

PROVISIONAL DATA SHEET

GRILAMID XE 4181 NATURAL

General product description

Grilamid XE 4181 natural is a unreinforced, high viscosity, plasticized, high impact resistant polyamide 1010 (PA1010) extrusion grade.

Grilamid XE 4181 natural is highly resistant to automotive fluids and chemicals in general.

Unique features of Grilamid XE 4181 natural are:

- Polymer fully based on renewable raw materials
- Flexibility, high elongation
- Very low water absorption
- Good cold impact resistance
- Good heat and UV resistance
- Excellent chemical and zinc-chloride resistance
- Easy processing

Application examples

Grilamid XE 4181 natural has been designed for use in various types of demanding automotive and industrial tubings. It is technically a very close and bio based alternative to comparable PA12 based Grilamid products.



PROPERTIES

Mechanical Properties

		Standard	Unit	State	Grilamid XE 4181 natural
Tensile E-Modulus	1 mm/min	ISO 527	MPa	dry cond.	800 600
Tensile strength at yield	50 mm/min	ISO 527	MPa	dry cond.	40 35
Elongation at yield	50 mm/min	ISO 527	%	dry cond.	30 30
Tensile strength at break	50 mm/min	ISO 527	MPa	dry cond.	- -
Elongation at break	50 mm/min	ISO 527	%	dry cond.	>50 >50
Impact strength	Charpy, 23°C	ISO 179/2-1eU	kJ/m ²	dry cond.	no breakno break
Impact strength	Charpy, -30°C	ISO 179/2-1eU	kJ/m ²	dry cond.	no breakno break
Notched impact strength	Charpy, 23°C	ISO 179/2-1eA	kJ/m ²	dry cond.	70no break
Notched impact strength	Charpy, -30°C	ISO 179/2-1eA	kJ/m ²	dry cond.	55

Thermal Properties

Melting point	DSC	ISO 11357	°C	dry	197
Heat deflection temperature HDT/A	1.80 MPa	ISO 75	°C	dry	55
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	1.7
Thermal expansion coefficient trans.	23-55°C	ISO 11359	10 ⁻⁴ /K	dry	1.1

Electrical Properties

Dielectric strength		IEC 60243-1	kV/mm	dry cond.	39 37
Comparative tracking index	CTI	IEC 60112	-	cond.	600
Specific volume resistivity		IEC 60093	Ω · m	dry cond.	10 ⁹ 10 ⁸
Specific surface resistivity		IEC 60093	Ω	cond.	10 ¹¹

General Properties

Density		ISO 1183	g/cm ³	dry	1.05
Flammability (UL94)	0.8 mm	ISO 1210	rating	-	HB
Water absorption	23°C/sat.	ISO 62	%	-	1.3
Moisture absorption	23°C/50% RH	ISO 62	%	-	0.7
Linear mould shrinkage	long.	ISO 294	%	dry	-
Linear mould shrinkage	trans.	ISO 294	%	dry	-

Product-nomenclature acc. ISO 1874:PA1010-HIP, E, 24-007

Processing information for the extrusion of Grilamid XE 4181 natural

This technical datasheet for Grilamid XE 4181 natural provides you with information on material preparation, machine requirements, tooling and processing.

MATERIAL PREPARATION

Grilamid XE 4181 natural is delivered dry in sealed, air tight packaging.

Storage

The sealed bags have to be stored dry and protected from any damage.

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 4181 natural is delivered with a moisture content of $\leq 0.10\%$. Should the packaging become damaged or be left open too long time, then the material must be dried. A too high moisture content affects the processability and also the mechanical properties of the extruded tube. With longer residence times of the material in the hopper (over 0.5hour) we recommend to use a smaller hopper or a hopper dryer (80°C).

Drying can be done as follows:

Desiccant dryer

Temperature:	max. 80°C
Time:	4 - 12 hours
Dew point of the dryer:	-30°C

Vacuum oven

Temperature:	max. 100°C
Time:	4 - 12 hours

Drying temperature

The material should not be dried with temperatures above 80°C for desiccant dryers and temperatures above 100°C for vacuum ovens should be avoided.

MACHINE REQUIREMENTS

Grilamid XE 4181 natural can be processed on all machines suitable for polyamides.

Screw

Wear protected, universal screws are recommended (3 zones).

Screw

Length:	24 D - 26 D
Compression ratio:	2.8:1 - 3.5:1

Grooved Feeding Zone

The material can be extruded with smooth or grooved feeding zone where the grooves do not exceed a depth of 0.5 mm. It is recommended to keep the barrel temperature in the hopper zone between 40 and 90 °C.

PROCESSING

Basic machine settings

As basic settings we recommend the following parameters for the processing Grilamid XE 4181 natural:

Temperatures

Hopper zone	40-90°C
Feeding zone	230-260°C
Compression zone	230-260°C
Metering zone	230-260°C
Head	230-260°C
Nozzle	230-260°C
Melt	230-260°C

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.

The recommendations and data given are based on our experience to date, however, no liability can be assumed in connection with their usage and processing.

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This version replaces all previous product specific data sheets
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