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Protect and Insulate.

3M™ Insulating and Conductive Tapes
Interactive Product Selection Guide

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3M™ Insulating and Conductive Tapes are made from a broad range of backings and adhesives to help meet the demanding requirements of different applications and environments. Extensive quality control and testing, combined with accurate process controls, are just part of the reason that 3M consistently provides high quality products.

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3M™ Electrical Tapes

Glass Cloth

3M offers exceptionally flexible and conformable glass cloth backings with high-temperature resistance and tensile strength. With excellent absorption of resins and varnishes plus cut-through and edge-tear resistance, they are ideal for holding and strapping applications up to 200°C.

Available with three (3) adhesive systems: aggressive thermosetting rubber resin, solvent-resistant acrylic and high-temperature silicone.

Thermosetting Rubber			Acrylic	Silicone
3M™ Glass Cloth Tape	**27** SDS | DS	**90** SDS | DS	**79** SDS | DS	**69** SDS | DS
Features	High-performance glass cloth tape that is tough and conformable.	Stiffer, saturated backing. Provides different handling.	Solvent-resistant version of 3M tape 27 Printable. Listed in many Class B systems.	High-temperature (200° C) glass cloth tape. UL 510 flame retardant. Printable.
Operating Temp (°C) †	150	155	155	200
Total Thickness (mils)/(mm)	7.0/0,177	7.5/0,19	7.0/0,177	7.0/0,177
Dielectric Breakdown (V)	3000	3000	3000	3000
Insulation Resistance (megaohms)	4.8×10^4	1×10^2	2.7×10^2	4.8×10^4
Breaking Strength (lb/in)(N/10 mm)	150/252	175/306	150/262	180/314
Elongation (% at break)	5	5	5	5
Electrolytic Corrosion (3M Test Method ETM 54001)	0.9	0.9	0.9	0.9
Adhesion to Steel (oz/in)/(N/10 mm)	30/3,3	50/5,5	30/3,3	40/4,4
CTI Material Group	I	-	I	I

† Operating temperature is equivalent to UL Recognition temperature where applicable (See page 16).
= Flame retardant. See page 16 for product specifications.

Filament Reinforced

Filament tapes are designed for applications needing both the dielectric strength of polyester film and the high mechanical strength of glass fibers. They offer the ultimate in low stretch, high tensile and edge-tear resistance for a more cost-effective solution to glass cloth tapes. Excellent for anchoring lead wires to banding coils and end-turn taping. A special paper-backed filament tape is available for high-voltage oil-filled distribution transformer use.

Available with two (2) adhesive systems: aggressive thermosetting rubber resin and solvent-resistant acrylic.

	Thermosetting Rubber		Acrylic			
3M™ Filament Tape	**46** SDS | DS	**1046** SDS | DS	**1139** SDS | DS	**1076** SDS | DS	**1339** SDS | DS	**1039** SDS | DS
Features	Tough, durable filament tape.	Tough, durable filament tape.	Solvent-resistant, high-temperature filament tape.	Paper/glass filament backing designed for oil-filled transformer applications.	Solvent-resistant filament tape. More conformable.	Solvent-resistant filament tape. More conformable.
Operating Temp (°C) †	130	130	155	105	130	130
Total Thickness (mils)/(mm)	7.0/0,177	7.0/0,177	6.5/0,165	10.0/0,253	6.5/0,165	7.0/0,177
Dielectric Breakdown (V)	5500	5500	5500	3500	5500	5500
Insulation Resistance (megaohms)	$3x10^3$	$3x10^3$	-	-	$1x10^5$	$1x10^5$
Breaking Strength (lb/in) (N/10 mm)	275/481	275/481	225/394	275/481	275/481	275/481
Elongation (% at break)	5	5	6	5	5	5
Electrolytic Corrosion (3M Test Method ETM 54001)	1.0	1.0	-	1.0	1.0	1.0
Adhesion to Steel (oz/in)/(N/10 mm)	50/5,4	50/5,4	35/3,8	40/4,4	35/3,8	35/3,8
CTI Material Group	II	-	-	-	I	I

† Operating temperature is equivalent to UL Recognition temperature where applicable (See page 16).

3M™ ElectricalTapes

Acetate Cloth

These aesthetically pleasing acetate cloth tapes offer excellent conformability in coil-wrapping applications up to 105°C plus excellent absorption of electrical insulating resins and varnishes.

Paper

Paper tapes provide good cushioning, puncture resistance and toughness. Great for use as coil cover on bobbin-wound coil.

Both available with one (1)adhesive system: aggressive rubber resin.

Thermosetting Rubber		
3M™ Acetate Cloth Tape	**11** SDS | DS	**28** SDS | DS
Features	Black. Printable, Excellent Conformability.	White, printable. Excellent Conformability.
Operating Temp (°C) †	105	105
Total Thickness (mils)/(mm)	8.0/0,203	8.0/0,203
Dielectric Breakdown (V)	2000	2500
Insulation Resistance (megaohms)	$2x10^4$	$2x10^4$
Breaking Strength (lb/in)(N/10mm)	35/62	35/62
Elongation (% atbreak)	10	10
Electrolytic Corrosion (3M Test Method ETM 54001)	1	1
Adhesion to Steel (oz/in)/(N/10mm)	40/4,4	40/4,4
CTI Material Group	I	I

Thermosetting Rubber		
3M™ Paper Tape	**12** SDS | DS	**16** SDS | DS
Features	Flatback backing.	Thicker, crepe backing.
Operating Temp (°C) †	105	105
Total Thickness (mils)/(mm)	5.5/0,14	9.0/0,228
Dielectric Breakdown (V)	2000	2500
Insulation Resistance (megaohms)	$> 1x10^6$	$> 1x10^6$
Breaking Strength (lb/in)(N/10mm)	22/38,5	25/44
Elongation (% at break)	–	10
Electrolytic Corrosion (3M Test Method ETM 54001)	–	–
Adhesion to Steel (oz/in)/(N/10mm)	40/4,4	50/5,5
CTI Material Group	I	I

† Operating temperature is equivalent to UL Recognition temperature where applicable (See page 16).

Epoxy Film

3M has been vital to the development of epoxy film tapes. These offer solder and puncture resistance, high dielectric strength, conformability and UL recognition for flame retardancy at temperatures up to 155° C. 3M Epoxy Film Tapes are designed to require fewer wraps to meet dielectric requirements, compared to typical glass cloth tapes. Their versatility can help reduce your tape inventory.

Available with two (2) adhesive system: aggressive thermosetting rubber resin and solvent-resistant acrylic.

Acrylic			Thermosetting Rubber
3M™ Epoxy Film Tape	**1** SDS | DS	**Super 20** SDS | DS	**Super 10** SDS | DS
Features	High-performance epoxy tape. Thin. Printable. UL 510 Flame retardant.	Thicker, double-sided epoxy for higher temperature and dielectric. Printable. UL 510 Flame retardant.	Thicker epoxy for higher temperature and dielectric. Rubber adhesive. UL 510 Flame retardant.
Operating Temp (°C) †	130	155	155
Total Thickness (mils)/(mm)	3.5/0,088	5.0/0,127	5.0/0,127
Dielectric Breakdown (V)	6500	8000	8000
Insulation Resistance (megaohms)	> $1x10^6$	> $1x10^6$	> $1x10^6$
Breaking Strength (lb/in)(N/10mm)	30/53	45/79	45/79
Elongation (% at break)	120	120	120
Electrolytic Corrosion (3M Test Method ETM 54001)	1.0	1.0	1.0
Adhesion to Steel (oz/in)/(N/10mm)	40/4,4	30/3,3	45/4,9
CTI Material Group	I	I	I

3M™ Electrical Tapes

Polyester Film

3M offers a variety of polyester tapes for insulating applications requiring a thin, durable tape with high dielectric strength. They can withstand higher-temperature conditions than tapes with acetate cloth backings. They are also conformable, exhibit excellent chemical, solvent and moisture resistance and resist cut-through and abrasion.

Available in flame retardant and non-flame retardant versions and with two (2) adhesive systems: aggressive rubber resin and solvent-resistant acrylic.

Acrylic					
3M™ Polyester Film Tape	**5** SDS | DS	**1318-1** SDS | DS	**1350F-1** SDS | DS	**1350F-2** SDS | DS	**1351-1** SDS | DS
Features	1-mil film. General purpose polyester tape. Clear.	1-mil film. Printable. Black or yellow.	1-mil film. UL 510 Flame retardant. Black, white, or yellow.	2-mil film. UL 510 Flame retardant. Thicker version of 3M tape 1350F-1. Black, white, or yellow.	1-mil film. UL 510 Flame retardant. Smooth, even unwind for use on automatic equipment. White.
Operating Temp (°C) †	130	130	130	130	130
Total Thickness (mils)/(mm)	2.5/0,063	2.5/0,063	2.5/0,063	3.5/0,088	2.5/0,063
Dielectric Breakdown (V)	5500	5500	5500	7000	5500
Insulation Resistance (megaohms)	$>1x10^6$	$>1x10^6$	$>1x10^6$	$>1x10^6$	$>1x10^6$
Breaking Strength (lb/in)(N/10mm)	25/44	25/44	25/44	50/88	25/44
Elongation (% at break)	100	100	100	110	100
Electrolytic Corrosion (3M Test Method ETM 54001)	1.0	1.0	1.0	1.0	1.0
Adhesion to Steel (oz/in)/(N/10 mm)	35/3,8	30/3,3	30/3,3	30/3,3	30/3,3
CTI Material Group	–	I	II	IIIa	I

† Operating temperature is equivalent to UL Recognition temperature where applicable (See page 16).
= Flame retardant. See page 16 for product specifications.

Thermosetting Rubber

3M™ Polyester Film Tape	54 SDS | DS	56 SDS | DS	57 SDS | DS	58 SDS | DS	74 SDS | DS	75 SDS | DS
Features	1-mil film. General purpose polyester tape. Clear.	1-mil film. General purpose polyester tape. Yellow.	2-mil film version of 56. Thicker, higher dielectric. Yellow.	2-mil film version of 54. Thicker, higher dielectric. Clear.	0.5-mil film. Thin for coil applications where space is at a premium.	1-mil film. Coated on both sides. For use in bonding applications requiring a double positive insulation barrier.
Operating Temp (°C) †	130	130	130	130	130	130
Total Thickness (mils)/(mm)	2.5/0,063	2.3/0,058	3.3/0,083	3.3/0,083	0.8/0,020	3.8/0,096
Dielectric Breakdown (V)	5000	5000	7000	7000	3500	6500
Insulation Resistance (megaohms)	$>1x10^6$	$>1x10^6$	$>1x10^6$	$>1x10^6$	$>1x10^6$	$>1x10^6$
Breaking Strength (lb/in)(N/10mm)	25/44	25/44	50/88	50/88	12/21	25/44
Elongation (% at break)	100	100	110	110	100	100
Electrolytic Corrosion (3M Test Method ETM 54001)	1.0	1.0	1.0	1.0	1.0	1.0
Adhesion to Steel (oz/in)/(N/10mm)	45/4,9	50/5,5	60/6,5	60/6,5	20/2,2	45/4,9
CTI Material Group	I	I	I	I	I	–

† Operating temperature is equivalent to UL Recognition temperature where applicable (See page 16). The second number is the maximum operating temperature.

= Flame retardant. See page 16 for product specifications.

3M™ Electrical Tapes

Polyimide Film

3M Polyimide Film tapes are specially designed for high-temperature applications requiring a thin puncture-resistant backing. The physical and electrical properties of polyimide remain stable when used in such applications as coils, harnesses and capacitors, that are subjected to extreme temperatures.

Available with two (2) adhesive systems: solvent-resistant acrylic and high-temperature silicone.

Silicone			Acrylic	
3M™ Polyimide Film Tape	**92** SDS | DS	**1093** SDS | DS	**1205** SDS | DS	**1218** SDS | DS
Features	1-mil film. High-performance polyimide tape. High-temperature. Printable. UL 510 Flame retardant.	1-mil film. High-temperature masking applications. UL 510 Flame retardant.	1-mil film. Solvent-resistant version of 3M tape 92. UL 510Flame retardant.	1-mil film. High-temperature and solvent-resistant. UL 510 Flame retardant.
Operating Temp (°C) †	180	180	155	180
Total Thickness (mils)/(mm)	3.0/0,076	2.5/0,063	3.0/0,076	3.0/0,076
Dielectric Breakdown (V)	7500	7500	7500	6000
Insulation Resistance (megaohms)	$>1x10^6$	-	$>1x10^6$	$>1x10^6$
Breaking Strength (lb/in)(N/10mm)	30/53	35/62	30/53	30/53
Elongation (% at break)	55	50	55	55
Electrolytic Corrosion (3M Test Method ETM 54001)	1.0	-	1.0	1.0
Adhesion to Steel (oz/in)/(N/10mm)	25/2,8	20/2,2	35/3,8	19/2,1
CTI Material Group	IIIb	-	IIIb	IIb

† Operating temperature is equivalent to UL Recognition temperature where applicable (See page 16).
= Flame retardant. See page 16for product specifications.

Composite Film

3M Composite Film Tapes are excellent for general purpose insulation, anchoring, and banding in motors and transformers. They combine the high dielectric strength and edge-tear resistance of polyester film and nonwoven polyester mat for a conformable product with great puncture resistant and electrical properties.

Available in a variety of thicknesses and with two (2) adhesive systems: aggressive rubber resin and solvent-resistant acrylic.

Thermosetting Rubber				Acrylic	
3M™ Composite Film Tape	**44** SDS | DS	**44HT** SDS | DS	**55** SDS | DS	**44D-A** SDS | DS	**44T-A** SDS | DS
Features	Economical, general purpose composite film tape. For general purpose electrical applications. Longer-length rolls.	Composite film tape with aggressive adhesive designed for motor applications.	Thicker composite film tape for better puncture resistance and higher dielectric applications.	A version of 3M tape 44 with twice the backing thickness for greater dielectric strength.	A version of 3M tape 44 with three times the thickness for greater dielectric strength.
Operating Temp (°C) †	130	130	130	130	130
Total Thickness (mils)/(mm)	5.5/0,139	5.5/0,139	7.5/0,190	12/0,304	18/0,455
Dielectric Breakdown (V)	5500	5500	6000	6000	8500
Insulation Resistance (megaohms)	$>1x10^6$	$>1x10^6$	$>1x10^6$	$>1x10^6$	$>1x10^6$
Breaking Strength (lb/in)(N/10mm)	40/70	40/70	35/62	40/70	80/141
Elongation (% at break)	50	50	30	20	20
Electrolytic Corrosion (3M Test Method ETM 54001)	1.0	1.0	1.0	1.0	1.0
Adhesion to Steel (oz/in)/(N/10mm)	65/7,1	80/8,8	80/8,7	35/3,8	45/4,9
CTI Material Group	I	I	I	I	I

† Operating temperature is equivalent to UL Recognition temperature where applicable (See page 16).

3M™ Electrical Tapes

PTFE Film

Thin high-temperature PTFE tapes are used in applications requiring consistent performance and minimum shrinkage across a wide range of temperatures. They are resistant to chemicals, have high arc resistance, are free of carbonizing materials and are great for non-stick applications. Great for use on high-temperature coils, capacitors, and wire harnesses.

Available with two (2) adhesive systems: solvent-resistant acrylic and high-temperature silicone.

	Silicone			Acrylic
3M™ PTFE Film Tape	**60** SDS | DS	**61** SDS | DS	**62** SDS | DS	**63** SDS | DS
Features	2-mil film. UL 510 Flame retardant.	5-mil film. Thicker for higher dielectric and breaking strength. UL 510 Flame retardant.	2-mil film. Printable. Bondable backside on liner for higher adhesion to its own backing, resins and varnishes. UL 510 Flame retardant.	2-mil film. Solvent-resistant version of 3M tape 60. UL 510Flame retardant.
Operating Temp (°C) †	180	180	180	155
Total Thickness (mils)/(mm)	4.0/0,102	7.0/0,178	4.0/0,102	3.5/0,088
Dielectric Breakdown (V)	9500	15000	9500	9500
Insulation Resistance (megaohms)	$>1x10^6$	$>1x10^6$	$>1x10^6$	$>1x10^6$
Breaking Strength (lb/in)(N/10mm)	20/35	45/79	20/35	20/35
Elongation (% at break)	200	300	200	200
Electrolytic Corrosion (3M Test Method ETM 54001)	1.0	1.0	1.0	1.0
Adhesion to Steel (oz/in)/(N/10 mm)	30/3,2	35/3,8	30/3,2	35/3,8
CTI Material Group	I	I	I	I

† Operating temperature is equivalent to UL Recognition temperature where applicable (See page 16). The second number is the maximum operating temperature.

= Flame retardant. See page 16 for product specifications.

Vinyl

Vinyl Electrical Tapes combine the flexibility of a PVC backing with excellent electrical insulating properties, high dielectric strength, and resistance to moisture, UV rays, abrasion, corrosion, alkalies and acids. (Their rubber-based adhesive performs well over a range of temperatures).

Fade-resistant vinyl comes in a range of colors for marking. For primary electrical insulation up to 600 volts, including wire harnessing, degaussing coils and high-voltage cables.

Non-Thermosetting Rubber

Vinyl Electrical Tape	Scotch® Super33+™ Vinyl Electrical Tape SDS | DS	Scotch® Vinyl Electrical Tape 35 SDS | DS	Scotch® Vinyl Electrical Tape Super 88 SDS | DS	Scotch® Vinyl Electrical Tape 22 SDS | DS	3M™ Temflex™ Vinyl Electrical Tape 1700 SDS | DS
Features	7-mil premium black vinyl electrical tape. Offers excellent adhesion and cold weather performance. UL 510 Flame retardant.	7-mil premium vinyl tape for color coding. Available in 9 fade- and weather-resistant colors. UL 510 Flame retardant.	8.5-mil premium black vinyl electrical tape. Offers excellent adhesion and cold weather performance. UL 510 Flame retardant.	10-mil heavy-duty black vinyl tape. Offers great mechanical strength and abrasion resistance. UL 510Flame retardant.	7-mil general purpose black vinyl electrical tape. Good mechanical strength and abrasion resistance. UL 510 Flame retardant.
Operating Temp (°C) †	80/105	80/105	80/105	80	80
Total Thickness (mils)/(mm)	7.0/0,177	7.0/0,177	8.5/0,215	10.0/0,254	7.0/0,177
Dielectric Breakdown (V)	8750	8750	10000	12000	7000
Insulation Resistance (megaohms)	$>1x10^6$	$>1x10^6$	$>1x10^6$	$>1x10^6$	$>1x10^6$
Breaking Strength (lb/in)(N/10mm)	15/26	17/30	20/35	20/35	17/30
Elongation (% at break)	250	225	250	200	200
Electrolytic Corrosion (3M Test Method ETM 54001)	–	–	–	–	–
Adhesion to Steel (oz/in)/(N/10 mm)	28/3,0	20/2,2	28/3,0	20/2,2	22/2,4
CTI Material Group	–	–	–	–	–

† Operating temperature is equivalent to UL Recognition temperature where applicable (See page 16). The second number is the maximum operating temperature

= Flame retardant. See page 16 for product specifications.

3M™ Conductive and EMI Shielding Tapes

3M™ EMI Shielding Tapes are designed for applications requiring reliable point-to-point electrical contact, particularly EMI/RFI shielding, grounding and static charge draining. The tapes are easily die-cut and have a multitude of uses in electrical design and test laboratories for prototyping, design and troubleshooting.

Available in copper, aluminum, embossed, and tin-plated materials and with two (2) adhesive systems: solvent-resistant acrylic and conductive acrylic.

	Conductive adhesive							Nonconductive adhesive		
3M™ Conductive/ Shielding Tape	**1115B** SDS | DS	**1120** SDS | DS	**1126** SDS | DS	**1170** SDS | DS	**1181** SDS | DS	**1182** SDS | DS	**1183** SDS | DS	**425** SDS | DS	**1125** SDS | DS	**1194** SDS | DS
Features	Aluminum foil, acrylic adhesive.	Aluminum foil, acrylic adhesive.	Copper foil, acrylic adhesive.	Aluminum foil, acrylic adhesive.	Copper foil, acrylic adhesive.[1]	Copper foil, acrylic adhesive[1] on both sides.	Tin-plated copper foil, acrylic adhesive.[1]	Aluminum foil, acrylic adhesive.	Copper foil, acrylic adhesive.	Copper foil, non-conductive adhesive.
Roll Length3	60 yds	36 yds	36 yds	18 yds	18 yds	18 yds	18 yds	60 yds	36 yds	36 yds
Backing Thickness (mils)(mm)	4.5 mil (0,114 mm)	2.0 mil (0,05 mm)	1.4 mil (0,04 mm)	2.0 mil (0,05 mm)	1.4 (0,04 mm)	1.4 mil (0,05 mm)	1.4 mil (0,04 mm)	2.8 mil (0,07 mm)	1.4 mil (0,04 mm)	1.4 mil (0,04 mm)
Total Thickness (mils)(mm)	6.0 mil (0,152 mm)	3.8 mil (0,10 mm)	3.5 mil (0,088 mm)	3.2 mil (0,08 mm)	2.6 mil (0,07 mm)	3.5 mil (0,09 mm)	2.6 mil (0,07 mm)	4.6 mil (0,12 mm)	3.5 mil (0,088 mm)	2.6 mil (0,07 mm)
Breaking Strength (lb/in)(N/10 mm)	40 lb/in (70 N/10 mm)	20 lbs/in (35 N/10 mm)	25 lb/in (44 N/10 mm)	20 lb/in (35 N/10 mm)	25 lb/in (44 N/10 mm)	25 lb/in (44 N/10 mm)	25 lb/in (44 N/10 mm)	28 lb/in (4,9 N/10 mm)	25 lb/in (44 N/10 mm)	25 lb/in (44 N/10 mm)
Adhesion to Steel[4] (oz/in) (N/10mm)	52 oz/in (5.6 N/10 mm)	35 lbs/in (3,8 N/10 mm)	35 oz/in (3,8 N/10 mm)	35 oz/in (3.8 N/10 mm)	35 oz/in (3.8 N/10 mm)	35 oz/in (3.8 N/10 mm)	35 oz/in (3.8 N/10 mm)	47 lb/in (5,1 N/10 mm)	40 oz/in (4,4 N/10 mm)	40 oz/in (4,4 N/10 mm)
Electrical Resistance[6] (Ohms)	0.0065	0.0010	0.005	0.010	0.005	0.010	0.005	–	N/A	N/A

[1] Conductive particles in the adhesive provide the electrically conductive path between the substrate and the backing.
[2] The embossed pattern provides the electrically conductive path through the adhesive.
[3] Multiple-length rolls and custom slit widths are available by special order.

Testmethods:
[4] ASTM D1000
[5] Most foil shielding tapes from 3M are UL Recognized ( ) for flame retardancy per UL 510, Product Category OANZ 2, File E17385.
[6] Resistance measured through the adhesive. MIL-STD-202 Method 307 maintained at 5 PSI (3,4 N/sq cm) measured over 1 sq in. surface area.

= Flame retardant. See page 16 for product specifications.

	Conductive-through-adhesive			Conductive adhesive	
3M™ Conductive/ Shielding Tape	**1245** SDS | DS	**1267** SDS | DS	**1345** SDS | DS	**CN-3190** SDS | DS	**2191 FR** SDS | DS
Features	Embossed copper foil, acrylic adhesive.[2]	Embossed aluminum foil, acrylic adhesive.[2]	Embossed tin-plated foil, acrylic adhesive.2	Anti-corrosion metallized polyester rip-stop fabric, acrylic adhesive.	Anti-corrosion, metallized nonwoven rip-stop fabric, acrylic adhesive.
Roll Length3	18yds	18yds	18yds	54.5 yds	-
Backing Thickness (mils)(mm)	1.4 mil (0,04 mm)	2.0 mil (0,05 mm)	1.4 mil (0,04 mm)	4.3 mil (0,11 mm)	5.2 mil (0,13mm)
Total Thickness (mils)(mm)	4.0 mil (0,10mm)	5.0 mil (0,13mm)	4.0 mil (0,10mm)	5.8 mil (0,14mm)	5.3 mil (0,14mm)
Breaking Strength (lb/in)(N/10mm)	25 lb/in (44 N/10mm)	20 lb/in (35 N/10mm)	25 lb/in (44 N/10mm)	40 lb/in (70 N/10mm)	5.5 lbs/in (108 N/ 10mm)
Adhesion to Steel[4] (oz/in)(N/10mm)	35 oz/in (3.8 N/10mm)	35 oz/in (3.8 N/10mm)	45 oz/in (5.0 N/10mm)	30 oz/in (3.3 N/10mm)	20 oz/in (2,1 N/10mm)
Electrical Resistance[6](Ohms)	0.001	0.005	0.001	0.05	0.003 (over a 25x25 mm area)

[1] Conductive particles in the adhesive provide the electrically conductive path between the substrate and the backing.
[2] The embossed pattern provides the electrically conductive path through the adhesive.
[3] Multiple-length rolls and custom slit widths are available by special order.

Test methods:
[4] ASTM D 1000
[5] Most foil shielding tapes from 3M are UL Recognized ( ) for flame retardancy per UL 510, Product Category OANZ 2, File E17385.
[6] Resistance measured through the adhesive. MIL-STD-202 Method 307 maintained at 5 PSI (3,4 N/sq cm) measured over 1sq in. surface area.

= Flame retardant. See page 16 for product specifications.

Tape Construction

Smooth foil backings with conductive adhesive

3M™ EMI Shielding Tapes 1170 (aluminum), 1181 (copper) and 1183 (tin-plated copper) are smooth-backed foil tapes that establish secure electrical contact with the application surface by means of a unique adhesive. Broadly distributed conductive particles in the adhesive provide a multitude of low-resistance paths between the backing and the substrate. (Figure 1)

Embossed foil backings

The backings of 3M Shielding Tapes 1245 (copper), 1267 (aluminum) and 1345 (tin-plated copper) are impressed with an embossed pattern (Figure 2) that protrudes through the acrylic adhesive to make direct electrical contact with the application surface. This reliable "through-the-adhesive" conductivity system provides stable contact resistance and a high level of shielding effectiveness.

Tin-plated foil backings

The copper used in 3M EMI Shielding Tapes 1183 (smooth backing) and 1345 (embossed backing) is plated on both sides with tin to provide excellent solderability and resistance to corrosion and oxidation. The tapes are designed to remain conductive even after oxidation.

Conductive adhesive on both sides

3M Shielding Tape 1182 is a copper foil tape coated on both sides with conductive acrylic adhesive. This unique construction offers an excellent method of grounding and bonding conductive surfaces. It also exhibits low thermal resistance. 3M tape 1182 is supplied with a removable liner on each side for ease of handling.

Smooth foil backing with nonconductive adhesive

3M Shielding Tape 1194 is a smooth-backed copper tape that features the same high quality solvent-resistant, acrylic adhesive as other 3M foil tapes. Good solderability makes it an economical choice for applications like connector and cable shielding, grounding, electrostatic shielding between transformer windings, outer wrap for coils, and attachment of connector tabs on rolled film-and-foil capacitors.

Conductive fabric tape

3M Fabric Tape CN-3190 is an anti-corrosion polyester ripstop fabric backing with an electrically conductive acrylic adhesive. It provides effective copper-nickel shielding with excellent flexibility and conformability as well as light weight and high strength.

Adhesive

Both the conductive and nonconductive versions use the same acid-free, corrosion-resistant acrylic resin.

Figure 1 **Smooth Backing with Conductive Adhesive**

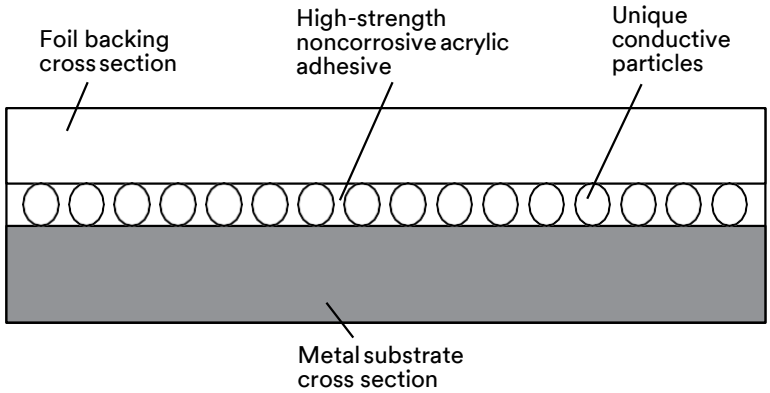
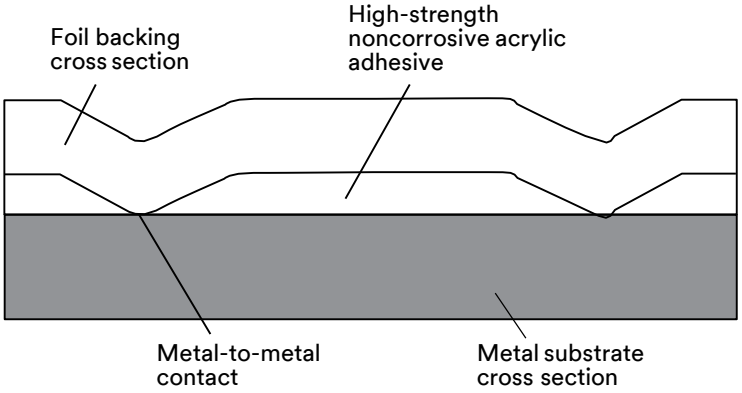


Figure 2 **Embossed Backing with "Through-the-Adhesive" Contact**



3M™ Specialty Tapes

These tapes have a multitude of uses in component design and manufacturing as well as to support the insulation of components.

General Use/Antistatic			Miscellaneous
3M™ Special Use Tapes	**40** SDS | DS	**40PR** SDS | DS	**1157R** SDS | DS
Features	General-use utility tape, 1-mil clear polyester film backing, anti-static conductive polymer adhesive.	General-use utility tape, 1-mil clear polyester film backing, anti-static conductive polymer adhesive. With preprinted static symbol.	Tape with non-woven mat designed to allow thorough penetration of the impregnating resin inside bobbin-wound coils.
Backing Description	Film	Film	Rayon fiber mat
Breaking Strength (lb/in)/(N/10mm)	20/35	20/35	tensile strength (8.5 lbs/in (14.8 N/10 mm))
Adhesion to Steel (oz/in)/(N/10mm)	15/1,7	15/1,7	1.2/10
Static Charge Generation at 50% RH — **Remove from roll (volts)**	5	5	N/A
Static Charge Generation at 50% RH — **Remove from stainless steel (volts)**	5	5	N/A
Adhesive	Conductive polymer	Conductive polymer	Acrylic
Operating Temperature (°C)			
Total Thickness (mils)/(mm)	2.2 mil/0,056	2.2 mil/0,056	4.0/0,102

The symbol shown is the industry standard ESD Protective Symbol which is used to identify items that are specifically designed to provide electrostatic discharge protection.

Industry Specifications

Scotch® Vinyl Electrical Tapes / 3M™ Tartan™ and 3M Temflex™ Vinyl Electrical Tapes

UL Listed in UL File E129200, Product Category OANZ

Specification	Tape Number	Type
UL 510 – For use as electrical insulation up to 600 volts and 80°C	22, Super 33+™, 35, Super 88, 1700	PVC Insulating Tape
Flame Retardancy – The following tapes meet the flame retardancy requirements of UL 510	22, Super 33+, 35, Super 88, 1700	PVC Insulating Tape

CSA Certified in CSA File LR48769, Product Class 9052-02

Specification	Tape Number	Type
CSA 22.2 No. 197 – For use as electrical insulation up to 1000 volts at temperatures not to exceed 80°C	22	PVC Insulating Tape
For use as electrical insulation up to 1000 volts at temperatures not to exceed 105°C	Super 33+™, 35, Super 88	PVC Insulating Tape

3M Electrical Insulating Tapes for Electrical Device Applications

UL Recognized components in UL File E17385, product Category OANZ2

Specification	Tape Number	Type
For use at temperatures not to exceed 130°C	44, 44D-A, 44HT, 44T-A, 55	Composite Film
	1	Epoxy Film
	5, 54, 56, 57, 58, 74, 75, 1318-1, 1350F-1, 1350F-2, 1351-1	Polyester Film
	46, 1039, 1046	Filament Reinforced
For use at temperatures not to exceed 150°C	27, 79	Glass Cloth
For use at temperatures not to exceed 155°C	Super 10, Super 20	Epoxy Film
		Filament Reinforced
	1205	Polyimide Film
For use at temperatures not to exceed 180°C	92, 1093, 1218	Polyimide Film
For use at temperatures not to exceed 200°C	69	Glass Cloth

3M and Scotch ElectricalTapes

Military** †

Specification	Previously Known As	Tape Number	Type
A-A-59770A (Type MFT 2.5)	MIL-15126F	54, 56	Polyester Film
A-A-59770A (Type MFT 3.5)	MIL-15126F	57, 58	Polyester Film
A-A-59770A (Type MF 2.5)	MIL-15126F	5, 1318-1, 1350F-1, 1351-1	Polyester Film
A-A-59770A (Type ACT)	MIL-15126F	11,28	Acetate Cloth
MIL-I-19166C		69	Glass Cloth
A-A-59474C, Type 1,Class 1	MIL-23594C	60	PTFE Film
A-A-59474C, Type 2, Class 1	MIL-23594C	62 Bondable	PTFE Film
A-A-55809		22, Super 33+, 35, Super 88	Vinyl

Tape Dimensions †

Standard Lengths*	Tape Number
16 meters (18yards)	1170, 1181,1182, 1183, 1245, 1267, 1345
20 meters (22 yards)	22, Super 33+, 35, Super 88
33 meters (36 yards)	22, Super 33+, 44T-A, 60, 61, 62, 63, 69, 75, Super 88, 92, 1093, 1115B,1120, 1125, 1126, 1194, 1205, 1218,1700
45 meters (49 yards)	44D-A
55 meters (60 yards)	12, 16, Super 10, Super 20, 46, 79, 90, 425, 1039, 1046, 1076, 1139, 1339
66 meters (72 yards)	1,5, 11,28, 40, 54, 55, 56, 57, 58, 74, 1318-1, 1350F-1, 1350F-2, 1351-1
82 meters (90 yards)	44, 44HT

* Other tape lengths may be available; contact your 3M sales representative or Customer Service for information.

† These tape charts are intended to serve as comparative guides for tape selection purposes. All property values shown are typical and are not intended for specification purposes. They are based on tests performed in accordance with ASTM D1000, except Electrolytic Corrosion Factor, which is a 3M test method available on request. Proposed specifications detailing maximum and minimum values are also available on request.

** Confirmed as of August 8, 2019.

About 3M™ Insulating and Conductive Tapes

Recommended Thermosetting Time & Temperatures for Adhesive Systems

Time	Rubber-Resin	Acrylic	Silicone
1 hour	150°C (300°F)	150°C (300°F)	–
2 hours	135°C (275°F)	135°C (275°F)	–
3 hours	120°C (250°F)	120°C (250°F)	260°C (500°F)
24 hours	–	–	260°C (500°F) (for maximum solvent resistance)

Thermal setting data not applicable to conductive tapes with acrylic adhesives.

Tape Adhesives

Thermosetting Rubber (RT): Thermosetting rubber adhesives have high initial adhesion and electrical purity. When properly thermoset, a rubber-resin adhesive system is designed to provide more aggressive adhesion and bonding, higher solvent resistance and higher heat resistance.

Acrylic (A): Acrylic adhesives have high solvent resistance and do not require pre-baking or thermosetting because they are made from synthetic polymers specifically formulated to resist heat, oxidation, solvents and oils, and exhibit acceptable performance in many applications without a cure cycle.

Silicone (ST): Silicone adhesive systems are perfect for high temperature applications because they have exceptional heat resistance, are inorganic, require higher temperatures for the thermosetting reaction, and, if burned, leave a nonconductive residue.

Product Shelf Life

All 3M™ Electrical Tapes have a 5-year shelf life (excluding 3M 40 tape) following the date of manufacture. It is 3M's standard procedure to ship any product with at least two years of its shelflife remaining. Any special request for a specific shelf life requirement may require a larger-than-stated minimum order quantity (MOQ) that justifies a non-scheduled product run. Contact your 3M sales representative for specific shelf life and minimum order quantity requirements. (No product returns will be accepted on special shelf life request orders.)

Slitting

Precision slitting ± 0.005" (0.127 mm) may be available for some tapes upon request. The minimum width for this service is 0.125" and the maximum width is 2.000". Standard slitting tolerances are dependent on the type of backing. All tapes have a width tolerance of ± 1/64", with the exception of some polyesters, vinyl, acetate and glass cloth which have a tolerance of ± 1/32".

Printing Options

There are five available methods for imprinting tapes: Ink Jet, Hand Stamping/Hot Stamping, Letterpress, Flexographic, and Offset. All 3M™ Electrical Tapes are printable by hot stamping. Some tapes in the 3M line are more suited for the other methods. Printer converters who print with flexography should contact their 3M sales representative to determine the tapes that are suitable for this printing method.

Other 3M Tape Solutions

Customer Plant Survey: 3M will provide a technically trained sales professional who can survey your plant, manufacturing procedures, equipment and tapes, and suggest ways to improve your product cost effectiveness and make your plant more efficient – all at no cost to you. Ask your 3M representative for more details.

ISO Registration

The 3M facilities which manufacture the insulating and conductive tapes in this publication have been registered by Underwriters Laboratories, Inc. to the International Standards Organization (ISO) 9001 quality management system standard. (Some facilities may be certified to ISO-9002 standards. Contact 3M to confirm, if necessary.) For the customer, registration provides proof of the quality of suppliers' systems. For companies with numerous manufacturing sites, such as 3M, ISO registration provides a consistent and efficient method of standardization. Prior to actual use, the product label and/or Safety Data Sheet should be reviewed.

Log Only Products

The following 3M Tapes are not available in slit rolls: 12, 16, 44D-A, 44T-A, 55, 1093, 1157R, 1318, 1350F and 1351. These products must be purchased through an authorized slitter/distributor.

Industry Standard Test Methods

This publication is a comparative guide for tape selection purposes. All property values shown are typical and are not intended for specification purposes. With the exception of Electrolytic Corrosion Factor, which is a 3M Test Method available on request, the properties are based on tests performed in accordance with recognized industry standard procedures:

- IEC 60454 Specification for pressure-sensitive adhesive tapes for electrical purposes, Part 2: Methods of Test
- ASTM-D1000 Test methods for pressure-sensitive adhesive-coated tapes used for electrical and electronic applications

Proposed specifications detailing maximum and minimum values are also available.

Other Quality 3M Electrical Products

3M makes exceptional high-temperature flexible insulation products, heat shrink tubing and molded shapes, liquid resins and wire management products for electrical and electronic applications. For complete information, go to www.3M.com/electrical/oem.

3M™ Flexible Insulation Products

3M™ Flexible Insulation Products are recommended for:

- Ground, phase and interwinding insulation for dry-type transformers
- Slot, phase and wedge insulation for electric motors and generators
- Flame barrier insulation for appliances
- Collars for voice coilsused in loudspeakers
- Wire and cable wrap
- Layer insulation used in cast coil transformers

3M ThermaVolt Calendared Inorganic Insulating Paper

3M ThermaVolt Calendared Insulating Paper is an inorganic-based paper with high thermal conductivity that helps achieve the heat dissipation required in today's electrical apparatus. That allows more efficient operation or the design of smaller, more cost-effective equipment. 3M ThermaVolt AR paper combines the advantages of of 3MThermaVolt paper with improved mechanical properties.

3M CeQUIN Inorganic Insulating Paper, Laminates and Boards

3M CeQUIN Inorganic Insulating Paper is 3M's highest inorganic-content paper; comprised primarily of glass fibers and microfibers, inorganic fillers, and less than 10% organic materials. It is designed for high-temperature electrical insulation applications up to Class 220(R) and is a highly flexible paper. This is available in a modified version with higher mechanical strength as well as in laminate and board form.

3M TufQUIN Hybrid Insulating Paper

3M TufQUIN Hybrid Insulating Paper is a tough, flexible and conformable paper with good dielectric characteristics and thermal conductivity. It also is available in a form that maintains comfortability at high thickness. It also is available in laminate form.

3M Flexible Insulation Products also are available in laminate form, as two-ply and three-ply using polyester film. Ask your 3M sales representative or authorized distributor for details.

Benefits

1

Thermal Conductivity

The high thermal conductivity of inorganic papers helps achieve the heat dissipation required in today's electrical apparatus, allowing more efficient operation or the design of smaller, more cost-effective equipment.

2

Voltage Endurance

3M™ Inorganic Insulating Materials retain a high percentage of dielectric strength even after extended exposure to high operating temperatures while its inorganic content helps reduce damage caused by partial discharge.

3

Low Moisture Absorption

Manufactured with less than 1% moisture content, inorganic papers exhibit dimensional stability, even in humid environments. It does not require extended drying time prior to varnish saturation.

4

Varnish Absorption

The good varnish absorption characteristics of inorganic paper can enhance its already high thermal conductivity, allowing equipment to run cooler, quieter, and last longer.

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