

What is PE-UHMW EL

PE-UHMW EL black

Ultra-high molecular weight polyethylene, electrically conductive (PE-UHMW / PE 1000 EL)

PE-UHMW (ultra-high molecular weight polyethylene, also known as PE 1000) belongs to the polyolefin family and is characterised by an exceptionally low coefficient of friction, high wear resistance and very good impact strength. In the conductive EL version, the material is made electrically conductive by adding special conductivity carbons: it rapidly discharges electrostatic charges and thereby protects against sparking in potentially explosive atmospheres. Liedtke stocks this type in black with FDA suitability for food contact.

Material Character

Like all PE-UHMW types, the conductive version owes its high toughness, abrasion resistance and permanent self-lubrication to the exceptionally long molecular chains of the base polymer, without the need for additional lubricants.

The incorporated conductivity carbons reduce the surface and bulk resistance to $\leq 10^6 \Omega$ and $\Omega \cdot \text{cm}$ respectively. This value is markedly lower than antistatic/dissipative (ELS) types and makes the material the primary conductive type (EL) for ATEX explosion protection, for example when lining silos, chutes and tanks.

Advantages and Limitations

Advantages

- Electrically conductive, surface resistance $\leq 10^6 \Omega$ – suitable for primary explosion protection
- High impact strength, even at low temperatures
- Good sliding properties, permanent self-lubrication
- Very low water absorption
- FDA-compliant for food contact (EL + FDA black type)

Disadvantages

- Lower stiffness and dimensional stability than engineering plastics such as PA or POM
- More demanding to machine than many other thermoplastics – sharp tools required
- No transparency in the black version
- Conductivity depends on dry, unaltered material and may be reduced by surface processing

Processing

PE-UHMW EL can be milled, turned, drilled and sawn like other PE-UHMW types, using sharp tools suited to tough plastics; low cutting speeds and good chip removal improve surface finish. Before machining, the semi-finished product should be at room temperature and/or stored for at least 24 hours under normal ambient conditions.

Use in Explosion Protection and the Food Industry

PE-UHMW EL is used specifically where electrostatic charges need to be discharged quickly and reliably, for example when lining silos and chutes in the bulk materials industry, in components for the electrical industry, and on slide rails in mechanical engineering. The EL + FDA black type documented here is also suitable for food contact under 21 CFR § 177.1520.

Typical Properties

- Electrically conductive, surface resistance $\leq 10^6 \Omega$ (explosion protection)
- Food-safe according to FDA 21 CFR § 177.1520

Product Examples

- Lining of silos and chutes in bulk materials handling
- Slide rails in machinery and plant engineering
- Components for the electrical industry in potentially explosive

Typical Industries

- Tank and apparatus construction (explosion protection)
- Electrical industry
- Bulk materials industry (silo and chute lining)

- High impact strength, no break in drop-weight testing
- Good sliding properties, permanent self-lubrication
- Very low water absorption
- atmospheres
- Packaging technology
- Machinery and plant engineering (slide rails)
- Food industry

	Test Method	Unit	Value
General Properties			
Density	DIN EN ISO 1183	g / cm ³	0.95
Water absorption (24 h)	DIN EN ISO 62899	%	< 0.02
Fire behaviour*	DIN 4102		B2, normal flammability
Mechanical Properties			
Tensile modulus of elasticity	DIN EN ISO 527	MPa	800
Yield stress	DIN EN ISO 527	MPa	20
Elongation at yield	DIN EN ISO 527	%	10
Impact strength	DIN EN ISO 179		no break
Notched impact strength	DIN EN ISO 179	kJ / m ²	-
Ball indentation hardness	DIN ISO 2039-1	MPa	31
Shore hardness D (15 s)	DIN EN ISO 868	scale D	64
Thermal Properties			
Vicat softening temperature (Vicat B)	DIN EN ISO 306	°C	88
Mean coefficient of linear thermal expansion	ISO 11359-2	K ⁻¹	1.8 · 10 ⁻⁴
Service temperature range	-	°C	-260 ... +80
Electrical Properties			
Surface resistance	DIN IEC 60093	Ω	≤ 10 ⁶
Bulk resistance	DIN IEC 60093	Ω * cm	≤ 10 ⁶

*The fire behaviour rating is based on our own assessment without a test certificate. The values stated are guideline values that serve as information for material selection and do not constitute a legally binding guarantee of specific properties.