

## *fastFilm*<sup>™</sup> Low Loss Non-Reinforced Film

*fastFilm*<sup>™</sup> 27 is a low loss flexible laminate constructed with non-reinforced high temperature polymer chemistry to provide excellent thermal, mechanical, electrical and moisture resistant properties. The low dissipation factor, thermal stability and smooth surface profile minimizes insertion loss at higher frequencies and temperatures, yielding exceptional low loss circuit performance. *fastFilm*<sup>™</sup> 27 is ideally suited for high frequency, high temperature and harsh environment applications.

As an alternative to polyimide, *fastFilm*<sup>™</sup> 27 offers an effective solution in high frequency applications. Polyimide suffers from atmospheric moisture absorption of 2 wt % which renders this material as lossy as FR-4 and unsuitable for high frequency applications. Some polyimides also employ lossy adhesives for copper adhesion that are not temperature resistant or low loss at high frequencies. The electrical properties of *fastFilm*<sup>™</sup> 27 have been designed to be independent of frequency.

*fastFilm*<sup>™</sup> 27 eliminates skew in long differential transmission lines as an alternative to coaxial cable. This material is ideal for flex-to-install applications.

Taconic is a world leader in RF laminates and high speed digital materials, offering a wide range of high frequency laminates and prepregs. These advanced materials are used in the fabrication of antennas, multilayer RF and high speed digital boards, interconnections and devices.

### Benefits & Applications:

- High frequency alternative to polyimide
  - Exceptionally low loss
  - Low Dk
  - Superior peel strength
  - High temperature performance
  - Low moisture absorption
  - No adhesive
- 
- Medical
  - Military
  - Consumer electronics
  - Fiber optic modules
  - Telecommunications
  - Avionics
  - Double sided, multilayer & rigid flex circuits
  - Automotive



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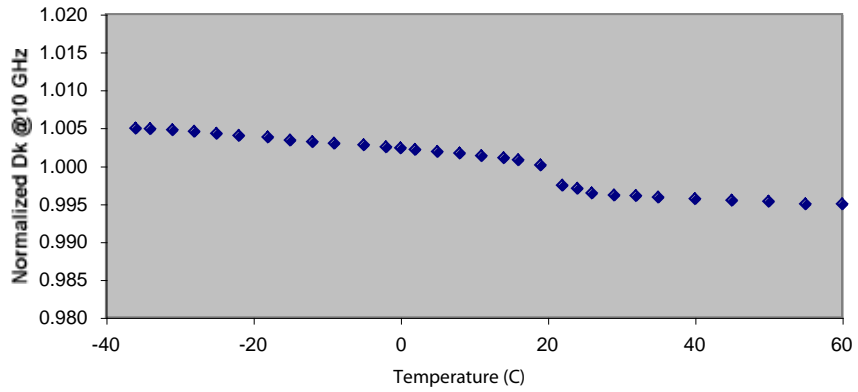
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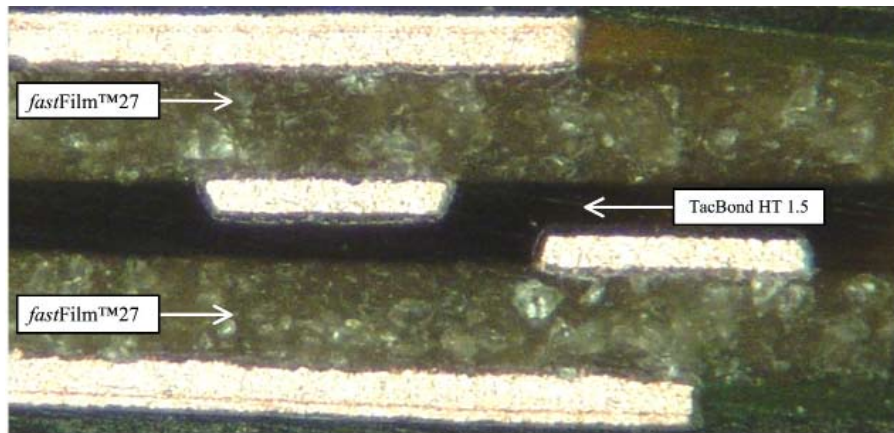
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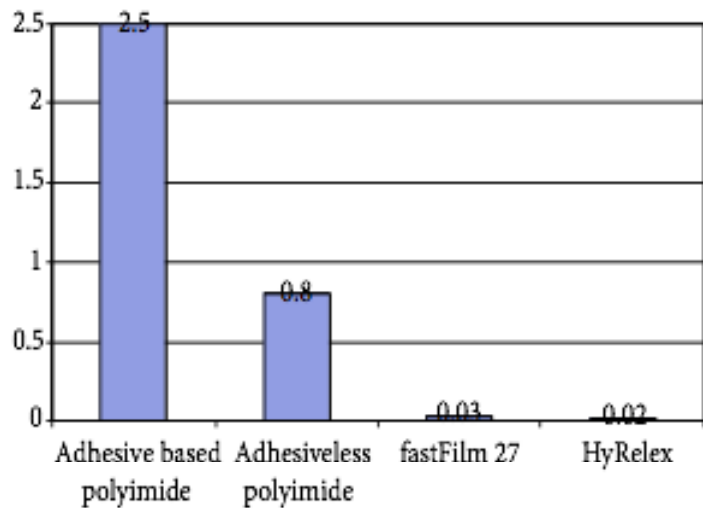


fastFilm™ 27 Dk vs. Temperature



fastFilm™ construction

## Moisture Absorption



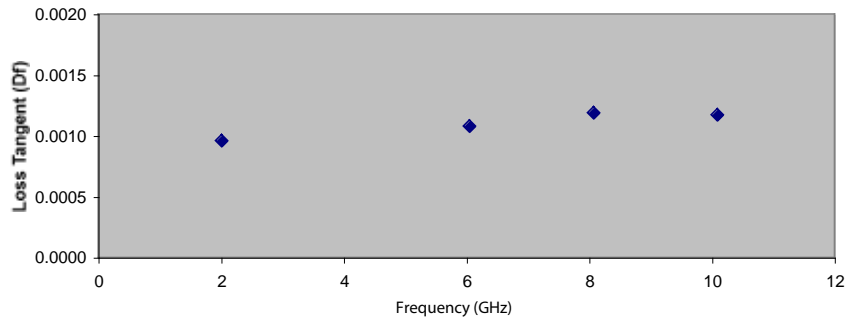
% moisture absorption (23 °C/24 hrs.)



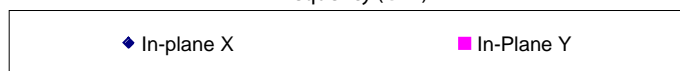
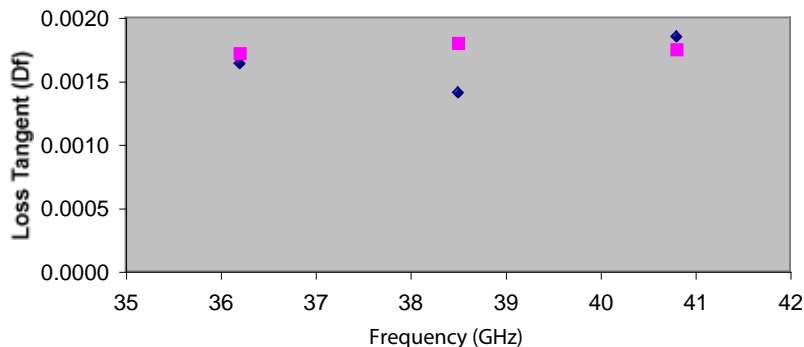
fastFilm™ 27 is a low loss flex laminate designed for double sided, multilayer and flex circuits.

*fastFilm*<sup>™</sup> Typical Values

Property	Test Method	Unit	Value	Unit	Value
Dk @ 10 GHz	IPC-650 2.5.5.5.1 (modified)		2.70		2.70
Df @ 10 GHz	IPC-650 2.5.5.5.1 (modified)		0.0012		0.0012
Df @ 40 GHz	IPC-650 2.5.5.5.1 (modified)		0.0018		0.0018
Moisture Absorption	IPC-650 2.6.2.1	%	0.03	%	0.03
Dielectric Strength	ASTM D 149	V/mil	1300	Kv/mm	51.18
Volume Resistivity	IPC-650, 2.5.17.1 (Humidity Conditioning)	Mohms/cm	1.60 x 10 <sup>8</sup>	Mohms/cm	1.60 x 10 <sup>8</sup>
Surface Resistivity	IPC-650, 2.5.17.1 (Humidity Conditioning)	Mohms	9.20 x 10 <sup>8</sup>	Mohms	9.20 x 10 <sup>8</sup>
Flexural Strength (MD)	ASTM D 790	psi	4,420	N/mm <sup>2</sup>	30.47
Flexural Strength (CD)	ASTM D 790	psi	4,360	N/mm <sup>2</sup>	30.06
Flexural Modulus (MD)	ASTM D 790	psi	408,000	N/mm <sup>2</sup>	2,813.06
Flexural Modulus (CD)	ASTM D 790	psi	401,000	N/mm <sup>2</sup>	2,764.80
Tensile Strength (x)	ASTM D 902	psi	2,320	N/mm <sup>2</sup>	16
Tensile Strength (y)	ASTM D 902	psi	2,160	N/mm <sup>2</sup>	14.9
Tensile Modulus (x)	ASTM D 902	kpsi	181	N/mm <sup>2</sup>	1,250
Tensile Modulus (y)	ASTM D 902	kpsi	176	N/mm <sup>2</sup>	1,210
Elongation at Break (x)	ASTM D 902	%	4.42	%	4.42
Elongation at Break (y)	ASTM D 902	%	4.08	%	4.08
Density (Specific Gravity)		g/cm <sup>3</sup>	2.08	g/cm <sup>3</sup>	2.08
Peel Strength (CVH)	IPC-650 2.4.8 Sec. 5.2.2 (Thermal Stress)	lbs./inch	10	N/mm	1.7
Peel Strength (CV1)	IPC-650 2.4.8 Sec. 5.2.2 (Thermal Stress)	lbs./inch	16	N/mm	2.7
CTE (X axis) (50 to 250 °C)	IPC-650 2.4.41/TMA	ppm/°C	29	ppm/°C	29
CTE (Y axis) (50 to 250 °C)	IPC-650 2.4.41/TMA	ppm/°C	28	ppm/°C	28
CTE (Z axis) (50 to 250 °C)	IPC-650 2.4.41/TMA	ppm/°C	112	ppm/°C	112



*fastFilm*<sup>™</sup> 27



All reported values are typical and should not be used for specification purposes. In all instances, the user shall determine suitability in any given application.

# fastFilm™ Low Loss Non-Reinforced Film

Designation	Dielectric Constant	Typical Thicknesses		Available Sheet Sizes	
		FF-27	2.70	.00225"	.06 mm
.003"	.08 mm			16" x 18"	406 mm x 457 mm
.005"	.13 mm			18" x 24"	457 mm x 610 mm
				16" x 36"	406 mm x 914 mm
				24" x 36"	610 mm x 914 mm

Our standard sheet size is 36" x 48" (914 mm x 1220 mm). Please contact our customer service department for availability of other sizes.

fastFilm™ laminates are generally ordered clad on both sides with 17 and 35 micron (.5 and 1 oz.) high elongation electrodeposited copper.

Available Copper Cladding						
Designation	Weight	Copper Thickness		R <sub>MS</sub> Treated Side		Description
R1*	1 oz / ft <sup>2</sup>	~0.0014"	~35 µm	11 µin	0.3 µm	Rolled annealed
CLH	½ oz / ft <sup>2</sup>	~0.0007"	~18 µm	13 µin	0.3 µm	Reverse treated/Electrodeposited
CL1	1 oz / ft <sup>2</sup>	~0.0014"	~35 µm	13 µin	0.3 µm	Reverse treated/Electrodeposited
CEH	½ oz / ft <sup>2</sup>	~0.0007"	~18 µm	19 µin	0.5 µm	High elongation / Electrodeposited
CE1	1 oz / ft <sup>2</sup>	~0.0014"	~35 µm	19 µin	0.5 µm	High elongation / Electrodeposited

\* Thickness dependent

An example of our part number is: FF-27-00225-CE1/CE1 - 18" x 24" (457 mm x 610 mm)

