

Mitsubishi Chemical Advanced Materials Borotron® HM PE-HMW + boron based additive (ISO Data)
Categories: Polymer; Thermoplastic; Polyethylene (PE); High Density (HDPE)

Material Notes: Borotron UH and Borotron HM are boron loaded PE-(U)HMW grades, specifically developed for neutron shielding purposes in nuclear installations. The high hydrogen content of PE-(U)HMW makes it very suitable for slowing down fast neutrons to lower energy thermal (slow) neutrons, which are then absorbed by the added boron compound. Whereas both PE-HMW and PE-UHMW are suitable for neutron shielding, PE-UHMW is often preferred because of its better deformation behaviour at high temperatures and its superior impact strength and wear resistance

- 1 Effectively attenuates neutron radiation particles and minimises the gamma radiation released during their capture
- 1 Very good wear and abrasion resistance
- 1 High impact strength (particularly PE-UHMW)
- 1 Excellent chemical resistance
- 1 Low coefficient of friction
- 1 Very low water absorption
- 1 Moderate mechanical strength, stiffness and creep resistance
- 1 Excellent machinability

Quadrant Engineering Plastic Products is now Mitsubishi Chemical Advanced Materials>

Physical Properties	Metric	English	Comments
Density	1.01 g/cc	0.0365 lb/in ³	ISO 1183-1
Outgassing - Total Mass Loss	0.14 %	0.14 %	
Mechanical Properties	Metric	English	Comments
Hardness, Shore D	65	65	
Ball Indentation Hardness	55.0 MPa	7980 psi	ISO 2039-1
Tensile Strength, Yield	23.0 MPa	3340 psi	ISO 527-1/-2
Elongation at Break	15 %	15 %	ISO 527-1/-2
Elongation at Yield	8.0 %	8.0 %	ISO 527-1/-2
Tensile Modulus	1.55 GPa	225 ksi	ISO 527-1/-2
Flexural Strength	28.0 MPa	4060 psi	
Compressive Strength	13.5 MPa @ Strain 1 %	1960 psi @ Strain 1 %	ISO 604
	20.5 MPa @ Strain 2 %	2970 psi @ Strain 2 %	ISO 604
	28.5 MPa @ Strain 5 %	4130 psi @ Strain 5 %	ISO 604
K Factor (ISO)	150 µm/km	150 µm/km	
Charpy Impact Unnotched	2.50 J/cm ²	11.9 ft-lb/in ²	ISO 179-1/1eU
Charpy Impact, Notched	0.600 J/cm ²	2.86 ft-lb/in ²	Complete Break; ISO 179-1/1eA
Coefficient of Friction, Dynamic	0.15 - 0.30	0.15 - 0.30	
Sand Slurry	275	275	
Limiting Pressure Velocity	0.0500 MPa-m/sec	1430 psi-ft/min	at 1 m/s unlubricated
	0.0800 MPa-m/sec	2280 psi-ft/min	at 0.1 m/s unlubricated
Electrical Properties	Metric	English	Comments
Volume Resistivity	>= 1.0e+14 ohm-cm	>= 1.0e+14 ohm-cm	IEC 60093
Surface Resistivity per Square	>= 1.0e+12 ohm	>= 1.0e+12 ohm	IEC 60093
Thermal Properties	Metric	English	Comments
CTE, linear	140 µm/m-°C @Temperature 23.0 - 100 °C	77.8 µin/in-°F @Temperature 73.4 - 212 °F	
Thermal Conductivity	0.650 W/m-K	4.51 BTU-in/hr-ft ² -°F	
Melting Point	135 °C	275 °F	DSC, 10°C/min.; ISO 11357-1/-3
Maximum Service Temperature, Air	80.0 °C	176 °F	Continuous
Deflection Temperature at 1.8 MPa (264 psi)	45.0 °C	113 °F	ISO 75-1/-2
Flammability, UL94	HB	HB	
Oxygen Index	<= 20 %	<= 20 %	ISO 4589-1/-2
Compliance Properties	Metric	English	Comments
3A-Dairy	No	No	
European Food 1935/2004	No	No	
FDA	No	No	
USP Class VI	No	No	

Chemical Resistance Properties	Metric	English	Comments
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	Acceptable	Acceptable	
Continuous Sunlight	Limited	Limited	
Hot Water / Steam	Unacceptable	Unacceptable	
Hydrocarbons - Aliphatic	Acceptable	Acceptable	
Hydrocarbons - Aromatic	Limited	Limited	
Inorganic Salt Solutions	Acceptable	Acceptable	
Ketones, Esters	Acceptable	Acceptable	



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