



# INSTRUCTIONS FOR USE AND PHYSICAL PROPERTIES

## Description

ClearShield™ is a transparent, lead-free, sheet of styrene-acrylate copolymer that contains about 30% by weight bismuth. The bismuth provides X-ray shielding properties comparable to lead (Pb). A 12mm thickness of ClearShield is equivalent in shielding to 0.5mm of Pb.

The bismuth in ClearShield produces a slight yellow tint in the material. This tint is inherent to the material and cannot be removed.

ClearShield is available in a number of standard sizes, as well as custom sizes by request. Please see [turnermedtech.com](http://turnermedtech.com) or contact Turner MedTech for more information.

## Storage and Handling

### HANDLING

Carefully remove ClearShield from packaging to prevent damage. Both sides of the ClearShield sheets are protected by masking paper. Do not remove the masking paper until the material is mounted and ready for the intended use. When moving with a forklift, take care to avoid scratching, chipping, and cracking. Always lift material, never slide.

Additional care should be taken to exercise caution when handling fractured or machined edges of ClearShield to avoid cuts or injury.

### STORAGE

Store ClearShield horizontally. Place a sheet of cardboard on both sides of the ClearShield sheet and, if stacking, between each sheet. The storage base should be a sturdy, flat platform such as a sheet of plywood. Avoid extreme temperatures and high humidity.

## Radiation Inspection

Radiation inspections should be performed with the ClearShield part in the “as used” condition to verify acceptable radiation attenuation for the application.

## ClearShield Use

ClearShield should only be used within manufacturer supplied specifications.

ClearShield is designed for indoor use only.

## Fabrication

Fabricators should review the ClearShield Safety Data Sheet (SDS) for health and safety considerations prior to ClearShield fabrication. The ClearShield SDS can be found on the Turner MedTech website: [turnermedtech.com](http://turnermedtech.com).

Due to the many types of tools that could be used in fabrication, it is impractical for Turner MedTech to provide specific requirements for each operation. It is highly recommended that the user determine cutting/drilling speeds, feed rates, and other machining parameters on a scrap

piece of ClearShield before fabricating a finished piece. To protect the surface of the material, leave the protective masking paper in place during fabrication operations.

When fabricating with ClearShield, provide adequate ventilation to manage dust, which may be a lung irritant. If adequate ventilation cannot be provided, a mask or other physical barrier to prevent inhalation is recommended.

### **SAW CUTTING**

A table saw or panel saw is recommended for cutting straight edges. The saw blade should protrude through the sheet ½ inch when cutting. Use a saw blade designed specifically for cutting acrylic.

### **DRILLING**

Use a drill press. Twist drills with a 60-90° point is recommended to prevent chipping. High speeds, slow feeds yield the best surface finish. There is no cutting fluid required. Support bottom side of material with a scrap piece of wood or plastic to prevent chipping.

### **TAPPING**

Chamfer both sides of the hole before tapping to prevent chipping. No cutting fluid required.

### **CHAMFERS AND FILLETS**

A milling machine, hand router, or table router is recommended for cutting chamfers, fillets, and other edge profiles. Slow feeds and high speeds are recommended for a good surface finish.

### **MACHINING**

Slow feeds and high speeds are recommended for a good surface finish. A conventional cut is better than a climb cut for optimal surface finish.

### **SANDING**

Light sanding starting with a course grit and working up to a fine grit will yield the best results. Continuously moving to different regions of the sandpaper will prevent heat buildup.

### **POLISHING**

ClearShield can be polished by hand or by machine buffing. When machine buffing, constantly move the part side to side to prevent heat buildup. Use a plastic cleaner to prep the surface for polishing. Use plastic polish specified for acrylics for the final polishing.

### **MOUNTING**

Leave room within the mounting frame to allow for expansion and contraction of ClearShield. Oversize holes for fasteners, do not overtighten screws and bolts, and avoid local load concentrations.

## **Cleaning**

Clean using a mild soap solution in water with a soft cloth. Avoid cleaners containing ammonia or alcohol.

# Physical Properties

Typical physical properties for 12mm thick ClearShield.

Physical Properties:	Test Method	Units	ClearShield
Thickness		mm	12.0 +/- 1.0
Specific gravity		g/cc	1.6
Tensile Strength	ASTM D-638	kg/cm <sup>2</sup>	370
Tensile Modulus	ASTM D-638	kg/cm <sup>2</sup>	3.1 x 10 <sup>4</sup>
Flexural Strength	ASTM D-790	kg/cm <sup>2</sup>	727
Flexural Modulus	ASTM D-790	kg/cm <sup>2</sup>	2.5 x 10 <sup>4</sup>
Izod Impact (Method A)	ASTM D-256	kg/cm/cm	2.22
Rockwell Hardness (M Scale)	ASTM D-785		TBD
Deflection Temperature	ASTM D-648	°C	96.2
Optical Properties:			
Light Transmittance	ASTM D-1003	%	73
Haze	ASTM D-1003	%	<2
Miscellaneous:			
Lead Equivalent Thickness (minimum)	IEC 61331	mm Pb	0.5
Flammability	UL 94		HB

ClearShield has US and foreign patent-pending.

ClearShield™ is a registered trademark of Turner MedTech, Inc.

See SDS for Health and Safety Considerations. The ClearShield SDS can be found on the Turner MedTech website: [turnermedtech.com](http://turnermedtech.com).

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