EASTMAN

Technical Data Sheet

Eastman Tritan™ Copolyester EX501

Applications

- Baby bottles/sippy cups
- Childcare items
- Infant/toddler

Key Attributes

- Dishwasher durability: Chemical resistance; Heat resistance; Hydrolytic stability
- Drop impact resistance
- Glass-like clarity
- Global food contact regulatory clearances
- Low taste and odor retention
- Stain resistance
- Sterilization capable via microwave steaming and boiling water immersion

Product Description

Tritan™ EX501 is an amorphous copolyester specifically developed for the Infant Care market. Its most outstanding features are consistent glass-like clarity even after multiple dishwasher cycles. Additionally, Tritan™ EX501 exhibits low taste and odor retention versus cPP, excellent drop impact resistance, and dishwasher durability. Tritan™ EX501 contains a mold release derived from vegetable based sources. Tritan™ EX501 meets infant care sterilization requirements via boiling water or microwave steam sterilization. This new-generation copolyester can also be molded into various applications without incorporating high levels of residual stress. Combined with Tritan™ copolyester's outstanding chemical resistance and hydrolytic stability, these features give molded products enhanced durability in the dishwasher environment, which can expose products to high heat, humidity, and aggressive cleaning agents.

Tritan™ EX501 can be converted into parts using injection molding, injection stretch blow molding (ISBM), and extrusion blow molding techniques.

Tritan™ EX501 copolyester may be used in repeated-use food contact articles under United States Food and Drug Administration (FDA) regulations. Contact an Eastman representative for details on global food contact regulatory clearances.

Eastman Tritan™ EX501 copolyester is included in Eastman Chemical Company’s Customer Notification Procedure which details our policy for customer notification when significant changes are made in Tritan™ 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.

Typical Properties

Property[a]	Test Method[b]	Typical Value, Units[c]
General Properties		
Specific Gravity	D 792	1.18
Mold Shrinkage	D 955	0.005-0.007 mm/mm
ISBM Bottle Properties		
Fill Volume Shrinkage - Boiling, 1 hr[d]	EMN	1.9 %
Fill Volume Shrinkage - Boiling, 2 hr[d]	EMN	2.3 %
Fill Volume Shrinkage - Dishwasher (50 cycles, 75°C, Residential)[d]	EMN	0 %
Microwave Steam Sterilization (Total Energy=Wattage*Minutes)[d]	EMN	No bubbling
Microwave Boiling (Oven Power	EMN	No bubbling

100%)[d]		
Drop Impact after 20 cycles Regular Steam Sterilization[e]	EMN	No crazes/no impact failures
Mechanical Properties (ISO Method)		
Tensile Strength @ Yield	ISO 527	44 MPa
Tensile Strength @ Break	ISO 527	55 MPa
Elongation @ Yield	ISO 527	6 %
Elongation @ Break	ISO 527	151 %
Tensile Modulus	ISO 527	1538 MPa
Izod Impact Strength, Notched		
@ 23°C	ISO 180	114 kJ/m²
@ -40°C	ISO 180	14 kJ/m²
Mechanical Properties		
Tensile Stress @ Yield	D 638	45 MPa
Tensile Stress @ Break	D 638	56 MPa
Elongation @ Yield	D 638	6 %
Elongation @ Break	D 638	176 %
Tensile Modulus	D 638	1516 MPa
Flexural Yield Strength	D 790	72 MPa
Rockwell Hardness, R Scale	D 785	109
Izod Impact Strength, Notched		
@ 23°C (73°F)	D 256	1024 J/m
@ -40°C (-40°F)	D 256	136 J/m
Impact Strength, Unnotched		
@ 23°C (73°F)	D 4812	NB
@ -40°C (-40°F)	D 4812	NB
Impact Resistance (Puncture), Energy @ Max. Load		
@ 23°C (73°F)	D 3763	57 J
@ -40°C (-40°F)	D 3763	66 J
Optical Properties		
Total Transmittance	D 1003	91 %
Haze	D 1003	<1 %
Haze after re-equilibration (8-hr boiling)		6 %
Thermal Properties		
Deflection Temperature		
@ 0.455 MPa (66 psi)	D 648	101 °C
@ 1.82 MPa (264 psi)	D 648	88 °C
Typical Drying Conditions		
Drying Temperature		88 °C (190 °F)
Drying Time		4-6 hrs
Dewpoint		< -35 °C (< -30 °F)
Typical Processing Conditions - Injection Molding		
Processing Melt Temperature		260-282 °C (500-540 °F)
Mold Temperature		38-66 °C (100-150 °F)
Typical Processing Conditions - Injection Stretch Blow Molding (ISBM)		
Processing Melt Temperature		270-285 °C (520-545 °F)
Injection Mold Temperature		60-70 °C (140-160 °F)
Preform Temperature at Blow		185-195 °C (365-385 °F)
Primary Blow Pressure		0.03-0.08 MPa (4-12 psi)
Secondary Blow Pressure		0.2-0.3 MPa (25-40 psi)
Blow Mold Temperature		80-90 °C (175-195 °F)
Residual Stress Under Polarized Light, Fringe Count		<= 3

[a] *Unless noted otherwise, all tests are run at 23°C (73°F) and 50% relative humidity.*

[b] *Unless noted otherwise, the test method is ASTM.*

[c] *Units are in SI or US customary units.*

[d] *Applies to the stretch blow molded portion only (not the injection molded preform). Properties are typical of bottles made with proper processing to minimize residual stress.*

[e] *Bottle filled with cold water, two drops of milk added to steamer water, steam sterilized 20 cycles, then drop tested.*

Comments

Properties reported here are based on limited testing. Eastman makes no representation that the material in any particular shipment will conform exactly to the values given.
