



ETFE Fluoropolymer Extruded Films

ETHYLENE TETRAFLUOROETHYLENE FILM FOR USE IN SEMICONDUCTOR APPLICATIONS

ETFE films are materials of choice for cushioning / release function in Film Assisted Molding (FAM) processes of semiconductors and integrated circuits. They possess superior release properties and flexibility over a broad continuous use temperature range of -200°C to 165°C (-328°F to 330°F).

ETFE films reduce release forces required to remove the molded integrated circuit from the mold, and provide wrinkle-free surfaces after molding. The mold doesn't need to be cleaned between molding cycles.

Due to its lower density, ETFE films provide 20% higher area yield than FEP, PFA and PTFE.

TCI offers several options to match demanding requirements of FAM process :



ETFE PG (Premium Grade)

- General purpose grade fit for use in most electronics / release applications.
- Offers superior anti-stick and low frictional properties, combined with high elongation and tear resistance.

ETFE B1 Grade

- Specialty grade of ETFE that possesses superior elongation and formability characteristics when compared to standard ETFE PG grade
- Features 350-450% elongation which allows deeper draws.

ETFE B2 Grade

- Specialty grade of ETFE that possess highest elongation and formability characteristics at molding temperatures amongst all ETFE films, due to its lower melt point (225°C versus 260°C for other grades)
- It's engineered for deepest draws and most complex molding shapes
- Provides wrinkle-free surface after molding

TCI's ETFE Films Characteristics

- Excellent non-stick / release properties
- High elongation and tear resistance at deep drawdowns
- Helps to prevent flash on molds and tools
- Good conformability
- Specialty grades B1 & B2 provide superior elongation and formability
- Broad continuous use temperature range:
- Continuous use temperature range from -200°C to 165 °C (328°F to 330°F)
- ETFE B2 grade service temperature is from -200°C to 125°C (-328°F to 257°F)
- Free of plasticizers, processing aids, or additives

TCI's ETFE Films - General Availability

- Thickness range from 0.001" to 0.005" (25 to 125 µm)
- Standard width: 60" (1,524 mm)
- Width up to 62" (1,575 mm) available
- Any slit widths available upon request



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			ETFE PG	ETFE B1	ETFE B2
General Properties	Units	Test Method			
Specific Gravity		ASTM D792	1.74	1.74	1.78
Area Yield	ft ² /lb/mil		110	110	108
Area Yield	m ² /kg/25mμ		22.6	22.6	22.2
Flammability		UL-94	V-0	V-0	V-0
Water Absorption	%		<0.03	<0.03	
Mechanical Properties					
Tensile Strength	psi (MPa)	ASTM D882	7,000 (48)	7,500 (52)	6,000 (42)
Elongation at Break, min.	%	ASTM D882	300	350	400
Tensile Modulus	psi (MPa)	ASTM D882	140,000 (965)	125,000 (850)	
Folding Endurance (MIT)	cycles	ASTM D2176	50,000	80,000	200,000
Thermal Properties					
Continuous Use Temp	°F (°C)	UL-746 B	330 (165)	330 (165)	257 (125)
Melt Point	°F (°C)	ASTM D3418	500 (260)	482 (250)	437 (225)
Coeff. of Lin. Thermal Expansion	in/(in °F)	ASTM D696	7x10 ⁻⁵	7x10 ⁻⁵	7x10 ⁻⁵
Product Offering					
Width	inches (mm)		Up to 62" (1,575)		
Thickness	mils (μm)		0.5 - 5 (12.5 - 125)		
Standard Colors			Clear		
Surface Treatments Available					
Chemical Etching			•		
Plasma Treatment			•		

The above table contains typical representative values and is not to be used for product specification. Contact TCI for a formal specification.

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