ESSENTIUM

# Essentium PPS-CF
# TECHNICAL DATA SHEET

## ESSENTIUM PPS-CF

Essentium PPS-CF is a 15% carbon fiber reinforced polyphenylene sulfide (PPS) filament made with LUVOCOM® 3F resin from LEHVOSS Group. PPS is a semicrystalline, high-performance polymer used in numerous challenging applications in various industries. This material has an outstanding price-to-performance ratio with exceptional strength, stiffness, temperature, chemical and wear resistance. PPS is suitable in many cases instead of higher priced super polymers as PAEKs (PEEK, PEKK).

ESSENTIUM HSE CERTIFIED

### MECHANICAL PROPERTIES

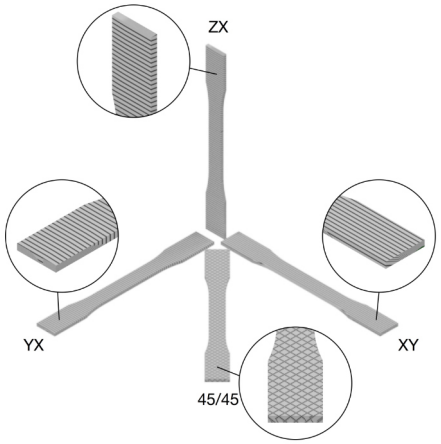
| Metric | Test Method | Print Orientation | | |
|---|---|---|---|---|
| | | XY | 45/45 | ZX |
| Ultimate Tensile Strength, MPa | ISO 527-2 | 63.0 (5.4) | 44.7 (3.5) | 28.2 (4.4) |
| Tensile Modulus, GPa | ISO 527-2 | 7.46 (0.33) | 4.55 (0.12) | 2.72 (0.14) |
| Strain at Break, % | ISO 527-2 | 2.2 (0.2) | 2.1 (0.2) | 1.7 (0.3) |
| Flexural Strength, MPa | ISO 178 | 98.2 (9.5) | 78.3 (3.9) | 38.7 (2.0) |
| Flexural Modulus, GPa | ISO 178 | 6.18 (0.49) | 3.61 (0.32) | 2.31 (0.11) |
| Izod Impact Strength, Notched kJ/m$^2$ | ISO 180 | 3.0 (0.7) | 2.6 (0.6) | 2.2 (0.8) |

Standard deviations listed in parentheses

### MATERIAL PROPERTIES

| Property | Method | Value |
|---|---|---|
| Density[1], g/cm$^3$ | ISO 1183 | 1.5 |
| HDT @ 0.45 MPa, ˚C | ISO 75 | -- |
| HDT @ 1.8 MPa, ˚C | ISO 75 | -- |
| Melting Point, ˚C | ISO 11357 | 280 |
| Glass Transition Temp, ˚C | ISO 11357 | 92 |
| Flammability Rating[1] | UL94 | V0 |
| Equilibrium Water Absorption[1], 23˚C, 50% RH, % | ISO 62 | 0.06 |
| Continuous Service Temp[1], 20,000 hrs, ˚C | IEC 60216 | 220 |

1 Values taken from raw material TDS

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## MATERIAL HANDLING AND DRYING

Essentium PPS-CF is a slightly hygroscopic thermoplastic and will absorb small amounts of moisture from humid air. Keep the material in the vacuum sealed packaging until you are ready to print with it. PPS-CF filament should always be fed to the printer in a dry container and stored in a dry cabinet to minimize absorbed moisture. If the material does absorb more than 200 ppm moisture, it should be dried in a low dew point oven or vacuum oven at 120˚C for 3 – 8 hours or overnight in the Essentium DryBox™ with SmartBAKE™. Essentium recommends printing PPS-CF on a G14 phenolic build sheet with a thin layer of Magigoo® HT applied to the surface to facilitate the removal of parts.

## RECOMMENDED HSE PRINT SETTINGS

Contact Essentium for HSE Print Profiles or find our Print Profiles online.

## RECOMMENDED FFF PRINT SETTINGS

| | | | |
|---|---|---|---|
| Nozzle Temperature, ºC | 330 – 400 | Fan Speed, % | 0 – 20 |
| Bed Temperature, ºC | 100 – 120 | Bed Material | G14 |
| Print Speed, mm/s | 25 – 75 | Bed Adhesion Method | Magigoo® HT or VM Nano |
| First Layer Speed, mm/s | 20 | Infill Density, % | 10 – 90 |

## KEY FEATURES:

- Hight temperature resistance
- Excellent chemical and solvent resistance
- Lower cost compared to PEEK
- Inherently flame retardant

## APPLICATIONS INCLUDE:

- Injection mold tooling
- Expanded foam mold tooling
- Aerospace parts
- Railway parts
- Oil and gas

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