

Product Data Sheet

Eastman™ Copolyester 1223

Application/Uses

- Blown film
- Credit cards
- Debit cards
- Deodorant packaging
- Electronic packaging
- Fabricated Boxes
- Flexible packaging
- Food packaging
- Furniture/Furniture trim
- Gaming cards
- Gift cards
- Identification cards
- Laminating
- Phone cards
- Plastic Cards
- Shrink film
- Signs
- Smart cards
- Toys/Sporting goods
- Writing instruments

Key Attributes

- Easy primary & secondary operations
- Excellent clarity
- Excellent toughness
- Gamma, ebeam, ETO sterilization stable

Product Description

Eastman™ copolyester 1223 is a clear, amorphous material. Because of its clarity, toughness and good melt strength at processing temperatures, it is useful in a variety of processing techniques including film and sheet extrusion. Eastman™ Copolyester 1223 may be colored using color concentrates, dry colors or liquid colorants.

Typical Properties

Property ^a	Test ^b Method	Typical Value, Units ^c
Film Properties		
Thickness of Film Tested	D 374	250 microns (10 mils)
Density	D 1505	1.27 g/cm ³
Haze	D 1003	0.8%
Gloss @ 45°	D 2457	108
Transparency	D 1746	85%
Regular Transmittance	D 1003 Modified	89%

Total Transmittance	D 1003 Modified	91%
Water Vapor Transmission Rate ^d	F 1249	7 g/m ² ·24h (0.5 g/100in. ² ·24h)
Gas Permeability, CO ₂	D 1434	49 cm ³ ·mm/m ² ·24h·atm (125 cm ³ ·mil/100in. ² ·24h·atm)
Gas Permeability, O ₂	D 3985	10 cm ³ ·mm/m ² ·24h·atm (25 cm ³ ·mil/100in. ² ·24h·atm)
Elmendorf Tear Resistance		
M.D.	D 1922	13.7 N (1400 gf)
T.D.	D 1922	16.7 N (1700 gf)
PPT Tear Resistance		
M.D.	D 2582	93 N (21 lbf)
T.D.	D 2582	93 N (21 lbf)
Tear Propagation Resistance, Split Tear Method		
@ 254 mm/min (10 in./min) M.D.	D 1938	36 N/mm (205 lbf/in.)
@ 254 mm/min (10 in./min) T.D.	D 1938	36 N/mm (205 lbf/in.)
Tear Resistance, Trouser @ 200 mm/min		
M.D.	ISO 6383-1	36 N/mm (205 lbf/in.)
T.D.	ISO 6383-1	36 N/mm (205 lbf/in.)
Tensile Strength @ Yield		
M.D.	D 882	52 MPa (7500 psi)
T.D.	D 882	52 MPa (7500 psi)
Tensile Strength @ Break		
M.D.	D 882	59 MPa (8600 psi)
T.D.	D 882	55 MPa (8000 psi)
Elongation @ Yield		
M.D.	D 882	4%
T.D.	D 882	4%
Elongation @ Break		
M.D.	D 882	400%
T.D.	D 882	400%
Tensile Modulus		
M.D.	D 882	1900 MPa (2.8 x 10 ⁵ psi)
T.D.	D 882	1900 MPa (2.8 x 10 ⁵ psi)
Dart Impact ^e		
@ 23°C (73°F)	D 1709A Modified	400 g
@ -18°C (0°F)	D 1709A Modified	500 g

Mechanical Properties (Injection Molded), ASTM Method

Specific Gravity	D 792	1.27
Water Absorption, 24 h immersion	D 570	0.13%
Tensile Stress @ Break	D 638	28 MPa (4100 psi)
Tensile Stress @ Yield	D 638	50 MPa (7300 psi)
Elongation @ Break	D 638	130%
Tensile Modulus	D 638	2100 MPa (3.0×10^5 psi)
Flexural Modulus	D 790	2100 MPa (3.0×10^5 psi)
Flexural Yield Strength	D 790	70 MPa (10200 psi)
Rockwell Hardness, R Scale	D 785	106
Izod Impact Strength, Notched		
@ 23°C (73°F)	D 256	101 J/m (1.9 ft·lbf/in.)
@ -40°C (-40°F)	D 256	37 J/m (0.7 ft·lbf/in.)
Impact Strength, Unnotched ^f		
@ 23°C (73°F)	D 4812	NB
@ -20°C (-4°F)	D 4812	NB
@ -30°C (-22°F)	D 4812	NB
@ -40°C (-40°F)	D 4812	NB
Impact Resistance (Puncture), Energy @ Max. Load		
2.5-mm (0.100-in.) Thick Plaques, @ 23°C (73°F)	D 3763	28 J (21 ft·lbf)
2.5-mm (0.100-in.) Thick Plaques, @ -40°C (-40°F)	D 3763	41 J (30 ft·lbf)
3.2-mm (0.125-in.) Thick Plaques @ 23°C (73°F)	D 3763	33 J (24 ft·lbf)
3.2-mm (0.125-in.) Thick Plaques @ -40°C (-40°F)	D 3763	50 J (37 ft·lbf)

Mechanical Properties (Injection Molded), ISO Method

Density	ISO 1183, Method D	1.27 g/cm ³
Water Absorption, 24 h immersion	ISO 62	0.13%
Tensile Stress @ Break	ISO 527	28 MPa
Tensile Stress @ Yield	ISO 527	50 MPa
Elongation @ Break	ISO 527	100%
Tensile Modulus	ISO 527	2100 MPa
Flexural Modulus	ISO 178	2000 MPa
Flexural Yield Strength	ISO 178	68 MPa
Rockwell Hardness, R Scale	ISO 2039-2	109
Izod Impact Strength, Notched, Type 1 Specimen, Type A Notch		
@ 23°C	ISO 180	6.2 kJ/m ²
@ -40°C	ISO 180	4.2 kJ/m ²
Impact Strength, Unnotched, Type 1 Specimen ^g		
@ 23°C	ISO 180	NB kJ/m ²

@ -20°C	ISO 180	NB kJ/m ²
@ -30°C	ISO 180	NB kJ/m ²
@ -40°C	ISO 180	NB kJ/m ²
Impact Resistance (Puncture), Energy @ Max. Load ^h		
2.5-mm Thick Plaques @ 23°C	ISO 6603-2	40 J
2.5-mm Thick Plaques @ -40°C	ISO 6603-2	35 J
3.2-mm Thick Plaques @ 23°C	ISO 6603-2	44 J
3.2-mm Thick Plaques @ -40°C	ISO 6603-2	36 J

Thermal Properties

Deflection Temperature		
@ 0.455 MPa (66 psi)	D 648	70°C (158°F)
@ 1.82 MPa (264 psi)	D 648	64°C (147°F)
Vicat Softening Temperature		
	D 1525	85°C (185°F)
Thermal Conductivity		
	C 177	0.21 W/m·K (1.5 Btu·in./h·ft ² ·°F)
Glass Transition Temperature (T_g)		
	DSC	80°C (176°F)
Specific Heat		
@ 60°C (140°F)	DSC	1.30 kJ/kg·K (0.31 Btu/lb·°F)
@ 100°C (212°F)	DSC	1.76 kJ/kg·K (0.42 Btu/lb·°F)
@ 150°C (302°F)	DSC	1.88 kJ/kg·K (0.45 Btu/lb·°F)
@ 200°C (392°F)	DSC	1.97 kJ/kg·K (0.47 Btu/lb·°F)
@ 250°C (482°F)	DSC	2.05 kJ/kg·K (0.49 Btu/lb·°F)
Coefficient of Linear Thermal Expansion ⁱ		
	D 696	5.1 x 10 ⁻⁵ /°C (mm/mm·°C) (2.8 x 10 ⁻⁵ /°F (in./in·°F))

Electrical Properties

Dielectric Constant		
1 kHz	D 150	2.6
1 MHz	D 150	2.4
Dissipation Factor		
1 kHz	D 150	0.005
1 MHz	D 150	0.02
Arc Resistance		
	D 495	158 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 kV/mm (410 V/mil)

^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 Test conducted at 38°C (100°F) and 100% relative humidity.

^e 12.7 mm (0.5 in.) dia. head, 127 mm (5 in.) dia. clamp, 660 mm (26 in.) drop

^f Nonbreak as defined by ASTM D 4812 with 3.2-mm specimens.

g Nonbreak as defined by ISO 180 with 4-mm specimens.

h Testing based on ISO 6603-2 using a striker diameter of 20 mm, a support and clamp diameter of 40 mm, and a velocity of 4.1 m/s.

i -30°C to 40°C (-22°F to 104°F)

Comments

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

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