MEDICAL AND PHARMACEUTICAL MATERIALS FOR INNOVATIVE HEALTHCARE PRODUCTS
Celanese offers one of the broadest ranges of healthcare materials in the industry. With over 40 years of technical expertise, Celanese is the trusted development partner and first-choice chemistry solution provider to enhance your ability to meet the demands of next generation healthcare technologies. Our innovation platforms and customized solutions provide high-quality, advanced and biocompatible polymers to help our clients innovate new healthcare technologies, mitigate risk through regulatory compliance and create eco-responsible materials.

ART OF MATERIAL SELECTION & ENGAGEMENT.

Our experts work with manufacturers and engineers to help understand, articulate and develop material needs in diverse application bases. The Celanese integrated engagement model makes it easy to innovate together with our broad portfolio, process support, part design, global footprint and continued investment into healthcare technology.

<table>
<thead>
<tr>
<th>Broad Portfolio</th>
<th>Process Support</th>
<th>Material Design</th>
<th>Global Footprint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covers a wide range of chemical resistance, mechanical performance and usage temperatures</td>
<td>Individualized Field Technical support across our customers ecosystem (molding, extrusion, troubleshooting, testing)</td>
<td>Advanced computer aided engineering and design</td>
<td>Ten technical and customer centers across the globe</td>
</tr>
<tr>
<td>Ability to customize materials to meet varying application CTQs</td>
<td>End-to-end (pellet to part) support</td>
<td>Application and subject matter expertise (aesthetics, tribology, etc.) to support part design challenges</td>
<td>Technical support in every time zone</td>
</tr>
</tbody>
</table>

MATERIAL TECHNOLOGIES FOR NEXT GENERATION DEVICES.

<table>
<thead>
<tr>
<th>VITALDOSE® CONTROLLED RELEASE EXCIPIENT EVA</th>
<th>HOSTAFORM® MT® SLIDEX® POM</th>
<th>VECTRA® LCP FOR LASER DIRECT STRUCTURING</th>
<th>CELANESE APPEARANCE POLYMERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulator-approved, easy-processing, controlled-release drug delivery</td>
<td>Exceptional low friction and noise in drug delivery devices</td>
<td>Integration of structure and electronics in a single component for smart medical devices</td>
<td>Improved haptics and appearance for medical devices</td>
</tr>
</tbody>
</table>
Celanese strives to maintain one of the broadest material portfolios in the industry through constant innovation and expansion. Our existing, enhanced and select material solutions offer a wide range of mechanical, chemical and temperature properties and characteristics.

**Medical Engineered Materials**
- HOSTAFORM® MT® POM
  - Metal gear replacement
  - Tribological systems
  - Functional parts with high-dimensional precision and stability
- CELANEX® MT® PBT
  - Metal gear replacement
  - Tribological systems
  - Functional parts with high-dimensional precision and stability
- GUR® UHMW-PE
  - Acetabular liners for total hip arthroplasty (THA)
  - Tibial inserts for total knee arthroplasty
  - Bearing components for shoulder and other joints
- FORTRON® MT® PPS
  - Surgical instrumentation
  - Sterilization trays
  - Metal replacement
- VECTRA® MT® LCP
  - Surgical instrumentation
  - Sterilization trays
  - Surgical staple cartridges
  - Integrated 3D circuits

**Pharma Excipient Materials**
- ATEVA® G EVA
  - Medical bags (e.g. blood derivative, nutrition, single-use bioprocess containers)
  - Cryogenic stem cell storage
  - Medical tubing and drainage
- VITALDOSE® EVA
  - Intravaginal rings
  - Subcutaneous implants
  - Transdermal patches
- SUNETT® ACESULFAME POTASSIUM
  - Cough syrup
  - Pharmaceuticals
  - Throat lozenges
- NUTRINOVA® SORBIC ACID AND NUTRINOVA® POTASSIUM SORBATE
  - Cough syrup
  - Pharmaceuticals
  - Throat lozenges

**Medical EVA/LDPE Devices**
- CELANESE LDPE
  - Medical packaging
  - Blow fill seals
  - Extrusion coating

**CONTINUOUS PORTFOLIO EXPANSION**

**GLOBAL REACH AND CAPABILITIES**

**INNOVATE WITH CELANESE, YOUR TRUSTED PARTNER FOR MEDICAL AND PHARMACEUTICAL POLYMERS.**
### Celanese Engineered Materials for Medical Applications

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Typical Medical Applications</th>
<th>Grade/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermally stable</td>
<td>Drug delivery systems</td>
<td>MT 2U01, MT 8U01, MT 12U01, MT 24U01, MT 8R02, MT 12R01, MT 8F02, MT 24F01, MT 8U01</td>
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<tr>
<td>High chemical resistance</td>
<td>Drug delivery systems</td>
<td>MT 2U01, MT 8U01, MT 12U01, MT 24U01, MT 8R02, MT 12R01, MT 8F02, MT 24F01, MT 8U01</td>
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<tr>
<td>Excellent impact resistance</td>
<td>Drug delivery systems</td>
<td>MT 2U01, MT 8U01, MT 12U01, MT 24U01, MT 8R02, MT 12R01, MT 8F02, MT 24F01, MT 8U01</td>
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<tr>
<td>Good dimensional stability</td>
<td>Drug delivery systems</td>
<td>MT 2U01, MT 8U01, MT 12U01, MT 24U01, MT 8R02, MT 12R01, MT 8F02, MT 24F01, MT 8U01</td>
</tr>
<tr>
<td>High strength &amp; rigidity</td>
<td>Drug delivery systems</td>
<td>MT 2U01, MT 8U01, MT 12U01, MT 24U01, MT 8R02, MT 12R01, MT 8F02, MT 24F01, MT 8U01</td>
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<tr>
<td>Nonwovens used</td>
<td>Drug delivery systems</td>
<td>MT 2U01, MT 8U01, MT 12U01, MT 24U01, MT 8R02, MT 12R01, MT 8F02, MT 24F01, MT 8U01</td>
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<tr>
<td>Surgical instrumentation</td>
<td>Drug delivery systems</td>
<td>MT 2U01, MT 8U01, MT 12U01, MT 24U01, MT 8R02, MT 12R01, MT 8F02, MT 24F01, MT 8U01</td>
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<tr>
<td>Replication of very fine parts with extremely high precision</td>
<td>Drug delivery systems</td>
<td>MT 2U01, MT 8U01, MT 12U01, MT 24U01, MT 8R02, MT 12R01, MT 8F02, MT 24F01, MT 8U01</td>
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<tr>
<td>Drug delivery systems</td>
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<td>MT 2U01, MT 8U01, MT 12U01, MT 24U01, MT 8R02, MT 12R01, MT 8F02, MT 24F01, MT 8U01</td>
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</tr>
</tbody>
</table>

### Special Applications

- **Celanex® MT** and **Celanex® thermoplastic polyesters (PBT)**
  - Ideal sliding and wear behavior
  - High dimensional stability
  - Good chemical resistance to polar and non-polar solvents
  - Gamma resistance up to 50kGy
- **Fortron® MT** polyphenylene sulfide (PPS)
  - High dimensional stability
  - Excellent chemical resistance
  - Heat resistance up to 240°C
  - Gamma, ETO and Steam Sterilizable
  - Suitable for repeat steam sterilization cycles
- **Vectra® MT** liquid crystal polymer (LCP)
  - Extremely high rigidity in thin walled designs
  - High impact strength
  - Very high heat resistance
  - Suitable for repeat steam sterilization cycles
  - High dimensional stability
  - Replication of very fine parts with extremely high precision

---

**Applications Grade Description**

**Typical Medical**

- Cervical disks for spine
- Endoprosthetics
- Tibial inserts for TKA
- Acetabular liners for THA
- Complete air and moisture barrier
- Integrated 3D inserts
- Replication of very fine parts

**Applications Grade Description**

- Nonwovens used
- Surgical instrumentation
- Clips and clamps
- Snap fittings
- Sliding mechanisms
- Metal gear replacement
- Low coefficient of friction
- Excellent chemical resistance
- Low coefficient of friction
- Injection moldable

---

**Applications Grade Description**

**Typical Medical**

- Drug delivery systems
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**Celanese Medical Products Data Sheet**

<table>
<thead>
<tr>
<th>Property</th>
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<th>HOSTAFORM® POM</th>
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<td>Charpy impact strength at 23°C (kJ/m²)</td>
<td>ISO 179/1eU</td>
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<td>Charpy notch impact strength at 23°C (kJ/m²)</td>
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<td>Mechanical Properties</td>
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<td>Tensile stress at yield (50mm/min) (MPa)</td>
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<td>Charpy notch impact strength at 23°C (kJ/m²)</td>
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<td>FDA regulation CFR Vol.21 § 177 – Food contact notification – FCN</td>
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*German Federal Institute for Risk Assessment
We Invite You to Contact Us to Discuss Your Material Requirements.
HEALTHCARE MATERIALS
healthcare.celanese.com

Contact Information

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  e: foodingredients-am@celanese.com