

## TECHNICAL DATA SHEET

### GRILAMID L 25 G NATURAL 6011

#### General product description

Grilamid L 25 G natural 6011 is a high viscosity, lubricated 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 G natural 6011 is suitable for the manufacture of blown and cast film being mono or coextruded.

Grilamid L 25 G natural 6011 is used for artificial sausage casings for precooked sausages and packaging films for deep-frozen goods.

**Grilamid®**  
**EMS**

## PROPERTIES

### Thermal Properties

		Standard	Unit	Grilamid L 25 G natural 6011
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

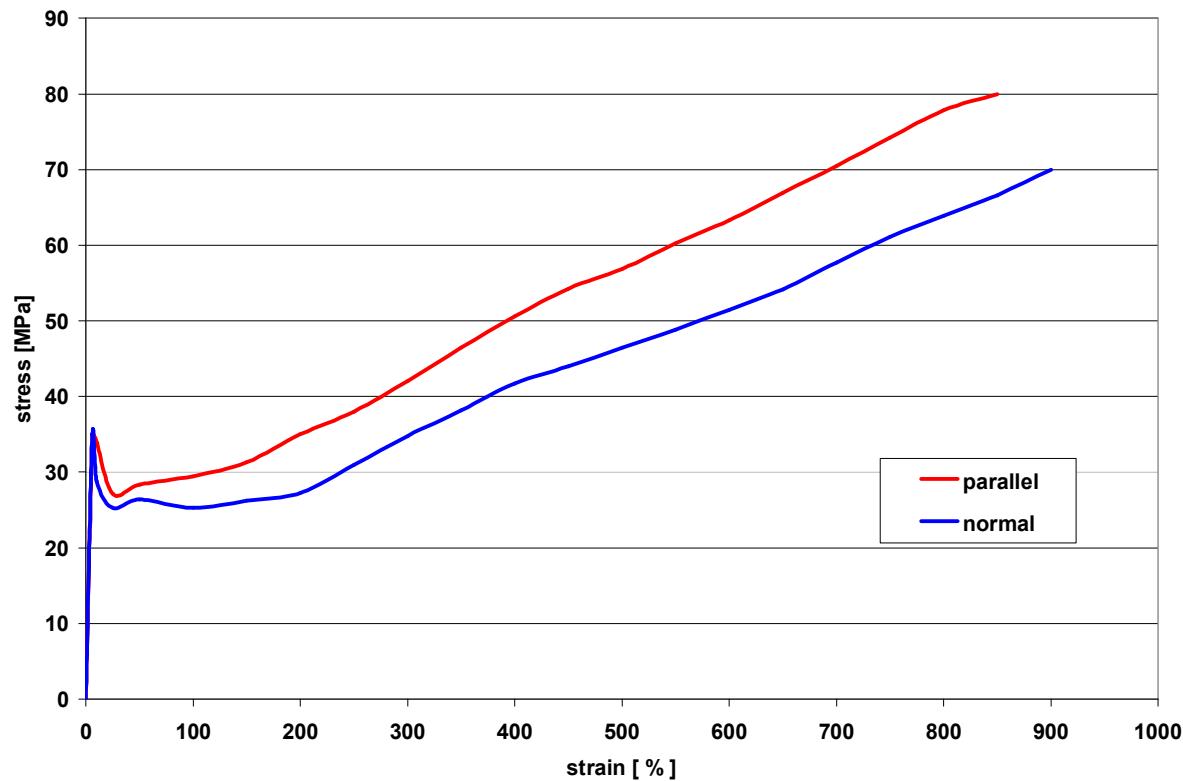
### Mechanical Properties

Tensile E-Modulus		ISO 527-2	MPa	1100
Stress at yield	Parallel Normal	ISO 527-3	MPa	35 35
Strain at yield	Parallel Normal	ISO 527-3	%	6 6
Stress at break	Parallel normal	ISO 527-3	MPa	80 70
Strain at break	Parallel Normal	ISO 527-3	%	850 900
Tear resistance	Parallel Normal	ISO 6383-1	N/mm	20 25
Elmendorf tear resistance	Parallel Normal	ISO 6383-2	N	10 10
Dart drop impact	A B	ISO 7765-1	g	-- --
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

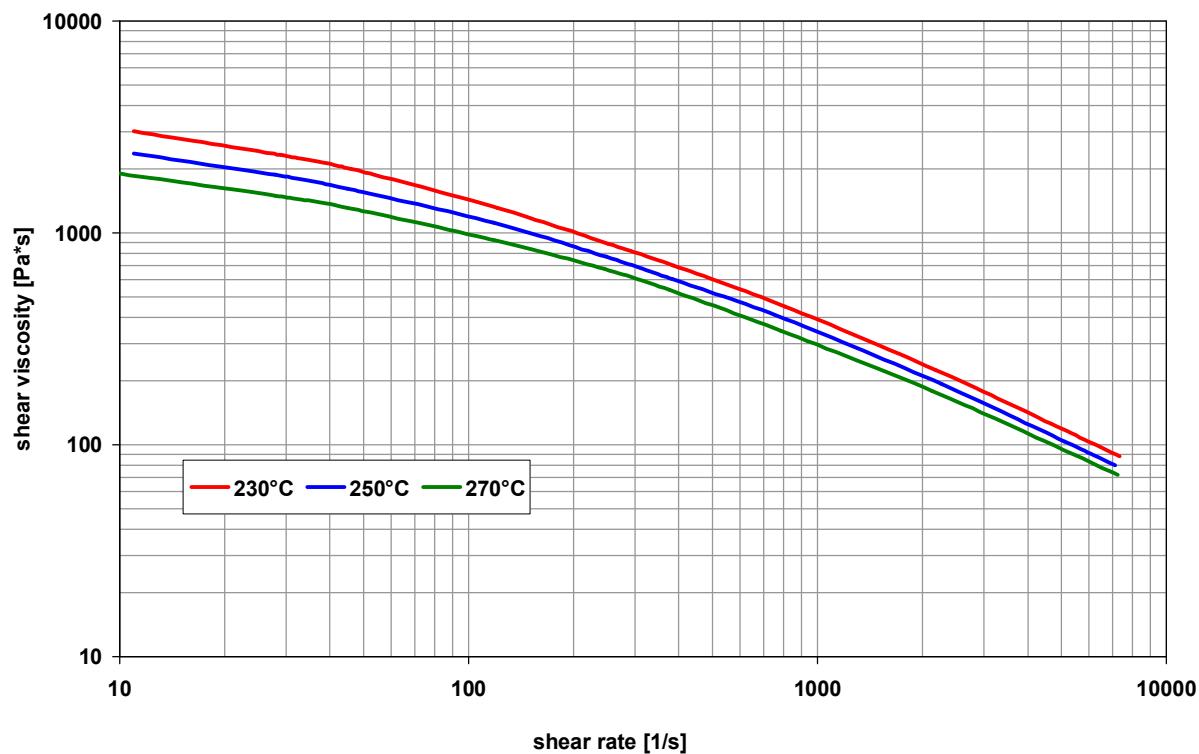
Product nomenclature acc. ISO 1874: PA 12, E, 24-010

<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 G natural 6011



## Viscosity function Grilamid L 25 G natural 6011



# Processing information for the extrusion of Grilamid L 25 G natural 6011

This technical data sheet for Grilamid L 25 G natural 6011 provides you with useful information on material preparation, machine requirements and processing.

## MATERIAL PREPARATION

Grilamid L 25 G natural 6011 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 G natural 6011 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 G natural 6011 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 G natural 6011 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	230 - 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.