

TECHNICAL DATA SHEET

GRILON F40 NATURAL 6511

General product description

Grilon F40 natural 6511 is a lubricated high viscosity Polyamide 6 extrusion grade.

- Good barrier against various gases
- Good mechanical properties
- Good barrier against oil and fat
- Improved processing and surface slip characteristics

Application examples

Grilon F40 natural 6511 is suitable for mono and co-extrusion of blown and cast film. Because of its lubricant content it is also used as outer-layer in co-extruded films.

Grilon F40 natural 6511 is used in all kind of multi-layer film such as oriented film, sausage casings, thermoforming film and lidding film. These are used in all kind of packaging for meat, cheese and fish (pouches, shells, lidding film) or non food products e.g. medical.

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PROPERTIES

Thermal Properties

		Standard	Unit	Grilon F40 natural 6511
Melting point	DSC	ISO 11357	°C	222
Melt volume rate (MVR)	275°C / 5 kg	ISO 1133	ml/10 min	25

General Properties

Density		ISO 1183	g/cm ³	1.14
Water absorption	23°C/sat.	ISO 62	%	9
Moisture absorption	23°C/50 % r.h.	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	cm ³ /m ² 24h bar	25
	23°C/85 % RH		cm ³ /m ² 24h bar	50
CO ₂ -Transmission rate	23°C/ 0 % RH	DIS/ISO 15105-2	cm ³ /m ² 24h bar	80
	23°C/85 % RH		cm ³ /m ² 24h bar	250
Moisture vapour transmission rate	23°C/85 % RH	DIS/ISO 15106-1	g/m ² 24h	15

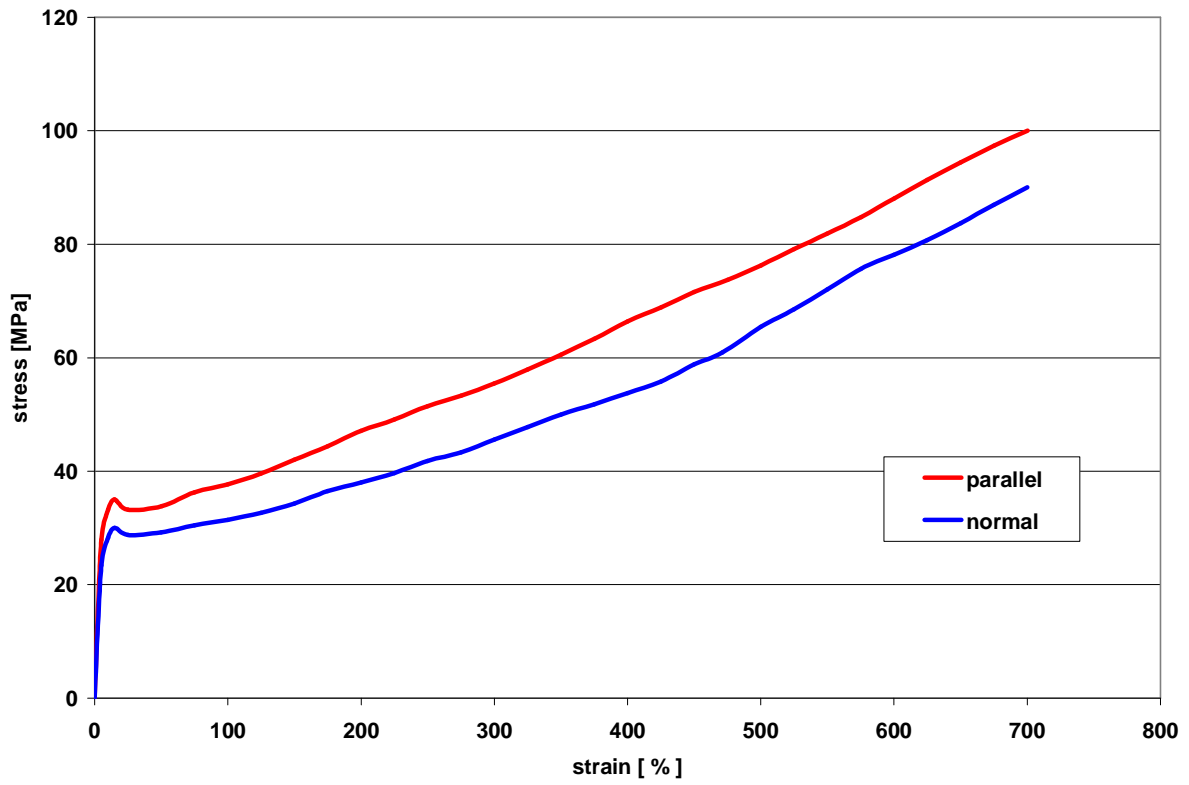
Mechanical Properties

Tensile E-Modulus	4 mm bar	ISO 527-2	MPa	750
Stress at yield	parallel	ISO 527-3	MPa	35
	normal			30
Strain at yield	parallel	ISO 527-3	%	15
	normal			15
Stress at break	parallel	ISO 527-3	MPa	100
	normal			90
Strain at break	parallel	ISO 527-3	%	700
	normal			700
Tear resistance	parallel	ISO 6383-1	N/mm	30
	normal			30
Elmendorf tear resistance	parallel	ISO 6383-2	N	10
	normal			10
Dart drop impact	A	ISO 7765-1	g	-
	B			-
Gelboflectest	900 cycles	EMS	holes/ m ²	800

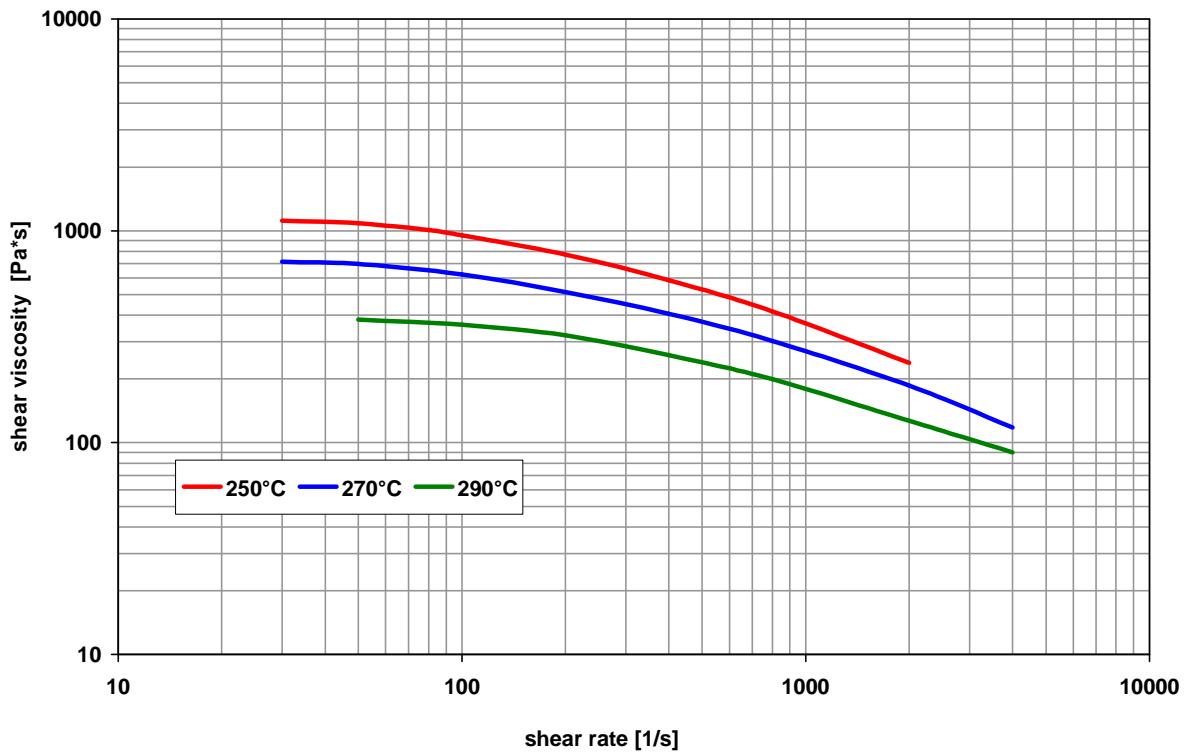
Product nomenclature acc. ISO 1874: PA 6, FS, 27-030

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

Stress & Strain Grilon F40 natural 6511



Viscosity function Grilon F40 natural 6511



Processing information for the extrusion of Grilon F40 natural 6511

This technical data sheet for Grilon F40 natural 6511 provides you with useful information on material preparation, machine requirements and processing.

MATERIAL PREPARATION

Grilon F40 natural 6511 is delivered dry and ready for processing in sealed, air tight packaging. Pre-drying 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 the material order.

Drying

Grilon F40 natural 6511 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.

The 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 F40 natural 6511 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 F40 natural 6511 the following parameters are recommended:

Temperatures

Hopper	15 - 60°C
Zone 1	235 - 245°C
Zone 2	240 - 255°C
Zone 3	240 - 255°C
Adapter	240 - 255°C
Mould	240 - 255°C
Die	240 - 260°C
Melt	240 - 260°C

In cases where the use of grooved feed zones is employed it is recommended to temper this zone between 80 and 180°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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