

3M

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 Over-wrap for protection of terminating high-voltage cables against arcing and tracking. High-voltage cables with these insulations should be Over-wrapped:
 - 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 ie. 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 Over-wrapped 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 Over-wrapped 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

WOKING

Unit 19, Woking Business Park, Albert Drive,
Woking GU21 5JY
Tel: 01483 747747 • Fax: 01483 747001

BRISTOL

The Alpha Centre, Armstrong Way, , Great Western
Business Park, Yate, Bristol BS37 5NG
Tel: 01454 322555 • Fax: 01454 323555

NORTON CANES

Unit 15-16, Bellsze Close, Norton Canes,
Staffordshire WS11 9TQ
Tel: 01543 450555 • Fax: 01543 450600



Scotch® 70 Self-Fusing Silicone Rubber Electrical Tape

Data Sheet

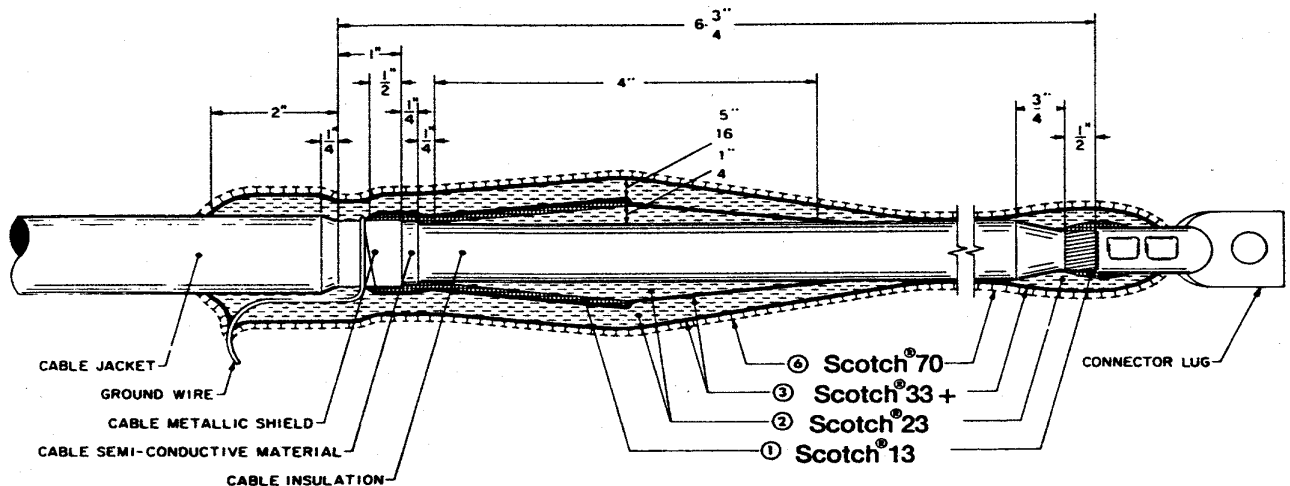


Figure 1

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 ₂ 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.

WOKING

Unit 19, Woking Business Park, Albert Drive,
Woking GU21 5JY
Tel: 01483 747747 • Fax: 01483 747001

BRISTOL

The Alpha Centre, Armstrong Way,, Great Western
Business Park, Yate, Bristol BS37 5NG
Tel: 01454 322555 • Fax: 01454 323555

NORTON CANES

Unit 15-16, Bellsze Close, Norton Canes,
Staffordshire WS11 9TQ
Tel: 01543 450555 • Fax: 01543 450600



Scotch® 70 Self-Fusing Silicone Rubber Electrical Tape

Data Sheet

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 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. Scotch 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 Over-wrap of silicone tape during installation. Over-wrap the end seal with several half-lapped layers. Over-wrap 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 end lifting 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.

Important Notice

Technical information provided by 3M is based on experience and/or tests believed to be reliable, but their accuracy is not guaranteed and the results may not be relevant to every user's application. For this reason 3M does not accept responsibility or liability, direct or consequential, arising from reliance upon any information provided and the user should determine the suitability of the products for their intended use. Nothing in this statement will be deemed to exclude or restrict 3M's liability for death or personal injury arising from its negligence. All questions of liability relating to 3M products are governed by the seller's terms of sale subject where applicable to the prevailing law. If any goods supplied or processed by or on behalf of 3M prove on inspection to be defective in material or workmanship, 3M will (at its option) replace the same or refund to the Buyer the price paid for the goods or services. Except as set out above, all warranties and conditions, whether express or implied, statutory or otherwise are excluded to the fullest extent permissible at law. 3M and Scotch are trademarks of the 3M Company. Printed in the UK. © 3M United Kingdom PLC, 2003.

WOKING

Unit 19, Woking Business Park, Albert Drive,
Woking GU21 5JY
Tel: 01483 747747 • Fax: 01483 747001

BRISTOL

The Alpha Centre, Armstrong Way, Great Western
Business Park, Yate, Bristol BS37 5NG
Tel: 01454 322555 • Fax: 01454 323555

NORTON CANES

Unit 15-16, Bellsizes Close, Norton Canes,
Staffordshire WS11 9TQ
Tel: 01543 450555 • Fax: 01543 450600