

What is PE-UHMW ELS

PE-UHMW ELS black

Ultra-high molecular weight polyethylene, electrostatically dissipative (PE-UHMW / PE 1000 ELS)

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 – even at low temperatures. In the ELS version, the material is set to be electrostatically dissipative (ESD): it controllably discharges electrostatic charges and thereby reduces the adhesion of dust and the risk of electrostatic discharge. Liedtke stocks this type in black with FDA suitability for food contact.

Material Character

Due to its very high molecular weight of around $9 \cdot 10^6$ g/mol, PE-UHMW differs markedly from standard polyethylenes such as PE-HD. The exceptionally long molecular chains provide high toughness, high abrasion resistance and permanent self-lubrication, without the need for additional lubricants.

The electrostatically dissipative treatment (ELS) reduces the surface and bulk resistance to around $10^9 \Omega$ and $\Omega \cdot \text{cm}$ respectively – a value within the typical ESD range of 10^6 to $10^{11} \Omega$. This controllably discharges electrostatic build-up, which reduces dust deposition on component surfaces and provides additional safety and cleanliness in dust-sensitive environments.

Advantages and Limitations

Advantages

- Very low coefficient of friction and permanent self-lubrication
- High wear and abrasion resistance
- High impact strength, even at low temperatures
- Electrostatically dissipative treatment reduces dust deposition and electrostatic charging
- FDA-compliant for food contact (ELS + FDA black type)
- Good chemical resistance

Disadvantages

- Lower stiffness and dimensional stability than engineering plastics such as PA or POM
- Lower permissible continuous service temperature than high-performance plastics (up to around 80 °C)
- More demanding to machine than many other thermoplastics – sharp tools required
- No transparency in the black version

Processing

PE-UHMW can be milled, turned, drilled and sawn with 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 to relieve internal stresses.

Use in the Food Industry

The ELS + FDA black type documented here complies with 21 CFR § 177.1520 for food contact and is also electrostatically dissipative. This makes it a popular material for chutes, guides, slide rails and hoppers in the meat, fish, poultry, baking and beverage industries, where electrostatically caused dust and product adhesion needs to be avoided.

Typical Properties

- Electrostatically dissipative (ESD) treatment, reduced dust deposition
- Very low coefficient of friction
- High wear resistance

Product Examples

- Chutes and hoppers for food processing
- Slide and guide rails in conveyor technology

Typical Industries

- Conveyor technology & automation
- Machinery and plant engineering
- Meat, fish and poultry processing
- Baking and confectionery industry

- High impact strength
- Good sliding properties, permanent self-lubrication
- Good chemical resistance
- Components for packaging and filling systems
- Wear parts in machinery and plant engineering
- Beverage industry

	Test Method	Unit	Value
General Properties			
Density	DIN EN ISO 1183-1	g / cm ³	> 0.94
Moisture absorption	DIN EN ISO 62	%	0.01
Flammability (thickness 3 mm / 6 mm)	UL 94		HB
Molecular weight	–	g / mol	~9 · 10 ⁶
Mechanical Properties			
Tensile strength	DIN EN ISO 527	MPa	> 20
Elongation at break	DIN EN ISO 527	%	> 50
E-modulus	DIN EN ISO 527	MPa	> 700
Notched impact strength	DIN EN ISO 11542	kJ / m ²	> 50
Shore hardness	DIN EN ISO 868	scale D	> 63
Thermal Properties			
Melting temperature	ISO 11357-3	°C	130 ... 135
Thermal conductivity	DIN 52612-1	W / (m * K)	0.40
Heat capacity	DIN 52612	kJ / (kg * K)	1.90
Linear expansion coefficient	DIN 53752	10 ⁻⁶ / K	150 ... 230
Long-term service temperature	Average	°C	-150 ... 80
Short-term service temperature (max.)	Average	°C	130
Vicat softening temperature	DIN EN ISO 306 (Vicat B)	°C	79
Electrical Properties			
Bulk resistance	DIN EN 62631-3-1	Ω * cm	10 ⁹
Surface resistance	DIN EN 62631-3-2	Ω	10 ⁹

The values stated are mean values secured through continuous statistical testing in accordance with DIN EN 15860. They serve as information for material selection and do not constitute a legally binding guarantee of specific properties.