

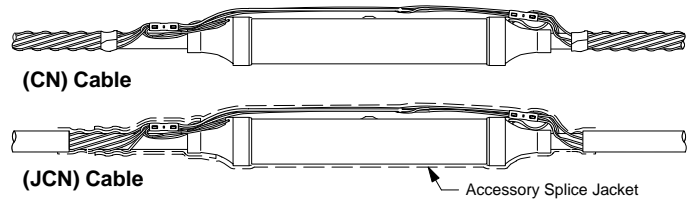


Quick Splice II

5412R

15 kV Molded Rubber Cable Repair Splicing Kit

Data Sheet



1. Product Description

The 3M™ 5412R Quick Splice II is a 15 kV class inline splice designed to serve as a cable repair for 4/0 stranded concentric neutral (CN) and jacketed concentric neutral (JCN) distribution class power cables. It is designed to replace up to 6 inches (152 mm) of damaged cable, thus eliminating the need to splice in a new section of cable with two separate splices.

The splice is a one-piece molded design made of specially formulated, peroxide cured EPDM rubbers. Each splice is production tested on CN cable to ensure reliability. The splice is designed for use with the special CIR-4/0 Inline Compression Connector provided, for connecting either aluminum or copper conductors. The 5412R Quick Splice II meets the 15 kV voltage rating requirements of ANSI/IEEE Std. 404-1986.

Kit Contents:

- 1 Molded rubber splice body
- 1 Connector (CIR-4/0)
- 2 Packets of silicone grease
- 1 Template
- 1 Instruction sheet

Splice Features:

- One-piece design, for simple installation
- Elongated splice body, allows for the removal of up to 6" (152 mm) of damaged cable
- Special 3M CIR-4/0 repair connector, for a one-piece connection to bridge across the gap resulting from the removal of damaged cable
- Production tested, partial discharge and alternating current withstand, for long term reliability
- Peroxide cured EPDM rubber construction, for long term elastic memory (sealing) and easy installation
- Computer designed, for compact size and optimal distribution of the electrical field

2. Applications

To make a repair splice on 15 kV class distribution cable:

- For inline repair splicing of damaged cable
- For cable repairs up to 6" (152 mm) in length
- For damaged concentric neutral (CN) cable
- For damaged jacketed concentric neutral (JCN) cable (used with an accessory splice jacket, e.g. 3M SJ-A Series with additional 8420 Series Cold Shrink™ Insulator or 3M HSJ Series with additional ITCSN Series Heat Shrinkable Sleeve)
- For fitting cable insulation diameter sizes of 0.870" to 1.055" (22,1 to 62,8 mm)
- For direct burial installations
- For aerial installations
- For submerged locations

3. Data: Physical and Electrical Properties

The 3M 5412R Quick Splice II can be used on distribution class cables with a rated operating temperature of 90°C, and an emergency overload rating of 130°C. Splices made with this kit are rated for 15 kV and meet the 15 kV rating requirements of ANSI/IEEE Std. 404-1986, "IEEE Standard for Cable Joints for Use with Extruded Dielectric Cable Rated 5000 V through 46,000 V." The current rating of the splice meets or exceeds the current rating for the cables on which it is installed. BIL rating of the splice is 150 kV.

A Special 3M CIR-4/0 Series connector is included with the splice kit. It is crimped with a standard 840 die. The connector meets the requirements of ANSI C119.4-1986, "Connectors for Use Between Aluminum or Aluminum-Copper Overhead Conductors."

A. Selection Table

SPLICE KIT SELECTION TABLE

NOTE: Final determining factor is cable insulation diameter.

Kit Number (with connector)*	Cable Insulation (O.D. Range)	Conductor Size (AWG)	Cable Insulation Thickness (mils)
5412R-CIR-4/0	0.870 – 1.055 in. (22,1 – 26,8 mm)	4/0 Stranded	175 220

* NOTE: CIR-4/0 Connector is sized for 840 crimping die.

Table 1

B. Typical Dimensions

Dimension		
A	B	C
18.4 in. (467 mm)	2.47 in. (63 mm)	1.16 in. (29 mm)

Table 2

C. Typical Physical and Electrical Properties

Insulating EPDM Rubber

Physical Properties

Test Method	Typical Value*
• Color	White
• Ultimate Elongation ASTM D 412	570% min.
• Ultimate Tensile Strength ASTM D 412	900 psi min. (6.21 MPa min.)
• Shore A Hardness ASTM D 2240	55
• Permanent Set (3M Test Method: 100% strain with 5 min. recovery)	25%
• Compression Set ASTM D 395, Method B	19%
• 100% Modulus ASTM D 412	185 psi (1.28 MPa)
• 300% Modulus ASTM D 412	650 psi (4.49 MPa)

Electrical Properties

Test Method	Typical Value*
• Dielectric Constant ASTM D 150 73°F (23°C) 194°F (90°C) 266°F (130°C)	2.71 2.58 2.56
• Dissipation Factor ASTM D 150 73°F (23°C) 194°F (90°C) 266°F (130°C)	0.4% 1.3% 4.7%
• Dielectric Strength ASTM D 149 25 mil thick slab 100 mil thick slab	1177 Volts/mil (46.4 MV/m) 518 Volts/mil (20.4 MV/m)
• 20 Days @ 96% RH and 194°F (90°C) 25 mil thick slab 100 mil thick slab	1066 Volts/mil (42.0 MV/m) 790 Volts/mil (31.1 MV/m)

Splice Jacket Semi-Conductive Rubber

Physical Properties

Test Method	Typical Value*
• Color	Black

• Ultimate Elongation ASTM D 412	300% min.
• Ultimate Tensile Strength ASTM D 412	1700 psi min. (11.7 MPa min.)
• Shore A Hardness ASTM D 2240	70
• Die C Tear ASTM D 624	225 lbs/in min. (39.4 KN/m min.)
• Permanent Set (3M Test Method TM 86A)	20% max.
• 100% Modulus ASTM D 412	400 psi (2.8 MPa)
• 300% Modulus ASTM D 412	1800 psi (12.4 MPa)
• Ozone Resistance (70 hrs., 150 ppm @ 20% strain)	No Cracking
• UV Resistance (70 hrs. @ 20% strain)	No Cracking

Electrical Properties

Test Method	Typical Value*
• Volume Resistivity (3M Test Method TM 80)	15.4 Ohm-inch max. (40 Ohm-cm max.)

* This data is not to be used for specification. Values listed are for typical properties and should not be considered minimum or maximum.

4. Specification

Product

(Open Specification)

The concentric neutral (CN) and jacketed concentric neutral (JCN) cable repair splice must meet the requirements of ANSI/IEEE Std. 404-1986 for a 15 kV rating. It must be rated for continuous operation at 90°C, with an emergency overload temperature rating of 130°C. The repair splice must be capable of replacing up to 6 inches (152 mm) of damaged CN or JCN cable. The splice shall be a one-piece, slip-on design made of molded peroxide cured EPDM rubber. It shall be rated for indoor, outdoor and direct burial applications.

Engineering/Architectural (Closed Specification)

Repair splicing, for up to 6 inches (152 mm) of damaged cable length, of all 15 kV rated, 4/0 stranded, concentric neutral (CN) and jacketed concentric neutral (JCN) cables shall be performed in accordance with the instructions provided with the 3M 5412R-CIR-4/0 Quick Splice II Molded Rubber Cable Repair Splicing Kit. For JCN applications, the splice shall be sealed with an additional jacket installed in accordance with the instructions provided with the 3M SJ-A Series Cold Shrink™ Jacket Kit, plus the addition of an 8420 Series Cold Shrink™ Insulator to provide for additional repair length.

5. Performance Tests

IEEE Std. 404–1986
15 kV Voltage Rating

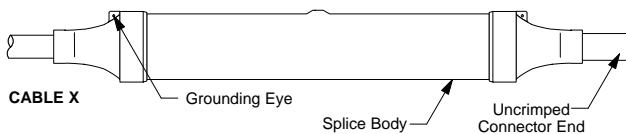
Design Test and Sequence	Test Requirements
Minimum Partial Discharge (Corona) Level (kV–rms @ <3 pC)	13
Alternating-Current 1 Minute Withstand (kV–rms)	35
Direct -Current 15 Minute Withstand (kV–dc)	70
Impulse Withstand (BIL) at 68°F (20°C) (kV–crest)	± 110
Impulse Withstand (BIL) at 266°F (130°C) (kV–crest)	± 110
Minimum Partial Discharge (Corona) Level (kV–rms @ <3 pC)	13
Cyclic Aging (kV–rms)	26
High Voltage Time	
5 Hour Alternating-Current Withstand (kV–rms)	35.0
1 Hour Alternating-Current Withstand (kV–rms)	52.5
Short-Time Current (sec.) (ICEA P–32–382 and ANSI/IEEE C37.09–1979)	0.17
Alternating-Current 1 Minute Withstand (kV–rms)	35
Shielding	IEEE Std. 592–1990
Connector Thermal and Mechanical	ANSI/NEMA CC3–1978 and ANSI C119.4–1986
Production Test	Test Requirements
Production Units Tested (%)	100
Minimum Partial Discharge (Corona) Level (kV–rms @ <3 pC)	13
Alternating-Current 1 Minute Withstand (kV–rms)	35

Table 3

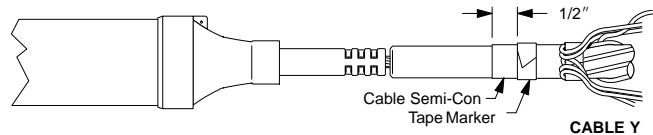
6. Installation Techniques

Detailed Instructions for installing the 5412R Quick Splice II are included with each kit. The following is a brief summary of the installation steps required:

- Cut out damaged section of cable but do not exceed 6" (152 mm).
- Fold neutral wires back and prepare cable.
- Install CIR Connector onto one cable.
- Lubricate connector and cable, and slide splice body onto connector until uncrimped end is exposed.



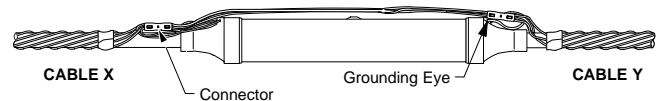
- Connect other end of connector and place a tape marker 1/2" (13 mm) from end of cable semi-con.



- Lubricate exposed connector and cable. Center splice body over connector, aligning its end with the tape marker.



- Join neutral wires, attaching one wire from each cable to the splice grounding eyes.



Installation Techniques *(continued)*

- h. JCN Cables Only: Install accessory splice jacket over splice and exposed neutral wires.



7. Maintenance

Components of the 3M 5412R Quick Splice II Kit are stable under normal storage conditions. Normal stock rotation procedures are recommended. The splice can be field tested using normal field cable testing procedures (reference: ANSI/IEEE Std. 400, “Guide for Making High-Direct-Voltage Tests on Power Cable Systems in the Field).”

8. Availability

The 3M 5412R-CIR-4/0 Quick Splice II Kit is available to splice 15 kV 4/0 stranded, CN and JCN distribution class cables. This kit is available from your local authorized 3M electrical distributor.

Important Notice to Purchaser:

All statements, technical information and recommendations related to the Seller's products are based on information believed to be reliable, but the accuracy or completeness thereof is not guaranteed. Before utilizing the product, the user should determine the suitability of the product for its intended use. The user assumes all risks and liability whatsoever in connection with such use.

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