TECHNICAL DATA SHEET

GRILON FG 40 NL NATURAL 6021

General product description

Grilon FG 40 NL natural 6021 is a modified, high viscosity polyamide 6. As a result of the modification in comparison to conventional polyamide 6 Grilon FG40 NL natural 6021 offers the following improvements:

- Better gas barrier properties at elevated humidity and after pasteurisation and sterilisation
- Better optical and UV- barrier properties
- Better aroma barrier and flavour protection
- Better thermoforming and orientation properties

Application examples

Grilon FG 40 NL natural 6021 is suitable for the manufacture of mono and coextruded blown and castfilms.

Grilon FG 40 NL natural 6021 is used as oriented films, sausage casings and deep-drawn films as packaging for meat cheese, fish (pouches, shells, covers)at elevated humidity levels.

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PROPERTIES

Thermal Properties

		Standard	Unit	Grilon FG 40 NL natural 6021
Melting point	DSC	ISO 11357	°C	222
Melt volume rate (MVR)	275°C / 5 kg	ISO 1133	cm³/10 min	20

General Properties

Density		ISO 1183	g/cm³	1.14
Water absorption	23°C/sat.	ISO 62	%	9
Moisture absorption	23°C/50 % RH	ISO 62	%	3
Shrink[1)]		EMS	%	--
Gloss	60°	ISO 2813	-	100
Haze		ISO 14782	%	--

Barrier Properties (50 µm films)

O_2-Transmission rate	23°C/ 0 % RH	DIS/ISO 15105-1	cm³/m² 24h bar	25
	23°C/85 % RH		cm³/m² 24h bar	45
CO_2-Transmission rate	23°C/ 0 % RH	DIS/ISO 15105-2	cm³/m² 24h bar	80
	23°C/85 % RH		cm³/m² 24h bar	220
Moisture vapour transmission rate	23°C/85 % RH	DIS/ISO 15106-1	g/m² 24h	10

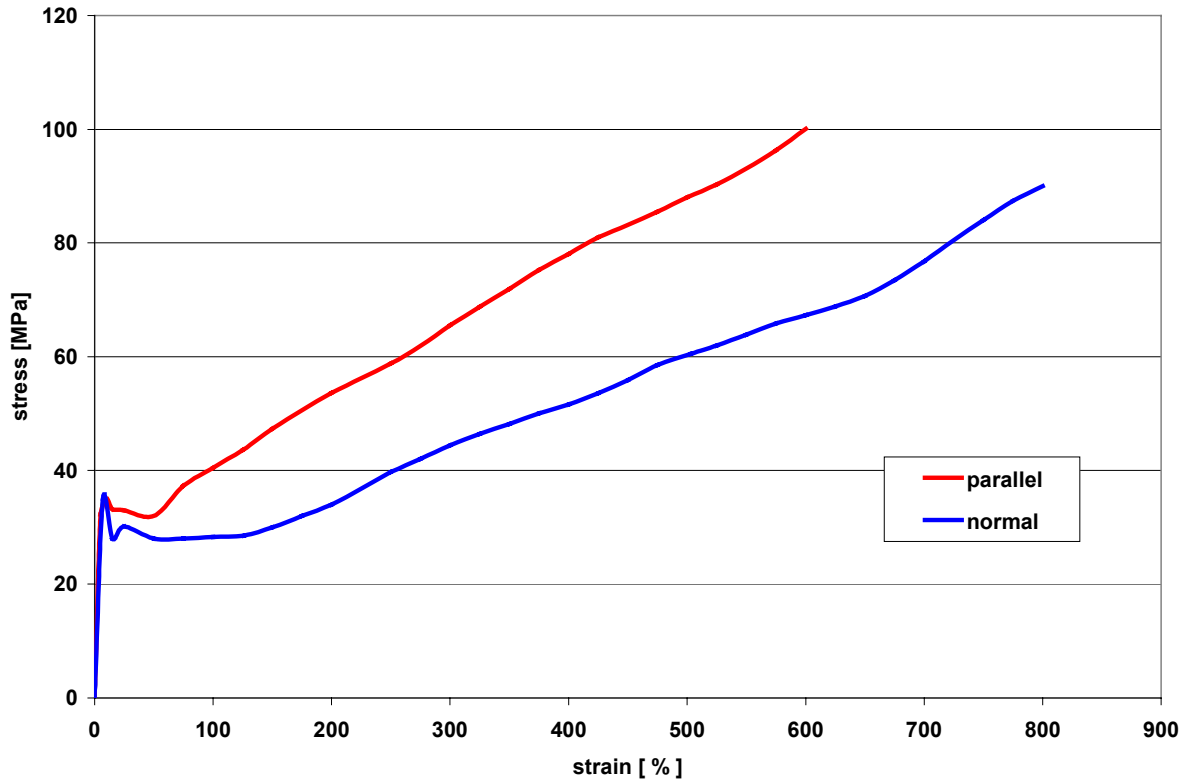
Mechanical Properties

Tensile E-Modulus		ISO 527-2	MPa	1100
Stress at yield	parallel normal	ISO 527-3	MPa	35 35
Strain at yield	parallel normal	ISO 527-3	%	10 7
Stress at break	parallel normal	ISO 527-3	MPa	100 90
Strain at break	parallel normal	ISO 527-3	%	600 800
Tear resistance	parallel normal	ISO 6383-1	N/mm	50 50
Elmendorf tear resistance	parallel normal	ISO 6383-2	N	15 15
Dart drop impact	A B	ISO 7765-1	g	-- --
Gelboflextest	900 cycles	EMS	holes/ m²	550
Dynamic Coefficient of friction	parallel	ISO 8295	-	0.25

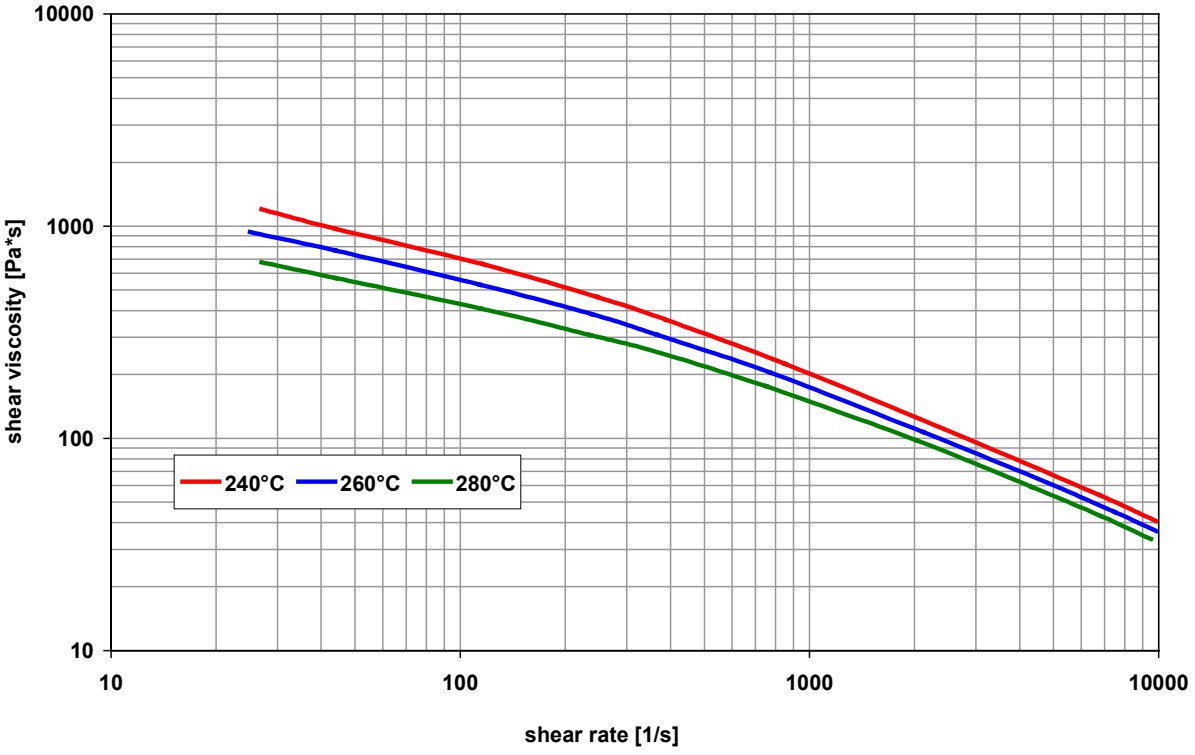
Product nomenclature acc. ISO 1874: PA 6 + PA 6I/6T, FR, 27-010N

[1)] 80 µm film applicated on 160 µm Iononmer, biaxially oriented at 70°C (draw ratio 2:1), afterwards shrinkage in water at 85°C

Stress & Strain Grilon FG 40 NL natural 6021



Viscosity function Grilon FG 40 NL natural 6021



Processing information for the extrusion of Grilon FG 40 NL natural 6021

This technical data sheet for Grilon FG 40 NL natural 6021 provides you with useful information on material preparation, machine requirements and processing.

MATERIAL PREPARATION

Grilon FG 40 NL natural 6021 is delivered dry and ready for processing in sealed, air tight packaging. Predrying is not necessary.

Storage
Sealed, undamaged bags can be kept over a long period of time in storage facilities which are dry, protected from the influence of weather and where the bags can be protected from 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
Grilon FG 40 NL natural 6021 is dried and packed with a moisture content of less than 0.10 %. The processing of moist material reduces the optical and mechanical quality of the application. A too high moisture content can result in fish eyes, streaks and brittleness.

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 time
If there is only slight evidence of foaming of the melt or just traces of silver streaks on the part, then the above mentioned minimal drying time will be sufficient. Material, which is stored in open over days, which shows strong foaming, is unusually easy flowing melt or streaks on the article, then the maximal drying time is required.

Drying temperature
Polyamides are subjected to the affects of oxidation at temperatures above 80°C in the presence of oxygen. Visible yellowing of the material is an indication of oxidation. Hence temperatures above 80°C for desiccant dryers and temperatures above 100°C for vacuum ovens should be avoided.

At longer residence times (over 1 hour) hopper heating or a hopper dryer (80°C) is useful.

MACHINE REQUIREMENTS

Grilon FG 40 NL natural 6021 can be processed economically and without problems on all extrusion lines suitable for polyamides.

Screw
Wear protected, Universal 3 zone screws are recommended.

Screw

Length:	24 D - 30 D
Compression ration:	2.5 - 3.5

Heating
At least three separately controllable heating zones, capable of reaching cylinder temperatures of up to 270°C are recommended. The cylinder flange and adapter must be able to be heated.

PROCESSING

Temperatures
For the start up of processing Grilon FG 40 NL natural 6021 the following parameters can be recommended:

Temperatures

Hopper	15 - 60°C
Zone 1	235 - 250°C
Zone 2	240 - 255°C
Zone 3	250 - 265°C
Adapter	250 - 265°C
Mould	250 - 265°C
Die	255 - 265°C
Melt	250 - 265°C

In cases where the use of grooved feed zones is employed it is recommended to temper this zone between 80 and 160°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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