

## TECHNICAL DATA SHEET

### GRILAMID L 25

#### General product description

Grilamid L 25 is a high viscosity polyamide 12.

This product has the following features:

- Very tasteless
- High toughness, even at low temperatures
- Good resistance to weathering
- Good chemical resistance
- Mechanical properties only slightly dependent on relative humidity
- Significantly lower water absorption than polyamide 6

#### Application examples

Grilamid L 25 is suitable for the manufacture of blown and cast film being mono or coextruded.

Grilamid L 25 is used for artificial sausage casings for precooked sausages and packaging films for deep-frozen goods.

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**EMS**

## PROPERTIES

### Thermal Properties

|                        |              | Standard  | Unit                    | Grilamid L 25 |
|------------------------|--------------|-----------|-------------------------|---------------|
| Melting point          | DSC          | ISO 11357 | °C                      | 178           |
| Melt volume rate (MVR) | 275°C / 5 kg | ISO 1133  | cm <sup>3</sup> /10 min | 20            |

### General Properties

|                      |              |           |                   |      |
|----------------------|--------------|-----------|-------------------|------|
| Density              |              | ISO 1183  | g/cm <sup>3</sup> | 1.01 |
| Water absorption     | 23°C/sat.    | ISO 62    | %                 | 1.5  |
| Moisture absorption  | 23°C/50 % RH | ISO 62    | %                 | 0.7  |
| Shrink <sup>1)</sup> |              | EMS       | %                 | --   |
| Gloss                | 60°          | ISO 2813  | -                 | 150  |
| Haze                 |              | ISO 14782 | %                 | --   |

### Barrier Properties (50 µm films)

|                                    |              |                 |   |      |
|------------------------------------|--------------|-----------------|---|------|
| O <sub>2</sub> -Transmission rate  | 23°C/ 0 % RH | DIS/ISO 15105-1 | cm <sup>3</sup> /m <sup>2</sup> 24h bar | 350  |
|                                    | 23°C/85 % RH |                 | cm <sup>3</sup> /m <sup>2</sup> 24h bar | 370  |
| CO <sub>2</sub> -Transmission rate | 23°C/ 0 % RH | DIS/ISO 15105-2 | cm <sup>3</sup> /m <sup>2</sup> 24h bar | 1500 |
|                                    | 23°C/85 % RH |                 | cm <sup>3</sup> /m <sup>2</sup> 24h bar | 1600 |
| Moisture vapour transmission rate  | 23°C/85 % RH | DIS/ISO 15106-1 | g/m <sup>2</sup> 24h                    | 8    |

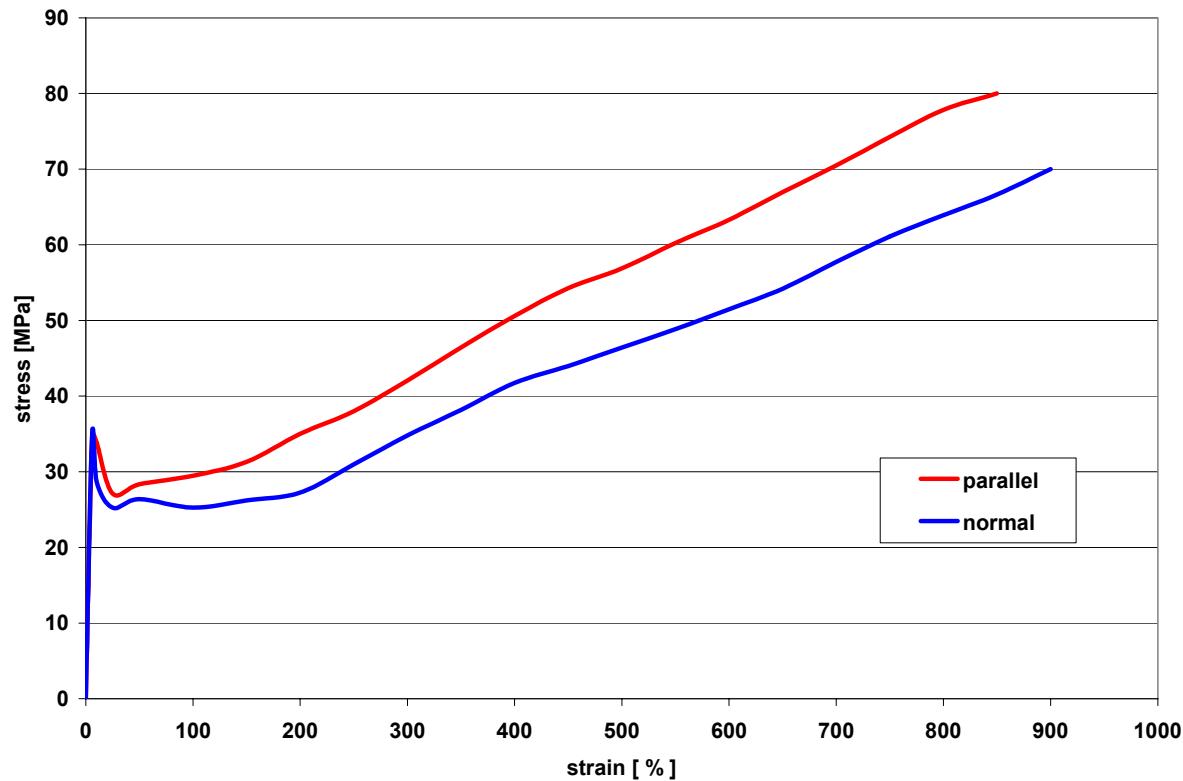
### Mechanical Properties

|                           |                    |                |                       |            |
|---------------------------|--------------------|----------------|-----------------------|------------|
| Tensile E-Modulus         |                    | ISO 527-2      | MPa                   | 1100       |
| Stress at yield           | Parallel<br>Normal | ISO 527-3      | MPa                   | 35<br>35   |
| Strain at yield           | Parallel<br>Normal | ISO 527-3      | %                     | 6<br>6     |
| Stress at break           | Parallel<br>normal | ISO 527-3      | MPa                   | 80<br>70   |
| Strain at break           | Parallel<br>Normal | ISO 527-3      | %                     | 850<br>900 |
| Tear resistance           | Parallel<br>Normal | ISO 6383-1     | N/mm                  | 20<br>25   |
| Elmendorf tear resistance | Parallel<br>Normal | ISO 6383-2     | N                     | 10<br>10   |
| Dart drop impact          | A<br>B             | ISO 7765-1     | g                     | --<br>--   |
| Notched impact strength   | Charpy, 23°C       | ISO 179 /2-1eA | kJ/m <sup>2</sup>     | cond.      |
| Notched impact strength   | Charpy, -30°C      | ISO 179 /2-1eA | kJ/m <sup>2</sup>     | cond.      |
| Gelboflextest             | 900 cycles         | EMS            | holes/ m <sup>2</sup> | 1300       |

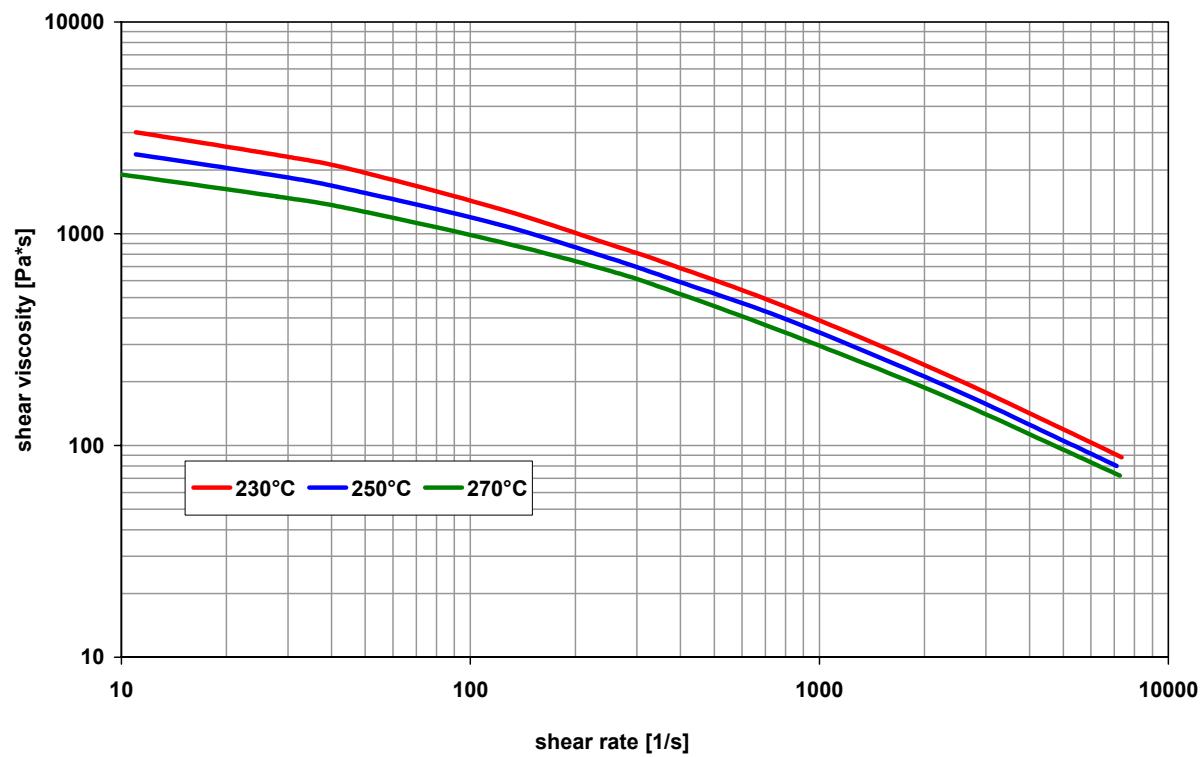
Product nomenclature acc. ISO 1874: PA 12, E, 24-010

<sup>1)</sup> 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 Grilamid L 25



## Viscosity function Grilamid L 25



# Processing information for the extrusion of Grilamid L 25

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

## MATERIAL PREPARATION

Grilamid L 25 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

Grilamid L 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 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

Grilamid L 25 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 Grilamid L 25 the following parameters can be recommended:

#### Temperatures

|         |             |
|---------|-------------|
| Hopper  | 15 - 60°C   |
| Zone 1  | 210 - 230°C |
| Zone 2  | 230 - 250°C |
| Zone 3  | 230 - 250°C |
| Adapter | 230 - 250°C |
| Mould   | 230 - 250°C |
| Die     | 240 - 250°C |
| Melt    | 230 - 250°C |

In cases where the use of grooved feed zones is employed it is recommended to temper this zone between 60 and 120°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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