

**Mitsubishi Chemical Advanced Materials TIVAR® ECO UHMW-PE, UV Resistant (ASTM Product Data Sheet)**

**Categories:** Polymer; Renewable/Recycled Polymer; Thermoplastic; Polyethylene (PE); High Density (HDPE); High Density Polyethylene (HDPE), UHMW PE Ultra High Molecular Weight

**Material Notes:** Quadrant Engineering Plastic Products is now Mitsubishi Chemical Advanced Materials.

| Physical Properties            | Metric     | English    | Comments                      |
|--------------------------------|------------|------------|-------------------------------|
| Specific Gravity               | 0.930 g/cc | 0.930 g/cc | ASTM D792                     |
| Water Absorption               | <= 0.010 % | <= 0.010 % | Immersion, 24hr; ASTM D570(2) |
| Water Absorption at Saturation | <= 0.010 % | <= 0.010 % | ASTM D570                     |

| Mechanical Properties            | Metric          | English         | Comments                     |
|----------------------------------|-----------------|-----------------|------------------------------|
| Hardness, Shore D                | 67              | 67              | ASTM D2240                   |
| Tensile Strength                 | 27.6 MPa        | 4000 psi        | ASTM D638                    |
| Tensile Strength at 65°C (150°F) | 2.76 MPa        | 400 psi         | ASTM D638                    |
| Elongation at Break              | 200 %           | 200 %           | ASTM D638                    |
| Tensile Modulus                  | 0.676 GPa       | 98.0 ksi        | ASTM D638                    |
| Flexural Strength                | 13.8 MPa        | 2000 psi        | ASTM D790                    |
| Flexural Modulus                 | 0.558 GPa       | 81.0 ksi        | ASTM D790                    |
| Compressive Strength             | 19.3 MPa        | 2800 psi        | 10% Def.; ASTM D695          |
| Compressive Modulus              | 0.414 GPa       | 60.0 ksi        | ASTM D695                    |
| Izod Impact, Notched             | NB              | NB              | ASTM D256                    |
| Coefficient of Friction, Dynamic | 0.14            | 0.14            | Dry vs. Steel; QTM 55007     |
| Sand Slurry                      | 18              | 18              | 1018 steel = 100; ASTM D4020 |
| Limiting Pressure Velocity       | 0.105 MPa-m/sec | 3000 psi-ft/min | 4:1 safety factor; QTM 55007 |

| Electrical Properties          | Metric          | English         | Comments       |
|--------------------------------|-----------------|-----------------|----------------|
| Surface Resistivity per Square | <= 1.00e+13 ohm | <= 1.00e+13 ohm | EOS/ESD S11.11 |

| Thermal Properties                          | Metric  | English   | Comments                     |
|---|---|---|------------------------------|
| CTE, linear                                 | 198 $\mu\text{m/m}\cdot^{\circ}\text{C}$<br>@Temperature -40.0 - 149 $^{\circ}\text{C}$ | 110 $\mu\text{in/in}\cdot^{\circ}\text{F}$<br>@Temperature -40.0 - 300 $^{\circ}\text{F}$ | ASTM E831                    |
| Melting Point                               | 135 $^{\circ}\text{C}$  | 275 $^{\circ}\text{F}$  | Crystalline Peak; ASTM D3418 |
| Maximum Service Temperature, Air            | 82.2 $^{\circ}\text{C}$   | 180 $^{\circ}\text{F}$  | Continuous                   |
| Deflection Temperature at 1.8 MPa (264 psi) | 46.7 $^{\circ}\text{C}$   | 116 $^{\circ}\text{F}$  | ASTM D648                    |
| Flammability, UL94                          | HB<br>@Thickness 3.17 mm  | HB<br>@Thickness 0.125 in   |                              |

| Compliance Properties | Metric | English | Comments |
|-----------------------|--------|---------|----------|
| 3A-Dairy              | No     | No      |          |
| Canada AG             | No     | No      |          |
| FDA                   | No     | No      |          |
| NSF                   | No     | No      |          |
| USDA                  | No     | No      |          |
| USP Class VI          | No     | No      |          |

| Chemical Resistance Properties  | Metric       | English      | Comments |
|---------------------------------|--------------|--------------|----------|
| Acids, Strong (pH 1-3)          | Limited      | Limited      |          |
| Acids, Weak                     | Acceptable   | Acceptable   |          |
| Alcohols                        | Acceptable   | Acceptable   |          |
| Alkalies, Strong (pH 11-14)     | Acceptable   | Acceptable   |          |
| Alkalies, Weak                  | Acceptable   | Acceptable   |          |
| Chlorinated Solvents            | Acceptable   | Acceptable   |          |
| Conductive / Static Dissipative | No           | No           |          |
| Continuous Sunlight             | Acceptable   | Acceptable   |          |
| Hot Water / Steam               | Limited      | Limited      |          |
| Hydrocarbons - Aliphatic        | Acceptable   | Acceptable   |          |
| Hydrocarbons - Aromatic         | Unacceptable | Unacceptable |          |
| Inorganic Salt Solutions        | Acceptable   | Acceptable   |          |
| Ketones, Esters                 | Limited      | Limited      |          |