



# Scotch™ 70 Self-Fusing Silicone Rubber Electrical Tape

## Data Sheet



### Product Description

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

### Tape Features

- ❖ Excellent track resistance.
- ❖ Excellent arc resistance.
- ❖ Excellent ozone resistance.
- ❖ High dielectric strength.
- ❖ Class “H” material (180°C continuous operation).
- ❖ Workable in extremely low temperatures.
- ❖ Excellent conformability.
- ❖ Excellent instantaneous fusion; does not need to be held down.
- ❖ Matches Sky Blue Grey Munsell 5BG7.0/0.4.
- ❖ Excellent weathering characteristics.

### 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
  - PVC
  - 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.

### Specifications

#### Product

The insulating tape must be composed of a self-fusing, inorganic silicone rubber with easy-tearing and easy-stripping polyester liner. The product must be Sky Blue Grey and conform to Munsell Colour 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™ 70 Silicone Rubber Electrical Tape. The exposed cable insulation on the lug side of assembled stress cone kits, which will be operated either outdoors or in areas subject to contamination or moisture, shall be overwrapped with at least one layer of Scotch™ 70 Silicone Rubber Electrical Tape. All splices on silicone rubber cables or other cables which can operate at temperatures in excess of 130°C/266°F, but not exceeding 180°C/356°F, shall use Scotch™ 70 Silicone Rubber Electrical Tape as the primary insulating material.

### Characteristics and Test Data

#### Typical Physical Properties

Colour:	Munsell
5BG7.0/0.4	
	Sky Blue Grey
Thickness ASTM-D1000-76	0.3mm
Tensile Strength ASTM-D1000-76	21N/10mm
Elongation at Break	
ASTM D-1000-76	450%

#### Typical Electrical Properties

Dielectric Strength	
ASTM-D1000-76	34kV/mm
Arc resistance ASTM-D1000-76	1 min. (minimum)

#### Dissipation Factor

Table 1 shows the dissipation factor versus temperature of 70 Tape. This test was run according to ASTM-D150-68 at a stress of 2kV/mm and a frequency of 60 cycles per second.

Dissipation Factor Vs. Temperature, Scotch™ 70 Tape	
Temperature (°C)	Dissipation Factor
23	1.3%
90	1.1%
130	0.5%
150	0.7%

Table 1

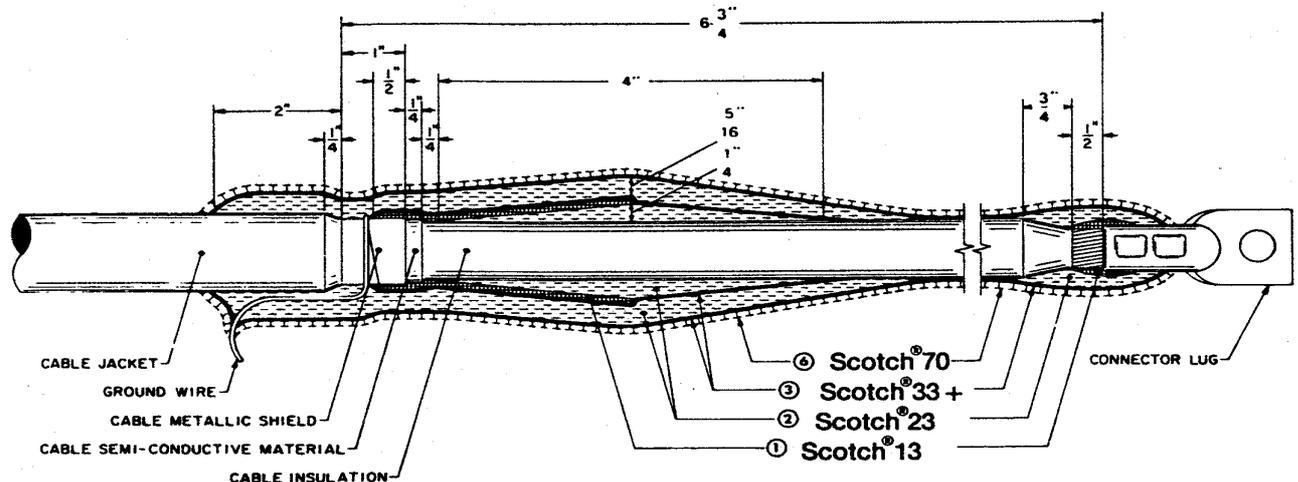
**3M UK PLC**  
**Electrical Products**  
 3M House, PO Box 1  
 Bracknell, Berkshire RG12 1JU  
 Telephone: 01344 858616  
 Fax: 01344 858758

**3M Ireland**  
**Sales Office**  
 3M House, Adelphi Centre  
 Dun Laoghaire, Co Dublin, Ireland  
 Telephone: 353 1 280 3555  
 Fax: 353 1 280 3509

**3M UK PLC**  
**Sales Office**  
 PO Box 393  
 Bedford MK41 0YE  
 Telephone: 01234 229462  
 Fax: 01234 229433

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## Data Sheet



**Figure 1**

### Dielectric Constant

Table 2 shows the dielectric constant versus temperature of 70 Tape. This test was run according to ASTM-D150-68 at a stress of 2kV/mil and a frequency of 60 cycles per second.

Dielectric Constant Vs. Temperature, Scotch™ 70 Tape	
Temperature (°C)	Dielectric Constant
23	3.03
90	2.89
130	2.60
150	2.51

Table 2

### A. Termination Tracking Test

Reduced-dimension terminations are prepared according to 3M print 2047-B-16 (see Figure 1). Each specimen consists of 2.4m of 15kV cable and two terminations. The contaminant employed in this test is the formula called ASTM Dust and Fog Test D-2132, as shown below:

Flint (SiO <sub>2</sub> 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 19mm 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 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.
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 0.15 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 for in ASTM-D-2132 is obtained by the use of special atomising, 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 energised at 8.7kV.



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The system is set up such that approximately 500 milliamps trip the circuit breaker. All samples are recontaminated 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 breaker 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 Protection	Time to Failure
No protection	15 hours
Scotch™ 70 Tape Self-Fusing	400 hours

### Installation Techniques

Scotch™ 70 Silicone Rubber Electrical Tape should be applied in half-lap layers using moderate tension. 70 Tape 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% elongation). Apply last lap with zero stretch. Press down to avoid endlifting before fusion takes place.*

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

#### 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.*

### Maintenance

Good stock rotation practices should be observed with 70 Tape. Under normal storage conditions, 70 Tape will retain its excellent fusion characteristics for reasonable storage periods. Prolonged exposure to temperatures in excess of 49°C/120°F can cause a loss of fusion in this tape.

### Availability

Scotch™ 70 Self-Fusing Silicone Rubber Electrical Tape is available in roll size 25mm x 9M from your electrical distributor.

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**3M UK PLC**  
**Electrical Products**  
 3M House, PO Box 1  
 Bracknell, Berkshire RG12 1JU  
 Telephone: 01344 858616  
 Fax: 01344 858758

**3M Ireland**  
**Sales Office**  
 3M House, Adelphi Centre  
 Dun Laoghaire, Co Dublin, Ireland  
 Telephone: 353 1 280 3555  
 Fax: 353 1 280 3509

**3M UK PLC**  
**Sales Office**  
 PO Box 393  
 Bedford MK41 0YE  
 Telephone: 01234 229462  
 Fax: 01234 229433