TUFFAK®

PLASKOLITE

TUFFAK TG 236 polycarbonate sheet

RAIL GLAZING

TUFFAK TG 236 sheet is a hard-coated polycarbonate product designed for high optical quality and exceptional durability. When incorporated in a dual glazed window, this 0.236″ thick product meets stringent U.S. Federal Railroad Administration requirements for impact, ballistic, and flammability performance. State-of-the-art manufacturing and inspection processes provide low optical distortion and the advanced hard coat technology provides excellent abrasion resistance, chemical resistance, and long lasting outdoor weathering performance. This product is available in clear and a variety of standard and custom tints. TUFFAK TG 236 is offered with a seven (7) year Limited Product Warranty against breakage for flat vertical applications. The terms of the warranty are available upon request.

APPLICATIONS

Passenger rail car windows and other transportation glazing

Typical Properties*

Property	Test Method	Units	Values
PHYSICAL			
Specific Gravity	ASTM D 792	–	1.2
Light Transmission, Clear @ 0.236″	ASTM D 1003	%	84
Chemical Resistance	ANSI Z26.1	–	Pass
Taber Abrasion @ 100 Cycles, Delta Haze	ASTM D 1044	%	2
CS-10F Wheel @ 500 g load			
MECHANICAL			
Tensile Strength, Ultimate	ASTM D 638	psi	9,500
Modulus of Elasticity	ASTM D 638	psi	340,000
Flexural Strength	ASTM D 790	psi	13,500
Compressive Strength	ASTM D 695	psi	12,500
Izod Impact Strength, Notched @ 0.125″	ASTM D 256	ft·lbs/in	16
Izod Impact Strength, Unnotched @ 0.125″	ASTM D 256	ft·lbs/in	No Break
Instrumented Impact @ 0.125″	ASTM D 3763	ft·lbs	47
Poisson's Ratio	ASTM E 132	–	0.38
Rockwell Hardness	ASTM D 785	–	M70/R118
THERMAL			
Coefficient of Thermal Expansion	ASTM D 696	in/in/°F	3.75 x 10-5
Heat Deflection Temperature @ 264 psi	ASTM D 648	°F	270
Heat Deflection Temperature @ 66 psi	ASTM D 648	°F	280
ELECTRICAL			
Dielectric Constant @ 10 Hz	ASTM D 150	–	2.96
Dielectric Constant @ 60 Hz	ASTM D 150	–	3.17
Volume Resistivity	ASTM D 257	Ohm·cm	8.2 x 1016
Dissipation Factor @ 60 Hz	ASTM D 150	–	0.0009
Dissipation Factor @ 1 MHz	ASTM D 150	–	0.01
Arc Resistance	–	–	–
Stainless Steel Strip Electrodes	ASTM D 495	Seconds	10
Tungsten Electrodes	ASTM D 495	Seconds	120
Dielectric Strength, in air, 125 mils	ASTM D 149	V/mil	380
FLAMMABILITY/BALLISTIC/IMPACT			
Federal Railroad Administration			
49 CFR Part 238, Appendix B	ASTM E 162	Is	<100
49 CFR Part 238, Appendix B	ASTM E 662	Ds (1.5 min) Ds (4.0 min)	<100 <200
49 CFR Part 223	Ballistic	–	Pass
49 CFR Part 223	Impact Type I & II	–	Pass
Bombardier Toxic Gas Generation	SMP 800-C	–	Pass

*Typical properties are not intended for specification purposes

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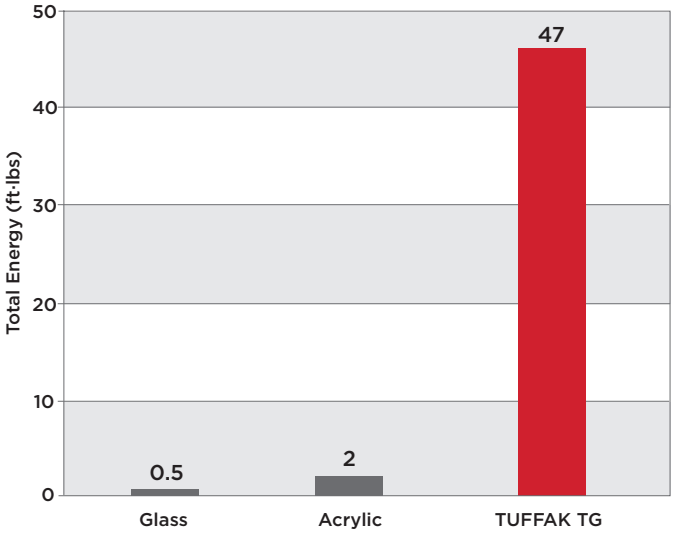
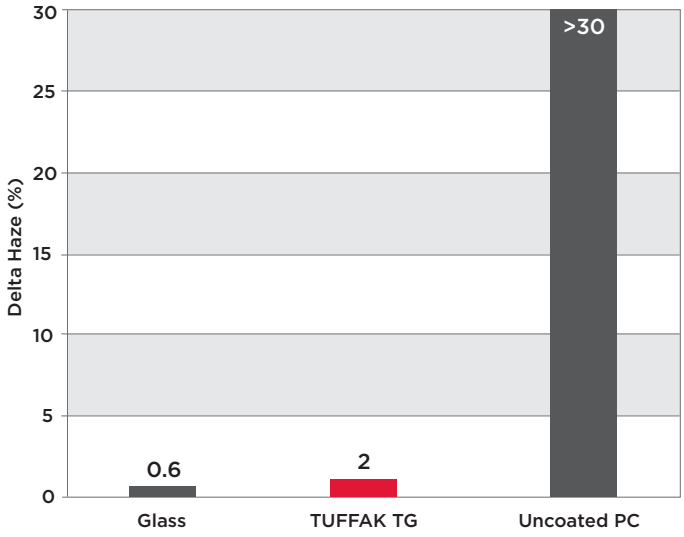
Impact Resistance*



*Instrumented Impact per ASTM D 3763, sample thickness is 0.125˝ nominal

Abrasion Resistance*



*Taber Abrasion per ASTM D 1044, 100 cycles using CS-10F wheels at 500 g load

Chemical Resistance*

Chemical Tested	Resistance Time
Acetone	>24 hrs
Ammonia (10% concentration)	>24 hrs
Antifreeze (50/50)	>24 hrs
Benzene	>24 hrs
Bleach (Clorox concentrated)	>24 hrs
Chloroform	>24 hrs
Denatured Alcohol	>24 hrs
Di (2-ethylhexyl) phthalate	>24 hrs
Diesel Oil	>24 hrs
Isopropyl Alcohol (IPA)	>24 hrs
Kerosene	>24 hrs
Methyl Alcohol	>24 hrs
Methyl Butyl Ketone	>24 hrs
Methyl Ethyl Ketone	>24 hrs
Methylene Chloride	>24 hrs
Naphthalene, 1-bromo-	>24 hrs
Potassium Hydroxide - Lye (10%)	>24 hrs
Sodium Hydroxide (10%)	>24 hrs
Toluene	>24 hrs
Turpentine	>24 hrs
Unleaded Gasoline (87 Octane)	>24 hrs
Vinegar	>24 hrs
Xylene	>24 hrs
Acids:	
Hydrochloric Acid (20%)	>24 hrs
Nitric Acid (20%)	>24 hrs
Sulfuric Acid (20%)	>24 hrs

*Tested in accordance to ASTM D 1308-02

Always keep hazardous chemicals away from uncoated edge of Tuffak Polycarbonate Sheet

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