

MediTECH Extruded UHMWPE Form, produced from Celanese GUR 1020 resin.

ISO Cell Designation: Thermoplastic ISO 11542-PE-UHMW QD, 2-2-2, ASTM Cell Designation: S-UHMW-PE0111A111

Material evaluated based on ISO 5834-1 Type 1, ISO 5834-2 Type 1, and ASTM F648 Type 1. Note - ISO 5834-2:2019 has updated to ASTM test methods, but for the purposes of comparison to previous testing the ISO test methods of the previous ISO 5834-2 standards have been included.

| Annealed Fabricated UHMWPE Form | ISO 5834-2:2011 | | | ISO 5834-2:2019 and ASTM F648:2014 | | |
|---|----------------------|----------------------|----------------------|------------------------------------|----------------------|----------------------|
| | Test methods | Units | Indicative Values | Test methods | Units | Indicative Values |
| Mechanical Properties (Note 1) | | | | | | |
| Density, (Annealed Material) | ISO 1183-1 | [kg/m ³] | 936 (1.5) | ASTM D792 / ASTM D1505 | [kg/m ³] | 936 (1.5) |
| Tensile stress at yield [tensile strength] | ISO 5834-2 / ISO 527 | [MPa] | 23.2 (0.7) | ASTM F648 / ASTM D638 | [MPa] | 22.9 (1.1) |
| Tensile stress at break [ultimate tensile strength] | ISO 5834-2 / ISO 527 | [MPa] | 54.0 (7.5) | ASTM F648 / ASTM D638 | [MPa] | 56.5 (6) |
| Elongation Percent at break | ISO 5834-2 / ISO 527 | [%] | 427 (30) | ASTM F648 / ASTM D638 | [%] | 467 (32) |
| Shore Hardness D-Scale, 15 sec. value | ISO 868 | [-] | 66 (2) | ASTM D2240 | [-] | 66 (2) |
| Notched Impact Strength (Charpy, Izod) | ISO 11542-2 | [kJ/m ²] | 187 (5.8) | ASTM F648 | [kJ/m ²] | 148 (6) |
| Crystallinity; DSC, (1st heat, 20°C - 160°C) | N / A | N / A | N / A | ASTM F2625 | [%] | 58 (1.5) |
| Water absorption at 23 °C until saturation | ISO 62 | % | <0.05 | ASTM D570 | [%] | <0.05 |
| Thermal Properties (Note 2) | | | | | | |
| Melting temperature (DSC, 10°C / min) | N / A | N / A | N / A | ASTM DF2625 | °C | 138 (0.9) |
| Vicat softening point, 10N, 50 °C/Hr. | ISO 306 | [°C] | 134 | ASTM D1525 B | [°C] | 134 |
| Coef. of Linear thermal expansion; 23°C to 80°C | ISO 11359 | [K ⁻¹] | 1.8*10 ⁻⁴ | ASTM D696 | [K ⁻¹] | 1.8*10 ⁻⁴ |
| Heat Deflection T: HDT/A [1.8 MPa]; 264psi | ISO 75 pt. 1/2 | [°C] | 42 | ASTM D648 | [°C] | 42 |
| Thermal Conductivity | DIN 52612 | [W/(m*K)] | Approx. 0.4 | DIN 52612 | [W/(m*K)] | Approx. 0.4 |
| Crystallization Temperature Range T _c ; (20-160°C) | ISO 3146 | [°C] | 126 - 144 | ASTM F2625 | [°C] | 126 - 144 |
| Ash particles, maximum | ISO 3451 -1 | [mg/kg] | ≤150 | N / A | N / A | N / A |
| Oxidation Resistance - Surface Oxidation Index | ISO 5834-4 | Index | ≤0.1 | ASTM F2102 | Index | ≤0.1 |
| Oxidation Resistance - Bulk Oxidation Index | ISO 5834-4 | Index | ≤0.1 | ASTM F2102 | Index | ≤0.1 |
| Oxidation Induction Time T ₀ , conducted @ 200°C | N / A | N / A | N / A | ASTM D3895 | Minutes | 10 |

NOTES IN DATASHEET

Note 1 Tensile Properties Conducted following: [ASTM Type IV @ 50 mm per minute and ISO Type 1B @ 100 mm per minute]

Note 2 Oxidative Indices: The process used can affect the oxidative potential. In the development of a material the goal is always to have "essentially zero" oxidative potential, that is typically numerically determined to be an index of 0.1 or less.

GENERAL NOTES

This product data sheet and any data and specifications presented on our website shall provide promotional and general information about the Engineering Plastic Products (the "Products") manufactured and offered by Mitsubishi Chemical Advanced Materials Inc. and shall serve as a preliminary guide. All data and descriptions relating to the Products are of an indicative nature only. Neither this data sheet nor any data and specifications presented on our website shall create or be implied to create any legal or contractual obligation.

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Regulatory Submission Support Available through MediTECH for Enhanced Forms

Mitsubishi Chemical Advanced Materials Inc. is able to produce Materials to customer specifications, characterize and report as requested according to validation protocols as evidence for new product development and submission according to:

- ASTM F 2565-13; "Standard Guide for Extensively Irradiation-Crosslinked Ultra-High Molecular Weight Polyethylene Fabricated Forms for Surgical Implant Applications"¹
- ASTM F 2695-12; "Standard Specification for Ultra-High Molecular Weight Polyethylene Powder Blended with Alpha-Tocopherol (Vitamin E) and Fabricated Forms for Surgical Implant Applications"¹
- ASTM F 2759-19; "Standard Guide for Assessment of the Ultra High Molecular Weight Polyethylene (UHMWPE) Used in Orthopedic and Spinal Devices"¹

IMPORTANT: Most plastics will ignite and sustain flame under certain conditions. Caution is urged where any material may be exposed to open flame or heat-generating equipment. Use Material Safety Data Sheets to determine auto-ignition and flashpoint temperatures of materials, or consult MediTECH if additional information is needed.

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