



# Tape Solutions for Electrical Insulation

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**Saint-Gobain®** offers a wide range of **CHR®** Electrical Grade Adhesive Tapes for electrical equipment including transformers, motors and generators. Electrically insulating pressure sensitive adhesive tapes are unique based on critical design stresses and assembly criteria. Key electrical equipment design stresses include thermal, dielectric, mechanical and chemical. Electrical insulation requirements in these demanding environments are achieved using a unique combination of backings and adhesives.

Several **CHR** Products are UL recognized components (UL 510) with thermal capabilities ranging from Class A (105°C) to Class N (200°C). Additionally, the chemical compatibility with common electrical insulation components have been validated by over 100 UL system designations (UL 1446). Thermal classifications specified by the UL recognition for the applicable test program (equipment, system of components or component) guarantee a life expectancy at a certain temperature. A typical expected equipment life at rated temperature is 20,000 hours. UL component and/or system recognitions are required by many Original Equipment Manufacturers (OEMs) who manufacture transformers, generators and motors.

## High Temperature — UL Class N (200°C) and UL Class H (180°C)

**Fluoropolymer Tapes (PTFE and FEP)** with silicone adhesive offer outstanding temperature resistance (Class 200°C) and dielectric strength, ideal for insulation of end-windings in high temperature motors and generators. The fluoropolymer backings are available in a wide range of thicknesses and conformability options.

**Polyimide (PI) Tapes** with silicone adhesive offer high thermal resistance (Class 180°C) and conformability, ideal for insulation of end-windings in high temperature motors and generators. PI Tapes available feature DuPont Kapton® and value grades of PI in a full range of thicknesses.

**Polyethylene-naphthalate (PEN-Teonex®) Tapes** with silicone adhesive offer equivalent thermal resistance to a PI tape (180°C) and improved chemical resistance. Commonly used as insulation for ignition coils. PEN Tapes are available in unique colors, including red and blue.

**Glass Cloth Tapes** with silicone adhesive are excellent insulation materials for high temperature applications, including thermal class 200°C. Higher temperature coil winding applications demand the use of a high tensile, high temperature glass cloth tape for banding layers of insulation together.

## Medium Temperature — UL Class F (155°C), UL Class B (130°C) and UL Class A (105°C)

**Nomex® Aramid Paper Tapes** with acrylic (Class 155°C) or rubber (Class 130°C) adhesives are an ideal choice to guarantee puncture resistance and absorption, excellent for use in resin-filled transformers or motors.

**Glass Cloth Tapes** with acrylic or rubber adhesives are an excellent insulation material for applications with medium thermal class ranges that require high adhesion. Glass cloth tapes offer puncture and abrasion resistance along with high tensile strength. Options are available in black, which is an ideal color for outer wrap insulation aesthetics.

**Polyester (PET) Tapes**, combined with rubber or acrylic adhesive, are available in a wide range of thicknesses and colors. PET tapes are thin and conformable with high dielectric strength, commonly used for end-winding insulation in motors/generators. Double-coated PET tapes with high initial tack are ideal for securing insulating material, such as slot liner.

**Glass Filament Reinforced Tapes** are very common in heavy banding and holding applications, especially those found in large-scale coil winding processes to secure insulation layers. Thermal capabilities range from Class 130°C (rubber adhesive) to Class 155°C (acrylic adhesive). The tensile strength for these products is superior to a glass cloth tape.

**Laminated PET Film Tapes** include a conformable fleece layer which offers great tear and puncture resistance. Ideal for securing phase insulation in a motor or generator end-winding region. Options are available with acrylic adhesive (Class 155°C and high adhesion) or thermosetting rubber adhesive (Class 130°C and high initial tack).

**Acetate Cloth Tapes**, combined with thermosetting rubber adhesive, provide a very good initial tack. Acetate cloth is highly conformable and easy to tear, which is ideal for hand application and coil outer wrap aesthetics.

**Copper Foil Tapes** with conductive acrylic adhesive are used for static electricity discharging and shielding from electromagnetic/electrostatic fields.

# Electrical Insulation Tapes

## High Temperature – UL Class N (200°C) and UL Class H (180°C)

Substrate	Adhesive	Tape Backing Thickness		Specification		Product Features	Common Applications
		Product Code		UL File	Thermal Class (°C)		
		0.0005-0.002 inches (0.013 - 0.050 mm)	0.003 - 0.010 inches (0.075 - 0.250 mm)				
Glass Cloth	Silicone		<b>G565</b>	OANZ2.E51201	Class N (200)	Superior thermal capability, tensile strength and abrasion resistant tape	High temperature dry type transformers or motors
PTFE	Silicone	<b>2255</b>		OANZ2.E66639	Class H (180)	High strength and high dielectric tape	High frequency motors, wire harnesses
PTFE	Silicone		<b>2045</b>	OANZ2.E66639	Class H (180)	High elongation tape for conformable wire wrapping	High frequency motors, wire harnesses
FEP	Silicone	C Tape			Class H (180)	For use in low temperature applications (-196°C)	High frequency motors, wire harnesses
FEP	Silicone	2355			Class H (180)	Exceptional clarity with a clean removal adhesive	High frequency motors, wire harnesses
Polyimide	Silicone	<b>2345-2</b>	2345-5	OANZ2.E66639	Class H (180)	Thick polyimide tape, high dielectric strength	High voltage motors
Polyimide	Silicone	2345-1D, 2345-2D (also listed as <b>H20, H50</b> )		OANZ2.E178430	Class H (180)	Featuring Dupont® Kapton® film	DuPont® Kapton® qualified traction motors, transformers
Polyimide	Silicone	<b>2345-1</b>		OANZ2.E66639	Class H (180)	Premium electrical grade polyimide with high adhesion	High temperature motors, wire harnesses
Polyimide	Silicone	K104			Class H (180)	Ultra-thin polyimide tape	Speaker insulation
PEN	Silicone	<b>K30, K50</b>		OANZ2.E178430	Class H (180)	Featuring chemical resistant DuPont® Teonex®	Ignition coil insulation
Glass Cloth	Silicone		G561, <b>2915-7Q</b>	OANZ2.E66639	Class H (180)	Glass cloth tape with thermoset silicone, Mil-i-19166C	High temperature motors, wire harnesses
Glass Cloth	Silicone		2915-10Q		Class H (180)	Glass cloth tape with higher adhesion silicone, Mil-i-19166C	High temperature motors, wire harnesses
Glass Cloth	Silicone		<b>GL.99</b>	OANZ2.E178430	Class H (180)	Economical glass cloth tape	High temperature dry type transformers
Glass Cloth	Silicone		<b>2905</b>	OANZ2.E66639	Class H (180)	Silicone coated on two sides	High temperature motors, wire harnesses

\***BOLD** = UL Recognized Component

## Medium Temperature – UL Class F (155°C), UL Class B (130°C) and UL Class A (105°C)

Substrate	Adhesive	Tape Backing Thickness		Specification		Product Features	Common Applications
		Product Code		UL File	Insulation Class (°C)		
		0.0005-0.002 inches (0.013 - 0.050 mm)	0.003 - 0.010 inches (0.075 - 0.250 mm)				
Polyimide	Acrylic	H20AC, <b>70AC</b>		OANZ2.E178430	Class F (155)	Featuring Dupont® Kapton® film with high adhesion acrylic	Satellites, aerospace electronics
Glass Cloth	Acrylic		<b>GL.94</b>	OANZ2.E178430	Class F (155)	High adhesion and abrasion resistant. Black option available.	End-winding insulation in motors
Nomex	Acrylic		<b>X.50</b>	OANZ2.E178430	Class F (155)	Puncture resistant and high absorption for resin filled systems	Motors & dry transformers
PET/Filament	Acrylic		<b>PS.25, PS249, PS.30</b>	OANZ2.E178430	Class F (155)	High adhesion, dielectric and tensile strength	Dry/oil-filled transformers
PET/Filament	Rubber		<b>PR25, PR30</b>	OANZ2.E178430	Class B (130)	High tack, dielectric and tensile strength	Dry transformers
Paper/Filament	Acrylic		6601		Class B (130)	Absorbent paper reinforced with glass filaments offers high tensile strength	Dry/oil-filled transformers
Glass Cloth	Rubber		<b>GL.95</b>	OANZ2.E178430	Class B (130)	High tack and abrasion resistant. Black option available.	Motors & dry transformers
PET/Nonwoven	Acrylic		<b>PT.20-20, PT.40</b>	OANZ2.E178430	Class B (130)	Conformable sharp edges & corners	End-winding insulation & coils wrapping
PET/Nonwoven	Rubber		<b>PT.25, PT.45</b>	OANZ2.E178430	Class B (130)	High adhesion & tack- wrap around sharp edges & corners	End-winding insulation & coils wrapping
PET	Silicone	M824, M887, M895			Class B (130)	Wide range of colors and thicknesses	Electrical insulation bonding to low surface energy substrates
PET	Acrylic	<b>P.34</b>		OANZ2.E178430	Class B (130)	Thin, conformable and high dielectric. Wide range of colors	End-winding insulation & outer wrap for toroidal coils
PET	Acrylic	<b>P.36, M765 (M706)</b>		OANZ2.E178430	Class B (130)	Flame retardant and printable	Holding tape in dry transformers
PET	Rubber	<b>P.31, P.315</b>		OANZ2.E178430	Class B (130)	High tack thermosetting rubber adhesive. Wide range of colors	Smaller dry transformers
Acetate Cloth	Rubber	CA.100			Class A (105)	Conformable and hand tearable. Available in white and black.	Smaller dry transformers
PET	Acrylic/Acrylic	M69			Class B (130)	Adhesive on two sides	Attachment & splicing tapes
PET	Rubber/Rubber	P.231			Class B (130)	Adhesive on two sides	Attachment & splicing tapes
Copper Foil	Acrylic	C665, SCUT.36				Electrically conductive adhesive	EMI shielding

\***BOLD** = UL Recognized Component

# Your Partner in Custom Tape Solutions

A custom tape solution can pay for itself many times over thanks to the process and product improvements it can provide. Tape development engineers will work with partners to design an economical but highly effective tape product.

Even with endless permutations of industrial tapes available there is only one company that can deliver a custom-made tape with optimal adhesive, the perfect backing materials, seamless process integration and superb performance.

To learn more about how **Saint-Gobain** can help solve tape and materials engineering challenges, call us or visit us online.

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