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Specification: **D-5023**
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SolderSleeve® One-Step™
Insulated Electrical Termination Devices

1.0 Introduction

1.1 **Scope.** This specification covers the design, performance, and qualification for Raychem Soldersleeve One-Step electrical termination devices.

1.2 **Description.** Raychem Soldersleeve One-Step electrical termination devices covered by this specification consist primarily of heat-shrinkable insulating sleeve and a solder preform. These devices reduce to predetermined diameters upon the application of heat, and form insulated, soldered connection between wire or cable conductors.

1.3 **Classification**. Soldersleeve One-Step Devices shall be specified on the applicable Specification Control Drawing.

1.4 **Temperature Rating**. The continuous operating temperature for Soldersleeve devices shall be -55ºC to +125ºC.

1.5 **Electrical Rating**. The electrical rating of terminations made with Soldersleeve One-Step Devices shall be as specified on the applicable Specification Control Drawing.

2.0 Applicable Documents

2.1. **Issues of documents**. The latest issue of those specification and standards referenced below or on the applicable Raychem Specification Control Drawing shall form part of this document to the extent specified.

Specifications:

UL 486 A	Wire Connectors And Soldering Lugs For Use With Copper Conductors
ASTM D 2671	Standard Test Methods For Heat-Shrinkable Tubing For Electrical Use

3.0 Requirements

3.1 **Detail Requirements.** Detail requirements shall be as specified herein, exceptions applicable to a particular style of Soldersleeve One-Step device shall be as specified on the Specification Control Drawing. In the event of conflict between requirements of this specification and the Specification Control Drawing, the latter shall take precedence.

3.2 **Classification of Requirements.** The requirements for Soldersleeve One-Step devices are classified herein as follows:

Requirement	***Paragraph***
Qualification	3.3
Materials	3.4
Design and Construction	3.5
Performance	3.6
Product Identification	3.7
Workmanship	3.8

3.3 **Qualification.** Soldersleeve One-Step devices furnished under this specification shall be products, which are qualified to this specification by test or by similarity of design and materials.

3.4 **Materials.** The materials used in the Soldersleeve One-Step devices shall be as specified herein.

3.4.1 Insulation Sleeve. Insulation sleeves shall be transparent, polyolefin-based heat-shrinkable tubing.

3.4.2 Solder Preform with Flux. Prefluxed solder performs shall consists of a tin/lead solder alloy, containing either cadmium or bismuth, with a melting point of approximately 145ºC with a non-corrosive rosin-based, flux. Flux may be an internal core or an external coating of the solder.

3.4.3 Meltable Inserts. Meltable inserts, when present, shall be polyolefin-based thermoplastic material.

3.4.4 Pre-installed Leads. Pre-installed leads shall be as defined in the applicable Specification Control Drawing.

3.5 **Design and Construction.** Soldersleeve One-Step devices shall conform to the design, construction, and physical dimensions specified in the applicable Specification Control Drawing.

3.6 **Performance.** Soldersleeve One-Step devices shall conform to those requirements of UL 486 A specified herein.

3.6.1 Static Heating. When terminations, made with Soldersleeve One-Step Devices, are tested in accordance with paragraph 11 of UL 486 A, the temperature of the splice shall not rise more than 50ºC (90ºF) above ambient temperature.

3.6.2 Pullout. When the installed Soldersleeve devices are tested in accordance with paragraph 12 of UL 486 A, the force required to fracture the solder joint shall be not less than the pullout forces listed in Table 12.1 of the UL specification for the wire size used in the specimen.

3.6.3 Dielectric Withstanding Voltage. Installed and uninstalled Soldersleeve One-Step devices shall evidence no flashover, or breakdown when tested in accordance with paragraph 13 of UL 486 A.

3.6.4 Salt Spray (Corrosion). When installed Soldersleeve One-Step devices are subjected to 48-hour salt-spray testing in accordance with 4.5.7, there shall be no evidence of corrosion, and the termination shall meet the pullout requirements specified in 3.6.2.

3.6.5 Immersion Resistance After Immersion in Water. The insulation resistance of the terminated Soldersleeve One-Step device shall not be less than 5,000 Megaohms when measured in accordance with 4.5.4 after the assembly has been immersed in water for 24 hours.

3.6.6 Copper Mirror Corrosion. When Soldersleeve One-Step devices are tested in accordance with ASTM D 2671 Test A copper removal shall not exceed 10 percent of the area of the mirror above the bottom 0.063 inch (1.60 mm).

3.7 **Workmanship.** When Soldersleeve One-Step devices shall be uniform in quality and shall be free from defects detrimental to life, serviceability, or performance.

4.0 Quality Assurance Provisions

4.1 **Responsibility of Inspection.** Unless otherwise specified in the contract or purchase order, the supplier is responsible for performing the inspection tests specified herein. The supplier may utilize his own facilities or any suitable testing facility. Inspection records of the tests shall be kept complete and available to the buyer as specified in the contract order.

4.1.1 Inspection Equipment and Facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality, and quantity to permit performance of the required inspection shall be established and maintained by the supplier.

4.2 **Classification of Inspections.** The examination and testing of Soldersleeve devices covered by this specification shall be classified as follows:

a) Qualification Inspection (see para. 4.3)
b) Quality Conformance Inspection (see para. 4.4)

4.3 **Qualification Inspection.** Qualification inspection shall consist of visual and dimensional examination per paragraph 4.5.2 and the Dielectric Voltage Withstand and the tests in Table 5.2 of UL 486 A.

4.3.1 Test Samples for Qualification Testing. Test samples submitted for qualification inspection shall be in accordance with the material requirements set forth herein and the dimensional requirements of the applicable Specification Control Drawing.

4.3.2 Failures. One or more failures in the specified tests shall be cause for failure of qualification of the parts under tests.

4.3.3 Qualification report. Qualification shall be documented in a report, which shall be available to buyers.

4.3.4 Retention of Qualification. Qualification will remain in effect as long as the component design and materials of construction remain unchanged, and components meet quality conformance requirements.

4.4 Quality Conformance Inspection.

4.4.1 Component Materials Inspection. Component materials inspection shall consist of verification that the component materials are in accordance with paragraph 3.4.

4.4.2 Inspection of Product for Delivery. Inspection of product for delivery shall consist of visual and dimensional examination. Statistical process control (SPC) may be substituted for lot acceptance inspection.

4.4.2.1 Inspection Lot. An inspection lot, as far as practicable, shall consist of all Soldersleeve One-Step devices having the same designation offered for inspection at one time.

4.5 Test procedures.

4.5.1 Test conditions. Unless otherwise specified herein, all inspection shall be made at ambient temperature, pressure, and humidity as specified in general requirements of MIL-STD-202.

4.5.1.1 Series 3800 Wire & Cable Terminators. When installed Soldersleeve One-Step devices are specified for testing, the test specimens shall be 1 to 1 in-line splices between wires of the same gauge size and material, assembled in accordance with the specified assembly technique. Splice configurations shall represent the maximum and minimum size range listed in the Soldersleeve One-Step selection guide. Length of the test specimen wires shall be 8 inches or as called out in UL 486 A for the particular test.

4.5.1.2 Series 1500 Discrete Wire Terminators. The test specimen shall be single wire terminations meeting the dimensional criteria detailed on the applicable selection guide. Length of the test specimen wires shall be 8 inches or as called out in UL 486 A for the particular test.

4.5.2 Visual and Dimensional Examination.

4.5.2.1 Visual and Dimensional Examination As Supplied (see 3.1, 3.4, 3.5, 3.7, 3.8). Devices shall be visually examined, and as-supplied dimensions shall be measured in accordance with the applicable Specification Control Drawing.

4.5.2.2 Dimensional Examination After Unrestricted Shrinkage (see 3.5). Soldersleeve One-Step Devices, with the solder preform removed, shall be measured for overall length, heated at 200ºC for five (5) minutes and the after-shrinkage length shall be measured. Longitudinal change after the shrinkage shall be calculated as follows:
Longitudinal change % = 100 X (original length - recovered length) / original length

4.5.3 Insulation Resistance after Water Immersion (see 3.6.5). Soldersleeve One-Step devices installed on the maximum size wires shall be immersed in water at 25 ±5ºC for 24 hours. After removal from the immersion bath excess water shall be removed from the surface of the sleeve. The insulation resistance of the insulation sleeve shall be measured using the suitable Megohmeter, between the conductor and a strip of metallic foil 1/2 inches wide wrapped around the middle of the insulation sleeve. The test potential of 500V d-c shall be applied for 1 minute or until the reading is steady or whichever is less.

5.0 Preparation For Delivery

5.1 **Packaging and Packing.** Soldersleeve One-Step devices shall be packaged and packed in accordance with commercial practice.

5.2 **Marking.** Unless otherwise specified in the procurement document, marking of the packaging shall be in accordance with commercial practice.

6.0 Notes

6.1 **Intended Use**. The Soldersleeve One-Step devices described in this specification are intended for use in making soldered connections between the braided shield of a cable and a ground lead, between the braided shield and primary conductor of a coaxial cable and two extension leads, between two primary conductors, or between a wire and a connector terminal or component lead depending on the series designation of the device. They are suitable for usage in electrical circuits where the operating temperature does not exceed 125ºC (257ºF). The application in which any Soldersleeve device is used should conform with the Raychem Soldersleeve One-Step Selection Guides, and the installation should be in accordance with the installation procedure applicable to the type of termination being made.

6.2 **Ordering Data.** Procurement documents should specify the following:

(a) Raychem part number;
(b) Quantity;
(c) Any special marking or packaging requirements.

6.3 **Design Modification**. Raychem reserves the right to make minor design modifications (which do not affect the form, fit or primary function of the product) without notification.

6.4 **Storage Recommendation.** Raychem Soldersleeve devices may be stored up to 5 years after the date of manufacture indicated on the label, provided that the following conditions are satisfied:

- The products are kept unopened in their original packages.
- The storage temperature does not exceed +50ºC or fall below +5ºC, and the relative humidity does not exceed 80 percent.
- If storage exceeds 5 years, or storage conditions are not as described above, the user should carry out tests on installed products to ensure that solder joints have acceptable mechanical and electrical characteristics.