

TECHNICAL DATA SHEET

GRILON FG 47 NL NATURAL 6028

General product description

Grilon FG 47 NL natural 6028 is a modified, high viscosity Polyamide 6, which contains also slip and nucleating agents. Grilon FG 47 NL natural 6028 shows following improvements compared to standard Polyamide 6:

- Better flavour and gas barrier
- Better optical properties
- Reduced oxygen and moisture permeation
- Better thermoforming with less corner thinning and better impact behaviour after thermoforming
- Higher bonding to colors and tie layers

Application examples

Grilon FG 47 NL natural 6028 is used in different extrusion processes for the production of films, sheets and containers.

Thermoforming films for food (bags, trays and lidding films) at increased humidity.

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PROPERTIES

Thermal Properties

| | | Standard | Unit | Grilon FG 47 NL natural 6028 |
|------------------------|--------------|-----------|-----------|---------------------------------|
| Melting point | DSC | ISO 11357 | °C | 222 |
| Melt volume rate (MVR) | 275°C / 5 kg | ISO 1133 | ml/10 min | 15 |

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 | 40 |
| 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 | 200 |
| Moisture vapour transmission rate | 23°C/85 % RH | DIS/ISO 15106-1 | g/m ² 24h | 10 |

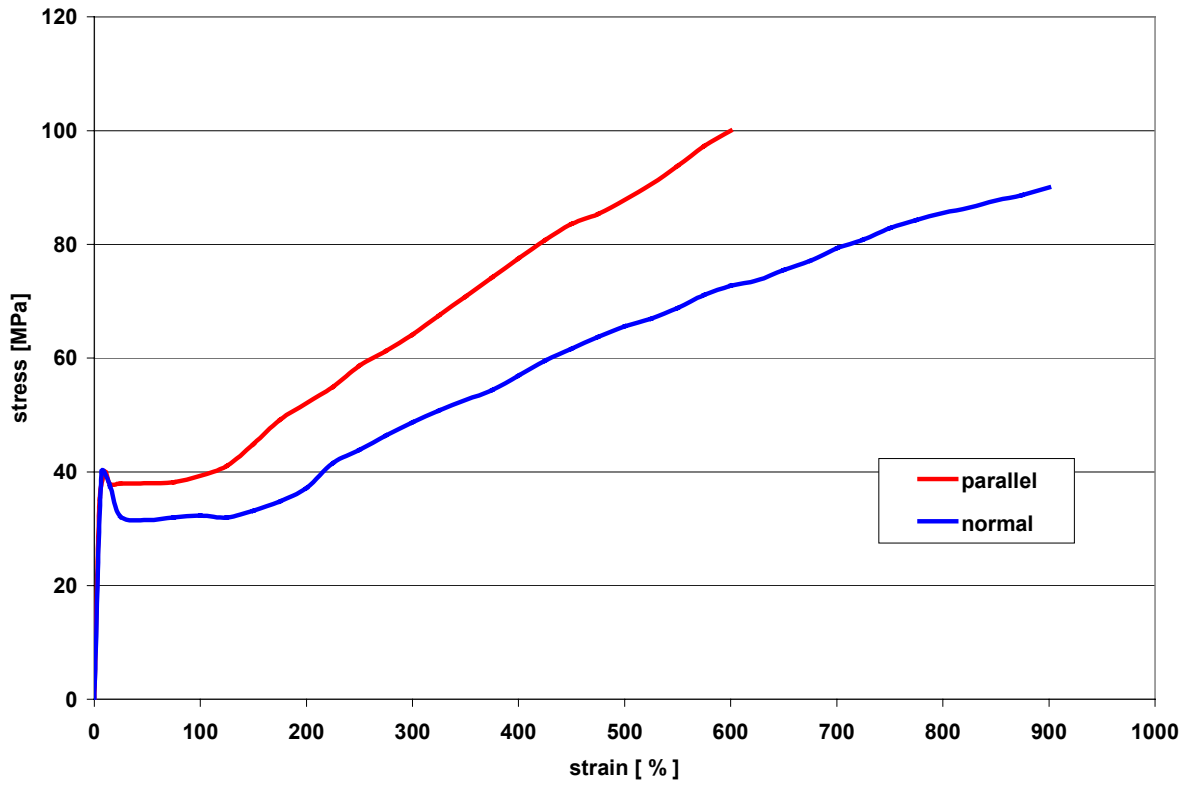
Mechanical Properties

| | | | | |
|---------------------------|------------|------------|-----------------------|------|
| Tensile E-Modulus | 4 mm bar | ISO 527-2 | MPa | 1100 |
| Stress at yield | parallel | ISO 527-3 | MPa | 40 |
| | normal | | | 40 |
| Strain at yield | parallel | ISO 527-3 | % | 10 |
| | normal | | | 7 |
| Stress at break | parallel | ISO 527-3 | MPa | 100 |
| | normal | | | 90 |
| Strain at break | parallel | ISO 527-3 | % | 600 |
| | normal | | | 900 |
| Tear resistance | parallel | ISO 6383-1 | N/mm | 50 |
| | normal | | | 50 |
| Elmendorf tear resistance | parallel | ISO 6383-2 | N | 15 |
| | normal | | | 15 |
| Dart drop impact | A | ISO 7765-1 | g | - |
| | B | | | - |
| Gelboflectest | 900 cycles | EMS | holes/ m ² | - |

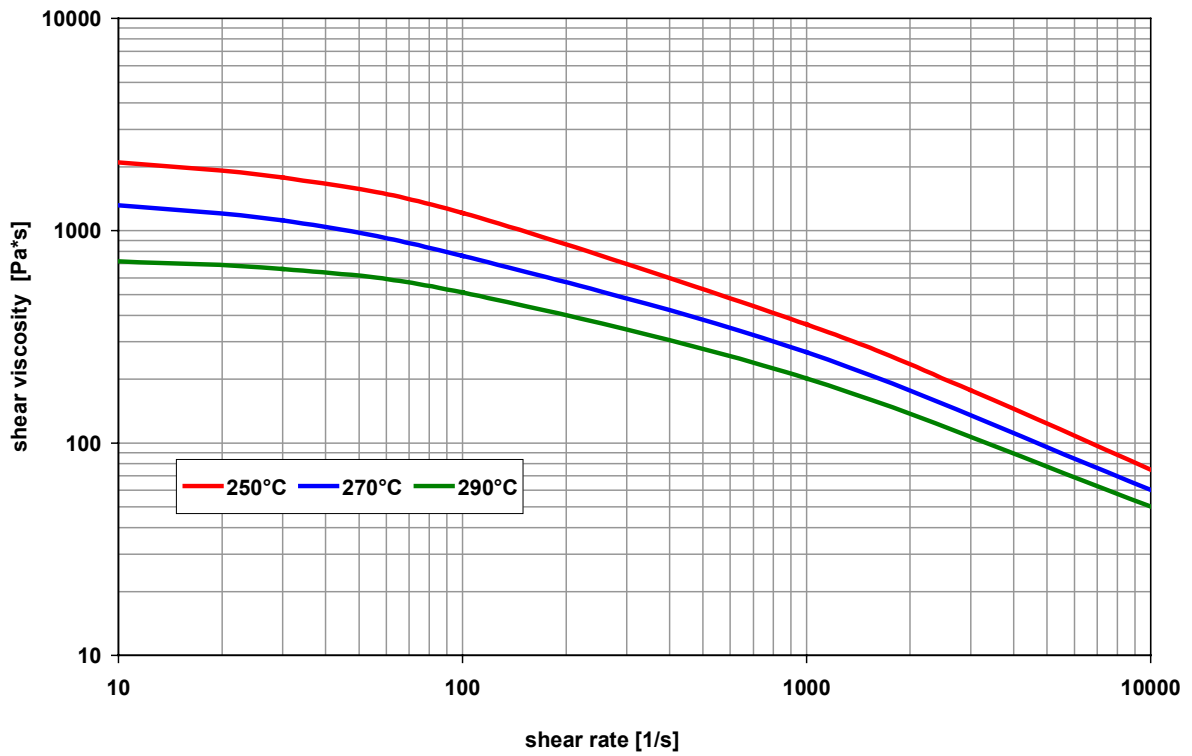
Product nomenclature acc. ISO 1874: PA 6 + 6I/6T, FR, 32-030/N

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 FG 47 NL natural 6028



Viscosity function Grilon FG 47 NL natural 6028



Processing information for the extrusion of Grilon FG 47 NL natural 6028

This technical data sheet for Grilon FG 47 NL natural 6028 provides you with useful information on material preparation, machine requirements and processing.

MATERIAL PREPARATION

Grilon FG 47 NL natural 6028 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 47 NL natural 6028 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 FG 47 NL natural 6028 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 ratio: | 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 47 NL natural 6028 the following parameters are recommended:

Temperatures

| | |
|---------|-------------|
| Hopper | 15 - 80°C |
| Zone 1 | 240 - 250°C |
| Zone 2 | 250 - 265°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 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.

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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