

Material Information



ULTEM 1000

Introduction

ULTEM 1000 is an unreinforced amorphous Polyetherimide (PEI) thermoplastic known for its high strength, stiffness, dimensional stability, high-temperature performance, and excellent electrical insulation. Its combination of mechanical performance, chemical resistance, and inherent flame retardancy makes it suitable for CNC-machined precision components used in demanding industrial and high-temperature applications.

Advantages

Excellent abrasion and wear resistance, very low friction, high impact resistance, good chemical resistance, low moisture absorption, and low density. UHMWPE can also operate effectively in low-temperature environments and can reduce the need for lubrication in many sliding applications.

Disadvantages

ULTEM 1000 is significantly more expensive than common engineering plastics such as ABS, POM, and Polycarbonate. It also requires more specialized machining and material-handling practices than general-purpose thermoplastics, while its high-performance characteristics may be unnecessary for applications that do not require high-temperature or demanding electrical and mechanical performance.

Tolerance

3DSPRO can manufacture and inspect to tight tolerances, including sub ± 0.001 " tolerances, per your drawing specifications and GD&T callouts.

Recommendation

The combination of high strength, rigidity, dimensional stability, electrical insulation, flame retardancy, and high-temperature performance makes ULTEM 1000 suitable for CNC-machined components used in aerospace, electrical and electronics, automotive, industrial, and other high-performance applications. It is particularly appropriate for precision parts that must maintain their mechanical and dimensional properties under elevated temperatures.

Material Specifications (For reference only.)	
Tensile strength	90 to 110MPa
Elongation at Break	60% to 80%
Hardness	109 to 112 HRM
Heat deflection temperature	200°C
Glass transition temperature	210°C to 215°C

Attention

ULTEM 1000 is an amorphous thermoplastic with relatively high thermal performance, but machining-generated heat and residual stress can still affect dimensional accuracy and surface quality. Appropriate cutting parameters, sharp tooling, effective chip removal, and suitable workholding should be used during CNC machining. For close-tolerance parts, the material's thermal expansion and dimensional changes during machining and conditioning should also be considered.

Applications

3DSPRO finds people using ULTEM 1000 to make functional parts and prototypes in the following industries and applications.

Aerospace components:

Aircraft interior components, brackets, electrical housings, ducts, structural fittings, and other lightweight parts requiring flame resistance and high-temperature performance.

Electrical and electronics equipment:

Insulators, connectors, housings, terminal components, coil forms, and other precision parts requiring excellent electrical insulation and dimensional stability.

Automotive and transportation:

Sensor components, electrical housings, brackets, lighting components, and other parts requiring high-temperature performance and dimensional stability.

Industrial and precision equipment:

Fixtures, housings, guides, machine components, laboratory equipment parts, and other CNC-machined components requiring high strength, chemical resistance, electrical insulation, and reliable performance at elevated temperatures.