NORTON®

A Saint-Gobain Brand

PTFE FILM

Advanced Materials for Your Wire and Cable Needs

SAINT-GOBAIN
PERFORMANCE PLASTICS

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Saint-Gobain offers a full line of high performance films for use in manufacturing wires and cables.

EXTRUDED UNSINTERED PTFE FILMS

Full Density

Unsintered films are used as primary insulation for high-temperature wires, jackets and cables and wall for convoluted hose. They meet the requirements of component insulation to MIL-W-16878/4A, MIL-W-22759B and NAS703 and are available in white, natural, and many colors to round out your selection. Standard grades include R128 (white and natural), R129 (colors). Premium grades include R131 and R132.

Expanded

Unsintered films are used in microwave and coaxial cable applications in which low dielectric constant and high velocities are required. R167—nominal density of 0.7 g/cc.

SKIVED PTFE FILMS

Used as barrier and insulation tapes for wire and cable, as well as the primary wall material for convoluted hose, R191 skived sintered films meet the requirements of MIL-P-22241B, type II, grade A and MIL-W-22759.

PTFE COATED GLASS FABRICS

Fabrics number 349 and 355 are woven from yarn that meets MIL-Y-1140 and is impregnated with PTFE. They provide dimensional stability and abrasion resistance, and are used as barrier tapes for plenum cables and convoluted hose jacketing.

EXTRUDED FULL DENSITY R128 AND R129 SERIES—STANDARD GRADE

Total Thickness (in./mm)	Specific Gravity (grams/cc)	Longitudinal Tensile (psi)	Elongation Percent	Width Tensile (psi)	Approximate Yield (sq. ft./lb.)
.002 / .051	1.6	2,500	75	250	60.2
.003 / .076	1.6	2,300	125	275	40.1
.004 / .102	1.6	2,200	125	350	30.1
.005 / .127	1.6	1,900	150	350	24.1
.010 / .254	1.6	1,000	300	375	12.0

EXTRUDED EXPANDED R167 SERIES

Total Thickness (in./mm)	Specific Gravity (grams/cc)	Longitudinal Tensile (psi)	Elongation Percent	Width Tensile (psi)	Approximate Yield (sq. ft./lb.)
.004 / .102	0.7	3,200	75	125	68.7
.005 / .127	0.7	2,900	75	125	54.9
.006 / .152	0.7	2,700	75	150	45.8
.008 / .203	0.7	2,400	100	150	34.3
.010 / .254	0.7	1,700	125	150	27.5

SKIVED PTFE FILM R191

Total Thickness (in./mm)	Specific Gravity (grams/cc)	Longitudinal Tensile (psi)	Elongation Percent	Width Tensile (psi)	Approximate Yield (sq. ft./lb.)	Dielectric Strength (volts/mil)
.001/ .025	2.2	5,000	275	—	86.80	4,000
.002 / .051	2.2	5,600	300	—	43.40	4,000
.003 / .076	2.2	6,000	300	—	28.90	2,800
.005 / .127	2.2	6,000	350	—	17.60	2,000
.010 / .254	2.2	6,000	350	—	8.68	1,700

PTFE GLASS FABRIC TAPES 349 AND 355 SERIES

Part Number	Weight Min. (lbs./ sq. yd.)	Total Thickness (in./mm)	Breaking Strength (psi)	Resin Content Percent	Approximate Yield (sq. ft./lb.)	Dielectric Strength (volts/mil)
349-3T	.128	.0025 / .063	75	30	64.8	275
349-5T	.356	.005 / .127	160	35	25.2	—
355-3T	.186	.0028 / .071	85	50	48.6	300
355-5T	.411	.005 / .127	170	50	21.6	—

NORTON® Cast Fluoropolymer Films

CHEMFILM® FLUOROPOLYMER CAST FILMS AND TAPES FOR WIRE AND CABLE INDUSTRY

The multi-layer cast film process ensures inherently pin-hole free structure; therefore cast films possess superior dielectric properties. The multi-layer process is ideal for bulk and surface properties suited to most demanding applications.

DF1400 Series — Low noise cable applications

The DF1400 has a non-conductive, fully fused PTFE core coated with a conductive fluoropolymer formulation designed to be applied over jacketed wire and cable using standard tape-wrap equipment. It may be made bondable with FEP or PFA.

The DF1471 is a fully conductive PTFE that is also available with a conductive FEP surface.

DF1700/1900 Series

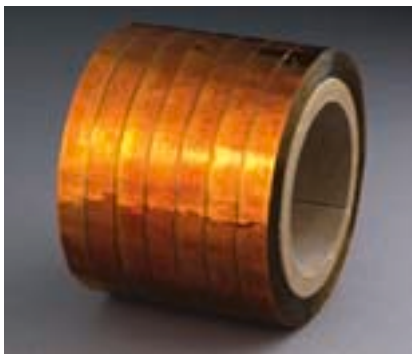
These films have a PTFE core with a thin layer of FEP or PFA (DF1700P) on one surface, which makes them heat bondable. Double bondable (DB) films are also available with PFA on both surfaces or FEP on one surface and PFA on the other surface. Laser markable (LM) films are also available.

Film Type	Tensile Strength (psi)	Elongation (%)	Elastic Modulus (psi)	Continuous Service Temp.	Dielectric Constant 60–108 HZ	Power/ Dissipation	Surface Resistivity	Volume Resistivity	Dielectric Strength (volts/mil)	Available Gauge (mil)
DF1400	4,000	400	60,000	-400°F, +500°F	12.0	0.036	Conductive	Conductive	4,200	2.5
DF1471	4,000	400	60,000	-400°F, +500°F	12.0	0.036	Conductive	Conductive	—	1.0-4.0
DF1700	4,300	400	60,000	-400°F, +500°F	2.0	<0.0001	1×10^{18}	$>10^{15}$	4,200	0.5-5
DF1900	4,300	400	60,000	-400°F, +500°F	2.0	<0.0001	1×10^{18}	$>10^{15}$	4,200	1-5

Available in slit widths down to 1/8", supplied in flat pad rolls or universal traverse packages.

NORTON® Polyimide Films

Polyimide films provide excellent electrical, thermal, physical and chemical properties over a wide temperature range in a lightweight package (135 sq. ft./lb. for 1 mil), making them superior for electrical insulation applications.



Taimide® TH Series — Uncoated

Taimide® polyimide films are produced with a world-class process that makes them dimensionally stable and inherently isotropic, meeting exacting tolerances, physically strong and electrically sound in widths up to 61.8". These products meet all of the requirements of ASTM D5213, which superseded MIL-P-46112B. TH series polyimide films exceed UL 94 V-0 flammability as well as a 235°C Relative Thermal Index (RTI) for both electrical and mechanical properties (UL file E231847). These high performance films are exclusively manufactured to Saint-Gobain's exacting specifications for the electrical insulation market by Taimide Technology (Taiwan) with world-class technology, process and equipment.

DF2000 Series — Fluoropolymer Coated

These products combine the electrical and thermal properties of fluoropolymers with the mechanical and dielectric properties of polyimide film. Heat sealable surfaces allow these tapes to be sealed to themselves and other layers of fluoropolymer tape wrap insulation at regular wire processing temperature. Further, the fully cured fluoropolymer base resin enables the films to be wrapped directly over the conductors. Test programs indicate that a combination of polyimide and fluoropolymer in electrical insulation on aircraft wiring provides maximum protection against arc propagation and failure.

NORTON® POLYIMIDE PRODUCTS FOR ELECTRICAL INSULATION

Name	Polyimide Construction (mil)	FEP Coating (mil)	Tensile Strength (psi)	Elongation %	Dielectric Strength (volts/mil)	Dielectric Constant $1MH_z$, 20C	Dissipation Factor	Shrinkage % at 200C, 2hr	UL RTI
TH-025	1	NONE	34,000	85	7,750	3.3	0.004	0.05%	235°C
TH-050	2	NONE	35,000	85	7,000	3.3	0.004	0.05%	235°C
DF2919	1	0.5 BOTH SIDES	18,000	100	6,000	2.6	0.010	0.05%	
DF2929	2	0.5 BOTH SIDES	21,000	100	5,100	2.8	0.013	0.05%	

Available in slit widths down to 1/8", supplied in flat pad rolls, universal traverse or step packages.

State-of-the-Art Winding Technology

Saint-Gobain now offers the industry's most advanced winding technology for extruded, skived, cast and polyimide films. State-of-the-art winding provides an unlimited range of pitch, overlap, tension and other programmable variables to best suit the product. For the customer, this means greater flexibility, longer length and more stable packaging for your narrow film requirements.

We've achieved this greater packaging stability with the **NORTON StablEdge™** spooling process. This produces a solid edge of film on the core instead of the soft fluffy appearance common to most traverse wound packages. Rolls wound with the NORTON StablEdge process are also less prone to edge drop off in the cable wrapping process, and are packed more efficiently on the core, allowing for smaller outside diameters.

For more information, contact your NORTON Films sales representative.

Product	Thickness Range (mils)	Widths	
		Traverse	Flat Pad
Extruded, Full Density	2 mil–10 mil	3/16"–3/4"	1/4" and up
Extruded, Expanded	4 mil–10 mil	3/16"–3/4"	3/8" and up
Skived	1 mil–10 mil	3/16"–3/4"	3/8" and up
Cast	0.5 mil–5 mil	3/16"–3/4"	1/4" and up
Polyimide	1 mil–2 mil	3/16"–3/4"	3/8" and up

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Saint-Gobain Performance Plastics Corporation
14 McCaffrey Street
Hoosick Falls, NY 12090-0320
Tel: (518) 686-7301
Fax: (518) 686-4840
www.fff.saint-gobain.com