

What is PVDF ESD60 black

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PVDF, electrostatically dissipative (ESD 60)

PVDF ESD60 black is a polyvinylidene fluoride made electrostatically dissipative by conductive carbon black (surface resistivity approx. $10^4 \Omega$). It combines the excellent chemical resistance, purity and flame retardancy of the fluoropolymer with reliable dissipation of electrostatic charges – for example when handling flammable solvents or sensitive semiconductors.

Properties

PVDF ESD60 black is resistant to most acids, alkalis, halogens and hydrocarbons, hydrolysis and UV resistant and self-extinguishing (UL 94 V0). With a yield stress of 58 MPa, a tensile modulus of 2,500 MPa and a continuous service temperature of 140 °C, it is the stiffest and strongest of the common fluoropolymers; moisture absorption is negligible. The low surface resistivity dissipates charges permanently and independently of humidity.

The carbon black reduces toughness and elongation at break (10 %) compared to standard PVDF; the material is available in black only, is not declared for food contact and is not resistant to strongly polar solvents such as ketones, esters and amines. Heating above 300 °C releases hydrogen fluoride.

Advantages

- Permanently electrostatically dissipative (approx. $10^4 \Omega$)
- Excellent chemical, hydrolysis and UV resistance
- Inherently flame retardant (UL 94 V0), continuous service up to 140 °C
- Highest stiffness and strength among fluoropolymers

Disadvantages

- Lower toughness than standard PVDF
- Not resistant to ketones, esters and amines
- Not generally declared for food contact (see FDA declaration)

Processing

PVDF ESD60 black can be machined using all conventional cutting methods; sharp carbide tools and good cooling via chip removal avoid heat build-up and residual stresses in the part.

For tight tolerances and thick-walled parts, we recommend intermediate annealing to relieve machining stresses; thanks to the low moisture absorption, no conditioning is required.

Do not allow temperatures above 300 °C during machining – overheating releases hydrogen fluoride; extract grinding dust.

Typical Applications

PVDF ESD60 black is used wherever high chemical resistance and dissipative properties come together – for example in the semiconductor industry (wet benches, wafer handling), in chemical plant engineering and in potentially explosive areas.

- Wafer carriers, handling and gripper parts for wet processes
- Valve, pump and fitting parts in hazardous areas
- Linings, guides and fixtures for aggressive media

Typical Properties

- Electrostatically dissipative (ESD)
- High chemical resistance
- Inherently flame retardant

Product Examples

- Wafer carriers and handling parts
- Valve and pump parts
- Linings and fixtures

Typical Industries

- Semiconductor Industry
- Chemical Plant Engineering
- Potentially Explosive Areas

	Test Method	Unit	Value
General Properties			
Density	DIN EN ISO 1183-1	g / cm ³	1.79
Water absorption	DIN EN ISO 62	%	0.040
Flammability (Thickness 3 mm / 6 mm)	UL 94		V0 / V0
Mechanical Properties			
Yield stress	DIN EN ISO 527	MPa	58
Elongation at break	DIN EN ISO 527	%	10
Tensile modulus of elasticity	DIN EN ISO 527	MPa	2.500
Notched impact strength	DIN EN ISO 179	kJ / m ²	7.0
Ball indentation hardness	DIN EN ISO 2039-1	MPa	130
Shore hardness	DIN EN ISO 868	scale D	79
Thermal Properties			
Melting temperature	ISO 11357-3	°C	178
Coefficient of linear thermal expansion	DIN 53752	10 ⁻⁶ / K	140
Service temperature, long term	Average	°C	-20 ... 140
Service temperature, short term (max.)	Average	°C	150
Electrical Properties			
Surface resistivity	DIN EN 62631-3-2	Ω	10 ⁴