# TECHNICAL DATA SHEET

# GRIVORY G 25

## Product Description

Grivory G 25 is a very high viscous amorphous copolyamide.

It is suitable for injection stretch blow moulding, injection blow moulding, extrusion blow moulding, the manufacture of coextruded blown film and mono- or coextruded cast film and coextrusion of tubes. Grivory G 25 is also used as an additive for polyamide 6 and different copolyamides to improve film properties.

The key properties of Grivory G 25 are:

- High transparency and high surface gloss
- Very good chemical resistance
- Very good abrasion resistance
- Excellent flavour and aroma barrier
- Improved gas and aroma barrier at elevated relative humidity
- Low transmission of UV radiation

## Application Examples

Barrier layer for mono- or coextruded rigid packaging (EBM or ISBM bottles), barrier tubes, barrier layer in multilayer films for flexible food and cosmetics packaging, barrier layer modifier for flexible meat/cheese or other food packaging.

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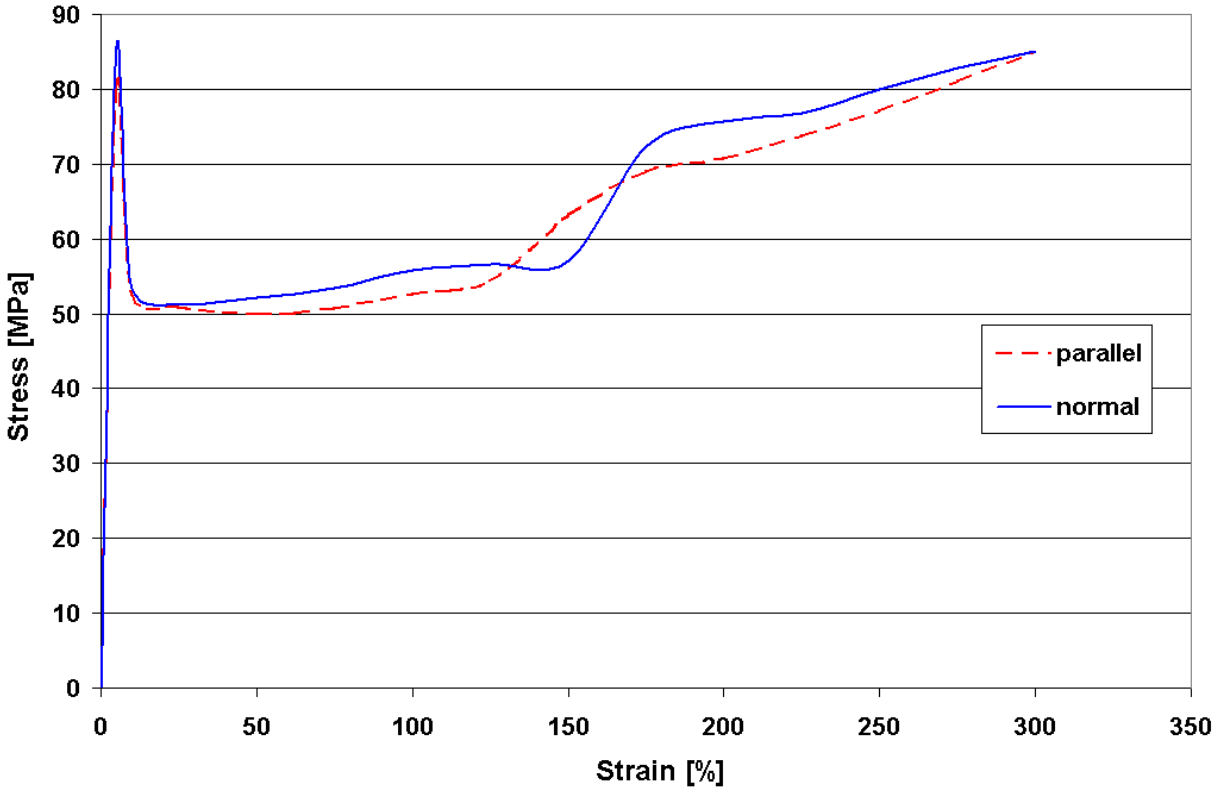
## PROPERTIES

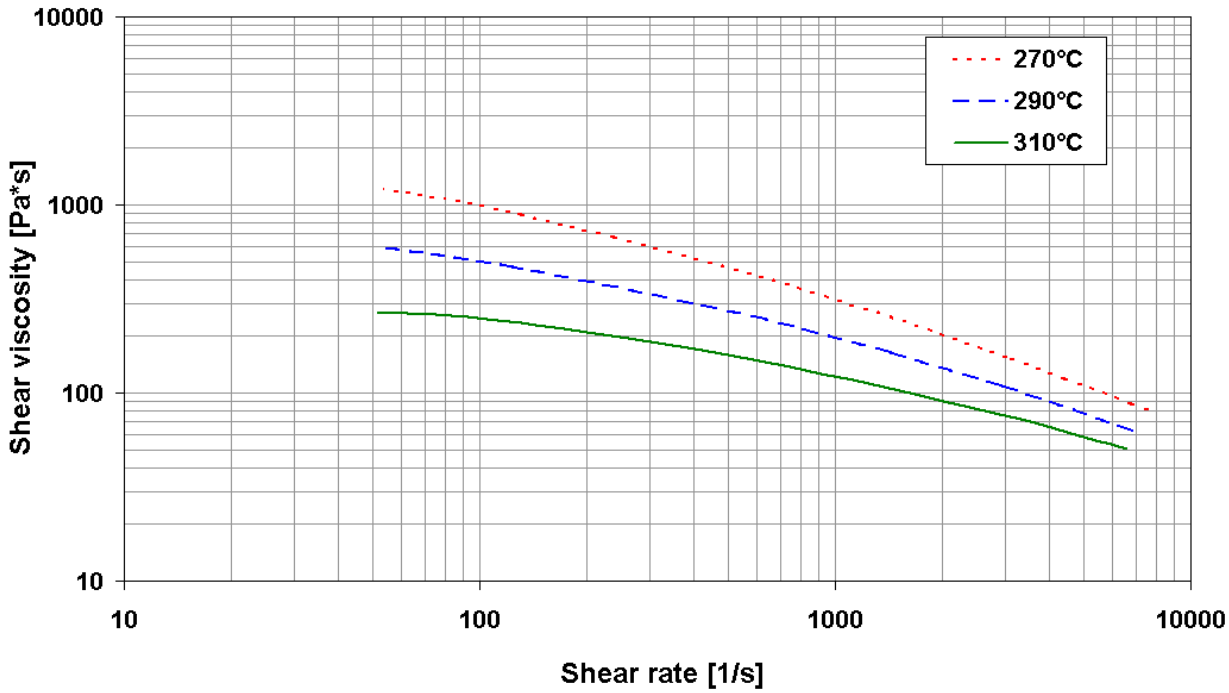
| **Thermal Properties** | | Standard | Unit | State | Grivory G 25 |
|---|---|---|---|---|---|
| Glass transition temperature | DSC | ISO 11357 | °C | dry | 125 |
| Melt volume rate (MVR) | 275°C / 5 kg | ISO 1133 | $cm^3$/10 min | dry | 12 |
| **General Properties** | | | | | |
| Density | | ISO 1183 | g/cm³ | dry | 1.18 |
| Water absorption | 23°C / saturated | ISO 62 | % | - | 7 |
| Moisture absorption | 23°C / 50 % r.h. | ISO 62 | % | - | 2 |
| Gloss | 60° | ISO 2813 | - | - | 160 |
| **Barrier Properties (50 µm films)** | | | | | |
| $O_2$-Transmission rate | 23°C / 0 % r.h.<br>23°C / 85 % r.h. | DIS/ISO 15105-1 | cm³/m² 24h bar | - | 30<br>10 |
| $CO_2$-Transmission rate | 23°C / 0 % r.h.<br>23°C / 85 % r.h. | DIS/ISO 15105-2 | cm³/m² 24h bar | - | 90<br>40 |
| Moisture vapour transmission rate | 23°C / 85 % r.h. | DIS/ISO 15106-1 | g/m² 24h | - | 7 |
| **Mechanical Properties** | | | | | |
| Tensile E-modulus | 4 mm test bar | ISO 527-2 | MPa | cond. | 3000 |
| Stress at yield | parallel<br>normal | ISO 527-3 | MPa | cond. | 85<br>85 |
| Strain at yield | parallel<br>normal | ISO 527-3 | % | cond. | 5<br>5 |
| Stress at break | parallel<br>normal | ISO 527-3 | MPa | cond. | 85<br>85 |
| Strain at break | parallel<br>normal | ISO 527-3 | % | cond. | 300<br>300 |
| Tear resistance | parallel<br>normal | ISO 6383-1 | N/mm | cond. | 5<br>5 |
| Elmendorf tear resistance | parallel<br>normal | ISO 6383-2 | N | cond. | 10<br>10 |
| Notched impact strength | Charpy, 23°C | ISO 179 /2-1eA | kJ/m² | dry<br>cond. | 8<br>8 |
| Notched impact strength | Charpy, -30°C | ISO 179 /2-1eA | kJ/m² | dry<br>cond. | 8<br>2 |

Product designation according to ISO 1874: PA 6I/6T, FT, 12-030

## Stress & Strain of Grivory G 25 (50 µm Films)




## Viscosity Function of Grivory G 25



# Information for Extrusion Processing of Grivory G 25

This technical data sheet for Grivory G 25 provides you with useful information on material preparation, machine requirements and processing.

## MATERIAL PREPARATION

Grivory G 25 is delivered dry and ready for processing in sealed packaging. Predrying is not necessary provided the packaging is undamaged.

### Storage
Sealed undamaged bags can be kept for 6 months 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
Grivory G 25 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 | -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 open over days, which shows strong foaming or unusual easy flowing or streaks on the article, requires the maximal drying time .

#### *Drying temperature*
Polyamides are affected by oxidation at temperatures above 80°C in the presence of oxygen. Visible yellowing of the material is an indication of oxidation. Temperatures above 80°C for desiccant dryers and temperatures above 100°C for vacuum ovens should be avoided.

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

## MACHINE REQUIREMENTS

Grivory G 25 can be processed economically and without problems on all machines suitable for polyamides.

### Screw
Wear protected, 3-zone universal screws are recommended.

**Screw**

| | |
|---|---|
| Length | 24 D - 30 D |
| Compression ratio | 2.5 : 1 - 3.5 : 1 |

### 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
In order to start up the machine for processing Grivory G 25, the following parameters are recommended:

**Temperatures**

| | |
|---|---|
| Hopper zone | 25 - 60°C |
| Zone 1 | 245 - 255°C |
| Zone 2 | 255 - 265°C |
| Zone 3 | 255 - 265°C |
| Adapter | 255 - 265°C |
| Mould | 255 - 265°C |
| Die | 255 - 265°C |
| Melt | 255 - 270°C |

In cases where grooved feeding zones are used it is recommended to keep this zone at a constant temperature 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

For further details concerning injection moulding and extrusion of EMS-GRIVORY polyamides please refer to our technical information brochures "Injection moulding machine" and "Tube Extrusion" available from your EMS-GRIVORY representatives.

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.

www.emsgrivory.com