

# Essentium TPU 74D-Z

## TECHNICAL DATA SHEET

### ESSENTIUM TPU 74D-Z

Essentium TPU 74D-Z is a high durometer filament in Essentium's electrostatically dissipative (ESD) portfolio. With non-marring surface properties, you don't have to worry about latent failures in electronics. Essentium's Z line of filaments are the only industrially-proven safe materials for ESD sensitive applications. Essentium TPU 74D-Z is a no-warp drop in replacement for ABS. It has excellent impact strength, tear strength, and abrasion resistance.

### MECHANICAL PROPERTIES

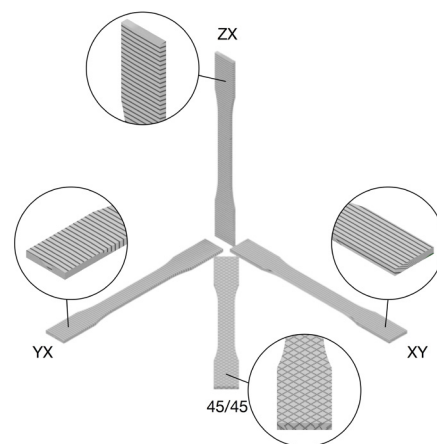
| Metric                                           | Test Method | Print Orientation |               |               |               |
|--------------------------------------------------|-------------|-------------------|---------------|---------------|---------------|
|                                                  |             | XY                | 45/45         | YX            | ZX            |
| Ultimate Tensile Strength, MPa                   | ISO 37      | 36.4 (1.2)        | 29.7 (0.6)    | 20.9 (1.5)    | 27.1 (0.2)    |
| Tensile Modulus, GPa                             | ISO 37      | 0.318 (0.009)     | 0.291 (0.023) | 0.276 (0.011) | 0.291 (0.008) |
| Strain at Break, %                               | ISO 37      | 730 (29)          | 370 (33)      | 25 (7)        | 230 (15)      |
| Notched Izod Impact Strength*, kJ/m <sup>2</sup> | ISO 180/A   | N                 | N             | 24 (12)-H     | 2.3 (0.9)-C   |

Standard deviations listed in parentheses. \*For Izod impact results the code-letters correspond to N: non-break, H: hinge break, C: complete break

### MATERIAL PROPERTIES<sup>1</sup>

| Property                            | Method   | Value |
|-------------------------------------|----------|-------|
| Specific Gravity, g/cm <sup>3</sup> | ISO 1183 | 1.23  |
| Glass Transition Temperature, °C    | DMA      | 33    |
| Shore Hardness                      | ISO 868  | 73D   |
| Tear Strength, kN/m                 | ISO 34-1 | 220   |
| Abrasion Loss, mm <sup>3</sup>      | ISO 4649 | 20    |
| Compression Set at RT               | ISO 815  | 50    |
| Compression Set at 70°C             | ISO 815  | 55    |

<sup>1</sup> Values taken from resin manufacturer TDS



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### MATERIAL HANDLING AND DRYING

Essentium TPU 74D-Z is a very hygroscopic thermoplastic and will rapidly absorb moisture from humid air. Keep the material in the vacuum sealed packaging until you are ready to print with it. TPU 74D-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 200ppm moisture, it should be dried in a low dew point (< -40°C) oven or vacuum oven at 90 – 120°C for 2 – 3 hours.

### RECOMMENDED HSE PRINT SETTINGS

#### 0.4mm Hozzle

|                     |            |                        |           |
|---------------------|------------|------------------------|-----------|
| Extrusion Width, mm | 0.4 – 0.45 | Hozzle Temperature, °C | 270 – 330 |
| Layer Height, mm    | 0.2 – 0.25 | Bed Temperature, °C    | 70 – 80   |
| Print Speed, mm/s   | 20 – 200   | IR Temperature, °C     | 20 – 40   |
| Infill, %           | 15 – 75    | Fan Speed, %           | 10 – 40   |

#### 0.8mm Hozzle

|                     |             |                        |           |
|---------------------|-------------|------------------------|-----------|
| Extrusion Width, mm | 0.75 – 0.85 | Hozzle Temperature, °C | 280 – 350 |
| Layer Height, mm    | 0.3 – 0.35  | Bed Temperature, °C    | 70 – 80   |
| Print Speed, mm/s   | 10 – 120    | IR Temperature, °C     | 20 – 40   |
| Infill, %           | 15 – 75     | Fan Speed, %           | 10 – 60   |

### RECOMMENDED FDM PRINT SETTINGS

|                         |           |                     |                   |
|-------------------------|-----------|---------------------|-------------------|
| Nozzle Temperature, °C  | 230 – 250 | Fan Speed, %        | 0 – 20            |
| Bed Temperature, °C     | 50 – 80   | Bed Material        | G-10/FR4 or Glass |
| Print Speed, mm/s       | 20 – 50   | Bed Adhesion Method | Magigoo® Flex     |
| First Layer Speed, mm/s | 15 – 20   | Infill Density, %   | <75               |

### KEY FEATURES:

- ESD safe
- Best in class tear resistance
- Temperature resistance up to 120°C
- Good abrasion and wear resistance
- Excellent chemical, solvent, oil and ozone resistance

### APPLICATIONS INCLUDE:

- ABS ESD replacement
- Electronics manufacturing ESD safe jigs and fixtures
- Snap fit connectors
- Heavy load vibration isolation
- Impact rated structural components

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### ELECTRICAL PROPERTIES

| Measurement position | Resistance, $\Omega$ |
|----------------------|----------------------|
|                      | 100 mm/s @ 295°C     |
| 1                    | 5.10e7               |
| 2                    | 1.23e7               |
| 3                    | 8.00e2               |
| 4                    | 7.90e2               |
| 5                    | 8.50e2               |
| 6                    | 1.44e3               |

