped portion of the shield.

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## 6.2 Heating

1. The solder preforms must have completely melted and flowed along the lead/conductor and lead/shield interfaces.
2. A solder fillet must be visible along at least one side of both interfaces.
3. The solder fillet must be at least 4.45 (0.175) long.
4. All sealing rings must be melted completely and evenly around the circumference of the cable.
5. The sleeve must not be discolored to the point where it prevents visual inspection of the solder joint.

## 6.3 Damage

1. The insulation sleeves must not be cut or split.
2. The strands of the conductor, shield or leads must not be poking through the insulation sleeve of the terminator.

## 7.0 Rework

### 7.1 Under heated Terminations

Reheat, per 5.2, until correct solder flow is obtained.

### 7.3 Overheated Terminations

#### **WARNING**

Eye damage is possible if safety glasses are not worn during sleeve removal.

#### A. Conductor Termination

1. Heat until solder has melted and pull lead out of termination.
2. Allow sleeve to cool and then pull sleeve off of cable.
3. Re-terminate per 5.2 (a) and (b).

#### B. Shield Termination

1. Heat the sleeve until the solder and inserts re-melt and then pull sleeve and lead off of the cable.
2. The cable should be checked for Dielectric Withstand, at the test voltage of the applicable cable specification, between the conductor and shield. If the cable is electrically sound re-terminate per 5.2 © and (d). If it is not, then cut off terminated end and start over.

### 7.3 Damaged Termination Sleeve Insulation

If a strand of wire has punctured the sleeve, cut out protruding strand flush with the sleeve and over-insulate with a piece of Raychem heat-shrinkable Kynar.



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Specification: **RCPS-200-36**

Rev: C

Date: June 21, 2001

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#### 7.4 Inspection of Reworked Assemblies

All reworked assemblies should be re-inspected per Section 6. In addition, a Dielectric Withstand test should be run between the shield and conductor to ensure that the cable dielectric has not been damaged.