

# Engineering Plastics for Neutron Radiation Shielding

## Quadrant borated Polyethylenes:

Borotron® UH015 | UH030 | UH050

Borotron® HM015 | HM030 | HM050



### Trends

Nuclear and medical radiation shielding applications require materials providing safety and protection for environment and people, exhibiting high hydrogen density and low weight at acceptable cost.

Most radiation fields are combinations of different kinds of radiation, such as fast neutrons, thermal neutrons, primary gamma and secondary gamma rays.

Fast neutrons are most effectively shielded by materials with high hydrogen content. They are slowed to thermal energies by collision with hydrogen atoms. Thermal neutrons can be virtually eliminated by the presence of high thermal neutron cross-section materials such as boron. Primary gamma rays are best shielded with lead or other high density materials. Secondary gamma rays are created as the result of the capture of thermal neutrons by hydrogen. These capture-gamma rays can be minimized by adding boron.

### Quadrant Solution

Borated UHMW-PE and HMW-PE grades

Dimensionally stable plastics with high hydrogen content and added boron

### Customer Benefits

- Consistent density and homogeneity
- Superior dimensional stability over a wide temperature range
- Easy to handle and fabricate to a variety of shapes and parts
- Low weight
- Acceptable cost versus other shielding materials

Distributed by:  Polymershapes

## Borotron® Borated Polyethylene

Borotron® - borated PE grades - has been used as a medical and industrial shielding material to attenuate and absorb neutron radiation. This easily fabricated polymer material also offers designers greater durability and function over a wider range of temperatures than traditional materials.

Whereas essentially any type of PE is suitable for shielding against high energy neutron radiation, borated PE combines the effect of moderation of fast neutrons and absorption of lower energy thermal neutrons.

### Applications

- Medical vaults and doors
- Hot cells
- Nuclear storage and transport containers
- Nuclear waste management
- Particle accelerators
- Nuclear detection systems

## Borotron® Product Range

BRAND	BORON %
Borotron® UH015 HM015	1,5%
Borotron® UH030 HM030	3,0%
Borotron® UH050 HM050	5,0%

UH = Ultra High Molecular Weight Polyethylene  
HM = High Molecular Weight Polyethylene

## Quadrant Engineering Plastic Products

This brochure and any data and specifications presented here or on our website shall provide promotional and general information about the Engineering Plastic Products (the „Products“) manufactured and offered by Quadrant Engineering Plastic Products („Quadrant“) and shall serve as a preliminary guide. All data and descriptions relating to the Products are of a general informational nature only. Neither this brochure nor any data and specifications presented on our website shall create or be implied to create any legal or contractual obligation. This brochure and any data or specifications herein do not create expressly or by implication any legal, contractual or warranty obligation whatsoever. No warranty of any kind, either express or implied, is made as to the information contained in these pages, including, but not limited to, all warranties provided for by Louisiana law, any implied warranty of merchantability, of fitness for a particular purpose, and any warranty against hidden defects or redhibitory defects or vices. No information in this brochure creates any express or implied warranty that the goods described here in shall conform to any description herein. Quadrant sells the products described herein solely to sophisticated users and not to consumers, and Quadrant assumes no responsibility that any goods described herein will be fit for any particular purpose for which a Quadrant customer may determine to purchase such goods, except and to the sole extent otherwise provided in a separate written contract.

Any illustration of the possible fields of application of the Products shall merely demonstrate the potential of these Products, but any such description does not constitute any kind of covenant or warranty whatsoever. Irrespective of any tests that Quadrant may have carried out with respect to any Product, Quadrant does not possess expertise in evaluating the suitability of its materials or Products for use in specific applications or products manufactured or offered by the customer respectively. It thus remains the customer's sole responsibility to test and assess the suitability and compatibility of Quadrant's Products for its intended applications, processes and uses, and to choose those Products that according to its assessment meet the requirements applicable to the specific use of the finished product. The customer undertakes all liability in respect of the application, processing or use of the aforementioned information or product, or any consequence there of, and shall verify its quality and other properties.

Borotron® is a registered trademarks of the Quadrant Group.

Distributed by:



Call: 1 (866) 437-7427  
Email: [info@polymershapes.com](mailto:info@polymershapes.com)  
[www.polymershapes.com](http://www.polymershapes.com)

