

# Engineering Plastics for Neutron Radiation Shielding





## Borated polyethylene products of Mitsubishi Chemical Group (MCG) - Advanced Materials Division

Borotron® UH015 | UH030 | UH050

Borotron® HM015 | HM030 | HM050

### 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

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### Applications

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

### 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.

### MCG Advanced Materials solution

Borated UHMW-PE and HMW-PE grades  
Dimensionally stable plastics with high hydrogen content and added boron



### 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.

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

### Download datasheets

- Borotron® UH015  Borotron® HM015 
- Borotron® UH030  Borotron® HM030 
- Borotron® UH050  Borotron® HM050 

# Get in touch

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