Makrolon®



Makrolon® Rx3440

for Better Performing IV Connectors

Introducing a ***new innovative material*** to meet the demands of delivering life-enhancing medications.

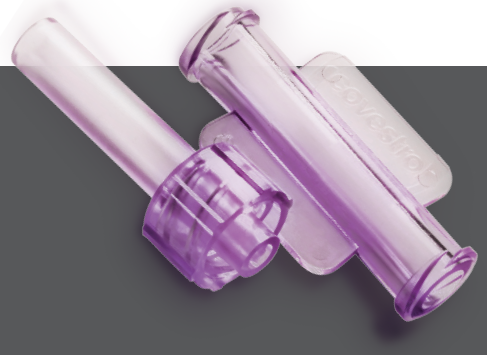
covestro

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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

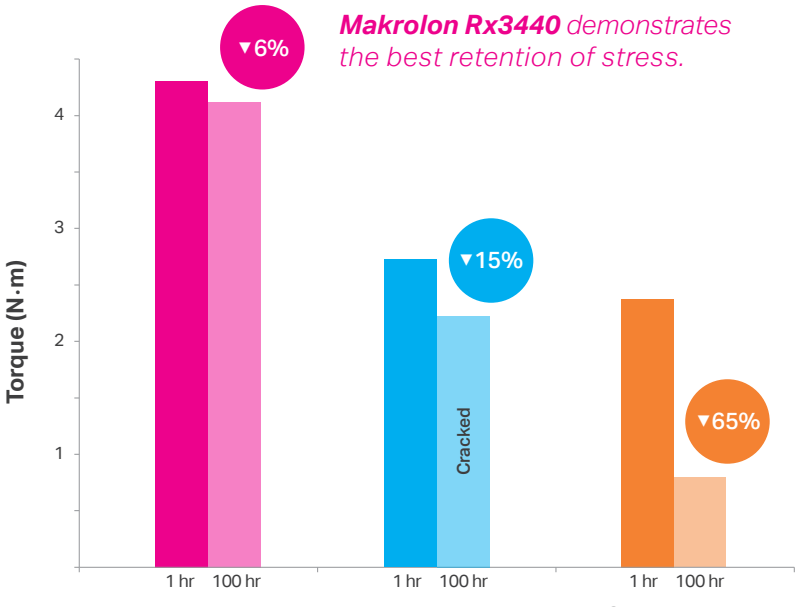
Best overall combination of physical properties

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

Table 1. Physical properties of Makrolon Rx3440 and competing materials

Superior physical properties provide reliable IV connections

Makrolon Rx3440 *demonstrates the best retention of stress.*



- 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

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

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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

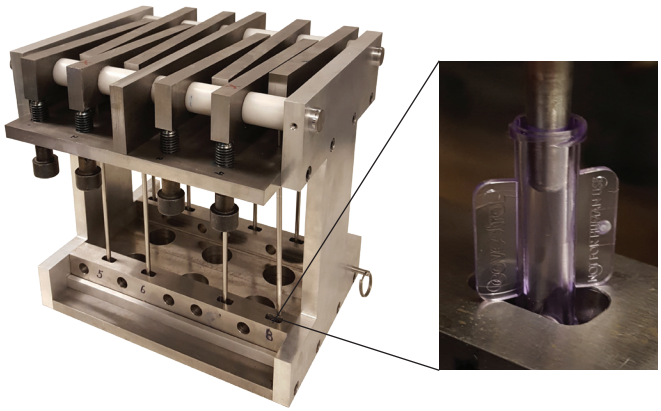
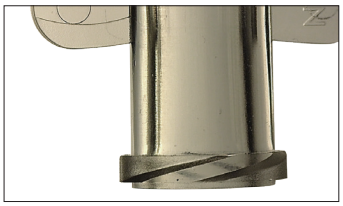


Figure 2. Novel apparatus for testing chemical resistance at a consistent force

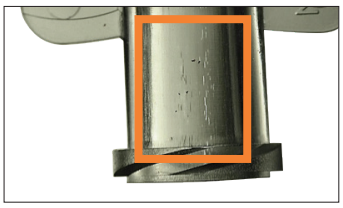
Superior resistance to cracking under stress

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

Solution	Makrolon Rx3440	Makrolon Rx1805	COC	Copolyester	PMMA	SAN
Isopropyl Alcohol (70% in water)	**100%**	88%	13%	0%	0%	0%
Etoposide simulant (Benzyl Alcohol)	**94%**	75%	0%	0%	0%	0%
Busulfex simulant (Dimethyl Acetamide + Polyethylene Glycol)	**75%**	63%	75%	0%	0%	0%
Taxol simulant (Castor Oil + Isopropyl Alcohol)	**75%**	69%	0%	0%	0%	0%



An uncracked luer



A cracked copolyester luer

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

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Contact your Covestro representative for tailor-made solutions.

The manner in which you use, and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of product evaluations), including any suggested formulations and recommendations, are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine, to your own satisfaction and requirements, whether our products, technical assistance and information are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoints. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale which are available upon request. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with any claim of any patent relative to any material or its use. No license is implied or in fact granted under the claims of any patent.

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