mechnano

Technical Datasheet

PK ESD

Strong, Tough, & Ductile Static Dissipative Powder for Laser Sintering

Gray

PK ESD

PK ESD is a tough static dissipative engineered polymer for laser sintering. It consists of an eco-friendly and non-toxic PolyKetone made from carbon monoxide and olefins coated with discrete functionalized carbon nanotubes (D'Func) to achieve consistent static dissipative properties.

Advantages

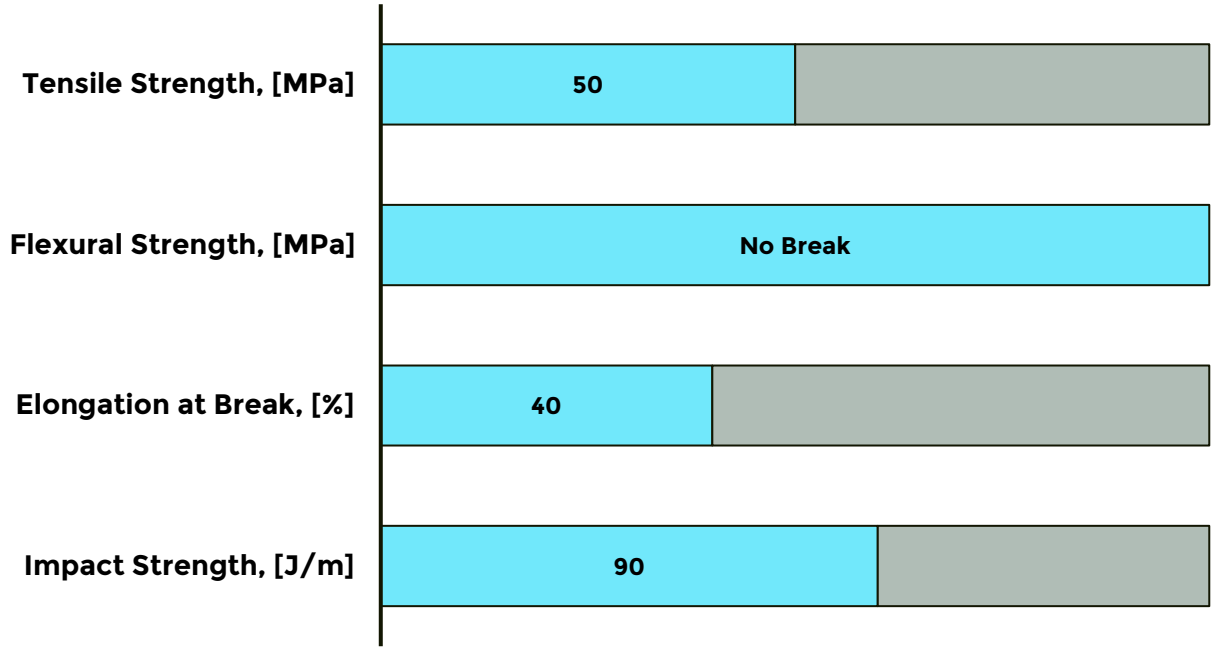
- Consistent surface resistivity
- Impact resistance 80-100 J/m
- Good elongation
- Fuel resistance
- Low toxicity

Industries

- Electronics
- Automotive
- Aerospace & Defense
- Industrial Manufacturing
- Oil & Gas

Applications

- Electronic housings
- Jigs & fixtures
- Wear-and-tear parts
- Tools for electronics shops
- Fuel systems



PROPERTIES

Mechanical Properties	xy (virgin)	xy (50/50)	z (50/50)	Units	Method
Ultimate Tensile Strength	50-55	50-55	40-50	MPa	ASTM D638-14
Tensile Modulus	1000-1100	950-1050	950-1000	MPa	ASTM D638-14
Elongation at Break	35-50	30-45	8-20	%	ASTM D638-14
Flexural Stress @5% Strain[1]	35-45	35-45	**	MPa	ASTM D790-15
Flexural Modulus	1000-1150	1000-1200	**	MPa	ASTM D790-15
IZOD Impact (Notched)	80-90	95-105	75-80	J/m	ASTM D256-10
IZOD Impact (Unnotched)[2]	900-1200	900-1000	200-400	J/m	ASTM D256-10
Hardness Shore "D"	75	75	72		ASTM D2240
Electrical Properties					
Surface Resistivity	10^7-10^8	10^7-10^8	10^7-10^8	Ω	ANSI ESD S11.11
Other Properties					
Water Absorption		0.9		%	ASTM D570-98
Powder Properties					
Color		Gray			Visual
Bulk Density		0.51		g/cm³	ASTM D1895
Melt Temperature		197		°C	DSC
Particle Size Distribution (µm)		D10: 35 D50: 50 D90: 76		µm µm µm	Laser Diffraction

Notes:

[1]Specimens did not break within the 5% strain limit when tested by Procedure A and B per ASTM D790-15. Beyond 5% strain, this test is not applicable. Testing continued until 20% strain without a break.

[2] Unnotched impact specimens did not break with 2.71 energy hammer; broke with 5.42 hammer.

**Not tested

VERIFIED HARDWARE

OEM	System(s)	Status
Farsoon	252P, Flight	Qualified

PROCESS GUIDE

Key Process Parameters

Farsoon CO_2 & FLIGHT Systems

Parameter	Value	Unit
Part Bed Temperature	177	°C
Feed Temperature	140	°C
Piston Temperature	165	°C
Cylinder Temperature	135	°C
Layer Thickness	0.1	mm
Energy Density	18.5	mJ/mm^2

Printing

1. The Laser Sintering machine is required to uphold an inert environment of less than 1% oxygen throughout the build process to prevent oxidation and material degradation.
2. To optimize powder flow and prevent clumping, the machine must recoat effectively. If issues arise, improve flow by reducing temperature and material quantity fed.
3. To ease machine transition from certain PA materials, clean roller thoroughly. Use gentle media blasting or sand roller with 240 grit sandpaper for complete residue removal.
4. Material susceptibility to machine leaks can cause oxidation and formation of cold spots, leading to undesirable orange peel effect. Maintain optimal condition of all machine seals to prevent such occurrences.
5. The material does not exhibit a tendency to curl, thus the occurrence of curling phenomena in parts within the part bed usually suggests:
    - Extremely low temperature in the part bed.
    - Excessive energy causing the powder to clump and adhere around the perimeters of the melt pool.
6. When exposed to high temperatures, the material may clump together. This can happen around the build plate near the part bed. It's unlikely that these clusters will affect the part quality unless the temperature reaches exceedingly high levels.

Post Printing

1. Keep part cake in machine under inert atmosphere until part bed surface temp cools to 60°C, then transfer to inert environment to continue cooling till cake center reaches 60°C.
2. Exposing semi-molten parts to oxygen for over 15 minutes can trigger an exothermic reaction, causing temperatures over 280°C in the part bed center. Ensure cooling under an inert environment.
3. Part cake, overflow, and remaining feed material should be sieved at 140 mesh (106μm) for reuse.
4. Material refresh: 40% virgin content needed for steady processing. Reduced content impacts lifespan and performance.
5. Material degraded by oxidation turns brown/amber and produces odor. This material should be discarded.

Changes from Version 1.1 to 1.2 include Process Guide.