Quick Term II

5630K and 5690K Series

Silicone Rubber Termination Kits 15 KV 34.5 kV

Data Sheet

1. Product Description

3M™ 5630K and 5690K Series Quick Term II Silicone Rubber Termination Kits are one-piece Cold Shrink™ terminations for Tape Shield, Wire-Shield and UniShield® power cables. **They meet the requirements of IEEE standard 48-1990, for class 1 terminations.** In addition they meet German standard VDE 0278 parts 5 & 100, British standard BS C-89, Spanish standard UNE 21-115-75 and Brazilian standard A·B·N·T· 9314. Similar terminations using Quick Term II technology meet French EdF standards HN 33-E-01 and HN 41-E-01. The 3M Quick Term II consists of a high dielectric constant (High-K) stress control tube insulated with a molded silicone skirted insulator. There is a four skirt design rated 15 kV, a six skirt design rated 25/28 kV and an eight skirt design rated 34.5 kV. Each insulator design incorporates an extended base feature which when combined with mastic ensures a seal at the cable jacket end where the termination ground strap is brought out. Quick Term II terminations are provided in an expanded state, mounted on a removable inner supporting plastic core. As supplied in this pre-stretched condition the termination is ready for field installation. During installation the core is unwound, allowing termination to shrink and form a tight seal. Collectively, these termination kits cover cables with primary insulation O.D. from 0.33″ to 1.95″ (0,85 – 49,5 mm) and with cable jacket O.D. from 0.55″ to 2.40″ (14,0 – 61,0 mm).

These kits can be used to terminate Tape Shield, Wire-Shield and UniShield® power cables from:

8 AWG 5 kV to 1500 kcmil 34.5 kV.

Stress Control

The 3M Quick Term II controls the electric field surrounding the terminated cable insulation shield end, by use of a special high dielectric constant (High-K) material which is an integral part of the termination. The High-K material has a dielectric constant of about 25. By controlling the electrical field, the stress concentration in the applied termination materials and at the air interface is less than 15 volts/mil at rated voltage. In the shielded portion of 15 kV cable, the stress concentrations typically vary from 50 volts/mil at the shield to about 70 volts/mil at the conductor. When terminated with the Quick Term II, the stress in the cable underneath this unit is less than it is in the shielded portion of the cable.

Figure 1 shows an actual computerized stress plot of the Quick Term II.

Cold Shrink™ Insulators

The 3M Quick Term II Skirted Insulators are constructed of non-tracking silicone rubber which minimizes leakage currents in wet conditions for three reasons:

1. The smooth surface of the silicone rubber insures that a minimum amount of contamination will adhere to the termination.
2. Silicone rubber has a hydrophobic surface: When water comes in contact with the silicone it beads up and runs off the skirts rather than completely wetting these surfaces. Thus a less conductive path is formed on the silicone and leakage currents are lowered.
3. When leakage currents do increase and arcing occurs on the surface, the ash formed by erosion of the silicone insulator is non-organic or non-conductive. Continued degradation is thereby deterred.

Under heavy rain conditions, conventional skirted terminations with even-skirt diameter insulators tend to form drip paths or continuous water paths from insulator skirt tip to skirt tip. By comparison, 3M Quick Term II insulators are designed with unique, uneven skirt diameters. This feature allows water dripping from the upper skirt to fall free, avoiding the skirt to skirt conductive path that can develop with even-skirt diameter insulators. This design of the 3M Quick Term II termination optimizes performance under heavy rain conditions.

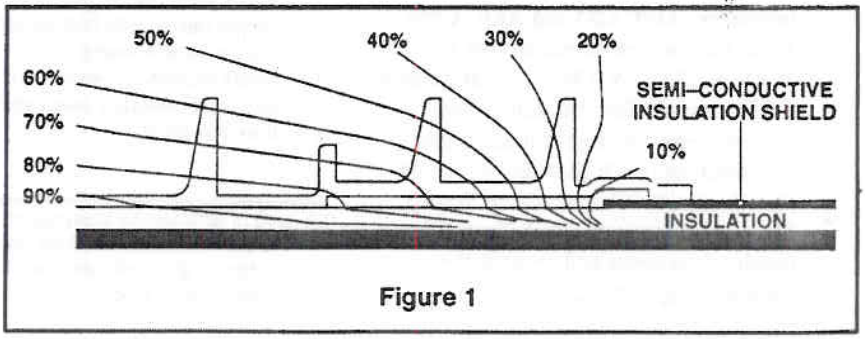


Figure 1

Kit Contents:

Each kit contains sufficient quantities of the following materials to make three terminations:

- 3 Hi-K Silicone Rubber Terminations
- 3 Mechanical Ground Strap Assemblies
- 3 Strips of Mastic
- 1 Roll of Scotch™ 13 Semi-Con Tape
- 1 Roll of Scotch™ 70 Silicone Tape
- 1 Scotch™ Cable Preparation Kit
- 3 Tubes of Silicone Grease
- 1 Instruction Sheet

2. Applications

The 5630K and 5690K Series Quick Term II Silicone Cold Shrink™ Terminations are used to terminate Tape Shield, Wire Shield and UniShield® power cable rated 15 kV, 25/28 kV and 34.5 kV having extruded solid dielectric insulation as follows: Polyethylene (high and low density), cross-linked polyethylene (XLP) and ethylene propylene rubber (EPR). The terminations are light weight for either free-hanging or bracket-mounting arrangements. They can be used in both protected and weather exposed contaminated areas. The amount of airborne contamination determines the operating environment. Operating environments are described as areas having varying degree of airborne contaminant or pollution severity that may, or may not effect the long term performance of terminations. These operating environments are defined as light, medium, heavy and extremely heavy variations of pollution severity. The appropriate termination selection depends on the system voltage and operating environment *(See tables to right)*.

3. Data: Physical and Electrical Properties

The 5630K and 5690K Series Quick Term II terminations can be used on cables with a rated operating temperature of 90°C and an emergency overload rating of 130°C, (reference: AEIC CS5 and AEIC CS6). These kits meet requirements for a 15 kV, 25 kV and 34.5 kV, Class 1 termination in IEEE Standard Test Procedures and Requirements for High-Voltage Cable Terminations (IEEE Standard 48-1990). (See Section 5, **"Performance Tests"**). The current rating of Quick Term II terminations meets and exceeds the current rating of the cables.

Recommended Application Guide

Termination Kit	System Voltage	Operating Environment			
		Light	Medium	Heavy	Extremely Heavy
(Four Skirt) 5632K – 5637K	5 & 8 kV	✔	✔	✔	
(Four Skirt) 5632K – 5637K	15 kV	✔	✔	✔	
(Six Skirt) 5691K – 5694K	15 kV		✔	✔	✔
(Eight Skirt) 5696K – 5698K	15 kV			✔	✔
(Four Skirt) 5633K – 5637K	25/28 kV	✔			
(Six Skirt) 5691K – 5694K	25/28 kV	✔	✔	✔	
(Eight Skirt) 5696K – 5698K	25/28 kV		✔	✔	✔
(Four Skirt) 5633K – 5637K	34.5 kV				
(Six Skirt) 5691K – 5694K	34.5 kV	✔			
(Eight Skirt) 5696K – 5698K	34.5 kV	✔	✔	✔	★

Recommended operating environments are marked with a check (✔)

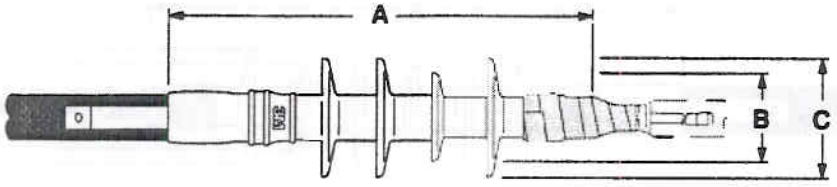
★ Consult 3M sales representative.

Pollution Severity Level Guide

Light	Heavy
• Areas without industry and with low density housing. • Areas subjected to frequent winds and/or rain fall with low density industry and housing. • Agricultural areas. ☆ • Mountainous areas. All of these regions should be situated at least 7 to 15 miles from the coast and should not be exposed to coastal winds. ✳	• High density industrial areas and some urban areas with high density housing, especially those with infrequent rain fall. • Areas subjected to a moderate concentration of conductive dust, particularly industrial smoke producing deposits. • Areas generally close to the coast and exposed to coastal spray or to strong winds carrying sand and salt, and subjected to regular condensation.
Medium	Extremely Heavy
• Non polluting industrial areas subject to infrequent rain fall and with average density housing. • Areas subjected to frequent winds and/or rainfall with high density industry and housing. • Areas exposed to wind from the coast but generally over two miles from the coast.	• Usually very limited areas having extremely heavy pollutants from industrial sites especially those located near oceans and subjected to prevailing winds from the sea. • Very small isolated areas where terminations are located immediately adjacent to a pollutant source, especially downwind (cement plants, paper mills, etc.).

☆ Use of fertilizers by spraying, or the burning of crop residues, can lead to a higher pollution level due to dispersal by wind.

✳ Distances from coast depend on the topography of the coastal area and on the extreme wind conditions.



FOUR–SKIRT TERMINATION

A. Typical Dimensions

Product Number	A	B	C	Creepage Distance	Arcing Distance
5632K	13.25″ (max) (337 mm)	1.62″ (41,1 mm)	2.60″ (66,0 mm)	18.00″ (max) (457 mm)	13.75″ (max) (349 mm)
5633K	12.00″ (max) (305 mm)	1.67″ (42,4 mm)	2.68″ (68,1 mm)	17.25″ (max) (438 mm)	12.50″ (max) (317 mm)
5635K	12.00″ (max) (305 mm)	1.82″ (46,2 mm)	2.75″ (69,8 mm)	17.25″ (max) (438 mm)	12.50″ (max) (317 mm)
5636K	13.50″ (max) (343 mm)	2.00″ (50,8 mm)	3.25″ (82,5 mm)	19.25″ (max) (489 mm)	14.00″ (max) (356 mm)
5637K	13.75″ (max) (349 mm)	2.00″ (50,8 mm)	3.55″ (90,2 mm)	19.50″ (max) (495 mm)	14.25″ (max) (362 mm)

B. Termination Selection Table

Kit Number	Cable Insulation O. D. Range	Cable Jacket O. D. Range	Conductor Size Range (AWG kcmil)					
			5 kV (100%)	8 kV* (100%)	8 kV (133%)	15 kV (100%)	15 kV (133%)	25 kV**
5632K	0.33 – 0.69 in. (8,4 – 17,5 mm)	0.55 – 0.92 in. (14,0 – 23,4 mm)	8 – 2/0	8 – 1/0	8 – 1	8 – 4	8 – 6	—
5633K	0.64 – 0.90 in. (16,3 – 22,9 mm)	0.80 – 1.20 in. (20,3 – 30,5 mm)	3/0 – 300	2/0 – 250	1/0 – 4/0	2 – 3/0	4 – 1/0	2 – 1
5635K	0.84 – 1.33 in. (21,3 – 33,8 mm)	1.00 – 1.60 in. (25,4 – 40,6 mm)	350 – 750	300 – 750	250 – 600	3/0 – 500	2/0 – 350	1/0 – 250
5636K	1.10 – 1.65 in. (27,9 – 41,9 mm)	1.30 – 1.90 in. (33,0 – 48,3 mm)	750 – 1500	750 – 1250	600 – 1000	500 – 1000	350 – 750	300 – 500
5637K	1.30 – 1.95 in. (33,0 – 49,5 mm)	1.50 – 2.40 in. (38,1 – 61,0 mm)	1000 – 2000	1000 – 2000	800 – 1750	750 – 1750	600 – 1500	600 – 1250

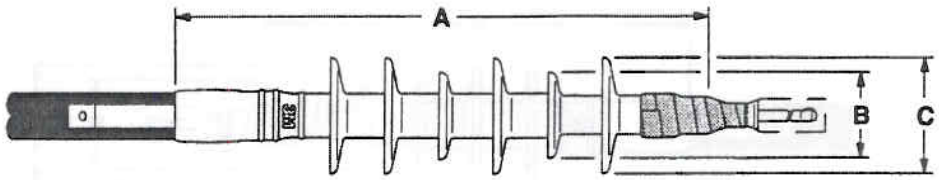
* Also appropriate for 5 kV (133%).

** See Recommended Application Guide, on page 2.

C. Typical Results per IEEE STD. 48–1990 Tests

IEEE STD. 48 Test	5 kV Class		8 kV Class		15 kV Class		25 kV Class	
	Requirement	Results	Requirement	Results	Requirement	Results	Requirement	Results
60 sec. w/s ac	25 kV	75 kV*	35 kV	80 kV*	50 kV	85 kV*	65 kV	90 kV*
10 sec. w/s wet ac	25 kV	55 kV*	30 kV	60 kV*	45 kV	65 kV*	60 kV	75 kV*
6 hours w/s ac	15 kV	70 kV*	25 kV	75 kV*	35 kV	80 kV*	55 kV	85 kV*
Corona @ 3 pc. CSV CEV	— 4.5 kV	9.0 kV 8.5 kV	— 7.5 kV	12 kV 11 kV	— 13 kV	33 kV 28 kV	— 21.5 kV	36 kV 32 kV
15 min. w/s dc	50 kV	Pass 50 kV	65 kV	Pass 65 kV	75 kV	Pass 75 kV	105 kV	pass 105 kV
Impulse w/s	75 kV	+125 kV* –115 kV*	95 kV	+130 kV* –125 kV*	110 kV	+165 kV* –150 kV*	150 kV	+180 kV* –165 kV*
30 day Cyclic Aging @ 130°C w/s ac Corona @ 3 pc. CEV> Impuse +10 – 10	 9 kV 4.5 kV +75 kV – 75 kV	 Pass Pass Pass Pass	 15 kV 7.5 kV +95 kV –95 kV	 Pass Pass Pass Pass	 28.5 kV 13 kV +110 kV –110 kV	 Pass Pass Pass Pass	 48 kV 21.5 kV +150 kV –150 kV	 Pass Pass Pass Pass

*At higher voltage flashovers occur.



SIX–SKIRT TERMINATION

A. Typical Dimensions

Product Number	A	B	C	Creepage Distance	Arcing Distance
5691K	15.00″ (max) (381 mm)	1.67″ (42,4 mm)	2.68″ (68,1 mm)	23.00″ (max) (584 mm)	15.50″ (max) (394 mm)
5692K	15.00″ (max) (381 mm)	1.82″ (46,2 mm)	2.75″ (69,8 mm)	23.00″ (max) (584 mm)	15.50″ (max) (394 mm)
5693K	16.50″ (max) (419 mm)	2.00″ (50,8 mm)	3.25″ (82,5 mm)	25.75″ (max) (654 mm)	17.00″ (max) (432 mm)
5694K	16.75″ (max) (425 mm)	2.00″ (50,8 mm)	3.55″ (90,2 mm)	26.00″ (max) (660 mm)	17.25″ (max) (438 mm)

B. Termination Selection Table

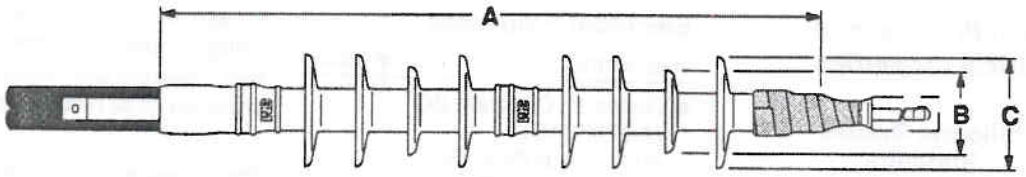
Kit Number	Cable Insulation O. D. Range	Cable Jacket O. D. Range	Conductor Size Range (AWG kcmil)		
			15 kV (100%)**	15 kV (133%)**	25 kV
5691K	0.64 – 0.90 in. (16,3 – 22,9 mm)	0.80 – 1.20 in. (20,3 – 30,5 mm)	2 – 3/0	4 – 1/0	2 – 1
5692K	0.84 – 1.33 in. (21,3 – 33,8 mm)	1.00 – 1.60 in. (25,4 – 40,6 mm)	3/0 – 400	2/0 – 350	1/0 – 250
5693K	1.10 – 1.65 in. (27,9 – 41,9 mm)	1.30 – 1.90 in. (33,0 – 48,3 mm)	500 – 750	400 – 750	300 – 500
5694K	1.30 – 1.95 in. (33,0 – 49,5 mm)	1.50 – 2.40 in. (38,1 – 61,0 mm)	800 – 1750	800 – 1500	600 – 1250

** See Recommended Application Guide, on page 2.

C. Typical Results per IEEE STD. 48–1990 Tests

IEEE STD. 48 Test	15 kV Class		25 kV Class†		34.5 kV Class†	
	Requirement	Results	Requirement	Results	Requirement	Results
60 sec. w/s ac	50 kV	100 kV*	65 kV	110 kV*	90 kV	115 kV*
10 sec. w/s wet ac	45 kV	70 kV*	60 kV	80 kV*	80 kV	90 kV*
6 hours w/s ac	35 kV	95 kV*	55 kV	105 kV*	75 kV	110 kV*
Corona @ 3 pc. CSV CEV	— 13 kV	33 kV 28 kV	— 21.5 kV	36 kV 32 kV	— 30 kV	41 kV 39 kV
15 min. w/s dc	75 kV	Pass 75 kV	105 kV	Pass 105 kV	140 kV	Pass 140 kV
Impulse w/s	110 kV	+195 kV* –180 kV*	150 kV	+210 kV* –195 kV*	200 kV	+225 kV* –210 kV*
30 day Cyclic Aging @ 130°C w/s ac Corona @ 3 pc. CEV> Impulse +10 – 10	28.5 kV 13 kV +110 kV – 110 kV	Pass Pass Pass Pass	48 kV 21.5 kV +150 kV –150 kV	Pass Pass Pass Pass	66 kV 30 kV +200 kV –200 kV	Pass Pass Pass Pass

†25 kV class Quick Term II terminations will also meet prorated values for 28 kV rated systems.
*At higher voltage flashovers occur.



EIGHT–SKIRT TERMINATION

D. Typical Dimensions

Product Number	A	B	C	Creepage Distance	Arcing Distance
5696K	19.50" (max) (495 mm)	1.82" (46,2 mm)	2.75" (69,8 mm)	30.00" (max) (762 mm)	20.00" (max) (508 mm)
5697K	21.50" (max) (546 mm)	2.00" (50,8 mm)	3.25" (82,5 mm)	33.00" (max) (832 mm)	22.00" (max) (559 mm)
5698K	21.75" (max) (552 mm)	2.00" (50,8 mm)	3.55" (90,1 mm)	33.25" (max) (845 mm)	22.25" (max) (565 mm)

E. Termination Selection Table

Kit Number	Cable Insulation O. D. Range	Cable Jacket O. D. Range	Conductor Size Range (AWG kcmil)		
			15 kV (100%)**	25 kV**	34.5 kV
5696K	0.84 – 1.33 in. (21,3 – 33,8 mm)	1.00 – 1.60 in. (25,4 – 40,6 mm)	3/0 – 400	1/0 – 250	2 – 3/0
5697K	1.10 – 1.65 in. (27,9 – 41,9 mm)	1.30 – 1.90 in. (33,0 – 48,3 mm)	500 – 750	300 – 500	4/0 – 400
5698K	1.30 – 1.95 in. (33,0 – 49,5 mm)	1.50 – 2.40 in. (38,1 – 61,0 mm)	800 – 1750	600 – 1250	500 – 1000

** See Recommended Application Guide, on page 2.

F. Typical Results per IEEE STD. 48–1990 Tests

IEEE STD. 48 Test	15 kV Class		25 kV Class		34.5 kV Class	
	Requirement	Results	Requirement	Results	Requirement	Results
60 sec. w/s ac	50 kV	115 kV*	65 kV	125 kV*	90 kV	135 kV*
10 sec. w/s wet ac	45 kV	75 kV*	60 kV	85 kV*	80 kV	95 kV*
6 hours w/s ac	35 kV	100 kV*	55 kV	110 kV*	75 kV	120 kV*
Corona @ 3 pc. CSV CEV	— 13 kV	33 kV 28 kV	— 21.5 kV	36 kV 32 kV	— 30 kV	41 kV 39 kV
15 min. w/s dc	75 kV	Pass 75 kV	105 kV	Pass 105 kV	140 kV	Pass 140 kV
Impulse w/s	110 kV	+215 kV* –200 kV*	150 kV	+235 kV* –220 kV*	200 kV	+255 kV* –240 kV*
30 day Cyclic Aging @ 130°C w/s ac Corona @ 3 pc. CEV> Impulse +10 – 10	28.5 kV 13 kV +110 kV – 110 kV	Pass Pass Pass Pass	48 kV 21.5 kV +150 kV –150 kV	Pass Pass Pass Pass	66 kV 30 kV +200 kV –200 kV	Pass Pass Pass Pass

*At higher voltage flashovers occur.

G. Typical Physical and Electrical Properties

Silicone Rubber Insulator

Physical Properties

Test Method	Typical Value*
• Color	Munsel Gray
• Permanent Set 22 hours @ 100°C (212°F) 100% elongation 5 minute recovery	8%
• Ultimate Tensile Strength (ASTM D412)	1200 psi (8.28 MPa)

Electrical Properties

Test Method	Typical Value*
• Dielectric Constant (K) (ASTM D150)	
23°C (73°F)	3.4
90°C (194°F)	3.0
130°C (266°F)	2.7
• Dissipation Factor (ASTM D150)	
23°C (73°F)	0.4%
90°C (194°F)	1.3%
130°C (266°F)	1.2%
• Dielectric Strength (ASTM D149) 0.075" thick slab (1,90 mm)	507 volts/mil (20 kV/mm)
• Track Resistance (ASTM 2303)	
2.5 kV	10 hrs.
3.5 kV	1 hr.

EPDM Rubber High-K Stress Control Tube

Physical Properties

Test Method	Typical Value*
• Ultimate Tensile Strength (ASTM 412)	1394 psi (9.6 MPa)
• Permanent Set 22 hours @ 100°C (212°F) 100% elongation 5 minute recovery	16%

Electrical Properties

Test Method	Typical Value*	
• Dielectric Constant (K) (ASTM D150) 60 Hz; @ 60% strain	@400 V	@3 kV
23°C (73°F)	25.7	28.8
65°C (149°F)	24.5	27.2
90°C (194°F)	25.2	27.7
vs. frequency @ 23°C (73°F)		
150 Hz		35
1,000 Hz		29
10,000 Hz		24
100,000 Hz		20
• Dissipation Factor (ASTM D150) 60 Hz; @ 60% strain	@400 V	@3 kV
23°C (73°F)	0.096	0.166
65°C (149°F)	0.093	0.165
90°C (194°F)	0.132	0.161
vs. frequency @ 23°C (73°F)		
150 Hz		0.16
1,000 Hz		0.15
10,000 Hz		0.14
100,000 Hz		0.12

* Average values, not intended for specification purposes.

4. Specification Guide

(Open Specification)

The cable termination must be a one-piece Cold Shrink™ 15 kV, 25 kV or 34.5 kV Class device and meet all 15 kV, 25 kV or 34.5 kV requirements for Class 1 termination as recorded in IEEE Standard 48-1990. The termination must be a molded rubber unit where the built in stress relief mechanism uses the concept of high dielectric constant capacitive stress grading. The molded rubber insulator must be made from silicone rubber.

(Closed Specification)

Terminate all 15 kV, 25 kV and 34.5 kV Class Tape Shield, Wire Shield, and UniShield® Cables in accordance with the instructions in the 3M Brand 5630K and 5690K Series Quick Term II Silicone Rubber Termination Kits.

5. Performance Tests

A. Corona Tests

The purpose of the corona tests is to insure that all properly installed terminations operate corona-free at a minimum of 150% of their operating voltage. In this test, phase to ground voltage is gradually increased until high frequency discharges are displayed on an oscilloscope.

The voltage at which these discharges reach three picocoulombs is recorded as the corona starting voltage (CSV). The voltage is then lowered until the discharges are less than three picocoulombs. This voltage is recorded as the corona extinction voltage (CEV). All Quick Term II terminations conform with the IPCEA recommended minimum corona extinction (CEV) level of 150% of operating voltage. Samples installed on 15 kV class cable are typically corona-free at 30 kV. Samples installed on 34.5 kV class cable are typically corona-free at 40 kV.

B. Impulse Tests (BIL)

In this test a nominal 1.2 × 50 microsecond wave, both positive and negative, is used. Ten consecutive impulses at each polarity are applied. All Quick Term II terminations meet the BIL requirements as recorded in IEEE Standard 48-1990 with a considerable amount of safety margin.

C. Alternating Current Withstand Tests

All terminations meet ac withstand tests as specified in IEEE Standard 48-1990. See applicable tables **"Typical Results per IEEE STD. 48-1990 Tests."**

The average value of voltage which will arc over the termination surface in air, from the cable connecting lug to the ground strap at the termination base, is shown in *table on next page*.

To determine dielectric strength, terminations are immersed in SF_6 gas. The SF_6 gas, having a higher dielectric strength than air, prevents termination flashover. The ac breakdown values are shown in *table on next page*.

Product Number	AC Flashover					AC Breakdown in SF_6				
	5 kV Class	8 kV Class	15 kV Class	25 kV Class	34.5 kV Class	5 kV Class	8 kV Class	15 kV Class	25 kV Class	34.5 kV Class
5632K–5637K	80 kV	85 kV	85 kV	95 kV	—	95 kV	100 kV	130 kV	155 kV	—
5691K–5694K	—	—	105 kV	115 kV	125 kV	—	—	130 kV	155 kV	197 kV
5696K–4598K	—	—	125 kV	135 kV	145 kV	—	—	130 kV	155 kV	197 kV

D. Environmental Performance

When airborne contaminants are deposited on a termination surface destructive leakage currents can be initiated when the surface becomes wet. Fog and drizzle are worse than rain. Rain tends to wash the pollutants off the termination while fog will wet the pollutants making the surface conductive to varying degrees promoting leakage current formation. This is most typical of hydrophillic surfaces typified by porcelain *(Figure 2)*. The surface of 3M Quick Term II silicone insulator is hydrophobic which makes it less likely to erode or track because the surface does not wet readily. *(Figure 3)*. This either prevents or minimizes leakage current formation. On occasion severe environmental conditions can be sustained for long time periods and cause any polymeric surface to lose its hydrophobicity. Because of this, EPDM polymers tend to lose their hydrophobicity over time, and porcelain surfaces become increasingly hydrophillic with time, which will result in premature failure or flashover. However, the silicone surface will re-establish its hydrophobic surface within 24 hours *(Figure 4)*. This unique ability of the Quick Term II silicone is a major factor to insure long service life.

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*Member of the 3M Electrical Products Division Technical Community.

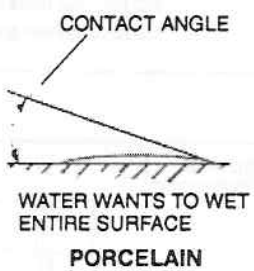
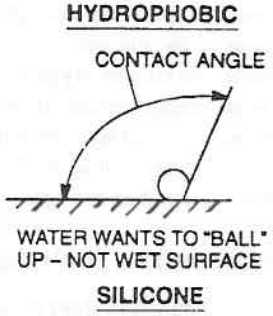


Figure 2



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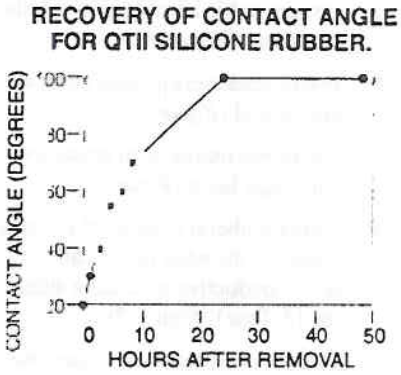


Figure 4

E. Sealing Tests

The bottom seal on shielded power cable is formed with mastic placed under and over the flat ground strap, which is then over-wrapped with vinyl tape. The tape wrap compresses the mastic to provide a moisture seal around the ground strap. The elongated base of a 5630K or 5690K Series Quick Term II Cold Shrink™ insulator covers the cable jacket end and tape/mastic region to complete the seal. The top seal on the lug is provided by the use of Scotch™ 70 Silicone Rubber Electrical Tape.

The seals are tested by immersing the lug end in water and applying air pressure to the conductor. Both seals will withstand internal air pressure test per IEEE Standard 48-1990.

F. Ultraviolet Resistance

After 1,000 hours of testing in a Weather-O-Meter according to Specifications ASTM D750 and ASTM G23, the silicone insulator exhibited no crazing, cracking or change in surface appearance. Silicone rubber, unlike carbon based elastomers, is inherently stable under exposure to sunlight. This is because of the silicone molecular back bone (the silicon-oxygen bond) has a bond strength greater than the ultraviolet energy of sunlight while the carbon-carbon bond of an EPDM elastomer is less than sunlight.

6. Installation Techniques

A detailed instruction sheet regarding proper installation is included in each kit. A brief summary of these procedures is as follows:

a. Prepare cable according to standard procedure *(Figure 5)*.

b. Install solderless ground strap and mastic seal *(Figure 6)*.

c. Overwrap mastic with protective vinyl tape layer *(Figure 7)*.

d. Apply a liberal coating of silicone grease to the edge of the cable semi-conductive insulation shield (or 13-Tape) *(Figure 7)*.

e. Place termination over cable and unwind the core allowing the termination to shrink into place *(Figure 8)*.

f. Install terminal lug and apply 70 Tape Top Seal *(Figure 9)*.

7. Field Maintenance

Hypotting

These terminations can be tested according to the instructions given in IEEE Standard 400-1991, "Guide for Making High Direct Voltage Tests in the Field."

Surface Cleaning

It is not uncommon in areas of extreme contamination for users to periodically clean terminations and other insulators. Energized or de-energized, established techniques for cleaning cable terminations can be used, e. g. high pressure water and pulverized corn cobs.

8. Availability

3M 5630K and 5690K Series Quick Term II Molded Silicone Rubber Termination Kits can be purchased through your local authorized 3M electrical distributor.

9. Shelf Life

3M 5630K and 5690K Series Quick Term II Silicone Rubber Termination Kits are packaged three terminations per carton. As provided in the expanded state, terminations have an on-shelf storage life of three years. Maximum recommended storage temperature is 110°F (43°C). They are not effected by freezing storage temperatures. The year and quarter of manufacture is molded into the base of each Quick Term II termination. Stock rotation practice is recommended.

Figure 5

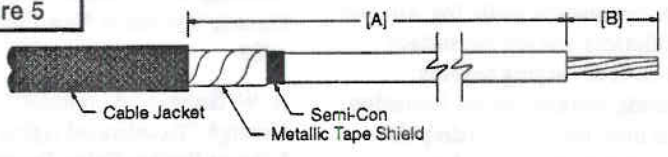


Figure 6

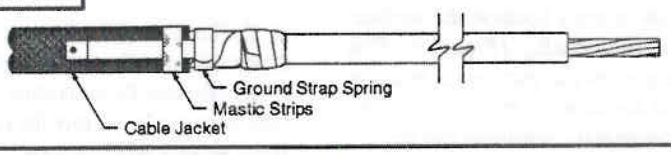


Figure 7

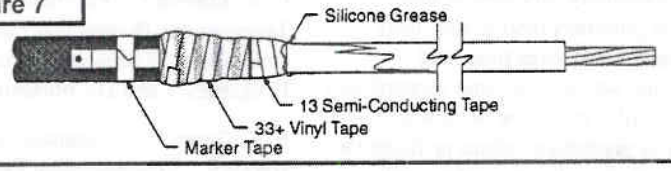
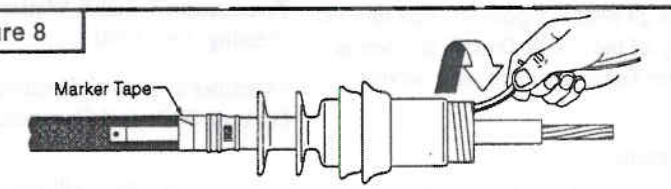
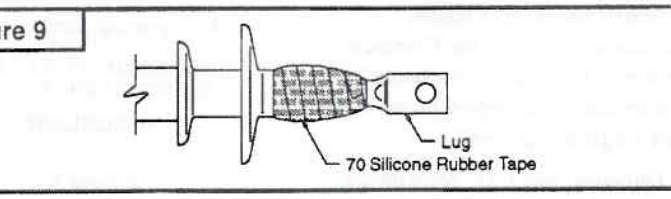


Figure 8



NOTE: The material being removed at this step is polypropylene and can be recycled with other ♳ waste.

Figure 9



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