Material Introduction

Liquid Crystal Polymer (LCP)

Zeus LCP monofilament can be used as an MRI-compatible, non-metallic alternative for catheter braiding.

Overview-

LCPs are thermoplastic resins that exhibit unique properties such as exceptional mechanical strength, heat tolerance for autoclaving, and chemical inertness. LCP materials have found favor in many high performance applications including, but not limited to, automotive, electronic, medical device, and food containers.

These aromatic polyester plastics are often difficult to process and can be cost-prohibitive to maximize end-user benefit. At Zeus, we have successfully developed a process to manufacture LCP as a monofilament with all of the significant properties commonly associated with this material. Our LCP monofilament exhibits exceptionally high tensile strength and stiffness – properties not seen in similar monofilaments made from materials such as nylon, polyethylene naphthalate (PEN), and even polyether ether ketone (PEEK). These characteristics make our LCP monofilaments ideal candidates to replace nitinol and other metals used as braiding reinforcement in traditional catheter construction.

A nonmetallic catheter braid allows for guidance under MRI in lieu of x-ray thus reducing radiation exposure for both the patient and clinician. Better imaging procedures under MRI mean better outcomes for patients and no heavy lead aprons for healthcare providers.

TENSILE STRENGTH

ABRASION RESISTANCE

FLEXURAL MODULUS

APPLICATIONS

- Braiding material for catheters
- Replacement for stainless steel, nitinol, and tungsten

AVAILABLE PRODUCTS

- Monofilament
- Custom monofilament shapes

KEY PROPERTIES

- Excellent mechanical strength
- Abrasion resistant
- Heat tolerant up to 302 °F / 150°C
- Chemically intert
- Class VI approved resins available

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LCP

The information presented in this publication is believed to be accurate and is not intended to constitute a specification. Property characteristics are dramatically impacted by geometry and processing method, thus properties of extruded parts may vary. In some instances, data may not be available for publication and will be notated as "na" where applicable.

These tables are meant to serve as a general guideline only. Users should evaluate the material to determine suitability for their own particular application.

PHYSICAL	ASTM	LCP
Density (g/cc)	D792	1.40 - 1.51
Water Absorption (%)	D570	0.003 - 0.006
Refraction Index	na	na

MECHANICAL	ASTM	LCP
E Tensile Modulus (MPa)	D638	10,000 - 37,900
Ultimate Tensile Strength (MPa)	D638	44.8 - 100
Elongation at Break (%)	D638	0.40 - 5.8
Flexural Modulus (MPa)	D790	7,580 - 19,300
Flexural Strength (MPa)	D790	68.9 - 159

ELECTRICAL	ASTM	LCP
Volume Resistivity (Ω - cm)	D257	4.0×10^{14}
Relative Permittivity	IEC 60250	4.39
Dissipation Factor	D149	1.0^{-3} - 0.035

THERMAL	ASTM	LCP
Deflection Temperature Under Load (°C)	D648	232 - 239
Maximum Service Temp, Air (°C)	na	150
Minimum Service Temp, Air (°C)	na	-50
Melt Temp (°C)	na	280 - 330
Coefficient of Thermal Expansion, Linear 20° (µm/m-°C)	D696	0 - 0.05