PROVISIONAL DATA SHEET

GRILAMID XE 4071 NATURAL

General product description

Grilamid XE 4071 NATURAL is an unreinforced impact modified high viscosity polyamide 612 (PA612) extrusion grade with superior hydrolysis and heat resistance.

Compared to standard Grilamid grades XE 4071 NATURAL exhibits an improved resistance when exposed to water/glycol mixtures as found in automotive coolant fluids. Furthermore it is highly resistant to heat, automotive fluids and chemicals in general.

Application examples

Grilamid XE 4071 NATURAL has been developed for use in the cooling / heating system of vehicles. One particular application is the use as outer layer material of the ECOSYS tube solution.
Grilamid XE 4071 NATURAL is suitable for other demanding automotive tubings too.

ECOSYS (= EMS Cooling System) is the designation of flexible partially corrugated multilayer tubes developed by EMS-GRIVORY for automotive heating and cooling systems.

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PROPERTIES

Mechanical Properties

		Standard	Unit	State	Grilamid XE 4071 NATURAL
Tensile E-Modulus	1 mm/min	ISO 527	MPa	dry cond.	2000 1200
Tensile strength at yield	50 mm/min	ISO 527	MPa	dry cond.	50 40
Elongation at yield	50 mm/min	ISO 527	%	dry cond.	5 20
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 break no break
Impact strength	Charpy, -30°C	ISO 179/2-1eU	kJ/m^2	dry cond.	no break no break
Notched impact strength	Charpy, 23°C	ISO 179/2-1eA	kJ/m^2	dry cond.	40 90
Notched impact strength	Charpy, -30°C	ISO 179/2-1eA	kJ/m^2	dry cond.	12 13
Ball indentation hardness		ISO 2039-1	MPa	dry cond.	100 70

Thermal Properties

Melting point	DSC	ISO 11357	°C	dry	210
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	115
Thermal expansion coefficient long.	23-55°C	ISO 11359	$10^{-4}/K$	dry	1.6
Thermal expansion coefficient trans.	23-55°C	ISO 11359	$10^{-4}/K$	dry	1.0
Maximum usage temperature	long term	ISO 2578	°C	dry	120 - 140
Maximum usage temperature	short term	ISO 2578	°C	dry	160

Electrical Properties

Dielectric strength		IEC 60243-1	kV/mm	dry cond.	40 40
Comparative tracking index	CTI	IEC 60112	-	cond.	600
Specific volume resistivity		IEC 60093	$\Omega \cdot m$	dry cond.	10^{10} 10^{10}
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	%	-	2.7
Moisture absorption	23°C/50% r.h.	ISO 62	%	-	1.2
Linear mould shrinkage	long.	ISO 294	%	dry	3.0
Linear mould shrinkage	trans.	ISO 294	%	dry	0.4

Product-nomenclature acc. ISO 1874: PA612-I, EH, 18-020

Processing information for the extrusion of Grilamid XE 4071 NATURAL

This technical datasheet for Grilamid XE 4071 NATURAL provides you with information on material preparation, machine requirements, tooling and processing.

MATERIAL PREPARATION

Grilamid XE 4071 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 4071 NATURAL is delivered with a moisture content of ≤ 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 4071 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.

PROCESSING

Basic machine settings
As basic settings we recommend the following parameters for the processing Grilamid XE 4071 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.

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This version replaces all previous product specific data Sheets

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