

**Mitsubishi Chemical Advanced Materials Duratron® PBI CU60 Polybenzimidazole, unfilled, compression molded (ASTM Product Data Sheet)**

**Categories:** Polymer; Thermoplastic; Polybenzimidazole (PBI)

**Material Notes:** Duratron® PBI is the highest performance engineering plastic available from Mitsubishi Chemical Advanced Materials. It offers the highest mechanical properties of any thermoplastic above 400° F (205° C). Duratron® PBI is ideal for high heat bushings, connectors and valve seats. Duratron® PBI is extremely hard and can offer a challenge to fabricate. Fabrication instructions can be furnished by Mitsubishi Chemical Advanced Materials.

It offers the highest heat resistance and mechanical property retention over 400°F (205°C) of any unfilled plastic. It has better wear resistance and load carrying capabilities at extreme temperatures than any other reinforced or unreinforced advanced engineering plastic.

As an unreinforced material, Duratron® PBI is very "clean" in terms of ionic impurity and it does not outgas (except water). These characteristics make this material very attractive to semiconductor manufacturers for vacuum chamber applications. Duratron® PBI has excellent ultrasonic transparency which makes it an ideal choice for parts such as probe tip lenses in ultrasonic measuring equipment.

Duratron® PBI is also an excellent thermal insulator. Other plastics in melt do not stick to PBI. These characteristics make it ideal for contact seals and insulator bushings in plastic production and molding equipment.

Formerly PBI Performance Products Celazole® PBI.

- 1 Highest mechanical properties of any plastic above 400°F (204°C)
- 1 Highest heat deflection temperature 800°F (427°C), with a continuous service capability of 750°F (399°C) in inert environments, or 650°F (343°C) in air with short term exposure potential to 1,000°F (538°C)
- 1 Lowest coefficient of thermal expansion and highest compressive strength of all unfilled plastics

Quadrant Engineering Plastic Products is now Mitsubishi Chemical Advanced Materials.

Physical Properties	Metric	English	Comments
Specific Gravity	1.30 g/cc	1.30 g/cc	ASTM D792
Water Absorption	0.40 %	0.40 %	Immersion, 24hr; ASTM D570(2)
Water Absorption at Saturation	5.0 %	5.0 %	Immersion; ASTM D570(2)

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell E	105	105	ASTM D785
Hardness, Rockwell M	125	125	ASTM D785
Hardness, Shore D	94	94	ASTM D2240
Tensile Strength	110 MPa	16000 psi	ASTM D638
Tensile Strength at 150°C (300°F)	82.7 MPa	12000 psi	ASTM D638
Tensile Strength at 65°C (150°F)	110 MPa	16000 psi	ASTM D638
Elongation at Break	2.0 %	2.0 %	ASTM D638
Tensile Modulus	5.86 GPa	850 ksi	ASTM D638
Flexural Strength	221 MPa	32000 psi	ASTM D790
Flexural Modulus	6.55 GPa	950 ksi	ASTM D790
Compressive Strength	345 MPa	50000 psi	10% Def.; ASTM D695
Compressive Modulus	6.21 GPa	900 ksi	ASTM D695
Izod Impact, Notched	0.267 J/cm	0.500 ft-lb/in	ASTM D256 Type A
Coefficient of Friction, Dynamic	0.24	0.24	Dry vs. Steel; QTM55007
K (wear) Factor	121 x 10 <sup>-8</sup> mm <sup>3</sup> /N-M	60.0 x 10 <sup>-10</sup> in <sup>3</sup> -min/ft-lb-hr	QTM 55010
Limiting Pressure Velocity	1.31 MPa-m/sec	37500 psi-ft/min	4:1 safety factor; QTM 55007

Electrical Properties	Metric	English	Comments
Surface Resistivity per Square	>= 1.00e+13 ohm	>= 1.00e+13 ohm	EOS/ESD S11.11
Dielectric Constant	3.2	3.2	ASTM D150
	@Frequency 1e+6 Hz	@Frequency 1e+6 Hz	
Dielectric Strength	21.7 kV/mm	550 kV/in	Short Term; ASTM D149
Dissipation Factor	0.0030	0.0030	ASTM D150
	@Frequency 1e+6 Hz	@Frequency 1e+6 Hz	

Thermal Properties	Metric	English	Comments
CTE, linear	23.4 µm/m-°C	13.0 µin/in-°F	ASTM E831
	@Temperature -40.0 - 149 °C	@Temperature -40.0 - 300 °F	
Thermal Conductivity	0.403 W/m-K	2.80 BTU-in/hr-ft <sup>2</sup> -°F	ASTM F433
Maximum Service Temperature, Air	316 °C	600 °F	Long Term
Deflection Temperature at 1.8 MPa (264 psi)	427 °C	800 °F	ASTM D648
Glass Transition Temp, Tg	413 °C	775 °F	ASTM D3418

Flammability, UL94	V-0 @Thickness 3.17 mm	V-0 @Thickness 0.125 in	Estimated Rating
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Compliance Properties	Metric	English	Comments
3A-Dairy	No	No	
Canada AG	No	No	
FDA	No	No	
NSF	No	No	
USDA	No	No	
USP Class VI	No	No	

Chemical Resistance Properties	Metric	English	Comments
Acids, Strong (pH 1-3)	Unacceptable	Unacceptable	
Acids, Weak	Limited	Limited	
Alcohols	Acceptable	Acceptable	
Alkalies, Strong (pH 11-14)	Unacceptable	Unacceptable	
Alkalies, Weak	Limited	Limited	
Chlorinated Solvents	Acceptable	Acceptable	
Conductive / Static Dissipative	No	No	
Continuous Sunlight	Limited	Limited	
Hot Water / Steam	Limited	Limited	
Hydrocarbons - Aliphatic	Acceptable	Acceptable	
Hydrocarbons - Aromatic	Acceptable	Acceptable	
Inorganic Salt Solutions	Acceptable	Acceptable	
Ketones, Esters	Acceptable	Acceptable	

Descriptive Properties	Metric	English	Comments
Machinability	10	10	1-10, 1=Easier to Machine