Product Data Sheet

Eastar™ Copolyester DN004, Natural

Application/Uses

- Appliances
- Blood Contact
- Cosmetics/personal care packaging
- Drug Delivery
- Floor care
- Frames
- IV Components
- Medical
- Ophthalmics
- Plastics for hygiene feminine products
- Refrigerator interior components
- Stationery supplies
- Suction & Drainage
- Surgical Instruments
- Toothbrushes
- Toys/Sporting goods
- Writing instruments

Key Attributes

- Chemical resistance to most medical solvents including lipids and IPA
- Gamma and E-beam color stability

Product Description

Eastar™ Copolyester DN004 has been tested for FDA/ISO 10993 and USP Class VI Biological Evaluation testing after Gamma and EtO sterilization. Eastar™ copolyesters are brilliantly clear polymers that have excellent impact strength, chemical resistance, dimensional stability, and low shrinkage rates. DN004 contains a mold release.

This product has been GREENGUARD INDOOR AIR QUALITY CERTIFIED®.
The GREENGUARD INDOOR AIR QUALITY CERTIFIED® Mark is a registered certification mark used under license through the GREENGUARD Environmental Institute (GEI). GEI is an industry-independent, non-profit organization that oversees the GREENGUARD Certification Program. The GREENGUARD Certification Program is an industry independent, third-party testing program for low-emitting products and materials for indoor environments. For more information about GEI and to obtain printable certificates for Eastman™ Copolyesters, visit www.greenguard.org. Choose Eastman Chemical Company under the Manufacturer category and click search to display a list of our products.

Typical Properties

Property[a]	Test[b] Method	Typical Value, Units[c]
Specific Gravity	D 792	1.23
Water Absorption, 24 h immersion		
	D 570	0.13%
	ISO 62	0.13%

Mold Shrinkage Parallel to Flow, 3.2-mm (0.125-in.) thickness	D 955	0.002-0.005 mm/mm (0.002-0.005 in./in.)
Density	ISO 1183	1.23 g/cm^3
Mechanical Properties		
Tensile Stress @ Yield		
	D 638	45 MPa (6500 psi)
	ISO 527	46 MPa
Tensile Stress @ Break		
	D 638	52 MPa (7600 psi)
	ISO 527	47 MPa
Elongation @ Yield		
	D 638	5%
	ISO 527	4.4%
Elongation @ Break		
	D 638	330%
	ISO 527	230%
Tensile Modulus	D 638	1800 MPa (2.6 x 10^5 psi)
Flexural Modulus		
	D 790	1800 MPa (2.6 x 10^5 psi)
	ISO 178	1800 MPa
Flexural Yield Strength		
	D 790	66 MPa (9600 psi)
	ISO 178	63 MPa
Rockwell Hardness, R Scale	D 785	105
Izod Impact Strength, Notched		
@ 23°C (73°F)	D 256	NB
@ -40°C (-40°F)	D 256	64 J/m (1.2 ft·lbf/in.)
@ 23°C	ISO 180	125 kJ/m^2
@ -40°C	ISO 180	7.4 kJ/m^2
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)	ISO 6603-2	14 J
@ -40°C (-40°F)	ISO 6603-2	16 J
Thermal Properties		
Deflection Temperature		
@ 0.455 MPa (66 psi)	D 648	74°C (165°F)
@ 1.82 MPa (264 psi)	D 648	64°C (147°F)
@ 0.45 MPa	ISO 75	74°C

@ 1.80 MPa	ISO 75	65°C
Vicat Softening Temperature		
@ 1 kg load	D 1525	88°C (190°F)
@ 1 kg load	ISO 306	88°C
@ 5 kg load	ISO 306	79°C
Thermal Conductivity	C 177	0.19 W/m·K (1.3 Btu·in./h·ft^2·°F)
Specific Heat		
@ 60°C (140°F)	DSC	1.34 kJ/kg·K (0.32 Btu/lb·°F)
@ 240°C (464°F)	DSC	2.05 kJ/kg·K (0.49 Btu/lb·°F)
UL Flammability Classification		
3.2 mm (0.125 in.) specimen	UL 94	94HB
1.6 mm (0.0625 in.) specimen	UL 94	94HB
Electrical Properties		
Dielectric Constant		
1 kHz	D 150	2.9
1 MHz	D 150	2.8
Dissipation Factor		
1 kHz	D 150	0.003
1 MHz	D 150	0.013
Arc Resistance	D 495	138 sec
Volume Resistivity	D 257	10^{15} ohm·cm
Surface Resistivity	D 257	10^{16} ohms/square
Dielectric Strength, Short Time, 500 V/sec rate-of-rise	D 149	16.3 kV/mm (415 V/mil)
High Voltage Arc Tracking Rate	UL 746A	0 mm/min (0 in./min)
Comparative Tracking Index	D 3638	>600 V
Optical Properties		
Haze	D 1003	<1.0%
Regular Transmittance	D 1003	87%
Total Transmittance	D 1003	89%
Typical Processing Conditions		
Drying Temperature		71°C (160°F)
Drying Time		6 hrs
Processing Melt Temperature		250-270°C (480-520°F)
Mold Temperature		15-40°C (60-100°F)

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.*

General
All ISO tests are run @ 4-mm thickness with the exception of Impact Resistance, which is run @ 2-mm thickness.

Comments
Properties reported here are typical of average lots. Eastman makes no representation that the material in any particular shipment will conform to the values given.

Eastman Medical Disclaimer
It is the responsibility of the medical device manufacturer ("Manufacturer") to determine the suitability of all component parts and raw materials, including any Eastman product, used in its final product in order to ensure safety and compliance with requirements of the United States Food and Drug Administration (FDA) or other international regulatory agencies.

Eastman Chemical Company products have not been designed for nor are they promoted for end uses that would be categorized by either the United States FDA or by the International Standards Organization (ISO) as implant devices. Eastman products are not intended for use in the following applications: (1) in any bodily implant applications for greater than 30 days, based on FDA-Modified ISO-10993, Part 1 "Biological Evaluation of Medical Devices" tests (including any cosmetic, reconstructive or reproductive implant applications); (2) in any cardiac prosthetic device application, regardless of the length of time involved, including, without limitation, pacemaker leads and devices, artificial hearts, heart valves, intra-aortic balloons and control systems, and ventricular bypass assisted devices, or (3) as any critical component in any medical device that supports or sustains human life.

Eastman Chemical Company products offered for the medical market have met selected FDA-Modified ISO-10993, Part 1 "Biological Evaluation of Medical Devices" tests with human tissue contact time of 30 days or less. The tests include: cytotoxicity, sensitization, irritation or intracutaneous reactivity, systemic toxicity (acute), subchronic toxicity (sub-acute), implantation, hemocompatibility. The Manufacturer is responsible for the biological evaluation of the finished medical device.

The suitability of an Eastman Product in a given end-use environment is dependent upon various conditions including, without limitation, chemical compatibility, temperature, part design, sterilization method, residual stresses, and external loads. It is the responsibility of the Manufacturer to evaluate its final product under actual end-use requirements and to adequately advise and warn purchasers and users thereof.

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