

# Raising the bar for infant-care-specific resins





# Take steps toward

## Baby steps

Eastman Tritan™ copolyester provides an important alternative to other clear polymers. It has transformed the way the industry thinks of clear polymers because of its unique balance of properties:

- BPA free (made without bisphenol A)
- Toughness
- Dishwasher durability
- Excellent clarity allows visual check for cleanliness
- Processability

Tritan offers a clear alternative to clarified polypropylene.

- Crystal clarity and gloss
- Excellent impact resistance frozen and at elevated temperatures
- Superior organoleptics; odor, taste, and stain resistant
- Easy printing and decorating
- Enhanced design flexibility
- Significantly tougher and stiffer



# satisfying consumer needs.

## Giant steps

Eastman Tritan™ EX401 and EX501 copolyesters address health and regulatory issues important to the infant care market. With these resins, Eastman has taken the first steps toward assessing the effects of products in contact with the body. Eastman introduced Tritan EX401 and EX501 to lead the industry toward establishing biocompatibility testing protocols for the infant care market.

Tritan EX401 and EX501 are included in Eastman's Customer Notification Procedure, which details our policy for customer notification when significant changes are made in Tritan EX401 and EX501 sold into the infant care market. This procedure provides the infant care industry an added layer of confidence in the consistent quality and performance of Tritan.

## Stepping up for you

Tritan EX401 and EX501 copolyesters are also proof of the commitment Eastman is making to this important and quality-conscious market segment.

- Injection stretch blow molding (ISBM) machines are well-suited for making high-performance baby bottles made of Tritan EX401 and EX501.
- Tritan EX401 and EX501 also offer the versatility of being suitable for extrusion blow molding (EBM) and injection molding (IM).
- Tritan EX401 and EX501 empower you to design and produce bottles, pacifiers, breast pumps, and other parts with the properties that are preferred in the marketplace and differentiate your products from the competition.



# Staying a **step ahead** in the m

## You take health seriously.

Consumers are concerned about the safety of anything contacting their food, and the marketplace has spoken loudly regarding consumer products containing BPA. The infant care industry continues to work to eliminate BPA from products, including bottles, pacifiers, and breast pumps, used worldwide by children three years old or less. Some countries and geographic regions have pending legislation to eliminate BPA from all food contact applications regardless of the age of the user.

Demonstrating safety should be a priority in the infant care market. When developing Eastman Tritan™ EX401 and EX501 copolyesters, the company sought standardized testing protocols that would inspire customer confidence in products that contact the body. Because no established testing protocol to assess such biocompatibility existed for the infant care market, Eastman took the initiative to establish such a protocol.

## Eastman takes biocompatibility testing to a new level.

Eastman worked with Toxikon Corporation, a life sciences company specializing in compliance studies for product safety, to create a testing protocol that assesses the suitability of a product for contact with the body. See the test descriptions and results in the inset box.

This testing is the first of its kind to be provided to manufacturers of infant care products. Eastman believes these protocols should be adopted by the industry so that manufacturers of infant care products (even manufacturers who do not use Eastman Tritan™ EX401 and EX501) can provide the same high level of confidence to their customers.



# marketplace



## A studied approach to consumer confidence

Eastman has developed a protocol to evaluate the biocompatibility of materials intended for infant care applications based on steam sterilization. The following is a brief description of the testing, including the results achieved by Tritan EX401 and EX501. For additional information, visit us at [eastman.com/tritan](http://eastman.com/tritan).

### Cytotoxicity\*

An agar diffusion test was conducted to evaluate the potential biological reactivity of mammalian cells in vitro. Mammalian cells were selected for this test because of their sensitivity to leachable cytotoxic substances. **Results:** There was no biological reactivity observed at 48 hours postexposure. Under accepted guidelines, these results indicate that Tritan EX401 and EX501 are noncytotoxic.

### Sensitization reactions\*

A direct-contact Buehler sensitization test was conducted to evaluate the potential to produce skin sensitization in mammalian tissue in vivo. Topical application was selected because it represents a likely route of human exposure for infant care products. **Results:** No skin reactions or overt signs of toxicity were detected. Tritan EX401 and EX501 are not considered skin sensitizers.

### Skin irritation responses\*

A primary skin irritation test was conducted to evaluate the potential to produce primary dermal irritation after a single topical exposure. Dermal exposure was selected because it represents a likely route of human exposure for infant care products. **Results:** There were no signs of erythema (redness) or edema (swelling) at any point during the observation period. Tritan EX401 and EX501 are considered negligible irritants.

For more information on the safety of Tritan copolyester, visit [TritanSafe.com](http://TritanSafe.com).

\*All studies conducted in compliance with the current FDA 21 CFR, Part 58—Good Laboratory Practice for Non-Clinical Laboratory Studies.

# Staying in step with **your requirements and market**

## Topping the BPA-free options for infant care

Specifying Eastman Tritan™ EX401 and EX501 copolyesters also provides the flexibility of conversion techniques and the reassurance of a unique biocompatibility assessment. (See the table for a comparison of properties.)

## They grow so fast when they're young!

Although Tritan was only introduced to the infant care market in late 2008, it has displaced polycarbonate in a wide range of applications. Tritan EX401 and EX501 create even greater value for products that must be sensitive to the rapidly growing concerns of regulation and consumer confidence.



# preferences

Property comparison of infant care materials for bottles

Property	Eastman Tritan™ EX401 copolyester	Eastman Tritan™ EX501 copolyester	PES (polyethersulfone)	cPP (clarified polypropylene)	Transparent polyamide (tPA)	Glass	PC (polycarbonate)
BPA	✗	✗	✗	✗	✗	✗	✓
Infant care specific	✓	✓	✓	✓	✗	✓	✓
Clarity	●	●	◐	◑	◐	●	●
Color	●	●	○	◐	◐	●	●
Toughness (impact/shatter resistant)	●	●	◐	◐	○	Shatter risk	●
Dishwasher durability	●	●	◑	◑	◑	●	◑
Processability/efficiency	Good process window	Good process window	Good process window	Good process window	Fair process window	N/A	Good process window
Cost <sup>a</sup>	\$\$	\$\$	\$\$\$	\$	\$\$\$\$	\$\$\$	\$\$
Weight <sup>b</sup>	🔒🔒	🔒🔒	🔒🔒	🔒	🔒🔒	🔒🔒🔒🔒🔒	🔒🔒
Biocompatibility certification for infant care	✓	✓	N/A	N/A	N/A	N/A	N/A
Taste/odor	●	●	Not tested	◐	Not tested	●	●

✗ No   ✓ Yes   ● Excellent   ◐ Very good   ◑ Good   ◒ Fair   ○ Poor

<sup>a</sup>Taking into account not only material cost but also total weight (minimum thickness) and cycle time.

<sup>b</sup>Taking into account not only density but also total weight (minimum thickness).

For more information about how these exciting infant-care-specific resins can add value to your products, visit [eastman.com/tritan](http://eastman.com/tritan) or call **1-888-321-1021**.



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