ECTFE Film

(ethylene-chlorotrifluoroethylene)

A GE TECHNICAL SOLUTIONS NETWORK Member
MODERN plastics
"Setting the Standards in Plastics Distribution"™
ISO 9001:2000 Certified
678 Howard Avenue :: Bridgeport, CT 06605

ECTFE provides excellent chemical resistance, good electrical properties, a broad-use temperature range from cryogenic to 300°F (150°C), and meets the requirements of UL-94 V-0 vertical flame test in thicknesses as low as 7 mils (0.18 mm). It is a tough material with excellent impact strength and wear resistance.

The following physical property information is based on typical values of the base Halar® 300 resin as well as test results obtained from actual film testing.

	Units	ASTM Test	Result
Mechanical			
Tensile Strength @yield	psi	D882	4,940
Elongation @break	%	D882	220
Tensile Modulus	psi	D882	284,000
Flexural Modulus	psi	D790	240,000
Tear Strength - prop.	g/mil	D1004	513
Thermal			
Continuous Use Temp.–UL	°F	—	302
Heat Deflection Temperature @66 psi	°F	D648	240
Melt Temp.–DSC	°F	—	464
Glass Transition Temp.	°F	D3418	—
Flammability			
UL Rating–UL94	—	—	VTM-0
L.O.I.	%	D2863	60
NBS Smoke	Dmax	E662	—
Electrical			
Surface Resistivity	Ohms	D257	$>10^{16}$
Dielectric Strength @.003"	V/mil	D149	2,670
Dielectric Constant	1 KHz	D150	2.56
Dissipation Factor	1 KHz	D150	0.0025-0.0050
Other			
Specific Gravity	—	D792	1.68
Water Absorption	%/24 hr.	D570	<0.1
Refractive Index	—	—	—
Haze	%	D1003	—
Area Factor	$in^2/lb/mil$	—	16,364

Applications Include:

- Filters
- Diaphragms
- Release films
- Cable insulation
- Solar collector panels
- Coaxial and fiber optic wrap film
- Medical bags

Advantages of ECTFE Film:

- Excellent purity
- Excellent chemical resistance
- Low permeability
- Excellent abrasion resistance
- Excellent temperature resistance

Manufacturing Capabilities:

Thicknesses and Widths:

.002" to .029" up to 25" wide

Finishes:

all thicknesses available polished one side, matte the other (P/M)

*In addition to our standard capabilities, Westlake also has the ability to process custom resins in various sizes and colors with some exceptions.

Manufactured by
WESTLAKE PLASTICS COMPANY

F-007 8/01

Adhesive Bonding:

ECTFE can be adhesive laminated to a variety of plastic film and metal substrates with bond strengths ranging from 52-800 psi and under harsh chemical envirionments.

Epoxy adhesives are useful for bonding ECTFE. The strength of the bond can be greatly increased if the surface is first etched with sodium, flame treated, plasma, or fluorine gas treated.

Adhesive System	Untreated Surface	Sodium Etched (1)	Flame Treated (2)
Scotch-Weld® #2214 Hi-Temp(3)	52 psi	>620(4) psi	>620(4) psi
Scotch-Weld® #2216	55 psi	337 psi	620(4) psi
BONDiT® B-45 TH	150 psi	800 psi	800 psi

Lap shear strength, HALAR resin/HALAR resin joint, ¾" x 1" joint area.

1. Etchant and procedure identical to that commonly used on PTFE. Specific etchant used was Tetra-Etch supplied by W.L. Gore Co. Etching time was 1-2 minutes.
2. Brushed with propane torch for 15-30 seconds. (Let tip of flame touch the surface. Move flame just rapidly enough to avoid charring and/or warping).
3. Rated good for 300°F (149°C) continuous service temperature by its vendor.
4. Exceeded the yield strength of the 90-mil HALAR resin used in the joint.

Thermoforming:

Typical thermoforming equipment utilizes infrared heating sources or convection ovens. Heat the film until it becomes transparent. Exact temperatures for convection ovens vary: a starting point is 530°F. Immediately apply vacuum pressure to the film. Hold the film in place until completely cooled. Some shapes may require heating of the mold or tools to prevent cracking or tearing of the film.

Heating requirements are considerably lower for pressure forming. A temperature range of 300°F to 375°F is a good starting range. The mass, heat capacity and temperature of the molds have a great effect on temperature requirements. Form the film and hold in place until cool.

Permeability To Gases:

ECTFE fluoropolymer has low permeability to water vapor and various other gases.

Gases	cc-mils/100 in²/24 hrs-atm
CO_2	25
Nitrogen	3
Oxygen	6
Water Vapor	0.15 (g-mil)

Heat Sealing:

ECTFE film can be sealed by thermal impulse, rotary band and hot bar techniques. Approximate hot bar sealing conditions are 475°F to 500°F with 1-2 second dwell times.

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