



Biodegradable Polymers

Product Information

Version 1.0

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ecovio[®] F Blend C2224

Biodegradable polyester for compostable film
containing 45% of renewable resources

[®] = ecovio and ecoflex are registered trademarks of BASF SE; NatureWorks is a registered trademark of NatureWorks LLC;
Lupolen is a registered trademark of Lyondell Basell group companies.

Product description

ecovio[®] F Blend C2224 is our biodegradable film product containing renewable resources. It is basically a compound of our biodegradable copolyester ecoflex[®] F Blend and polylactic acid (PLA, NatureWorks[®]). Because of the PLA content ecovio[®] F Blend C2224 consists of 45 % of renewable resources. ecoflex[®] F Blend is the coherent phase in the structure of ecovio[®] F Blend C2224 transferring the beneficial film properties of ecoflex[®] F Blend into the new film product.

 **BASF**
The Chemical Company

Our new ecovio® F Blend C2224 exhibits the following properties compared to PE-LD:

- Translucent, semi-crystalline structure with DSC melting point in two ranges: 140-155°C (PLA) and 110-120°C (ecoflex® F Blend)
- High strength, stiffness and failure energy (dart drop)
- High, but controllable water vapour transmission rate (WVTR)
- High melt strength: MVR (190°C, 2.16 kg): < 2.5 ml/10 min
MVR (190°C, 5 kg): < 6.5 ml/10 min
- Good thermostability up to 230°C
- Good processability on conventional blown film lines, e.g., for PE-LD, PE-MD
- Down gaging to 10 µm possible, typical thicknesses: 20 - 120 µm
- Weldable and printable in 8 colours by flexo printing

ecovio® F Blend C2224 exhibits an excellent compatibility to other biodegradable polymers e.g. in dry blends with ecoflex® F Blend, PLA or aliphatic biodegradable polyesters (e.g. Polycaprolactone PCL, Polybutylenesuccinate PBS or Polyhydroxyalkanoates PHA), if their MVR is close to the MVR of ecovio® F Blend C2224. Because of the moisture sensitivity of PLA at melt temperatures in the order of 170 - 180°C we have to assure a maximum moisture content of below 1000 ppm prior to film blowing.

The processing of ecovio® F Blend C2224 on extrusion lines depends on the formulation, the extrusion technology and processing conditions. Trials are always recommended to assess the quality of the final product. ecoflex® masterbatches have to be used as required to tailor the slip and antibloc properties of the final product as well as the barrier to water vapour. Detailed information concerning our ecoflex® masterbatches will be sent upon request.

ecovio® F Blend C2224 fulfils the requirements of the European standard DIN EN 13432 for compostable and biodegradable polymers, because it can be degraded by micro-organisms. The biodegradation process in soil depends on the specific environment (climate, soil quality, population of micro-organisms).

ecovio® F Blend C2224 is one of the few biodegradable plastics, which complies in its composition with the European food stuff legislation for food contact, EU Directive 2002/72/EC (as amended) and US food contact notification for the main components: e.g. FCN 178, 475 and 907. Specific limitations and more details are given on request. The converter or packer has to check the suitability of the article for the application.

Form supplied and storage

ecovio® F Blend C2224 is supplied as pearl- or cylinder-shaped pellets in 1t big bags. Temperatures during transportation and storage may not exceed 70°C at any time. Storage time in an unopened bag may not surpass 12 month at room temperature (23°C).

Quality Control

ecovio® F Blend C2224 is produced as a standard material in a continuous production process according to DIN EN ISO 9001:2000. The melt volume rate, MVR, at 190°C, 5 kg, according to ISO 1133 has been defined as specified parameter for quality control. A certificate of the MVR value can be provided with each lot number (5t) upon request. Other data given in our literature are typical values, which are not part of our product specification for ecovio® F Blend C2224.

Applications

ecovio® F Blend C2224 has been developed for the conversion to flexible films using a blown film process. Typical applications are packaging films, hygienic films, carrier bags and compost bags. In view of numerous factors influencing functionality and shelf life of ecovio® films and finished articles made thereof the production parameters have to be tested by the converters before utilisation. Additionally sufficient field tests are required to ensure the right functionality of the articles made from ecovio® F Blend C2224.

We supply technical service information concerning the blown film process with ecovio® F Blend C2224 on demand.

Typical basic material properties of ecovio® F Blend C2224

Property	Unit	Test Method	ecovio® F Blend C2224	Lupolen® 2420 F
Mass density	g/cm ³	ISO 1183	1.24-1.26	0.922-0.925
Melt flow rate MFR 190°C, 2.16 kg	g/10 min	ISO 1133	<2.5	0.6-0.9
Melt volume rate MVR 190°C, 5 kg	ml/10 min	ISO 1133	3.0-6.5	-
Melting Points	°C °C	DSC DSC	110-120 140-155	111
Shore D hardness	-	ISO 868	59	48
Vicat VST A/50	°C	ISO 306	68	96

Typical properties of ecovio® F Blend C2224 blown film, 50µm

Property	Unit	Test Method	ecovio® F Blend C2224	Lupolen® 2420 F
Haze	%	ASTM D 1003	85	8
Tensile modulus	MPa	ISO 527	750/520	260/-
Tensile strength	MPa	ISO 527	35/27	26/20
Ultimate strength	MPa	ISO 527	35/27	-
Ultimate Elongation	%	ISO 527	320/250	300/600
Failure Energy (dyna Test)	J/mm	DIN 53373	38	5.5
Permeation rates:				
Oxygen (23°C, dry)	cm ³ /(m ² ·d·bar)	ASTM D 3985	860	2900
Water vapour (23°C, 85% r. h.)	[g/(m ² ·d)]	ASTM F-1249	98	1.7

Note

The information submitted in this document is based on our current knowledge and experience. In view of the many factors that may affect processing and application, these data do not relieve processors of the responsibility of carrying out their own tests and experiments; neither do they imply any legally binding assurance for a special purpose. It is the responsibility of those to whom we supply our products to ensure that any proprietary rights and existing laws and legislation are observed.