Bay Plastics Datasheet

# Duratron CU60 PBI

Duratron CU60 PBI offers the highest temperature resistance and best mechanical property retention over 200°C of all unfilled thermoplastics. Duratron PBI is very 'clean' in terms on ionic impurity and does not outgas (except water). These characteristics make this material extremely attractive to high-tech industries such as semiconductor and aerospace industries. Usually Duratron CU60 PBI is used in critical components to decrease maintenance costs and to gain valuable production 'uptime'. It is used to replace metals and ceramics in pump components, valve seats (high tech valves), bearings, rollers, high temperature insulators.

| Properties | Test Methods | Units | Values |
|---|---|---|---|
| Colour | - | - | Black |
| Density | ISO 1183-1 | g/cm³ | 1.30 |
| Water Absorption: | | | |
| After 24/96 h immersion in water of 23°C (1) | ISO 62 | Mg | 60 / 112 |
| | ISO 62 | % | 0.74 / 1.37 |
| At saturation in air of 23°C / 50% RH | - | % | 7.5 |
| At saturation in water of 23°C | - | % | 14 |

| Thermal Properties | Test Methods | Units | Values |
|---|---|---|---|
| Melting temperature (DSC, 10°C/min) | ISO 11357-1/-3 | °C | N/A |
| Glass transition temperature (DSC, 20°C/min) –(3) | ISO 11357 -1/-2 | °C | 415 |
| Thermal conductivity at 23°C | - | W/(K.m) | 0.40 |
| Coefficient of linear thermal expansion: | | | |
| Average value between 23 & 60°C | - | m/(m.K) | 25 x $10^{-6}$ |
| Average value between 23 & 100°C | - | m/(m.K) | 25 x $10^{-6}$ |
| Average value above 150°C | - | m/(m.K) | 35 x $10^{-6}$ |
| Temperature of deflection under load: | | | |
| Method A: 1.8Mpa + | ISO 75-1/-2 | °C | 425 |
| Max allowable service temperature in air: | | | |
| For short periods (4) | - | °C | 500 |
| Continuously for 5,000 / 20,000 h (5) | - | °C | 310 |
| Min service temperature (6) | - | °C | -50 |
| Flammability (7): | | | |
| "Oxygen Index" | ISO 4589-1/-2 | % | 58 |
| According to UL 94 (3 / 6mm thickness) | - | - | V-0 / V-0 |

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| Mechanical Properties at 23°C (8) | | Test Methods | Units | Values |
|---|---|---|---|---|
| Tension test (9): | | | | - |
| Tensile strength at yield / tensile strength at break (10) | + | ISO 527-1/-2 | MPa | NYP / 130 |
| Tensile strength (10) | + | ISO 527-1/-2 | MPa | 130 |
| Tensile strain at yield (10) | + | ISO 527-1/-2 | % | NYP |
| Tensile strain at break (10) | + | ISO 527-1/-2 | % | 3 |
| Tensile modulus of elasticity (11) | + | ISO 527-1/-2 | MPa | 6000 |
| Compression test (12): | | | | 0 |
| Compressive stress at 1 / 2 / 5 & normal strain (11) | + | ISO 604 | MPa | 58 / 118 / 280 |
| Charpy impact strength – Unnotched (13) | + | ISO 179-1/1eU | kJ/m² | 20 |
| Charpy impact strength – notched (13) | + | ISO 179-1/1eA | kJ/m² | 2.5 |
| Ball indentation hardness (14) | + | ISO 2039-1 | N/mm² | 375 |
| Rockwell hardness (14) | + | ISO 2039-2 | - | E 120 |

| Electrical Properties at 23°C | | Test Methods | Units | Values |
|---|---|---|---|---|
| Electrical strength (15) | + | IEC 60243-1 | kV/mm | 28 |
| Volume resistivity | + | IEC 60093 | Ohm.cm | $>10^{13}$ |
| Surface resistivity | + | IEC 60093 | Ohm | $>10^{13}$ |
| Relative permittivity εr :- at 100 Hz | + | IEC 60250 | - | 3.3 |
| At 1 MHz | + | IEC 60250 | - | 3.2 |
| Dielectric dissipation factor tan õ: - at 100 Hz | + | IEC 60250 | - | 0.001 |
| At 1 MHz | + | IEC 60250 | - | - |
| Comparative tracking index (CTI) | + | IEC 60112 | - | - |

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**Legend:**

+ : values referring to dry material.
++ : values referring to material in equilibrium with the standard atmosphere 23°C / 50% RH (mostly derived from literature).

1. According to method 1 of ISO 62 and done so on discs Ø 50mm x 3mm.
2. The figures given for these properties are for the most part derived from raw material supplier data and other publications.
3. Values for this property are only given here for amorphous materials and not semi-crystalline ones.
4. Only for short time exposure (a few hours) in applications where no or only very low load is applied to the material.
5. Temperature resistance over a period of 5,000/20,000 hours. After these periods of time, there is a decrease in tensile strength – measured at 23°C – of about 50% as compared with the original value. The temperature values given here are thus based on the thermal-oxidative degradation which takes place and causes a reduction in properties. Note: however, that the maximum allowable service temperature depends in many cases essentially on the duration and the magnitude of the mechanical stresses to which the material is subjected.
6. Impact strength decreasing with decreasing temperature, the minimum allowable service temperature is practically mainly determined by the extent to which the material is subjected to impact. The value given here is based on unfavourable impact conditions and may consequently not be considered as being the absolute practical limit.
7. These estimated ratings, derived from raw material supplier data and other publications, are not intended to reflect hazards presented by the material under actual fire conditions. There is no 'UL File Number' available for Duratron stock shapes.
8. The figures given for the properties of dry material (+) are for the most part average values of tests run on test specimens machined out of rods Ø 40 – 60mm. Except for the hardness tests, the test specimens were then taken from an area mid between centre and outside diameter, with their length in longitudinal direction of the rod (parallel to the extrusion direction). Considering the very low water absorption of Duratron, the values for the mechanical and electrical properties of this material can be considered as being practically the same for dry (+) and moisture conditioned (++) test specimens.
9. Test specimens: Type 1 B
10. Test speed: 50 mm/min [chosen acc. To ISO 10350-1 as a function of the ductile behaviour of the material (tough or brittle)]
11. Test speed: 1mm/min.
12. Test specimens: cylinders Ø 8mm x 16mm
13. Pendulum used: 4 J
14. Measured on 10mm thick test specimens (discs), mid between centre and outside diameter.
15. Electrode configuration: Ø 25 / Ø 75mm coaxial cylinders; in transformer oil according to IEC 60296; 1mm thick test specimens. Please note that the electric strength of Ertalon 6 XAU+ black can be considerably lower than the figure listed in the table which refers to natural material. Possible microporosity in the centre of polyacetal stock shapes also significantly reduces the electric strength.

This table, mainly to be used for comparison purposes, is valuable help in the choice of material. The data listed here fall within the normal range of product properties. **However, they are not guaranteed and they should not be used to establish material specification limits nor used as the basis of design.**



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