

When safety & success must be **Absolutely Assured**



## PLASTI-SHIELD®

### Boron Filled Polyethylene Shielding

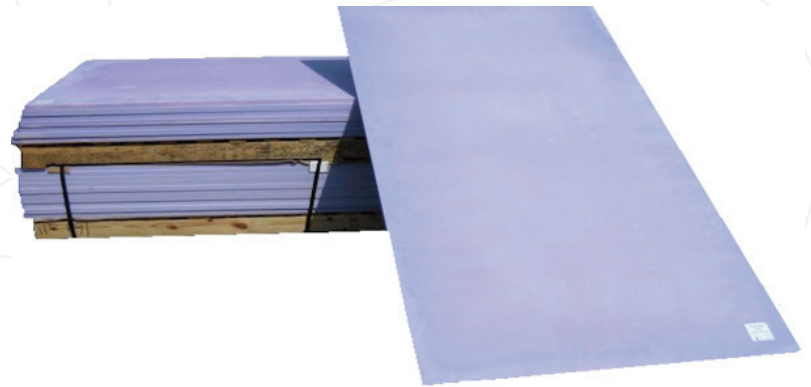
#### A lightweight, cost-effective neutron shielding solution.

Plasti-Shield® Boron Filled Polyethylene Neutron Shielding, supplied by MarShield, is a lightweight, cost-effective neutron shielding solution to attenuate and absorb neutron radiation. Our borated polyethylene contains 5% (2% available on special order) boron content by weight. Used in the medical, nuclear, and industrial marketplaces borated polyethylene is ideal for medical vaults and doors, particle accelerators, hot cells, nuclear storage and transport containers, and nuclear detection systems.

Most radioactive fields consist of different types of radiation. The most common include fast neutron, thermal neutron, primary gamma rays and secondary gamma rays. Plasti-Shield® is a borated polyethylene designed to attenuate these types of radiations.

- Fast Neutrons are most effectively shielded by hydrogen. Plasti-Shield® has an inherently high concentration of hydrogen, over 13% of volume
- Thermal Neutrons are shielded by polyethylene with the presence of boron, such as Plasti-Shield® Industrial Grade with 5% boron by weight
- Secondary Gamma Rays are created by the capture of thermal neutrons by hydrogen. These captured gamma rays can be minimized by adding boron, resulting in a significantly reduced energy dosage of only .42 MeV

For easy installation, MarShield's borated polyethylene comes in a standard sheet size of 48" x 96" x 1" thick. You can easily cut this polymer material using standard woodworking tools.



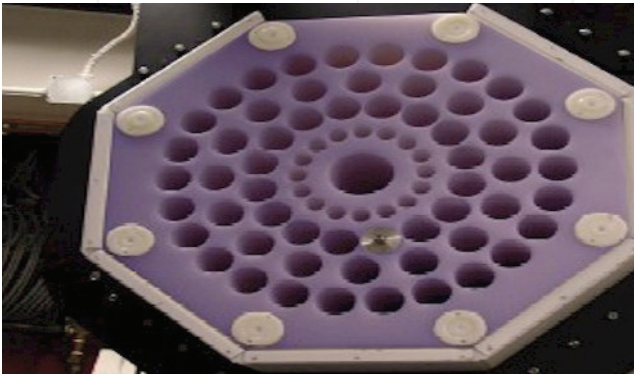
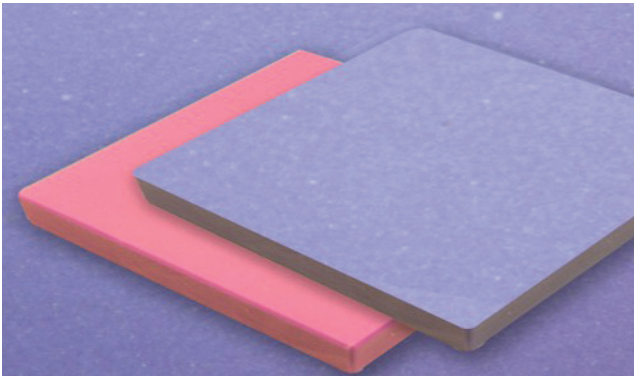
#### KEY FEATURES

- Available in 5% (or 2%) boron content
- Standard sheet size of 48" x 96" x 1" thick (160lbs)
- Durable over a wide temperature range
- Consistent density and homogeneity
- Rated to MIL-P-23536A and EB2562E specifications
- Used as medical and industrial neutron shielding for more than 25 years
- Light-weight, cost-effective and easily fabricated
- High cross-section for consistent neutron attenuation
- Specific Gravity is 0.92



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Boron Filled Polyethylene Shielding



## APPLICATIONS

- Airport Security and Sea Port Security
- Medical Vaults
- Nuclear Reactors
- Nuclear Storage
- Nuclear-Powered Vessels & Vehicles
- Research Applications
- Linear Particle Accelerators
- Transport Containers

## TOLERANCE INFORMATION

### K-Stran™

- Gauges 1/16" through 1-1/2" ± 5% | Length and width plus only at room temperature

### Compression Molding

- Gauges greater than 1" and under 1-1/2" ± 10% | Gauges 1-1/2" and greater plus only | Length and width plus only at room temperature
- Custom thickness up to 25"/635mm with our King Size Blocks and Massive Shapes
- Custom sheet sizes, gauges and colors available

## MATERIAL PROPERTIES

PROPERTIES	UNITS	ASTM	NOMINAL VALUES
Density	g/cc	D1505	0.918
Tensile Strength @ Break	%	D638	>500
Elongation @ Yield	p.s.i.	D638	>1,400
Flexural Modulus	p.s.i.	D790	30,000
Durometer	Shore D	D785	42
Notched Izod Impact	ft. lbs/in. <sup>2</sup>	D256	No Break
Vicat Softening Temp.	°C (°F)	D1525	89°C (192°F)
Brittleness Temp.	°C (°F)	D746	<-76°C (<-105°F)
Heat Deflection Temp. 66p.s.i.	°C (°F)	D648	50°C (122°F)
Haze	%	D1003	12.7
Dart Drop Impact Strength	g	D1709	130
Elmendorf Tear Strength	g	D1922	340

## MATERIAL COMPARISON

MATERIAL	DENSITY	THICKNESS
Water	1.000	8.8"
Concrete	2.400	9.6"
HD Concrete	3.500	9.6"
Plasti-Shield 5%	1.040	8.0"

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## Boron Filled Polyethylene Shielding

### DATA SHEET

PHYSICAL PROPERTIES	METRIC	IMPERIAL	COMMENTS
Specific Gravity	1.01 g/cc	1.01 g/cc	ASTM D792
<b>MECHANICAL PROPERTIES</b>			
Hardness, Shore D	71	71	ASTM D2240
Tensile Strength	16.60 MPa	2407 psi	ASTM D638
Tensile Strength at 65°C (150 °F)	2.76 MPa	400 psi	ASTM D638
Elongation at Break	4.0%	4.0%	ASTM D638
Tensile Modulus	0.7667 GPa	111.2 ksi	ASTM D638
Flexural Yield Strength	29.1 MPa	4220 psi	ASTM D790
Flexural Modulus	0.8729 GPa	126.6 ksi	ASTM D790
Compressive Strength	6.60 MPa	957 psi	10% Def.; ASTM D695
	11.70 MPa	1697 psi	2% Def.; ASTM D695
	19.1 MPa	2770 psi	5% Def.; ASTM D695
	24.50 MPa	3553 psi	10% Def.; ASTM D695
Compressive Modulus	0.6718 GPa	97.44 ksi	ASTM D695
Izod Impact, Notched	0.481 J/cm	0.900 ft-lb/in	ASTM D256
<b>ELECTRICAL PROPERTIES</b>			
Surface Resistivity per Square	>= 1.0e+12 ohm	>= 1.0e+12 ohm	ASTM D257
<b>THERMAL PROPERTIES</b>			
CTE, linear	198 µm/m-°C @Temperature - 40.0 - 150°C	110 µin/in-°F @Temperature - 40.0 - 302°F	ASTM E831
Melting Point	128C °C	262C °F	ASTM D3418
Deflection Temperature at 1.8 MPa (264psi)	46.7 °C	116 °F	ASTM D648
<b>COMPLIANCE PROPERTIES</b>			
3A-Dairy	No	No	
Canada AG	No	No	
FDA	No	No	
NSF	No	No	
USDA	No	No	
USP Class VI	No	No	
<b>CHEMICAL RESISTANCE PROPERTIES</b>			
Acids, Strong (pH 1-3)	Acceptable	Acceptable	
Acids, Weak	Acceptable	Acceptable	
Alcohols	Acceptable	Acceptable	
Alkalies, Strong (pH 11-14)	Acceptable	Acceptable	
Alkalies, Weak	Acceptable	Acceptable	
Chlorinated Solvents	Unacceptable	Unacceptable	
Conductive / Static Dissipative	Yes	Yes	
Continuous Sunlight	Limited	Limited	
Hot Water / Steam	Limited	Limited	
Hydrocarbons - Aliphatic	Unacceptable	Unacceptable	
Hydrocarbons - Aromatic	Unacceptable	Unacceptable	
Inorganic Salt Solutions	Acceptable	Acceptable	
Ketones, Esters	Unacceptable	Unacceptable	
<b>MISCELLANEOUS PROPERTIES</b>			
Targeted Usage	Structural Uses	Structural Uses	

Note: All statements, technical information and recommendations contained in this database are presented in good faith, based upon tests believed to be reliable and practical field experience. The reader is cautioned, however that MarShield and its affiliates cannot guarantee the accuracy or completeness of this information and it is the customer's responsibility to determine the suitability of the products in any given application.

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