

ESSENTIUM PCTG-Z

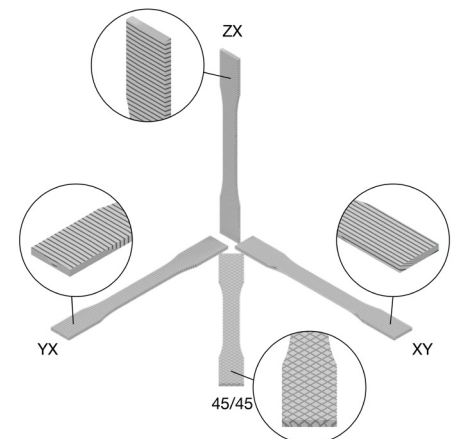
Introducing Essentium's new line of industrial grade filaments that are ESD safe. Essentium's ESD materials are proven to succeed in an industrial setting. With non-marring surface properties, you don't have to worry about latent failures in electronics. These materials are the only industrially proven, safe material for ESD sensitive applications where you need a material that you must trust. PCTG is an easy to print material with significantly increased impact strength when compared to PETG.

| MECHANICAL PROPERTIES | | | | | |
|---|-------------|-------------------|-------------|-------------|-------------|
| Metric | Test Method | Print Orientation | | | |
| | | XY | 45/45 | YX | ZX |
| Ultimate Tensile Strength, MPa | ISO 527-2 | 45.0 (0.5) | 41.0 (2.8) | 33.0 (4.3) | 33.3 (7.3) |
| Tensile Modulus, GPa | ISO 527-2 | 1.81 (0.07) | 1.74 (0.01) | 1.61 (0.05) | 1.67 (0.10) |
| Strain at Break, % | ISO 527-2 | 150 (27) | 8.8 (3.0) | 2.8 (0.7) | 2.2 (0.6) |
| Flexural Strength, MPa | ISO 178 | 74.5 (1.1) | 64.6 (1.2) | 37.2 (3.2) | 46.8 (2.8) |
| Flexural Modulus, GPa | ISO 178 | 1.72 (0.03) | 1.49 (0.04) | 1.42 (0.06) | 1.59 (0.06) |
| Notched Izod Impact Strength, kJ/m ² | ISO 180/A | 7.0 (0.6) | 2.7 (1.2) | 3.3 (1.6) | 2.1 (1.0) |

Standard deviations listed in parentheses

| MATERIAL PROPERTIES | | |
|---|------------|-------|
| Property | Method | Value |
| Specific Gravity ¹ , g/cm ³ | ASTM D792 | 1.23 |
| Glass Transition Temperature, °C | ASTM D3418 | 76 |
| Melting Point, °C | ASTM D3418 | 202 |
| HDT B @ 0.45 MPa ¹ , °C | ISO 75 | 76 |
| HDT A @ 1.8 MPa ¹ , °C | ISO 75 | 64 |

¹ Values taken from resin manufacturer TDS



MATERIAL HANDLING AND DRYING

Essentium PCTG-Z is a hygroscopic thermoplastic and will absorb moisture from humid air. Keep the material in the vacuum sealed packaging until you are ready to print with it. PCTG-Z filament should always be fed to the printer in a dry container and stored in a dry cabinet. If the material does absorb more than 600ppm moisture, it should be dried in a low dew point (< -40°C) oven or vacuum oven at 65 – 70°C for 4 – 8 hours. Avoid touching filament with bare fingers or introducing oils to the filament prior to printing.

RECOMMENDED HSE PRINT SETTINGS

0.4mm Hozzle

| | | | |
|---------------------|-------------|------------------------|-----------|
| Extrusion Width, mm | 0.35 – 0.5 | Hozzle Temperature, °C | 235 – 390 |
| Layer Height, mm | 0.15 – 0.25 | Bed Temperature, °C | 70 – 80 |
| Print Speed, mm/s | 50 – 500 | IR Temperature, °C | 20 – 40 |
| Infill, % | 15 – 75 | Fan Speed, % | 0 – 40 |

0.8mm Hozzle

| | | | |
|---------------------|------------|------------------------|-----------|
| Extrusion Width, mm | 0.7 – 0.9 | Hozzle Temperature, °C | 280 – 360 |
| Layer Height, mm | 0.3 – 0.35 | Bed Temperature, °C | 70 – 80 |
| Print Speed, mm/s | 20 – 220 | IR Temperature, °C | 20 – 40 |
| Infill, % | 15 – 75 | Fan Speed, % | 0 – 40 |

RECOMMENDED FDM PRINT SETTINGS

| | | | |
|-------------------------|-----------|---------------------|-------------------------|
| Nozzle Temperature, °C | 250 – 270 | Fan Speed, % | 25 – 50 |
| Bed Temperature, °C | 70 – 80 | Bed Material | G-10/FR4 or Glass |
| Print Speed, mm/s | 40 – 80 | Bed Adhesion Method | Dimafix® or Magigoo® HT |
| First Layer Speed, mm/s | 20 – 40 | Infill Density, % | <75 |

KEY FEATURES:

- All-purpose material for ESD safe jigs and fixtures
- Non-marring
- Low cost
- Easy to print
- Good all-around mechanical properties

APPLICATIONS INCLUDE:

- Handheld tools
- General assembly fixtures for electronics
- Robotics and automation components
- Parts for explosion-proof environments
- ESD part trays

Version 1.0
Revision Date: 05/27/20

ELECTRICAL PROPERTIES

| Measurement position | Resistance, Ω | | |
|----------------------|----------------------|------------------|------------------|
| | 80 mm/s @ 325°C | 140 mm/s @ 360°C | 200 mm/s @ 360°C |
| 1 | 2.61e8 | 4.12e6 | 4.67e6 |
| 2 | 2.56e6 | 2.67e4 | 9.30e7 |
| 3 | 5.83e3 | 3.59e3 | 5.89e3 |
| 4 | 1.02e4 | 5.51e3 | 7.80e3 |
| 5 | 3.96e4 | 4.87e3 | 4.21e4 |
| 6 | 3.42e4 | 7.60e4 | 5.56e4 |

