

PE-UHMW (POLYETHYLENE) PE 1000 MATERIAL DATA SHEET

- Very good wear and abrasion resistance
- High impact strength, even at low temperatures (particularly PE-UHMW)
- Excellent chemical resistance
- Low density compared with other thermoplastics
- Low coefficient of friction
- Excellent release properties
- Very low water absorption
- Moderate mechanical strength, stiffness and creep resistance
- Very good electrical insulating and dielectric properties (except static dissipative grades)
- Excellent machinability
- Physiologically inert (several grades are suitable for food contact)
- Good resistance to high energy radiation (gamma- and X-rays)
- Not self-extinguishing

This material exhibits a very well balanced property profile. It combines a very good wear and abrasion resistance with an outstanding impact strength, even at temperatures below -200°C.

PROPERTIES	Test methods	Units	VALUES
Color	-	-	Natural/green/black/colors
Density	ISO 1183-1	g/cm ³	0.93
Average molar mass (average molecular weight)		10 ⁶ g/mol	5
Water absorption at saturation in water of 23°C	ISO 62	mg	0.01
Thermal Properties			
Melting temperature (DSC, 10°C/min)	ISO 11357-1/-3	°C	135
Thermal conductivity at 23°C	-	W/(K.m)	0.40
Average coefficient of linear thermal expansion between 23 and 100°C	-	m/(m.K)	200 x 10 ⁻⁶
Vicat softening temperature – VST/B50	ISO 306	°C	80
Temperature of deflection under load:			
- method A: 1.8 MPa	ISO 75-1/-2	°C	42
Max. allowable service temperature in air:			
- for short periods	-	°C	120
- continuously : for min. 20,000 h	-	°C	80
Flammability			
- "Oxygen Index"	ISO 4589-1/-2	%	<20
- according to UL 94 (6 mm thickness)	-	-	HB
Min. service temperature	-	°C	-200
Mechanical Properties at 23°C			
Tension test			
- tensile stress at yield	ISO 527	MPa	19
- tensile strain at yield	ISO 527	%	15
- nominal tensile strain at break	ISO 527	%	>50
- tensile modulus of elasticity	ISO 527	MPa	750
Flexural test			
- flexural strength	178	MPa	17
Compression test			
- compressive stress at 1 / 2 / 5 % nominal strain	ISO 604	MPa	6.5/10.5/17
Charpy impact strength - unnotched	ISO 179-1/1eU	kJ/m ²	No break
Charpy impact strength - notched	ISO 179-1/1eA	kJ/m ²	115P
Charpy impact strength – notched (double 14° notch)	ISO 11542-2	kJ/m ²	170
Ball indentation hardness	ISO 2039-1	N/mm ²	33
Shore hardness D (15 s)	ISO 2039-2	-	60
Relative weight loss during a wear test in "sand/water-slurry"	ISO 15527	-	100

Electrical Properties at 23 °C			
Electric strength	IEC 60243-1	kV/mm	45
Volume resistivity	IEC 60093	Ohm.cm	> 10 ¹⁴
Surface resistivity	IEC 60093	Ohm	> 10 ¹²
Relative permittivity ϵ_r : - at 100 Hz	IEC 60250	-	2.1
- at 1 MHz	IEC 60250	-	3.0
Dielectric dissipation factor $\tan \delta$: - at 100Hz	IEC 60250	-	0.0004
- at 1 MHz	IEC 60250	-	0.0010
Comparative tracking index (CTI)	IEC 60112	-	600

Note: 1 g/cm³ = 1,000 kg/m³ ; 1 MPa = 1 N/mm² ; 1 kV/mm = 1 MV/m. NA: not applicable

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