PROVISIONAL DATA SHEET

GRILAMID XE 4224 NATURAL

Product description

Grilamid XE 4224 natural is a heat and UV stabilised high viscosity polyamide 1010 (PA1010), designed for extrusion. In addition the product can be used for thicker injection moulded articles.

Grilamid XE 4224 is characterised by the following product profile:

- Close to 100% based on renewable resources
- Good chemical and UV resistance
- Ductile, resilient
- Low moisture absorption
- High dimensional stability
- Low density

Application examples

Grilamid XE 4224 natural is suitable for applications in areas like:

- Consumer goods
- Automotive functional parts
- Semi-fabricates
- Tubes, film, sheet, profiles
- Cable sheathing and protection

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PROPERTIES

Mechanical Properties

		Standard	Unit	State	Grilamid XE 4224 natural
Tensile E-Modulus	1 mm/min	ISO 527	MPa	dry cond.	2000 1300
Tensile strength at yield	50 mm/min	ISO 527	MPa	dry cond.	55 50
Elongation at yield	50 mm/min	ISO 527	%	dry cond.	5 20
Tensile strength at break	50 mm/min	ISO 527	MPa	dry cond.	* *
Elongation at break	50 mm/min	ISO 527	%	dry cond.	30 45
Impact strength	Charpy, 23°C	ISO 179/2-1eU	kJ/m²	dry cond.	o.B. o.B.
Impact strength	Charpy, -30°C	ISO 179/2-1eU	kJ/m²	dry cond.	o.B. o.B.
Notched impact strength	Charpy, 23°C	ISO 179/2-1eA	kJ/m²	dry cond.	6 9
Notched impact strength	Charpy, -30°C	ISO 179/2-1eA	kJ/m²	dry cond.	7 6
Ball indentation hardness		ISO 2039-1	MPa	dry cond.	110 80

*not relevant according to ISO10350-1

Thermal Properties

Melting point	DSC	ISO 11357	°C	dry	200
Heat deflection temperature HDT/A	1.80 MPa	ISO 75	°C	dry	50
Heat deflection temperature HDT/B	0.45 MPa	ISO 75	°C	dry	125
Thermal expansion coefficient long.	23-55°C	ISO 11359	10^{-4}/K	dry	1.1
Thermal expansion coefficient trans.	23-55°C	ISO 11359	10^{-4}/K	dry	0.8
Maximum usage temperature	long term	ISO 2578	°C	dry	-
Maximum usage temperature	short term	ISO 2578	°C	dry	-

Electrical Properties

Dielectric strength		IEC 60243-1	kV/mm	dry cond.	38 38
Comparative tracking index	CTI	IEC 60112	-	cond.	600
Specific volume resistivity		IEC 60093	Ω · m	dry cond.	10^{9} 10^{9}
Specific surface resistivity		IEC 60093	Ω	cond.	10^{10}

General Properties

Density		ISO 1183	g/cm³	dry	1.04
Flammability (UL94)	0.8 mm	ISO 1210	rating	-	HB
Water absorption	23°C/sat.	ISO 62	%	-	2.1
Moisture absorption	23°C/50% r.h.	ISO 62	%	-	1.0
Linear mould shrinkage	long.	ISO 294	%	dry	
Linear mould shrinkage	trans.	ISO 294	%	dry	

Product-nomenclature acc. ISO 1874: PA 1010, G, 18-020

This technical data sheet for Grilamid XE 4224 natural provides you with useful information on material preparation, machine requirements, tooling and processing.

MATERIAL PREPARATION

Grilamid XE 4224 natural is delivered dry and ready for processing in sealed, air tight packaging. Predrying is not necessary provided the packaging is undamaged.

Storage
Originally Sealed, undamaged bags can be kept over a period of time of at least one year when stored dry, protected from the influence of weather.

Handling and safety
Detailed information can be obtained from the "Material Safety Data Sheet" (MSDS) which can be requested with every material order.

Drying
Grilamid XE 4224 natural is dried and packed with a moisture content of ≤ 0.10%. Should the packaging become damaged or be left open too long, then the material must be dried. A too high moisture content reduce the melt viscosity and can reduce the thermal stability during processing which could adversely effect the mechanical properties.

Drying can be done as follows:

Desiccant dryer

Temperature	70 - 80°C
Time	4 - 12 hours
Dew point of dry air	-30°C

Vacuum oven

Temperature	max. 100°C
Time	4 - 12 hours

MACHINE REQUIREMENTS

Grilamid XE 4224 natural can be processed economically and without problems on all machines suitable for polyamides.

Screw
Wear protected, 3-zone universal screws are recommended.

Screw

Length	24 D - 28 D
Compression ratio	2.5:1 - 3.5:1

Grooved Feeding Zone
Smooth feeding bushes are usually suggested for the extrusion of Grilamid XE 4224 natural. In order to obtain a higher through-put a grooved bush with a maximum depth of 0.5 mm can be recommended. The grooved feeding zone should be heated at a controlled temperature of 60 to 90°C, in case of elevated current consumption.

EXTRUSION PROCESSING

Basic Machine Settings
In order to start up the machine for processing Grilamid XE 4224 natural, the following temperature range is recommended depending on the particular extrusion process.

Temperatures

Hopper zone	15 - 60°C
Feeding zone	200 - 240°C
Compression zone	210 - 250°C
Metering zone	220 - 250°C
Die / Extrusion head	210 - 250°C
Melt temperature	220 - 260°C

For profile extrusion settings at the low end of the range are recommended, for tube extrusion in the middle and for film extrusion and cable sheathing at the upper end of the range above.

CUSTOMER SERVICES

EMS-GRIVORY is a specialist in polyamide synthesis and the processing of these materials. Our customer services are not only concerned with the manufacturing and supply of engineering thermoplastics but also provide full technical support including:

- Rheological design calculation / FEA
- Prototype tooling
- Material selection
- Processing support
- Mould and component design

We are happy to advise you. Simply call one of our sales offices.

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