

## CYROLITE® Protect

acrylic-based multipolymer compound  
for antimicrobial medical device applications



Evonik Industries is a global market leader in specialty chemicals with business activities all over the world. Evonik Cyro LLC, a business line within the Chemicals Business Area of Evonik, is a worldwide manufacturer of PMMA molding compounds.

This product is specifically designed for FDA regulated Class I or Class II medical devices covered by 510(k) PMN submission. Call Evonik Cyro for the Device Master File Number.

CYROLITE® Protect acrylic-based multipolymer compound provides antimicrobial capabilities\* against a variety of microorganisms commonly found in healthcare facilities. It is the latest addition to the family of CYROLITE® acrylic-based multipolymer compounds, the world's most advanced medical acrylics. Offering a superior balance of properties, CYROLITE® compounds empower designers to create better-than-ever medical devices.

#### Benefits of CYROLITE® Protect compound:

- Antimicrobial capabilities\*
- Tough
- Transparent
- Bondable
- Gamma, e-beam and EtO sterilizable
- Easy to process
- Chemical resistant
- Resistant to plasticizers found in flexible PVC tubing
- Free of bisphenol A (BPA)

**Processing:** CYROLITE® Protect compound can be processed in injection molding machines and extrusion lines with 3-zone general purpose screws.

#### Typical Medical Applications:

- Luer connectors
- Spikes
- Y-Sites
- Check valves
- Filter Housings

#### Product Offering:

**Color:** Transparent green tint

**Packaging:** Pellets in uniform size in 1500 lb. gaylord boxes; other packaging available on request.

#### Performance Capability:

##### Antimicrobial Activity – Test Method JIS Z 2801

| Duration | <i>Staphylococcus aureus</i> | <i>Klebsiella pneumoniae</i> | <i>Pseudomonas aeruginosa</i> | <i>Staphylococcus epidermidis</i> |
|----------|------------------------------|------------------------------|-------------------------------|-----------------------------------|
| 24 hours | >4                           | >4                           | >4                            | >4                                |
| 96 hours | >4                           | >4                           | >4                            | >4                                |

\* As tested by the JIS Z 2801 protocol.

**Evonik. Power to create.**



**CYROLITE® Protect acrylic-based multipolymer compound for antimicrobial applications – PRELIMINARY DATA**

| Parameter                         | Unit                       | ASTM-Standard         | CYROLITE® Protect<br>Typical Value |           |
|-----------------------------------|----------------------------|-----------------------|------------------------------------|-----------|
| <b>Mechanical Properties</b>      |                            |                       |                                    |           |
| Tensile Strength                  | psi [MPa]                  | D 638                 | 6,850 [47.2]                       |           |
| Tensile Modulus                   | x10 <sup>6</sup> psi [GPa] | D 638                 | 330 [2.3]                          |           |
| Tensile Elongation @ Yield        | %                          | D 638                 | 3.0                                |           |
| Tensile Elongation @ Break        | %                          | D 638                 | 8.0                                |           |
| Flexural Strength                 | psi [MPa]                  | D 790                 | 10,200 [70.3]                      |           |
| Flexural Modulus                  | x10 <sup>6</sup> psi [GPa] | D 790                 | 325 [2.2]                          |           |
| Notched Izod                      | ¼" bar @23°C               | ft-lb/in [J/m]        | D 256                              | 1.3 [69]  |
| Notched Izod                      | ¼" bar @0°C                | ft-lb/in [J/m]        | D 256                              | 1.0 [53]  |
| Rockwell Hardness                 | M Scale                    | D 785                 | 40                                 |           |
| <b>Thermal Properties</b>         |                            |                       |                                    |           |
| Vicat Softening Point             |                            | °F [°C]               | D 1525                             | 212 [100] |
| Deflection Temperature, Annealed  | 1.8 MPa, 0.250"            | °F [°C]               | D 648                              | 167 [75]  |
| Coeff. of Linear Therm. Expansion |                            | in/ in/°F<br>mm/mm/°C | D 696<br>D 696                     | -<br>-    |
| <b>Rheological Properties</b>     |                            |                       |                                    |           |
| Melt Flow Rate                    | 230°C & 5.0 kg             | g/10min               | D 1238                             | 10.0      |
| <b>Optical Properties</b>         |                            |                       |                                    |           |
|                                   | d = 3.2 mm                 |                       |                                    |           |
| Light Transmission                |                            | %                     | D 1003                             | 40.0      |
| Haze                              |                            | %                     | D 1003                             | 48.0      |
| Yellowness Index                  |                            |                       | E 313                              | 45.0      |
| <b>Other Properties</b>           |                            |                       |                                    |           |
| Specific Gravity                  |                            |                       | D 792                              | -         |
| Water Absorption                  |                            | % Max                 | D 570                              | 0.30      |
| Mold Shrinkage                    |                            | in/in, mm/mm          | D 955                              | -         |
| Bulk Density                      |                            | g/cc                  | D 1895                             | 0.54      |

All listed technical data are typical values intended for your guidance. They are given without obligation and do not constitute a materials specification.

CYROLITE® Protect polymer passed Class VI United States Pharmacopoeia tests for determining the suitability of a plastic material intended for use in fabricating containers or accessories thereto, for parenteral preparations.



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