Physical properties (indicative values *)

**PROPERTIES**

**Colour**
- light Blue

**Density**
- ISO 1183-1
- g/cm³
- 0.93

**Average molar mass (average molecular weight) (1)**
- 10³ g/mol
- 8

**Water absorption:**
- after 24 h immersion in water at 23 °C (2)
- ISO 62
- %
- < 0.1

**Thermal Properties (3)**

- Melting temperature (DSC, 10 °C/min)
- ISO 11357-1/-3
- °C
- 135

- Thermal conductivity at 23 °C
- W/(m·K)
- 0.40

- Coefficient of linear thermal expansion:
- average value between 23 and 100 °C
- m/(m·K)
- 200 x 10⁻⁶

- Temperature of deflection under load:
- method A: 1.8 MPa
- ISO 75-1/-2
- °C
- 80

- Min. service temperature (5)
- °C
- 200

- Flammability (6):
- - according to UL 94 (3 mm thickness)
- HB

**Mechanical Properties at 23 °C (7)**

- Impact test (8):
- - tensile strength (9)
- ISO 527-1/-2
- MPa
- 17

- - tensile strain at yield(9)
- ISO 527-1/-2
- %
- > 50

- - tensile modulus of elasticity (10)
- ISO 527-1/-2
- MPa
- 700

- Compression test (11):
- - compressive stress at 1 / 2 / 5 % nominal strain (10)
- ISO 604
- MPa

- Flexural test (12):
- - flexural strength
- ISO 178
- MPa

- - flexural modulus of elasticity
- ISO 178
- MPa

- Charpy impact strength - notched (13)
- ISO 179-1/1A
- kJ/m²
- no break

- Charpy impact strength - notched (double 14°) (14)
- ISO 11542-2
- kJ/m²
- 100

- Shore hardness D (15)
- ISO 868
- - 60 - 65

- Relative volume loss during a wear test in "sand/water slurry":
- TIVAR®1000 = 100
- ISO 15527
- - 80

- Dynamic Coefficient of Friction (16)
- ISO 7148-2 (17)
- 0.15 - 0.30

- Wear rate
- ISO 7148-2 (16)
- µm/ km
- 8

**Electrical Properties at 23 °C**

- Dielectric strength
- IEC 60243-1
- kV/mm
- 45

- Volume resistivity
- IEC 60593
- Ω·cm
- > 10¹²

- Surface resistivity
- ANSI/ESD STM 11.11
- Ω/cm²
- > 10¹²

- Relative permittivity εr:
- - at 1 MHz
- IEC 60250
- -

- Dielectric dissipation factor tan δ:
- - at 1 MHz
- IEC 60250
- -

**Legend:**

1. This is the average molar mass of the PE-UHMW resins (irrespective of any additives) used for the manufacture of this material. It is calculated by means of the Mark-Houwink equation
2. M = 5.37 x 10⁶ x [η]¹/², with [η] being the intrinsic viscosity (Staudinger index) derived from a viscosity measurement according to ISO 1628-3:2001, using decydroryihaline as a solvent (concentration of 0.0006 g/ml).
3. According to method 1 of ISO 62 and on discs Ø 50 mm x 3 mm.
4. The figures given for these properties are for the most part derived from raw material supplier data and other publications.
5. Temperature resistance over a period of min. 20,000 hours.
6. All testing referenced in this document refers to a standard of testing that is defined and used in the ISO series (e.g. ISO 75-1/-2).
7. Several of the properties are or may be anisotropic (properties differ when measured parallel and perpendicular to the manufacturing direction).
8. Most of the values given in this mechanical properties section are indicative values of tests run on dry test specimens machined either out of plate 15 - 20 mm thick or rod diameter 40-50mm, the test specimens were then taken from the stock shape with their length in the longitudinal direction (parallel to the extrusion direction).
9. Test specimens: Type 1 B
10. Test speed: either 5 or 50 mm/min (chosen acc. to ISO 10350-1 as a function of the ductile behaviour of the material (tough or brittle)
11. Test specimens: cylinders Ø 8 mm x 16 mm
12. Test specimens: bars 4 mm (thickness) x 10 mm x 80 mm; test speed: 200 mm/min; span: 64 mm
13. Perdulum used: 4 J. As received
14. Perdulum used: 25 J.
15. Measured on 10.0 mm thick test specimens
16. Test procedure similar to Test Method A: "Pin-on-disk" as described in ISO 7148-2. Load 3MPa, sliding velocity 0.33 m/s, mating plate steel Ra= 0.7-0.9 µm, tested at 23 °C, 50%RH.
17. Electrode configuration: Ø 25 mm / Ø 75 mm coaxial cylinders; in transformer oil according to IEC 60296; 1 mm thick test specimens.

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

It has to be noted that reinforced and filled material shows an anisotropic behaviour (properties differ when measured parallel and perpendicular to the manufacturing direction).

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note: 1 g/cm³ = 1,000 kg/m³, 1 MPa = 1 N/mm², 1 kV/mm = 1 MV/m.

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