Scotch® Self-Fusing Silicone Rubber Electrical Tape 70

Data Sheet October 2018

Product Description

Scotch® Self-Fusing Silicone Rubber Electrical Tape 70 is a high-temperature arc and track-resistant tape composed of self-fusing, inorganic silicone rubber with easy-tear and easy-strip liner.

Agency Approvals & Self Certifications

For RoHS information, please visit www.3M.com/regs

Product Features

- Excellent track resistance.
- Excellent arc resistance.
- Excellent ozone resistance.
- High dielectric strength
- Class H material (180°C continuous operation).
- Workable at extremely low temperatures.
- Excellent instantaneous fusion; does not need to be held down.
- Matches Sky Blue Gray Munsell 5BG7.0/0.4.
- Excellent weathering characteristics.
- AA-59163 Class-I Type-I.

Applications

- As an overwrap for protection of terminating high-voltage cables against arcing and tracking. High-voltage cables with these insulations should be overwrapped:
  - Butyl rubber
  - Oil-base rubber
  - Ethylene propylene rubber
  - P.V.C.
  - Low and high-density polyethylene cross-linked
- As primary insulation where Class H (180°C/356°F) temperatures are encountered i.e., silicone rubber cables.
- As splice overwrap on spacer cable operating at 15kV and above.

Data

Scotch® Rubber Electrical Tape 70 has a thickness of 12 mils and is available in roll size 1 inch wide x 30 ft. long. The core is 1 inch I.D.

Installation Techniques

Scotch® Self-Fusing Silicone Rubber Electrical Tape 70 should be applied in half-lap layers using moderate tension.

Scotch® Rubber Electrical Tape 70 should be applied on all tape-like terminations which will be operated either outdoors or in areas subjected to contamination or moisture. The following procedure should be used:

If possible, connect the termination to its final position. Otherwise, take care not to damage the final overwrap of silicone tape during installation. Overwrap the end seal with several half-lapped layers. Overwrap the entire termination with one additional half-lapped layer. For upright termination, begin from one inch on cable jacket and end at the lug. For inverted termination, end taping on the cable jacket. *Wrap with moderate tension (10 to 100 percent elongation). Apply last lap with zero stretch. Press down to avoid end lifting before fusion takes place.*

Scotch® Rubber Electrical Tape 70 can also be applied over the exposed cable insulation and/or end seal used in conjunction with molded (slip-on) stress cones.

Techniques for the proper use of Scotch® Rubber Electrical Tape 70 are contained in standard and special prints available through the 3M Systems for Splicing and Terminating Program. This material may be obtained through your local 3M Electrical Markets Division representative.

NOTE REGARDING LINER REMOVAL:
To separate the liner from the tape when starting a new roll, simply stretch the liner and tape until the silicone tape breaks. The liner will then separate at this point.

Characteristics and Test Data

Physical Properties	Typical Value
Color	Munsell 5BG7.0/0.4 Sky Blue Gray
Thickness ASTM-D-1000-10	0.012 in
Tensile Strength ASTM-D-1000-10	12 lbs./in.
Elongation at Break ASTM-D-1000-10	450%
Electrical Properties	
Dielectric Strength ASTM-D-1000-10	875 V/mil
Arc Resistance ASTM-D-495-71	1 min. (minimum)

Note: These are typical values and should not be used for specification purposes.

Characteristics and Test Data

Dissipation Factor: Table 1 shows the dissipation factor versus temperature of Scotch® Rubber Electrical Tape 70. This test was run according to ASTM-D-150-68 at a stress of 50 V/mil and a frequency of 60 cycles per second.

DISSIPATION FACTOR VS. TEMPERATURE

Temperature (°C/°F)	Dissipation Factor (%)
23/73	1.3%
90/194	1.1%
130/266	0.5%
150/302	0.7%

Table 1

Dielectric Constant: Table 2 shows the dielectric constant versus temperature of Scotch® Rubber Electrical Tape 70. This test was run according to ASTM-D-150-68 at a stress of 50 V/mil and a frequency of 60 cycles per second.

DIELECTRIC CONSTANT VS. TEMPERATURE

Temperature (°C/°F)	Dielectric Constant
23/73	3.03
90/194	2.89
130/266	2.60
150/302	2.51

Table 2

Performance Tests

Termination Tracking Test: Reduced-dimension terminations are prepared according to 3M print 2047-B-16 (See Figure 1). Each specimen consists of 8 feet of 15 kV cable and two terminations. The contaminant employed in this test is the formula called out in ASTM Dust and Fog Test D-2132, as shown below:

Flint (SiO2 floated) 240 mesh	85 parts
Clay 325 mesh	9 parts
Salt (Na Cl) technical grade	3 parts
Paper, filter pulp	3 parts
	all by weight

This mixture is then ball milled using 3/4- inch diameter ceramic cylinder. The milled dust is then mixed with equal parts by weight of water to make a slurry of paint consistency.

Next, each termination is carefully coated in such a manner as to deposit a uniform and reproducible amount of contamination. The following procedure is used:

1. Mix the slurry thoroughly
2. Submerge the inverted termination into the slurry.
3. Withdraw the termination from the slurry, taking care not to throw off too much excess slurry in rotating the termination from the inverted to an upright position. The majority of the excess slurry should drain off when the termination is upright.

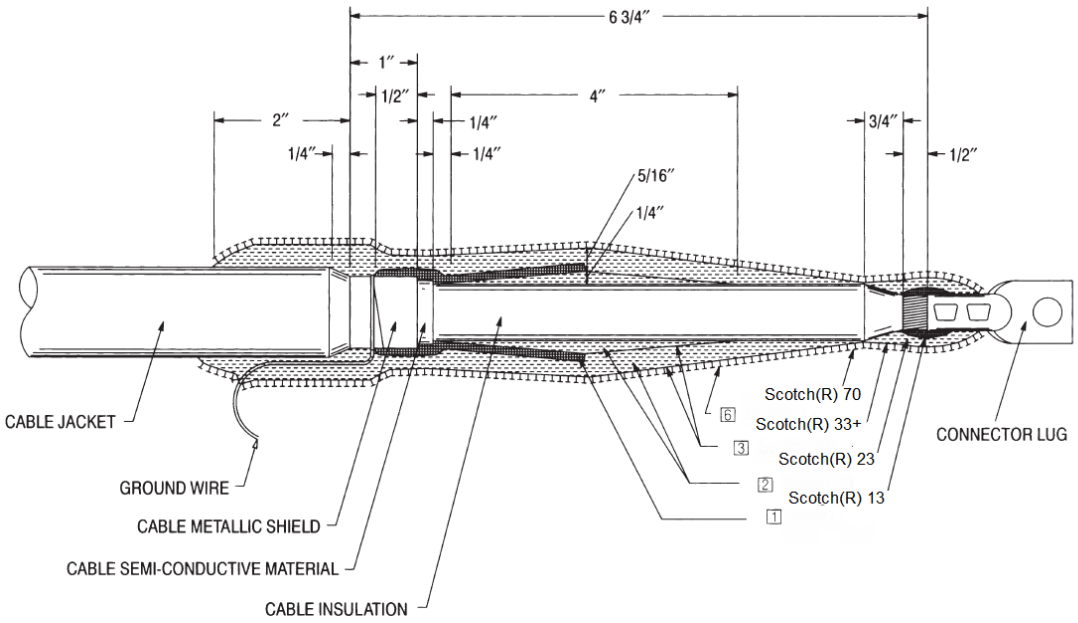

Figure 1

4. Allow the termination to air-dry in the upright position before applying the voltage.

This method, when tested on various surfaces including silicone rubber and glazed porcelain, has repeatedly produced a coating thickness of from 0.12 to 01.15 grams per square inch of surface. The terminations are then tested in a contamination building. All terminations are mounted vertically. The uniform fog rate called out in ASTM-D-2132 is obtained by the use of special atomizing, wide-angle nozzles. An on/off cycle is controlled to give a fog rate of 7 to 9 milligrams per square inch per minute. Each sample is energized at 8.7 kV. The system is set up such that approximately 500 milliamps trip the circuit breaker. All samples are re-contaminated every seven days. The new contaminant is applied over whatever contaminant remains. The sample is considered to have failed when:

1. 500 milliamps over the surface continuously cause the circuit break to trip.
2. Cable failure occurs.
3. The surface of the termination is severely burned. The time in hours for each failure is recorded. The results are as follows:

Tape Termination Protections	Time to Failure
No protection	15 hrs.
Scotch® Self-Fusing Silicone Rubber Electrical Tape 70	400 hrs.

Scotch® Self-Fusing Silicone Rubber Electrical Tape 70

Specification	**Product:** The insulating tape must be composed of self-fusing, inorganic silicone rubber with an easy-tearing and easy-stripping polyester liner. The product must be Sky Blue Gray and conform to Munsell Color No. 5BG7.0/0.4. The tape must be capable of operating continuously at Class H temperatures (180°C/356°F). The tape must be compatible with all synthetic cable insulations as well as cable splicing compounds. **Engineering/Architectural Specifications:** All tape or tape-like terminations which will be operated either outdoors or in areas subjected to contamination or moisture shall be overwrapped with at least one layer of Scotch® Self-Fusing Silicone Rubber Electrical Tape 70. The exposed cable insulation on the lug side of assembled stress cone kits, which will be operated either outdoors or in areas subjected to contamination or moisture, shall be overwrapped with at least one layer of Scotch® Rubber Electrical Tape 70. All splices on spacer cable operating at 15kV and above shall be overwrapped with Scotch® Rubber Electrical Tape 70. All splices on silicone rubber cables or other cables which can operate at room temperatures in excess of 130°C/266°F, but not exceeding 180°C/266°F, shall use Scotch® Rubber Electrical Tape 70 as the primary insulating material.
Shelf-Life	Scotch® Rubber Electrical Tape 70 has a 5-year shelf life (from the date of manufacture) when stored under the following recommended conditions. Store behind present stock in a clean dry place at a temperature of 10°C/50°F to 27°C/80°F and 40% to 50% relative humidity. Prolonged exposure to temperatures in excess of 49°C (120°F) can cause a loss of fusion in the tape. Proper stock rotation is recommended.
Availability	Scotch® Rubber Electrical Tape 70 is available from your electrical distributor in 1-inch by 30-foot rolls.

3M and Scotch are trademarks of 3M Company.
All other trademarks are property of their respective owners.

Important Notice	All statements, technical information, and recommendations related to 3M's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use. Any statements related to the product, which are not contained in 3M's current publications, or any contrary statements contained on your purchase order, shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.
Warranty; Limited Remedy; Limited Liability	This product will be free from defects in material and manufacture at the time of purchase. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. **Except where prohibited by law, 3M will not be liable for any direct, indirect, special, incidental or consequential loss or damage arising from this 3M product, regardless of the legal theory asserted.**

3M
Electrical Markets Division
Austin, TX
800.245.3573
FAX: 800.245.0329
www.3M.com/electrical

Please recycle
© 3M 2018 All rights reserved
78-8126-0479-7 Rev C