

ShotBLOCKER

About Norplex-Micarta

Norplex-Micarta is the leading manufacturer of high performance thermoset composites. Norplex-Micarta's vast product line of tubing, sheet, pre-preg, and rod products serves power generation, military/aerospace, oil & gas, medical device, electrical device, electronics assembly, construction, heavy industry, and transportation industries throughout Asia/Pacific, Europe, and the Americas.



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 **NORPLEX
MICARTA**
High Performance
Thermoset Composites

ShotBLOCKER

EXCELLENT ANTIBALLISTIC PROPERTIES • LIGHTER THAN STEEL

RICOCHET-RESISTANT • EASILY INSTALLED

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Ballistic Protection

To meet the world's growing requirement for ballistic protection, Norplex-Micarta has developed specialty high performance thermoset sheets, pre-pregs, and molded shapes that can withstand the most destructive military and civilian threats. ShotBlocker™ antiballistic material is an advanced fiberglass-based composite that offers several important benefits:

- 1) resistance to a projectile or blast, fire, and forced entry;
- 2) ease of installation;
- 3) light weight;
- and 4) moderate cost.

ShotBlocker is manufactured in six levels of bullet-resistance, depending on the threat and security function. The material can also be configured for threats exceeding Level 8 requirements. ShotBlocker can be cut and drilled in the field with commercial quality circular, table, or panel saws. For aesthetic conformity, the material can be surfaced on site with veneer, drywall, wallpaper, or other wall coverings.

Architectural Applications

ShotBlocker meets the requirements for courtroom, check-cashing, gas station, and convenience market armor, providing superior security and protection in walls, doors, and counters. The material can also be used for military/defense architectural applications in the field, such as guard stations. Overall, ShotBlocker performs similarly to that of conventional S-glass laminates, which cost considerably more.



Superior protection for courtrooms, check-cashing, and convenience stores

Government Facilities

ShotBlocker significantly lowers the weight and cost of embassy safe rooms, while maintaining the structural integrity to protect government documents and personnel. The material is readily machined and is far lighter than steel, making it easier to install and repair. Its light weight also facilitates the relocation of safe rooms around the world.

ShotBlocker meets stringent standards for ballistic and forced-entry protection. Structures built with a combination of ShotBlocker and steel meet the highest Department of State certification standard (Level 8) for ballistic-resistant structures.

Vehicle Armor

ShotBlocker is a light-weight, cost-effective alternative to steel for armoring automobiles, trucks, jeeps, and aircraft. The material can also be combined with ceramic or steel strike plates as well as steel backer plates to increase impenetrability, formability, and durability.

In the case of ground vehicles, the weight of large ballistic steel armor panels requires stronger suspensions, brakes, and engines than would otherwise be necessary. Steel armor may also compromise handling properties by raising roll centers and centers of gravity.

Excessive weight is also a problem in airborne applications. The use of steel armor would result in significant reductions in aircraft performance, range, and payload.



Alternative to steel for armoring trucks, jeeps, and aircraft

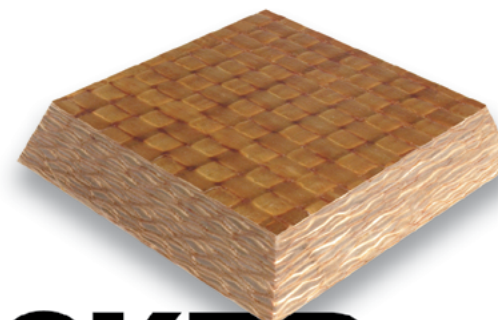
Phenolic Glass Thermoset Composites

ShotBlocker consists of woven glass fabric impregnated with a high-temperature phenolic resin system. The material provides superior flexural, compressive, and impact strength at elevated temperatures, as well as excellent creep resistance. Also, the phenolic resin system yields a ballistic laminate with superior fire, smoke, and toxicity ratings (ASTM E84) over conventional polyester resin fiberglass laminates.

Glass fabric-based, anti-ballistic materials, such as ShotBlocker, are far lighter than ballistic steel armor plate. The lower weight makes the material less cumbersome to fabricate, handle, and install.

Multi-Step Manufacturing Process

Norplex-Micarta utilizes state-of-the-art equipment for each step in the manufacturing process, from material preparation and treating to pressing and finishing. First, the substrate is processed through the resin compound. Then, the impregnated material is semi-cured in a treater oven. Once the material is treated, it is either issued to the customer as pre-preg, or sent to the press for sheet grades. Finally, the material is trimmed and packaged as required.



Typical ShotBlocker Properties	Value
Impact Strength	15.0 ft-lb/in (crosswise)
	15.0 notched (lengthwise)
Flexural Strength	23,200 psi (crosswise)
	17,200 psi (lengthwise)
Compressive Strength	65,000 psi (flatwise)
	9,300 psi (edgewise)
Tensile Strength	63,000 psi (crosswise)
	39,000 psi (lengthwise)
Rockwell Hardness	M Scale 110
Bonding Strength	400 lb

ShotBlocker Manufacturing Standards

Normal Available	Minimum Thickness ¹	Typical Weight	Sheet Size Available
UL-752 Performance Level Standard			
Level 1	.242"	92 lb	48 X 96 in
Level 2	.352"	137 lb	48 X 96 in
Level 3	.396"	149 lb	48 X 96 in
Level 4	1.188"	446 lb	48 X 96 in
Level 5	1.188"	446 lb	48 X 96 in
Level 8	1.320"	492 lb	48 X 96 in
NIJ 0108.01 Performance Level Standard			
Type IIA	.352"	137 lb	48 X 96 in
Type II	.396"	149 lb	48 X 96 in
Type IIIA	.396"	149 lb	48 X 96 in
Type III	1.188"	446 lb	48 X 96 in
Federal Aviation Regulation 25.853			
	.396"	149 lb	48 X 96 in
Class 1-A Fire- and Smoke Rated Building Material (ASTM E84)			
	.396"	149 lb	48 X 96 in

¹The minimum thickness is the thickness needed to assure compliance with the listed Standards. Sheets produced will always be thicker than the minimum.

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