TUFFAK®

PLASKOLITE

TUFFAK AR POLYCARBONATE SHEET

ABRASION RESISTANT

TUFFAK AR polycarbonate sheet is a one or both sides hard-coated polycarbonate product that adds higher abrasion resistance and surface hardness to polycarbonate's inherent performance benefits of impact strength and clarity. The proprietary hard-coat also provides chemical resistance and long lasting outdoor weathering performance. This product is available in clear, a range of standard tints, or can be custom matched to any color. TUFFAK AR polycarbonate sheet has a seven (7) year Limited Product Warranty against breakage, yellowing, and hazing. The terms of the warranty are available on request.

APPLICATIONS

Flat architectural glazing, machine guards, and laminates

Regulatory code compliance and certifications

- ANSI Z97.1-2009, 2015: American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test, Class A, Unlimited
- CPSC 16 CFR 1201 Category I and Category II: Safety Standard for Architectural Glazing Materials
- Florida Building Code
  High Velocity Hurricane Zone Classified
  Miami-Dade NOA: NOA
- ICC-ES Evaluation Report ESR-2728
- UL 94: Flammability File #E87887
- UL 972: Burglary Resistant Glazing Materials, UL File #BP2126
- UL 746C: Suitability for Outdoor Use, UL File #E87887
- AAMA 501.8: Resistance to Human Impact of Windows Systems Intended for Use in Psychiatric Applications

TYPICAL METRIC PROPERTIES*

Property	Test Method	Units	Values
PHYSICAL			
Specific Gravity	ASTM D 792	–	1.2
Refractive Index	ASTM D 542	–	1.586
Light Transmission, Clear @ 3.0mm	ASTM D 1003	%	86
Light Transmission, I30 Gray @ 3.0mm	ASTM D 1003	%	50
Light Transmission, K09 Bronze @ 3.0mm	ASTM D 1003	%	50
Light Transmission, I35 Dark Gray @ 3.0mm	ASTM D 1003	%	18
Water Absorption, 24 hours	ASTM D 570	%	0.15
Poisson's Ratio	ASTM E 132	–	0.38
Chemical Resistance	ASTM D 1308	–	Pass
Taber Abrasion @ 100 Cycles, Delta Haze CS-10F Wheel @ 500 g load	ASTM D 1044	%	2
MECHANICAL			
Tensile Strength, Ultimate	ASTM D 638	MPa	66
Tensile Strength, Yield	ASTM D 638	MPa	62
Tensile Modulus	ASTM D 638	MPa	2340
Elongation	ASTM D 638	%	110
Flexural Strength	ASTM D 790	MPa	93
Flexural Modulus	ASTM D 790	MPa	2380
Compressive Strength	ASTM D 695	MPa	86
Compressive Modulus	ASTM D 695	MPa	2380
Izod Impact Strength, Notched @ 3.18mm	ASTM D 256	J/cm	8.5
Izod Impact Strength, Unnotched @ 3.18mm	ASTM D 256	J/cm	No Break
Instrumented Impact @ 3.18mm	ASTM D 3763	J	64
Shear Strength, Ultimate	ASTM D 732	MPa	69
Shear Strength, Yield	ASTM D 732	MPa	41
Shear Modulus	ASTM D 732	MPa	786
Rockwell Hardness	ASTM D 785	–	M70 / R118
THERMAL			
Coefficient of Thermal Expansion	ASTM D 696	cm/cm/°C	6.8×10^{-5}
Coefficient of Thermal Conductivity	ASTM C 177	Cal-cm/sec-cm^2·°C	0.0005
Heat Deflection Temperature @ 1.82 MPa	ASTM D 648	°C	132
Heat Deflection Temperature @ 0.46 MPa	ASTM D 648	°C	139
Brittleness Temperature	ASTM D 746	°C	-129
Shading Coefficient, Clear @ 6.0mm	NFRC 100-2010	–	0.97
Shading Coefficient, Gray or Bronze @ 6.0mm	NFRC 100-2010	–	0.77
U factor @ 6.0mm (summer/winter)	NFRC 100-2010	W/m^2·°C	4.83/5.22
U factor @ 6.54mm (summer/winter)	NFRC 100-2010	W/m^2·°C	4.43/4.83
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	8.2×10^{16}
Dissipation Factor @ 60 Hz	ASTM D 150	–	0.0009
Arc Resistance	–	–	–
Stainless Steel Strip Electrodes	ASTM D 495	Seconds	10
Tungsten Electrodes	ASTM D 495	Seconds	120
Dielectric Strength, in air @ 3.18mm	ASTM D 149	V/mm	15000
FLAMMABILITY			
Horizontal Burn, AEB	ASTM D 635	cm	<2.54
Ignition Temperature, Self	ASTM D 1929	°C	577
Ignition Temperature, Flash	ASTM D 1929	°C	466
Flame Class @ 1.52mm	UL 94	–	HB
Flame Class @ 6.0mm	UL 94	–	HB

*Typical properties are not intended for specification purposes

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Security ratings for AR 0.500˝

- Forced Entry & Containment
- ASTM F 1233.08 Class 2.0 Body Passage
- ASTM F 1233.08 Class 1.4 Contraband Passage
- ASTM F 1915 Grade 3
- H.P. White TP 0500 Level 1 Sequence 8

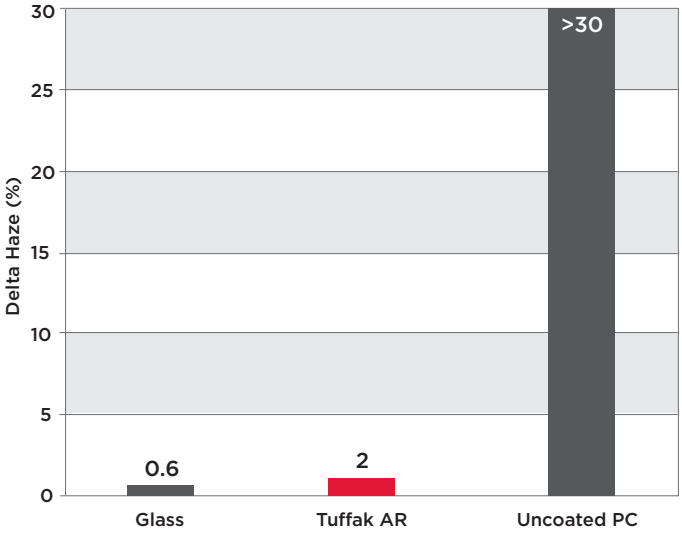
Chemical Resistance*

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

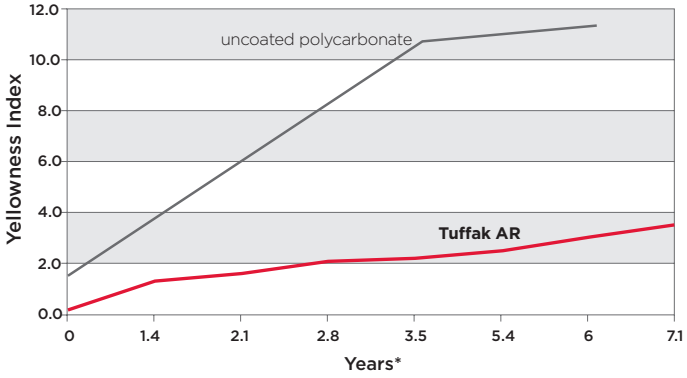
Always keep hazardous chemicals away from uncoated edge of TUFFAK Polycarbonate Sheet

Abrasion Resistance*



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

Weathering Behavior of Tuffak in Vertical Orientation



*Based upon Xenon WOM accelerated weathering for UV dose at mid-latitude location

These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use are beyond our control. We recommend that the prospective user determines the suitability of our materials and suggestions before adopting them on a commercial scale.

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