

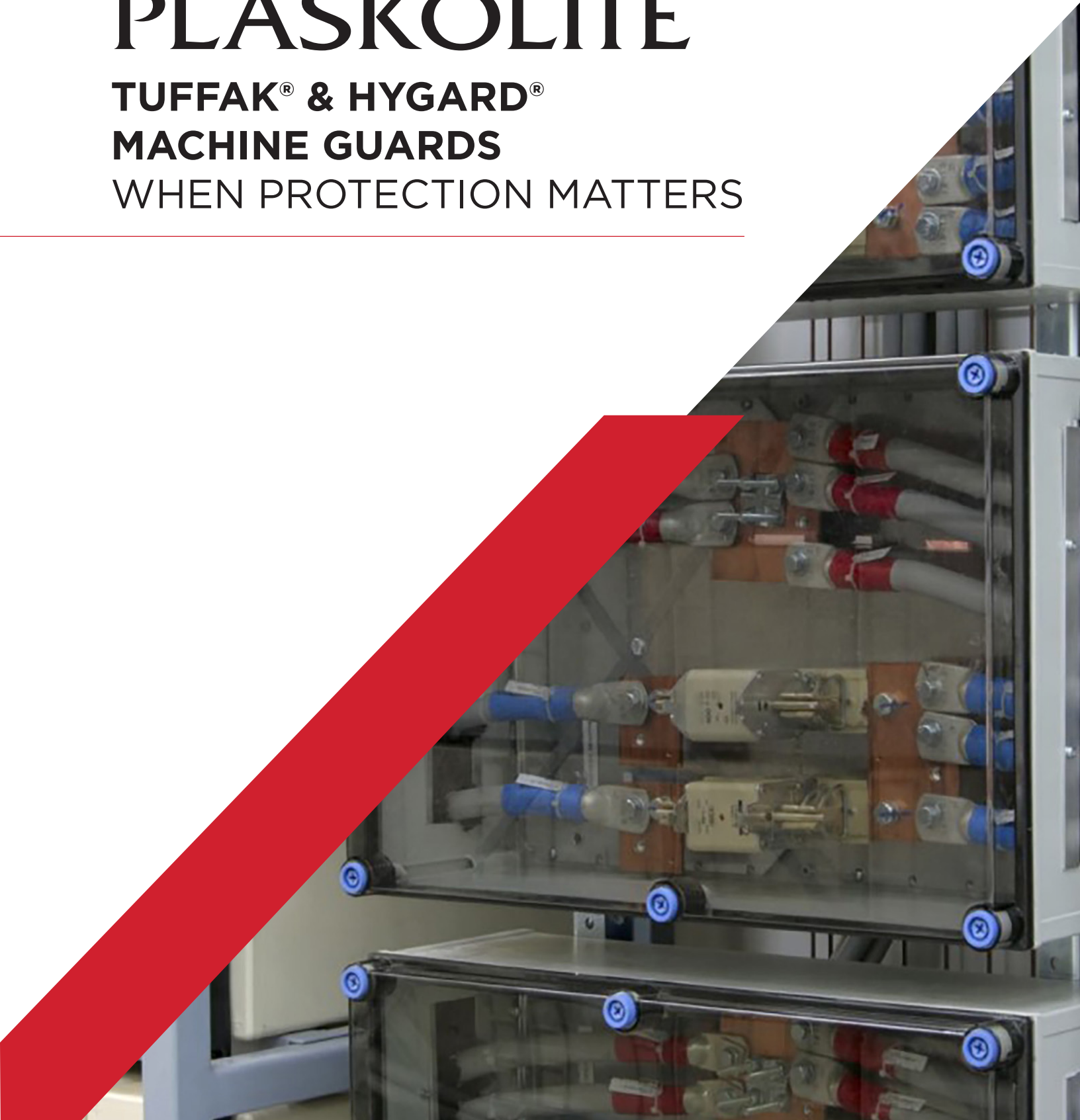
# PLASKOLITE

**TUFFAK® & HYGARD®**

**MACHINE GUARDS**

WHEN PROTECTION MATTERS

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# TUFFAK and HYGARD Polycarbonate Sheets Protecting People and Property

## MEETING OSHA SAFETY REQUIREMENTS

Safety initiatives are important in every business to protect our most important asset – People. Whether it’s a machine guard, machine enclosure, or simply just a visual barrier, the products utilized must protect your people and surrounding environment. When installed properly, incorporating highly impact-resistant TUFFAK polycarbonate sheet is clearly the right choice to support your compliance with OSHA regulation 1910.

### TUFFAK – General Purpose

- » Virtually unbreakable
- » Transparent, high optical clarity
- » Can be formed with heat or cold bending

### TUFFAK AR – UV Enhanced and Abrasion Resistant

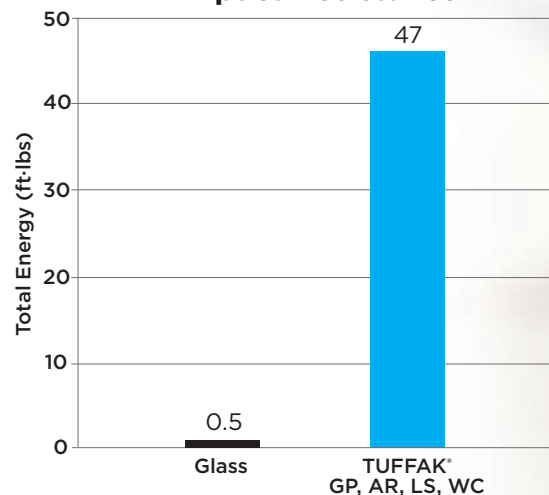
- » Increased surface hardness and resistance to abrasion
- » Enhanced resistance to chemical attack
- » Long-term resistance to UV exposure



### Installation options

- » Industrial glazing
- » Machine guard
- » Structural parts
- » Thermoformed and fabricated safety components
- » Industrial guarding
- » Robotic operations

### Impact Resistance\*



\*Instrumented Impact per ASTM D 3763, sample thickness 0.125" nominal

**Polycarbonate sheet offers the following benefits over other transparent protection:**

» **Lightweight** – approximately half the weight of glass    » **Exceptional thermal stability**    » **Ease of**



# TUFFAK MG / TUFFAK WG

## Thick Gauge Sheet

### TUFFAK MG machine grade polycarbonate

- » Low stress engineering plastic designed for heavily fabricated, tight tolerance parts
- » Extremely high impact strength
- » High modulus of elasticity
- » Outstanding dimensional stability
- » Good electrical properties
- » Available in clear & black and is textured on both sides



### TUFFAK WG polycarbonate engineering plate

- » Amorphous thermoplastic sheet
- » Extremely high impact strength
- » High modulus of elasticity
- » Outstanding dimensional stability
- » Good mechanical and electrical properties
- » Low levels of black specks or other impurities

### Fabrication guidelines for TUFFAK MG and TUFFAK WG

**Cutting:** A circular saw blade with carbide teeth utilizing the “triple chip” tooth design is the preferred method of cutting TUFFAK MG polycarbonate sheet. Table or overhead panel saws are normally used. Circular saws should be run in the speed range of 6000-8000 ft/min. Blades for cutting 3/32” and thicker material should have 3-5 teeth per inch. The hook or rake angle should be 10°-15°.

**Drilling:** Standard high speed twist drills should be used when drilling TUFFAK MG polycarbonate sheet. To achieve the best possible hole, surface speeds of 200 to 300 in./min for drills less than 1/4” to 1/2” in diameter should be used when material is machine dry. A cooling medium\* should be used with speeds of 500-700 in./min for drills under 1/4” diameter, and 1500 to 1600 in./min for drills 1/4” to 1/2” in diameter. A feed rate of 0.001 to 0.0015 per revolution is also recommended.

**Milling:** Milling can be used for either roughing or achieving extremely high quality surface finishes. Best results can be obtained when using a high-speed steel end drill of the four-flute type with a 15° rake angle.

**Turning:** Using conventional metal turning lathes with variable speed control, TUFFAK MG polycarbonate sheet

can be cut without coolant at turning speeds of 1500 to 2500 in./min. If cutter at higher speeds, water is preferred as a coolant. Good results can be obtained when using a round tip cutter. a high turning speed, a shallow cut and a low cross-feed rate. Radii of 15 to 30 mils are suggested for round tip cutters.

**Polishing:** TUFFAK MG machine grade polycarbonate is manufactured using clear resin but is textured on both sides so it is not optically clear. It can be mechanically polished or solvent vapor polished to yield an optically clear finished part. Please follow all EPA, local, state, and governmental guidelines when using any chemical-type polishing method.

#### Cautions:

The following are suggested guidelines or concerns regarding machining working with TUFFAK MG polycarbonate sheet or any other engineering plastics.

1. Thermal expansion is up to 10 times greater with plastics than metals
2. Plastics will lose heat more slowly than metals
3. Avoid localized overheating
4. Softening/melting temperatures of plastics are much lower than metals

### Regulatory code compliance and certifications

Polycarbonate sheet classification	A-A-59502	Type 1, Class 1
Polycarbonate resin classification	ASTM D 3935	PC0116
Flammability - Plastic component	UL 94	UL File #E87887

# TUFFAK WC

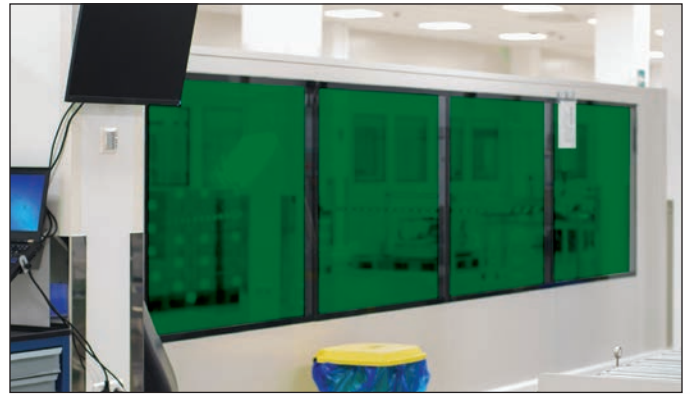
TUFFAK WC polycarbonate sheet protects people from intense and harmful light emitted during arc welding. Available in different color tints and light transmission shades (Light, Medium, Dark), TUFFAK WC effectively blocks 100% of harmful UV light as well as hazardous blue-light, a common cause of “welder arc-eye”.

- » Outstanding impact strength
- » Superior dimensional stability
- » High temperature resistance
- » High optical clarity
- » Easy to fabricate

Welding screens can be easily set up where needed and provide protection to you and your co-workers from eye damage.

This sheet product may also be used in areas that require UV light blocking. Backed with a five (5) year warranty, TUFFAK WC is available in four appealing standard colors; Bright Yellow (Light Shade), Ruby Red and Golden Amber (Medium Shade) and Emerald Green (Dark Shade). Gauge range is 0.118” - 0.236”.

**Complies with AWS F2.3M:2011 specification for use and performance of transparent welding curtain and screens for light transmission properties**



# TUFFAK LS Sheet

Working with high intensity lasers doesn't need to lead to unsafe conditions when using TUFFAK LS for laser shielding barriers. By installing specially 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' or 4'x 8' sheets and in three standard transparent colors; IR blocking light gray, visible light blocking bright amber and UV blocking yellow.

Applications include viewing windows, protective barriers, and safety screens in laser cutting operations.

## TUFFAK LS features

- » Outstanding impact strength
- » High temperature resistance
- » High light blocking properties at targeted wavelengths
- » High optical clarity
- » High optical density protection
- » Low weight compared to glass
- » Available in IR, Visible and UV laser blocking tints

## Regulatory code compliance and certifications

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ANSI Z136.7 Appendix C - Procedure for Laser Based Testing of Optical Density for Absorptive Filters. American National Standard for Laser Protective Equipment

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# HYGARD Laminate

HYGARD polycarbonate laminates are frequently used for their high impact resistance with high optical quality. These all-polycarbonate laminates resist spalling and white-out after repeated high force impacts...an advantage for maintaining visibility.

The incorporated TUFFAK AR hardcoat resists marring and chemical attack, and facilitates cleaning.

## Glazing recommendations

- » Structural security framing systems with equal or greater forced entry and/or ballistics ratings as the selected Hygard laminate are recommended
- » HYGARD laminate should be cut to allow for a minimum of one 1" (inch) edge engagement in the frame, with sufficient rabbet depth for material expansion (approx. 1/16"/ft.)
- » Use wet or dry sealants/gaskets that are compatible with polycarbonate
- » Remove protective masking after glazing operations are completed and before prolonged exposure to direct sunlight, moisture, or high temperature

See glazing details on [plaskolite.com](http://plaskolite.com)

## Product specification

### HYGARD polycarbonate laminate:

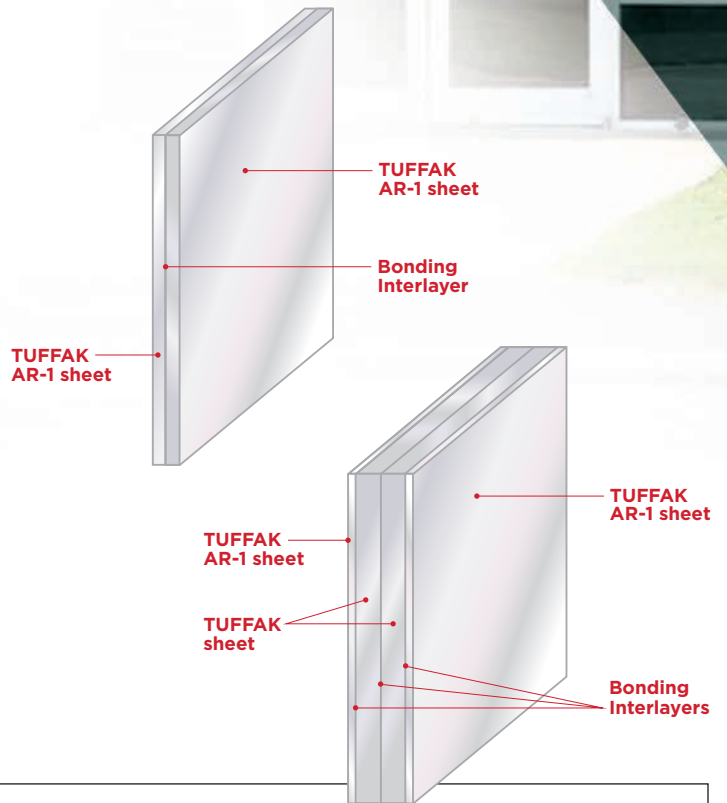
Multi-ply construction with optically clear TUFFAK AR coated polycarbonate exterior panels.

These multi-layer laminates offer a high level of impact resistance to meet customer specific needs. Consult with your Plaskolite representative for which gauges of HYGARD are best suited to your application.

DIN EN ISO 23125 2015-04		
Machine Tools - Safety - Turning Machines		
		Class
HYGARD CG375	9.6 mm	C <sub>1</sub>
HYGARD CG500	13.2 mm	C <sub>3</sub>
HYGARD CG750	19.5 mm	C <sub>3</sub>

### TECH TIP:

The edges of coated polycarbonate sheet are not protected with an abrasion and chemical resistant hard coating. Do not allow cleaning solutions and solvents to pool along the edges for any length of time. Always rinse edges thoroughly with generous amounts of lukewarm clean water.



# PLASKOLITE

**A GLOBAL LEADER IN THE PRODUCTION OF THERMOPLASTIC SHEET**

FOUNDED IN 1950

Our Mission: to deliver superior thermoplastic sheet, coatings and polymers to the world, through long-lasting customer relationships and hands-on customer service.

## MANUFACTURING LOCATIONS



From our founding, PLASKOLITE strives to treat our employees, our customers, our community and the world, with kindness, dignity and respect. This drives our continuing effort to create sustainable products, in a sustainable manner, for future generations. This on-going commitment is expressed in the

### PLASKOLITE Sustainable Ecosystem:

## QUICK FACTS

**STATUS:** Privately held

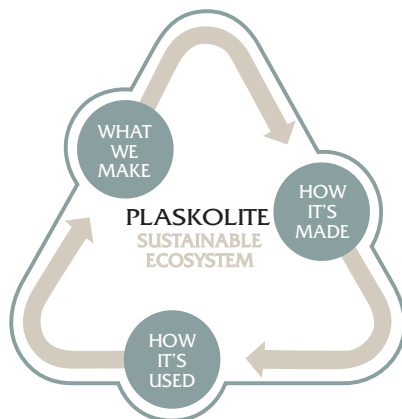
**GLOBAL HEADQUARTERS:** Columbus, OH

**EMPLOYEES:** 1800 Worldwide

**MARKETS SERVED:** Signage, Lighting, Retail Display, Construction, Transportation, Security, Bat & Spa, Industrial, Architecture, Green Houses

## OUR PILLARS OF SUSTAINABILITY

**EACH CONTRIBUTES TO MAKING THE WORLD A BETTER PLACE**



### WHAT WE MAKE

Versatile, high-quality, durable thermoplastic materials...not single-use plastics

### HOW IT'S MADE

How we make our products reflects our overall philosophy of continuous environmental improvement

### HOW IT'S USED

Our thermoplastics play an important role in advancing human well-being, energy conservation and quality of life

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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