


Polycarbonate

Grades, Descriptions and Sizes

Polycarbonate, General	6-2
TUFFAK® GP	6-2 to 6-3
TUFFAK® AR	6-4 to 6-5
TUFFAK® FD	6-6
TUFFAK® SL	6-7
TUFFAK® LD	6-8
TUFFAK® Other Grades	6-9 to 6-11
Recycled Polycarbonate	6-12 to 6-13
TUFFAK® MG & WG Thick Gauge	6-14 to 6-15
Zelux® Machine & Window Grade	6-16 to 6-17
Hygard® Bullet & Blast Resistant	6-18 to 6-19
Twinwall & Multiwall sheet	6-20

 **WARNING:** These products can potentially expose you to chemicals including, 4-Dioxane, Acetaldehyde, Acrylonitrile, Bisphenol-A, Carbon Black, Chromium, Cumene, Dichloromethane, Ethyl Acrylate, Ethylbenzene, Ethylene Glycol, Formaldehyde, Glass Fibers, Hexachlorobenzene, Lead, Methanol, Nickel, Polyvinyl Chloride, Silica-crystalline, Styrene, Tetrafluoroethylene, Titanium Dioxide, and Toluene, which are known to the state of California to cause cancer and/or birth defects or other reproductive harm. For more information, visit www.P65Warnings.ca.gov

Polycarbonate

Polycarbonate Sheets

Polycarbonate is a unique engineering thermoplastic which has an excellent balance of clarity and toughness while displaying a wide range of high-heat deflection temperatures. Toughness is the most outstanding feature of polycarbonate; for applications such as safety shields and sports equipment this durable material is without equal. Other characteristics include excellent electrical properties, dimensional stability and inherent ignition resistant properties. The close tolerance machinability and transparency of this material make it appropriate for applications which require high performance characteristics.

Polycarbonate is available in both general purpose and FDA grades. General purpose polycarbonate is enhanced by the addition of thermal stabilizers, U.V. stabilizers, mold release agents, glass fibers and ignition resistant additives. Fabrication techniques such as milling, forming or cutting can be performed using standard equipment and tools.

Common Trade Names:

- AZCARB (AZ Polymers)
- TUFFAK® (Plaskolite)
- Lexan® (Sabic)
- Palsun® (Palram Industries Ltd)
- Altron™ PC (Mitsubishi Chemical)
- Sustanat® PC (Rochling Sustaplast)
- Tecanat® (Ensinger)
- Zelux® (Westlake Plastics)

TUFFAK® GP (General Purpose)

TUFFAK® GP general purpose polycarbonate sheet is a polished surface, UV stabilized polycarbonate product for use in glazing and industrial applications, and features outstanding impact strength and superior dimensional stability. TUFFAK® GP polycarbonate sheet's five year warranty against breakage, along with its UL 94 VO rating on gauges .220" and greater, make it cost effective in a wide range of industrial glazing, design, and structural applications, and thermoformed and fabricated components.

Typical Features:

- Outstanding impact strength
- Superior dimensional stability
- High temperature resistance
- High optical clarity
- Lightweight & thermoformable

Product Applications:

- Industrial glazing
- Machine guards
- Structural parts
- Thermoformed parts
- Fabricated parts

TUFFAK® GP

Standard Thickness (inches) :	.030" up to .500" thick
Standard Sheet Size (inches) :	48 x 96, 48 x 120, 60 x 96, 60 x 120, 72 x 96 and 72 x 120
Standard Colors :	Clear A00, Bronze K09, Gray I30, Dark Gray I35 and Black L10

Run to Size - Custom size sheet solutions are available to lower costs and reduce waste, please inquire.



Polycarbonate

TUFFAK® GP - Typical Properties

PROPERTY TESTED	TEST METHOD	UNITS	TUFFAK® GP
PHYSICAL PROPERTIES			
Specific Gravity	ASTM D792	---	1.20
Refractive Index	ASTM D542	---	1.586
Water Absorption, 24 hours	ASTM D570	%	0.15
Poisson's Ratio	ASTM E132	---	0.38
MECHANICAL PROPERTIES			
Tensile Strength, Ultimate	ASTM D638	psi	9,500
Tensile Strength, Yield	ASTM D638	psi	9,000
Tensile Modulus	ASTM D638	psi	340,000
Elongation	ASTM D638	%	110
Flexural Strength	ASTM D790	psi	13,500
Flexural Modulus	ASTM D790	psi	345,000
Compressive Strength	ASTM D695	psi	12,500
Compressive Modulus	ASTM D695	psi	345,000
Izod Impact, Notched, 1/8"	ASTM D256	ft•lbs/in	18
Izod Impact, Unnotched, 1/8"	ASTM D256	ft•lbs/in	60 (No Failure)
Shear Strength, Ultimate	ASTM D732	psi	10,000
Shear Strength, Yield	ASTM D732	psi	6,000
Shear Modulus	ASTM D732	psi	114,000
Rockwell Hardness	ASTM D785	---	M70 (R118)
THERMAL PROPERTIES			
Coefficient of Thermal Expansion	ASTM D696	in/in/°F	3.75 x 10 ⁻⁵
Coefficient of Thermal Conductivity	ASTM C177	BTU•in/hr•ft ² •°F	1.35
Heat Deflection Temp @ 264 psi	ASTM D648	°F	270°
Heat Deflection Temp @ 66 psi	ASTM D648	°F	280°
Brittleness Temperature	ASTM D746	°F	-200°
ELECTRICAL PROPERTIES			
Dielectric Constant @ 10 Hz	ASTM D150	---	2.96
Dielectric Constant @ 60 Hz	ASTM D150	---	3.17
Volume Resistivity	ASTM D257	ohm•cm	8.2 x 10 ¹⁶
Dissipation Factor @ 60 Hz	ASTM D150	---	0.0009
Arc Resistance			
-Stainless Steel Strip electrode	ASTM D495	Seconds	10
-Tungsten Electrodes	ASTM D495	Seconds	120
Dielectric Strength, in air, 1/8"	ASTM D149	V/mil	380
FLAMMABILITY			
Horizontal Burn, AEB	ASTM D635	in	<1
Ignition Temperature, Self	ASTM D1929	°F	1,070
Ignition Temperature, Flash	ASTM D1929	°F	870
Flame Class @ 0.060"	UL 94	---	HB

Polycarbonate

TUFFAK® Abrasion Resistant Sheets

TUFFAK® AR polycarbonate sheet is a one or both sides hard-coated polycarbonate product. It has higher abrasion resistance and surface hardness. TUFFAK's inherent performance benefits remain of high 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. TUFFAK 15 polycarbonate sheet has a fifteen (15) year Limited Product Warranty against breakage, yellowing, and hazing. The terms of the warranty are available on request.

Typical Features:

- High impact strength
- Superior abrasion resistance
- Superior long-term weatherability
- High optical clarity
- Limited product warranty

Product Applications:

- Bus and transportation shelters
- Glazing in schools
- Public buildings
- Medical and Correctional facilities



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

TUFFAK® AR

Standard Thickness (inches) :	TUFFAK AR - .118" up to .500" thick TUFFAK 15 - .236" up to .500" thick
Standard Sheet Size (inches) :	48 x 96, 60 x 96 and 72 x 96
Standard Colors :	Clear A00, Bronze K09, Gray I30, Dark Gray I35 and Green H35

Polycarbonate

TUFFAK® AR - Typical Properties

PROPERTY TESTED	TEST METHOD	UNITS	TUFFAK® AR
PHYSICAL PROPERTIES			
Specific Gravity	ASTM D792	---	1.20
Refractive Index	ASTM D542	---	1.586
Water Absorption, 24 hours	ASTM D570	%	0.15
Poisson's Ratio	ASTM E132	---	0.38
MECHANICAL PROPERTIES			
Tensile Strength, Ultimate	ASTM D638	psi	9,500
Tensile Strength, Yield	ASTM D638	psi	9,000
Tensile Modulus	ASTM D638	psi	340,000
Elongation	ASTM D638	%	110
Flexural Strength	ASTM D790	psi	13,500
Flexural Modulus	ASTM D790	psi	345,000
Compressive Strength	ASTM D695	psi	12,500
Compressive Modulus	ASTM D695	psi	345,000
Izod Impact, Notched, 1/8"	ASTM D256	ft•lbs/in	18
Izod Impact, Unnotched, 1/8"	ASTM D256	ft•lbs/in	60 (No Failure)
Shear Strength, Ultimate	ASTM D732	psi	10,000
Shear Strength, Yield	ASTM D732	psi	6,000
Shear Modulus	ASTM D732	psi	114,000
Rockwell Hardness	ASTM D785	---	M70 (R118)
THERMAL PROPERTIES			
Coefficient of Thermal Expansion	ASTM D696	in/in/°F	3.75 x 10 ⁻⁵
Coefficient of Thermal Conductivity	ASTM C177	BTU•in/hr•ft ² •°F	1.35
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Heat Deflection Temp @ 66 psi	ASTM D648	°F	280°
Brittleness Temperature	ASTM D746	°F	-200°
ELECTRICAL PROPERTIES			
Dielectric Constant @ 10 Hz	ASTM D150	---	2.96
Dielectric Constant @ 60 Hz	ASTM D150	---	3.17
Volume Resistivity	ASTM D257	ohm•cm	8.2 x 10 ¹⁶
Dissipation Factor @ 60 Hz	ASTM D150	---	0.0009
Arc Resistance			
-Stainless Steel Strip electrode	ASTM D495	Seconds	10
-Tungsten Electrodes	ASTM D495	Seconds	120
Dielectric Strength, in air, 1/8"	ASTM D149	V/mil	380
FLAMMABILITY			
Horizontal Burn, AEB	ASTM D635	in	<1
Ignition Temperature, Self	ASTM D1929	°F	1,070°
Ignition Temperature, Flash	ASTM D1929	°F	870°
Flame Class @ 0.060"	UL 94	---	HB

Polycarbonate

TUFFAK® FD - FDA Compliant Sheet

TUFFAK® FD sheet is a non-UV stabilized transparent polycarbonate product which complies with FDA regulation 21 CFR § 177.1580 requirements for food contact. It features outstanding impact strength, superior dimensional stability, high temperature resistance, and high clarity. Ideally suited for demanding applications in food processing environments, as well as medical applications, this lightweight thermoformable sheet is also easy to fabricate and decorate. TUFFAK® FD sheet is offered with a five (5) year Limited Product Warranty against breakage. The terms of the warranty are available upon request.

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Typical Features:

- FDA compliant
- Outstanding impact strength
- Chemical resistance
- Superior dimensional stability
- High temperature resistance
- High clarity

Product Applications:

- Food processing equipment & guards
- Bulk food bins
- Candy molds
- Sneeze guards
- Single use autoclave packaging
- Hospital trays & incubators
- Bassinets
- Medical device storage containers

TUFFAK® FD

Standard Thickness (inches) :	.060" up to .500" thick
Standard Sheet Size (inches) :	48" x 96" and 60" x 96"
Standard Colors :	Clear (0A00)

Polycarbonate

TUFFAK® SL - Sign Grade Sheet

TUFFAK SL Sign Grade sheet is a polycarbonate product with an advanced UV resistance technology that promotes long lasting outdoor weathering performance. It features outstanding impact strength, excellent dimensional stability, high temperature resistance, and high clarity. This lightweight thermoformable sheet is also easy to fabricate and decorate.

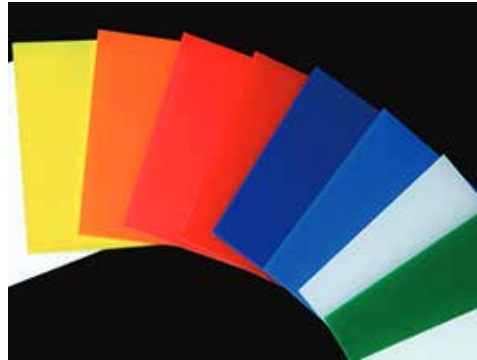
TUFFAK SL is offered in clear, a wide range of standard sign colors, or can be custom matched to any color. The product, available in either sheet or reels, has a proven track record of outstanding performance in extreme environments and meets the UL 879 standard for electric sign components. A ten (10) year limited product warranty is available for both clear and colors for breakage resistance. Clear sheet is also covered for weathering resistance. The terms of the warranty are available upon request.

Typical Features:

- Advanced UV resistance
- Excellent dimensional stability
- Outstanding impact strength
- High temperature resistance
- Lightweight and thermoformable

Product Applications:

- Flat and formed sign faces
- Channel letters



TUFFAK® SL

Standard Thickness (inches) :	.118" up to .500"
Standard Sheet Size (inches) :	Width: 48", 60" and 72" Length: 96" and 120"
Standard Colors :	Variety of colors
Reels & Coils Thickness (inches):	.118", .150" and .177" thick

Polycarbonate

TUFFAK® LD - Light Diffusing Sheet

TUFFAK® LD sheet is a highly UV stable polycarbonate product designed to provide superior light diffusion characteristics while maintaining high light transmission. The proprietary diffuser technology eliminates visible hot spots from pinpoint LED lights in typical flat and formed sign applications. The sheet is easy to form, fabricate and decorate and has excellent impact strength and dimensional stability.

Typical Features:

- Eliminates visible hot spots from LED lights
- Thinner deep draw areas retain strength
- Extensive inventory in sheet and reel stock
- Dimensional stability
- Clear & industry standard colors
- Custom colors and sheets

Certifications:

- UL 94 V-2, Flammability 0.118"– 0.177"
- UL 94 V-0, Flammability 0.236"– All colors
- UL 879 standard for use in electric signs
- Florida Building Code 2017, 6th Ed. High Velocity
- Hurricane Zone classified
- Miami Dade NOA
- UL 972: Burglary Resistant Glazing Materials: UL File #BP2126

TUFFAK® LD Standard Colors

Standard Plaskolite Color	Standard Industry Color	Standard Gauge
White / B48	2447	0.093" - 0.236"
White / B27	7328	0.093" - 0.236"
Red / D96	2283	0.118" - 0.177"
Red / D99	2793	0.118" - 0.177"
Blue / F84	2114	0.118" - 0.177"
Blue / F85	2051	0.118" - 0.177"
Green / H87	2108	0.118" - 0.177"
Yellow / M72	2037	0.118" - 0.177"
Orange / C59	2119	0.118" - 0.177"



Polycarbonate

TUFFAK® FI - High Flame Resistance sheet

TUFFAK® FI sheet is a flame retardant, non-UV stabilized, clear polycarbonate product with a UL 94 V-0 rating at 0.060" and UL 94 5VA rating at 0.118". It features high impact strength, superior dimensional stability, high temperature resistance, and high clarity. This lightweight thermoformable sheet is also easy to fabricate and decorate.

Typical Features:

- High impact strength
- Superior dimensional stability
- High optical clarity
- High temperature resistance

Product Applications:

- Electrical devices
- Equipment housings
- Switchgear covers
- Light fixtures

Availability:

- In Clear sheet, .060" and .125" thick and 48" x 96" sheet size.

TUFFAK® LF - Low Flammability sheet

TUFFAK® LF low flammability polycarbonate sheet is a flame inhibiting UV stable polycarbonate sheet. It meets the stringent UL 94 V-0 rating at 0.080" thickness, and conforms to FAR 25.853 (a), 1, (i) and (a), 1, (ii). Applications include interior aircraft components, switchgear covers, electrical devices, thermoformed equipment housings, and other current-carrying components.

Typical Features:

- High impact strength
- Superior dimensional stability
- High optical clarity
- High temperature resistance

Product Applications:

- Electrical devices
- Equipment housings
- Switchgear covers
- Light fixtures

Availability:

- In Clear sheet, .060" and .125" thick and 48" x 96" sheet size.

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Polycarbonate

TUFFAK® CA - Class A Fire Rating sheet

TUFFAK CA is an optical grade transparent polycarbonate sheet is designed to meet International Building Code (IBC) Class A flammability for interior wall and ceiling applications. This sheet product is virtually unbreakable, has high temperature resistance, high clarity and passes the National Fire Prevention Association (NFPA) 286 flammability requirement.

TUFFAK CA has been fire tested and certified in numerous installation configurations; both on and off wall and off ceiling. For maximum fire resistance, TUFFAK CA meets IBC code compliance for Class A performance when installed to specification.

Typical Features:

- Meets IBC flammability for Class A performance
- Passes NFPA 286
- UV stable
- Thermoformable
- Four approved attachment methods:
 - Direct to wall with four panel screws
 - Wall standoffs
 - Wall H-channels for seamless appearance
 - Ceiling standoff/hanger bars

Mounting Gauges:

- Walls: 0.118" - 0.236"
- Ceilings: 0.118" - 0.500"

TUFFAK® CA

Standard Thickness (inches) :	.118", .236" and .500"
Standard Sheet Size (inches) :	48" x 96"
Standard Colors :	Clear

Please inquire for patterns, standard & diffusing colors and hard coated.

Polycarbonate

TUFFAK® WC - Weld Curtain sheet

TUFFAK WC sheet is a polished surface, transparent polycarbonate sheet product designed for welding curtain and screen applications. The sheet can also be used in applications requiring UV light blocking such as screens in tanning salons and intense sunlit areas. It features outstanding impact strength, superior dimensional stability, high temperature resistance, high clarity and it is light weight and easy to fabricate. The sheet protects individuals against intense and harmful light emitted during arc welding. TUFFAK WC polycarbonate sheet is offered with a five (5) year Limited Product Warranty against breakage. The terms of the warranty are available upon request.

TUFFAK® IR - Welding Face Shields

TUFFAK IR is a polycarbonate sheet product developed to meet ANSI Z87.1, EN 169, and CSA Z94.3 standards for face shield applications. Proprietary additive systems block UV and IR light providing protection during gas flame welding and cutting operations and meeting the requirements for welding shades 3 and 5. Polycarbonate's toughness provides outstanding impact performance and state-of-the-art extrusion manufacturing delivers high optical quality needed for face shield applications.

TUFFAK® LS - Laser Shielding sheet

Working with high intensity lasers doesn't need to lead to unsafe conditions. Using TUFFAK LS for laser shielding barriers protects eyes and skin from being harmed by accidental exposure to a laser beam. By installing specialty tinted safety screens, windows, enclosures and partitions of optically clear polycarbonate, high visibility is achievable while still maintaining the highest personal safety standards. TUFFAK LS is available in 0.118", 2'x 4', 4'x 8' sheets and in three standard transparent colors; IR blocking light gray, visible light blocking bright amber and UV blocking yellow.

TUFFAK LS polycarbonate sheets are designed for a wide range of applications, including door and room windows, standing panels and screens, modular barriers, and enclosures.

PLASKOLITE, INC.

Polycarbonate

Recycled Polycarbonate sheet

Alro Plastics also offers recycled polycarbonate sheet as an eco-friendly alternative. We stock both post-industrial and post-consumer sheets. As more focus is placed on plastics and their role in society, we support our customers' environmental, social and governance (ESG) initiatives.

Recycled polycarbonate sheets are available in a wide range of thicknesses, colors and special effects. We can also supply recycled PC in run-to-size options.

Common Trade Names:

- TUFFAK® R (Plaskolite)
- AZCARB RENEW (AZ Plastics)

Typical Features:

- Optically clear extruded polycarbonate sheet with recycled polycarbonate content collected, separated and recovered back in the extrusion process.
- Maintains high quality and impact resistance.
- Eliminates waste and enables a circular thermoplastic ecosystem.
- Satisfies LEED Materials & Resources certified applications.
- Supports sustainability goals by meeting Environmental, Social, and Governance initiatives.

TUFFAK® R

TUFFAK® R is a recycled optically clear extruded polycarbonate sheet. TUFFAK® R's industry leading **up to 90% post-industrial recycled** content by collecting, separating and processing recovered polycarbonate sheet back into the extrusion process. Used by the worlds top brands for environmental responsibility through the use of sustainable products.

TUFFAK® R

Standard Thickness (inches) :	.118", .177" and .236"
Standard Sheet Size (inches) :	48" x 96"
Standard Colors :	Clear



Polycarbonate

Recycled Polycarbonate sheet

AZCARB RENEW is the first truly closed loop sustainable Post Consumer extruded polycarbonate sheet. AZCARB RENEW is domestically manufactured in Gurnee, IL utilizing the newest state-of-the-art extrusion technology in an ISO 8 certified clean room environment. This **high-quality 75% post-consumer reprocessed** polycarbonate sheet is offered with warranty's against breakage and loss of Light Transmission in the UV2 format.

	TEST METHOD	UNITS	AZCARB RENEW
PHYSICAL PROPERTIES			
Specific Gravity	ASTM D792	---	1.20
Rockwell Hardness	ASTM D785	M scale	60
OPTICAL PROPERTIES			
Refractive Index @ 72°F	ASTM D542	---	1,588
Light Transmission, Clear @0.118"	ASTM D1003	%	84
Haze	ASTM D1003	%	1.10
MECHANICAL PROPERTIES			
Tensile Strength, Yield	ASTM D638	psi	8,800
Tensile Strength, Ultimate	ASTM D638	psi	9,150
Tensile Modulus	ASTM D638	psi	300,000
Tensile Elongation	ASTM D638	%	150
Flexural Strength, Yield	ASTM D790	psi	14,000
Flexural Modulus	ASTM D790	psi	348,000
Izod Impact Strength, Notched	ASTM D256	ft•lbs/in	2.10
Charpy Impact, Notched	ASTM D6110	ft•lbs/in	2.80
Instrumental Drop Dart	ASTM D3763	ft•lbs	96
THERMAL PROPERTIES			
Deflection Temperature Under Flexural Load @ 66psi	ASTM D648	°F	288°
Deflection Temperature Under Flexural Load @ 264psi	ASTM D648	°F	279°

Values reported are averages and should not be used for specification purposes.

- Data given are typical average values and should not be used for specific purposes
- There are no Quality Specifications associated with this products
- All testing preformed at 0.220' to 0.118" thickness unless otherwise specified
- All samples conditioned for at least 24 hours at 77oF → 2oF and 50% RH → 5%

AZCARB RENEW

- Standard Thickness (inches) :** **.093" up to .375"**
- Standard Sheet Size (inches) :** **48" x 96", 60" x 96" and 72" x 96"**
- Standard Colors :** **Clear and Black**

**Run to size & oversize sheet quoted upon request.
Gray and bronze available, minimums may apply.**



Polycarbonate

TUFFAK® Thick Gauge Sheet & Plate

TUFFAK® MG machine grade polycarbonate engineering plate is a low stress polycarbonate ideally suited for heavily fabricated, tight tolerance parts. It features extremely high impact strength, high modulus of elasticity, outstanding dimensional stability, and good electrical properties. TUFFAK® MG machine grade polycarbonate plate has a heat deflection temperature of 270°F (132°C) at 264 psi.

TUFFAK® WG window grade polycarbonate engineering plate is an optically clear, low stress polycarbonate plate ideally suited for heavily fabricated, tight tolerance parts. It features extremely high impact strength, high modulus of elasticity, outstanding dimensional stability, and good electrical properties. TUFFAK® WG window grade engineering plate has a heat deflection temperature 270°F (132°C) at 264 psi, and demonstrates low levels of black specks and other impurities.

Typical Features:

- Extremely high impact strength
- Outstanding dimensional stability
- High modulus of elasticity
- High optical clarity (Window Grade)
- Good mechanical and electrical properties



Product Applications:

- Manifolds
- Insulators
- Diaphragms
- Semiconductor
- Sight window for tanks/vessels
- Viewport windows
- Medical parts
- Military applications

TUFFAK® MG & WG

Standard Thickness (inches) :	3/4 1 1-1/4 1-1/2 1-3/4 2
Standard Sheet Size (inches) :	48 x 96
Machine Grade Colors :	Clear A00 Matte and Black L10
Window Grade Colors :	Clear A00

Polycarbonate

TUFFAK® MG & WG - Typical Properties

PROPERTY TESTED	TEST METHOD	UNITS	TUFFAK® MG	TUFFAK® WG
PHYSICAL PROPERTIES				
Specific Gravity	ASTM D792	---	1.20	1.20
Refractive Index	ASTM D542	---	---	---
Water Absorption, 24 hours	ASTM D570	%	0.15	0.15
Poisson's Ratio	ASTM E132	---	0.38	0.38
MECHANICAL PROPERTIES				
Tensile Strength, Ultimate	ASTM D638	psi	9,500	9,500
Tensile Strength, Yield	ASTM D638	psi	9,000	9,000
Tensile Modulus	ASTM D638	psi	340,000	340,000
Elongation	ASTM D638	%	110	110
Flexural Strength	ASTM D790	psi	13,500	13,500
Flexural Modulus	ASTM D790	psi	345,000	345,000
Compressive Strength	ASTM D695	psi	12,500	12,500
Compressive Modulus	ASTM D695	psi	345,000	345,000
Izod Impact, Notched, 1/8"	ASTM D256	ft•lbs/in	---	---
Izod Impact, Unnotched, 1/8"	ASTM D256	ft•lbs/in	---	---
Shear Strength, Ultimate	ASTM D732	psi	10,000	10,000
Shear Strength, Yield	ASTM D732	psi	6,000	6,000
Shear Modulus	ASTM D732	psi	114,000	114,000
Rockwell Hardness	ASTM D785	---	M70 (R118)	M70 (R118)
THERMAL PROPERTIES				
Coefficient of Thermal Expansion	ASTM D696	in/in/°F	3.75×10^{-5}	3.75×10^{-5}
Coefficient of Thermal Conductivity	ASTM C177	BTU•in/hr•ft ² •°F	1.35	1.35
Heat Deflection Temp @ 264 psi	ASTM D648	°F	270°	270°
Heat Deflection Temp @ 66 psi	ASTM D648	°F	280°	280°
Brittleness Temperature	ASTM D746	°F	-200°	-200°
ELECTRICAL PROPERTIES				
Dielectric Constant @ 10 Hz	ASTM D150	---	2.96	2.96
Dielectric Constant @ 60 Hz	ASTM D150	---	3.17	3.17
Volume Resistivity	ASTM D257	ohm•cm	8.2×10^{16}	8.2×10^{16}
Dissipation Factor @ 60 Hz	ASTM D150	---	0.0009	0.0009
Arc Resistance				
-Stainless Steel Strip electrode	ASTM D495	Seconds	10	10
-Tungsten Electrodes	ASTM D495	Seconds	120	120
Dielectric Strength, in air, 1/8"	ASTM D149	V/mil	380	380
FLAMMABILITY				
Horizontal Burn, AEB	ASTM D635	in	---	---
Ignition Temperature, Self	ASTM D1929	°F	---	---
Ignition Temperature, Flash	ASTM D1929	°F	---	---
Flame Class @ 0.060"	UL 94	---	V-0	V-0

Polycarbonate

Zelux® Thick Gauge Sheet & Plate

Zelux® polycarbonate is an engineering plastic with excellent dimensional stability and good strength and stiffness over a wide range of service temperatures. Zelux® is often used for structural applications when clarity and impact strength are essential including lenses, manifolds, site glasses, and machine guards.

Zelux® is used for a wide variety of electrical applications since it has low moisture absorption, good insulating properties, and an excellent flammability rating. Zelux® polycarbonate is easy to fabricate, paint, and glue/bond. Zelux® is a registered trade name of Westlake Plastics.

Zelux® W is the Window grade (optically clear). Zelux® M is the machine grade, stress relieved (natural and black). Zelux® M-GF is glass-filled grades, 10%, 20%, 30% and 40%. FDA compliant grades and colors are available on a custom basis.

Typical Features:

- Optical clarity (window grade)
- Excellent impact resistance
- Excellent dimensional stability
- Low moisture absorption
- Easy to machine & fabricate
- Good strength & stiffness over a wide temperature range
- Good electrical insulating properties

Product Applications:

- Site glasses
- Viewing windows
- Impact shields
- Fluid handling components
- Manifolds
- Electrical components
- Housing and covers
- Scientific instrument components



Zelux® M & W

Standard Thickness (inches) :	3/8" up to 4" thick
Standard Sheet Size (inches) :	24 x 48
Machine Grade Colors :	Clear A00 Matte and Black L10
Window Grade Colors :	Clear A00

Polycarbonate

Zelux® M & W - Typical Properties

PROPERTY TESTED	TEST METHOD	UNITS	ZELUX® M	ZELUX® W
PHYSICAL PROPERTIES				
Specific Gravity	ASTM D792	---	1.20	1.20
Refractive Index	ASTM D542	---	---	---
Water Absorption, 24 hours	ASTM D570	%	0.15	0.15
Poisson's Ratio	ASTM E132	---	0.35	0.35
MECHANICAL PROPERTIES				
Tensile Strength, Ultimate	ASTM D638	psi	9,500	9,500
Tensile Strength, Yield	ASTM D638	psi	8,400	8,400
Tensile Modulus	ASTM D638	psi	---	---
Elongation	ASTM D638	%	110	110
Flexural Strength	ASTM D790	psi	13,500	13,500
Flexural Modulus	ASTM D790	psi	340,000	340,000
Compressive Strength	ASTM D695	psi	12,500	12,500
Compressive Modulus	ASTM D695	psi	340,000	340,000
Izod Impact, Notched, 1/8"	ASTM D256	ft•lbs/in	16.0	16.0
Izod Impact, Unnotched, 1/8"	ASTM D256	ft•lbs/in	---	---
Shear Strength, Ultimate	ASTM D732	psi	10,000	10,000
Shear Strength, Yield	ASTM D732	psi	6,000	6,000
Shear Modulus	ASTM D732	psi	114,000	114,000
Rockwell Hardness	ASTM D785	---	M70-78 (R118)	M70-78 (R118)
THERMAL PROPERTIES				
Coefficient of Thermal Expansion	ASTM D696	in/in/°F	3.8×10^{-5}	3.8×10^{-5}
Coefficient of Thermal Conductivity	ASTM C177	BTU•in/hr•ft ² •°F	1.35	1.35
Heat Deflection Temp @ 264 psi	ASTM D648	°F	275°	275°
Heat Deflection Temp @ 66 psi	ASTM D648	°F	280°	280°
Brittleness Temperature	ASTM D746	°F	---	---
ELECTRICAL PROPERTIES				
Dielectric Constant @ 10 Hz	ASTM D150	---	2.90	2.90
Dielectric Constant @ 60 Hz	ASTM D150	---	2.90	2.90
Volume Resistivity	ASTM D257	ohm•cm	1.0×10^{17}	1.0×10^{17}
Dissipation Factor @ 60 Hz	ASTM D150	---	---	---
Arc Resistance				
-Stainless Steel Strip electrode	ASTM D495	Seconds	---	---
-Tungsten Electrodes	ASTM D495	Seconds	---	---
Dielectric Strength, in air, 1/8"	ASTM D149	V/mil	380	380
FLAMMABILITY				
Horizontal Burn, AEB	ASTM D635	in	---	---
Ignition Temperature, Self	ASTM D1929	°F	---	---
Ignition Temperature, Flash	ASTM D1929	°F	---	---
Flame Class @ 0.060"	UL 94	---	V-0	V-0

Polycarbonate

TUFFAK® & HYGARD® Security Solutions

With a complete line of monolithic, containment, forced entry, and ballistic rated polycarbonate products, Plaskolite is committed to supplying high quality glazing materials for security glazing applications.

TUFFAK polycarbonate sheets maintain an aesthetically pleasing, glass-like appearance. These polycarbonate products offer a first line of defense against attack or unlawful entry and give time for law enforcement officials to gain control. Their performance has been tested by accredited, independent laboratories and the abrasion resistant hard coat provides excellent resistance against chemical attack.

Advantages vs Glass and Glass-Clad Products:

- Reduced Weight: Approximately 50% lighter than glass laminate of the same thickness
- Will not spall, spider web or white-out under attack, maintaining a clear line of site to provide an extra level of security
- TUFFAK 15, TUFFAK AR and HYGARD products feature a hard coat that resists abrasion, chemical, and graffiti attack
- TUFFAK AR offers a 7-year warranty against Yellowing, Loss of Light Transmission and Breakage
- TUFFAK 15 offers a 15-year warranty against Yellowing, Loss of Light Transmission and Breakage
- HYGARD products offer a 7-year limited warranty – See website for details

TUFFAK® & HYGARD®

THICKNESS	38 x 78	38 x 96	48 x 60	48 x 72	48 x 96	60 x 72	60 x 96
CG375	●			●	●		
CG500		●		●	●		●
CG750		●			●		
BR750	●	●	●	●	●	●	●
BR1000	●	●	●	●	●	●	●
BR1250	●	●	●	●	●	●	●

Colors: 0A00 Clear (standard). Gray, Bronze & Green by request, minimums will apply.



Polycarbonate

TUFFAK® & HYGARD® Security Solutions

Typical regulatory code compliance and certifications

Applicable Products

ANSI Z97.1 American National Standard for Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test, Class A, Unlimited	AR / 15 / GP / OP / HYGARD
CPSC 16 CFR 1201 Category I and Category II: Safety Standard for Architectural Glazing Materials	AR / 15 / GP / OP / HYGARD
Florida Building Code High Velocity Hurricane Zone Classified Miami-Dade	AR / 15 / HYGARD
ICC-ES Evaluation Report #ESR-2728	AR / 15 / HYGARD
Combustibility Class CC1	AR / 15 / GP / OP / HYGARD
UL 972 Burglary Resistant File #BP2126	AR / 15 / GP
UL 746C: Suitability for Outdoor Use, UL File #E87887	AR / 15
AAMA 501.8: Resistance to Human Impact of Windows Systems Intended for Use in Psychiatric Applications	AR / 15



PLASKOLITE, INC.

Polycarbonate

Twinwall & Multiwall sheet

Twinwall and MultiWall sheet and profile connectors are the innovative building material used in sports arenas, greenhouses, hurricane shutters, bus shelters, car ports, sunrooms, covered walkways, partition walls, facades, and roofing. Whether you want to keep the heat out in summer, or keep the heat in for winter.

Standard sheets are available in double and triple-layered styles. Sheets are manufactured in various colors and degrees of transparency. The sheets are designed for use in most conventional roofing and glazing applications.

Strength

Over 250 times more impact resistant than glass

Safety

Withstands hail damage, hurricane shutters

Superior Quality

10 year limited product warranty

Daylighting

Excellent thermal insulation



Common Trade Names:

- Polygal (Plaskolite)
- PoliCarb (Gallina)
- SUNLITE® (Palam)

Typical Features:

- Excellent insulation
- Controlled daylight transmission
- Virtually unbreakable
- Flexible and easy to install
- Flame retardant
- Lightweight
- UV-blocking
- Environmentally friendly

Twinwall & Multiwall

Double Layer Thickness (mm) :	4mm, 6mm, 8mm, 10mm
Double Layer Widths (mm) :	980mm, 1050mm, 1200mm, 1250mm, 2100mm
Double Layer Lengths (mm) :	6000mm and 12000mm
Triple Layer Thickness (mm) :	16mm
Triple Layer Widths (mm) :	980mm, 1050mm, 1200mm, 1250mm
Triple Layer Lengths (mm) :	6000mm and 12000mm