



## ULTEM™ Resin HU1000

### Americas: COMMERCIAL

Transparent, standard flow Polyetherimide (Tg 217C). ECO Conforming. For medical devices and pharmaceutical applications. Healthcare management of change, biocompatible (ISO 10993 or USP Class VI), food contact compliant. EtO and steam sterilizable.

| TYPICAL PROPERTIES <sup>1</sup>              | TYPICAL VALUE | Unit                | Standard    |
|--|---------------|---------------------|-------------|
| <b>MECHANICAL</b>                            |               |                     |             |
| Tensile Stress, yld, Type I, 5 mm/min        | 1120          | kgf/cm <sup>2</sup> | ASTM D 638  |
| Tensile Stress, brk, Type I, 5 mm/min        | 910           | kgf/cm <sup>2</sup> | ASTM D 638  |
| Tensile Strain, yld, Type I, 5 mm/min        | 7             | %                   | ASTM D 638  |
| Tensile Strain, brk, Type I, 5 mm/min        | 60            | %                   | ASTM D 638  |
| Tensile Modulus, 5 mm/min                    | 36500         | kgf/cm <sup>2</sup> | ASTM D 638  |
| Flexural Stress, yld, 1.3 mm/min, 50 mm span | 1760          | kgf/cm <sup>2</sup> | ASTM D 790  |
| Flexural Modulus, 1.3 mm/min, 50 mm span     | 35000         | kgf/cm <sup>2</sup> | ASTM D 790  |
| Tensile Stress, yield, 5 mm/min              | 105           | MPa                 | ISO 527     |
| Tensile Stress, break, 5 mm/min              | 85            | MPa                 | ISO 527     |
| Tensile Strain, yield, 5 mm/min              | 6             | %                   | ISO 527     |
| Tensile Strain, break, 5 mm/min              | 60            | %                   | ISO 527     |
| Tensile Modulus, 1 mm/min                    | 3200          | MPa                 | ISO 527     |
| Flexural Stress, yield, 2 mm/min             | 160           | MPa                 | ISO 178     |
| Flexural Modulus, 2 mm/min                   | 3300          | MPa                 | ISO 178     |
| <b>IMPACT</b>                                |               |                     |             |
| Izod Impact, unnotched, 23°C                 | 136           | cm-kgf/cm           | ASTM D 4812 |
| Izod Impact, notched, 23°C                   | 5             | cm-kgf/cm           | ASTM D 256  |
| Izod Impact, notched, -30°C                  | 5             | cm-kgf/cm           | ASTM D 256  |
| Instrumented Impact Total Energy, 23°C       | 0             | cm-kgf              | ASTM D 3763 |
| Izod Impact, notched 80*10*4 +23°C           | 6             | kJ/m <sup>2</sup>   | ISO 180/1A  |
| Izod Impact, notched 80*10*4 -30°C           | 6             | kJ/m <sup>2</sup>   | ISO 180/1A  |
| Charpy 23°C, V-notch Edgew 80*10*4 sp=62mm   | 4             | kJ/m <sup>2</sup>   | ISO 179/1eA |

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(3) This rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

(4) Internal measurements according to UL standards.

(5) Measurements made from laboratory test coupon. Actual shrinkage may vary outside of range due to differences in processing conditions, equipment, part geometry and tool design. It is recommended that mold shrinkage studies be performed with surrogate or legacy tooling prior to cutting tools for new molded article.

(6) Needs hard coat to consistently pass 60 sec Vertical Burn.

Source GMD, last updated:

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|---------------------------------------|---------------|-------------------------|--------------|
| <b>THERMAL</b>                        |               |                         |              |
| Vicat Softening Temp, Rate B/50       | 218           | °C                      | ASTM D 1525  |
| HDT, 1.82 MPa, 6.4 mm, unannealed     | 201           | °C                      | ASTM D 648   |
| CTE, -20°C to 150°C, flow             | 5.58E-05      | 1/°C                    | ASTM E 831   |
| CTE, -20°C to 150°C, xflow            | 5.4E-05       | 1/°C                    | ASTM E 831   |
| CTE, -40°C to 40°C, flow              | 5.E-05        | 1/°C                    | ISO 11359-2  |
| CTE, -40°C to 40°C, xflow             | 5.E-05        | 1/°C                    | ISO 11359-2  |
| Vicat Softening Temp, Rate B/50       | 215           | °C                      | ISO 306      |
| Vicat Softening Temp, Rate B/120      | 211           | °C                      | ISO 306      |
| HDT/Af, 1.8 MPa Flatw 80*10*4 sp=64mm | 215           | °C                      | ISO 75/Af    |
| <b>PHYSICAL</b>                       |               |                         |              |
| Specific Gravity                      | 1.27          | -                       | ASTM D 792   |
| Water Absorption, 24 hours            | 0.25          | %                       | ASTM D 570   |
| Water Absorption, equilibrium, 23C    | 1.25          | %                       | ASTM D 570   |
| Mold Shrinkage, flow, 3.2 mm (5)      | 0.5 - 0.7     | %                       | SABIC Method |
| Melt Flow Rate, 337°C/6.6 kgf         | 9             | g/10 min                | ASTM D 1238  |
| Density                               | 1.27          | g/cm <sup>3</sup>       | ISO 1183     |
| Water Absorption, (23°C/sat)          | 1.25          | %                       | ISO 62       |
| Moisture Absorption (23°C / 50% RH)   | 0.7           | %                       | ISO 62       |
| Melt Volume Rate, MVR at 220°C/5.0 kg | 13            | cm <sup>3</sup> /10 min | ISO 1133     |
| <b>ELECTRICAL</b>                     |               |                         |              |
| Volume Resistivity                    | 1.E+17        | Ohm-cm                  | ASTM D 257   |
| Dielectric Strength, in air, 1.6 mm   | 32.7          | kV/mm                   | ASTM D 149   |
| Dielectric Strength, in oil, 1.6 mm   | 27.9          | kV/mm                   | ASTM D 149   |
| Relative Permittivity, 1 kHz          | 3.15          | -                       | ASTM D 150   |
| Dissipation Factor, 1 kHz             | 0.0013        | -                       | ASTM D 150   |

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| <b>ELECTRICAL</b>                     |               |          |             |
| Dissipation Factor, 2450 MHz          | 0.0025        | -        | ASTM D 150  |
| Arc Resistance, Tungsten {PLC}        | 5             | PLC Code | ASTM D 495  |
| Hot Wire Ignition {PLC}               | 1             | PLC Code | UL 746A     |
| High Voltage Arc Track Rate {PLC}     | 2             | PLC Code | UL 746A     |
| High Ampere Arc Ign, surface {PLC}    | 3             | PLC Code | UL 746A     |
| Comparative Tracking Index (UL) {PLC} | 4             | PLC Code | UL 746A     |
| <b>FLAME CHARACTERISTICS</b>          |               |          |             |
| Oxygen Index (LOI)                    | 47            | %        | ASTM D 2863 |
| NBS Smoke Density, Flaming, Ds 4 min  | 0.7           | -        | ASTM E 662  |

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| PROCESSING PARAMETERS       | TYPICAL VALUE | Unit |
|-----------------------------|---------------|------|
| <b>Injection Molding</b>    |               |      |
| Drying Temperature          | 150           | °C   |
| Drying Time                 | 4 - 6         | hrs  |
| Drying Time (Cumulative)    | 24            | hrs  |
| Maximum Moisture Content    | 0.02          | %    |
| Melt Temperature            | 350 - 400     | °C   |
| Nozzle Temperature          | 345 - 400     | °C   |
| Front - Zone 3 Temperature  | 345 - 400     | °C   |
| Middle - Zone 2 Temperature | 340 - 400     | °C   |
| Rear - Zone 1 Temperature   | 330 - 400     | °C   |
| Mold Temperature            | 135 - 165     | °C   |
| Back Pressure               | 0.3 - 0.7     | MPa  |
| Screw Speed                 | 40 - 70       | rpm  |
| Shot to Cylinder Size       | 40 - 60       | %    |
| Vent Depth                  | 0.025 - 0.076 | mm   |

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