EASTMAN

Technical Data Sheet

Eastman Embrace™ LV Copolyester

Chemical Synonym

Copolyester

Applications

- Decorative laminates-cabinetry
- Decorative laminates-wood
- Home, garden & automotive packaging
- Labels non food contact
- Multi-layer film non food contact
- Shrink film food contact
- Shrink film non food contact

Key Attributes

- Customizable shrink curve
- Eye-catching 360° graphic capability
- Greater than 75% ultimate shrinkage
- Low shrink force
- Optimal machine direction growth
- Shrinks to fit contour bottles
- Sparkling clarity and high gloss
- Super-high print definition

Product Description

The world's leading shrink film just got better with the introduction of Eastman Embrace™ LV to the Eastman Embrace™ family of resins. LV stands for LOW shrink force and VERSATILE shrink curve. Living up to its name, it demonstrates its versatility with its ability to be produced with 40 to 50% reduction in shrink force, compared with other polyester shrink films and with a shrink curve that is similar to both PVC and OPS while still maintaining ultimate shrinkage greater than 75%. This versatility is achieved by making changes to the extruders manufacturing process. Eastman Embrace™ LV emulates all visually satisfying attributes expected from the current Eastman Embrace™ such as high gloss and clarity.

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 . Choose Eastman Chemical Company under the Manufacturer category and click search to display a list of our products.

This product has been *CRADLE TO CRADLE CERTIFIED*™ Bronze, with Material Health Certificate, Platinum.
The *CRADLE TO CRADLE CERTIFIED* mark is a registered certification mark used under license through the Cradle to Cradle Products Innovation Institute, a nonprofit organization that administers the publicly available *Cradle to Cradle Certified*™ Product Standard which provides designers and manufacturers with criteria and requirements for continually improving product materials and manufacturing processes. The *Cradle to Cradle Certified*™ Product Standard guides designers and manufacturers through a continual improvement process that looks at a product through five quality categories—material health, material reutilization, renewable energy and carbon management, water stewardship, and social fairness. A product receives an achievement level in each category—Basic, Bronze, Silver, Gold, or Platinum—with the lowest achievement level representing the product's overall mark.

The Material Health Certificate provides manufacturers with a trusted way to communicate their efforts to identify and replace chemicals of concern in their products. For more information about Cradle to Cradle certification and to obtain printable certificates for Eastman copolyesters, visit . Search for Eastman Chemical Company in *Cradle to Cradle Certified* Products Registry.

Typical Properties

Property[a]	Test Method[b]	Typical Value, Units[c]
Film Properties (Extruded/Cast Film)		
Inherent Viscosity	EMN-A-AC-G-V-1	0.70

Thickness of Film Tested		250 Microns (10 mils)
Density	D 1505	1.30 g/cm^3
Haze	D 1003	1.4 %
Gloss		
@ 60°	D 2457	161
Transparency	D 1746	99 %
Regular Transmittance	D 1003	89 %
Total Transmittance	D 1003	92 %
Water Vapor Transmission Rate[d]	F 1249	6.7 g/m^2·24h (0.43 g/100in.^{2}·24h)
Gas Permeability, O_2		
@ 30°C (86°F), 68% RH	D 3985	7.4 cm^3·mm/m^2·24h·atm (18.9 cm^3·mil/100in.^{2}·24h·atm)
Elmendorf Tear Resistance		
M.D.	D 1922	6.9 N (704 gf)
T.D.	D 1922	8.5 N (864 gf)
PPT Tear Resistance		
M.D.	D 2582	47 N (11 lbf)
T.D.	D 2582	62 N (14 lbf)
Tear Propagation Resistance, Split Tear Method		
@ 254 mm/min (10 in./min)	D 1938	34 N/mm (192 lbf/in.)
M.D.		
@ 254 mm/min (10 in./min) T.D.	D 1938	37 N/mm (210 lbf/in.)
Tensile Strength @ Break		
M.D.	D 882	51 MPa (7400 psi)
T.D.	D 882	50 MPa (7300 psi)
Elongation @ Break		
M.D.	D 882	4 %
T.D.	D 882	4 %
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)
Vicat Softening Temperature	D 1525	69 °C (156 °F)
Glass Transition Temperature (T_g)	D 1525	69 °C (159 °F)
Film Properties (Stretched Film)		
Inherent Viscosity	EMN-A-AC-G-V-1	0.70
Thickness of Film Tested		50 Microns (2 mils)
Density	D 1505	1.30 g/cm^3
Ultimate Shrinkage[e]		
@ 90°C		78 %
Haze	D 1003	3.8 %
Gloss		
@ 60°	D 2457	110
Transparency	D 1746	98 %
Regular Transmittance	D 1003	87 %
Total Transmittance	D 1003	92 %
Color		
a*	D 2244	0.02
b*	D 2244	0.38
L*	D 2244	95.8
Water Vapor Transmission Rate[d]	F 1249	25 g/m^2·24h (1.6 g/100in.^{2}·24h)
Gas Permeability, O_2		
@ 30°C (86°F), 68% RH	D 3985	3.9 cm^3·mm/m^2·24h·atm (9.9 cm^3·mil/100in.^{2}·24h·atm)
Elmendorf Tear Resistance		
M.D.	D 1922	2.4 N (242 gf)

Tear Propagation Resistance, Split Tear Method		
@ 254 mm/min (10 in./min)	D 1938	28 N/mm (160 lbf/in.)
M.D.		
@ 254 mm/min (10 in./min) T.D.	D 1938	3 N/mm (16 lbf/in.)
Tensile Strength @ Yield		
M.D.	D 882	43 MPa (6200 psi)
T.D.	D 882	105 MPa (15200 psi)
Elongation @ Yield		
M.D.	D 882	3 %
T.D.	D 882	4 %
Tensile Strength @ Break		
M.D.	D 882	49 MPa (7100 psi)
T.D.	D 882	258 MPa (37400 psi)
Elongation @ Break		
M.D.	D 882	480 %
T.D.	D 882	42 %
Tensile Modulus		
M.D.	D 882	2000 MPa (2.9 x 10^5 psi)
T.D.	D 882	5300 MPa (7.7 x 10^5 psi)
Vicat Softening Temperature	D 1525	69 °C (156 °F)
Glass Transition Temperature (T_g)	D 1525	69 °C (159 °F)
Surface Tension, Harmonic Mean		
Dispersive		44 dynes/cm
Polar		3 dynes/cm
Total		48 dynes/cm

[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]*For films with a stretch ratio of 5x and normal conditions for EMBRACE.*

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.

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