Makrolon® Rx3440
for Better Performing IV Connectors

Introducing a new innovative material
to meet the demands of delivering life-enhancing medications.
Makrolon® Rx3440 is manufactured for improved performance of IV connectors

Improved medical Makrolon polycarbonate was developed with increased oncology drug resistance to address attacks from solvents and requires minimal validation and requalification.

The Impact of Cancer Treatment on Plastics

- Some chemotherapy drugs contain aggressive solvents—these solvents dissolve, or attack, almost all plastics
- Among the most aggressive solvents include Benzyl Alcohol and Dimethyl Acetamide
- Increased cancer treatment has led to an increase in chemically induced cracks in IV connectors

Did you Know?

Approximately 40% of men and women will be diagnosed with cancer in their lifetimes.

– National Cancer Institute

Best overall combination of physical properties

<table>
<thead>
<tr>
<th>Physical Property</th>
<th>Makrolon Rx3440</th>
<th>COC</th>
<th>TPU</th>
<th>Copolyester</th>
<th>PMMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modulus (MPa) provides structural integrity in thin walls</td>
<td>2400</td>
<td>2900</td>
<td>1900</td>
<td>1500</td>
<td>3000</td>
</tr>
<tr>
<td>Heat Resistance (VST, °C) allows dimensional stability in shipping and storage</td>
<td>150</td>
<td>130</td>
<td>100</td>
<td>110</td>
<td>100</td>
</tr>
<tr>
<td>Impact Resistance offers toughness to resist mishandling</td>
<td>Ductile</td>
<td>Brittle</td>
<td>Ductile</td>
<td>Ductile</td>
<td>Brittle</td>
</tr>
</tbody>
</table>

Table 1. Physical properties of Makrolon Rx3440 and competing materials

Superior physical properties provide reliable IV connections

- IV connectors rely on a tight fit over time to prevent leakage during use
- Competing plastics stress relax much more than polycarbonate and may loosen over time
- Stress relaxation in competitive transparent materials also worsens at elevated temperatures

Makrolon Rx3440 demonstrates the best retention of stress.

Figure 1. Torque resistance at 1 and 100 hours at 23°C

Adapted from M. Yeager, Accounting for Differences in Modulus and Stress Relaxation Behavior in Plastics Undergoing Chemical Resistance Testing, in press.
Build a competitive advantage into your design

Comprehensive lab testing has shown Makrolon® Rx3440 is best-in-class for chemical and oncology drug resistance.

**Novel Testing Apparatus Designed by Covestro**

To keep pace with a growing market and tougher real-life demands, Covestro continues to lead in innovation.

**Innovative Capabilities:**
- Enables immersion testing under real-world loading
- Adjustable force allows accelerated testing
- Capable of testing customers’ luer connectors

**Superior resistance to cracking under stress**

When compared against competing materials, Makrolon Rx3440 demonstrated the best resistance to oncology drug simulants and a common disinfectant.

<table>
<thead>
<tr>
<th>Solution</th>
<th>Makrolon Rx3440</th>
<th>Makrolon Rx1805</th>
<th>COC</th>
<th>Copolyester</th>
<th>PMMA</th>
<th>SAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isopropyl Alcohol (70% in water)</td>
<td>100%</td>
<td>88%</td>
<td>13%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Etoposide simulant (Benzy1 Alcohol)</td>
<td>94%</td>
<td>75%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Busulfex simulant (Dimethyl Acetamide + Polyethylene Glycol)</td>
<td>75%</td>
<td>63%</td>
<td>75%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Taxol simulant (Castor Oil + Isopropyl Alcohol)</td>
<td>75%</td>
<td>69%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 2. Percentage of luers which did not exhibit cracks after submersion in solution for 1hr while subjected to 35 lb of insertion force

**Makrolon Rx3440 offers superior durability, reliable IV connections, and oncology drug resistance demonstrating ongoing innovation in healthcare.**

Learn more about Makrolon Rx3440 at [www.MakrolonRx3440.com](http://www.MakrolonRx3440.com)
Contact your Covestro representative for tailor-made solutions.

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