

TECHNICAL DATA SHEET

GRILAMID L 20 L

General product description

Grilamid L 20 L is a medium viscosity Polyamide 12 (PA12) extrusion type. Grilamid L 20 L is UV and heat stabilised.

Its main features are:

- High surface quality
- Very good UV and heat resistance
- High abrasion resistance
- Good chemical and oil resistance
- Low weight and low density

Application examples:

Grilamid L 20 L has been especially developed for high speed extrusion of thin walled primary copper wire insulation and secondary fibre optic cable sheathing as a protection against termites and ants.

Grilamid®
EMS

PROPERTIES

Mechanical Properties

| | | Standard | Unit | State | Grilamid L20L |
|---------------------------|---------------|---------------|-------------------|-------|---------------|
| Tensile E-Modulus | 1 mm/min | ISO 527 | MPa | cond. | 1100 |
| Tensile strength at yield | 50 mm/min | ISO 527 | MPa | cond. | 40 |
| Elongation at yield | 50 mm/min | ISO 527 | % | cond. | 12 |
| Tensile strength at break | 50 mm/min | ISO 527 | MPa | cond. | 50 |
| Elongation at break | 50 mm/min | ISO 527 | % | cond. | > 50 |
| Impact strength | Charpy, 23°C | ISO 179/2-1eU | kJ/m ² | cond. | no break |
| Impact strength | Charpy, -30°C | ISO 179/2-1eU | kJ/m ² | cond. | no break |
| Notched impact strength | Charpy, 23°C | ISO 179/2-1eA | kJ/m ² | cond. | 8 |
| Notched impact strength | Charpy, -30°C | ISO 179/2-1eA | kJ/m ² | cond. | 4 |
| Shore D hardness | | ISO 868 | - | cond. | 70 |

Thermal Properties

| | | | | | |
|--------------------------------------|------------|-----------|---------------------|-----|----------|
| Melting point | DSC | ISO 11357 | °C | dry | 178 |
| Heat deflection temperature HDT/A | 1.80 MPa | ISO 75 | °C | dry | 50 |
| Heat deflection temperature HDT/B | 0.45 MPa | ISO 75 | °C | dry | 130 |
| Thermal expansion coefficient long. | 23-55°C | ISO 11359 | 10 ⁻⁴ /K | dry | 1.2 |
| Thermal expansion coefficient trans. | 23-55°C | ISO 11359 | 10 ⁻⁴ /K | dry | 1.4 |
| Maximum usage temperature | long term | ISO 2578 | °C | dry | 80 - 110 |
| Maximum usage temperature | short term | ISO 2578 | °C | dry | 150 |

Electrical Properties

| | | | | | |
|------------------------------|-----|-------------|-------|-------|------------------|
| Dielectric strength | | IEC 60243-1 | kV/mm | cond. | 32 |
| Comparative tracking index | CTI | IEC 60112 | - | cond. | 600 |
| Specific volume resistivity | | IEC 60093 | Ω · m | cond. | 10 ¹¹ |
| Specific surface resistivity | | IEC 60093 | Ω | cond. | 10 ¹² |

General Properties

| | | | | | |
|------------------------|---------------|----------|-------------------|-----|------|
| Density | | ISO 1183 | g/cm ³ | dry | 1.01 |
| Flammability (UL94) | 0.8 mm | ISO 1210 | rating | - | HB |
| Water absorption | 23°C/sat. | ISO 62 | % | - | 1.5 |
| Moisture absorption | 23°C/50% r.h. | ISO 62 | % | - | 0.7 |
| Linear mould shrinkage | long. | ISO 294 | % | dry | 0.80 |
| Linear mould shrinkage | trans. | ISO 294 | % | dry | 0.85 |

Product-nomenclature acc. ISO 1874: PA12, MHL, 18 – 010

Processing information for the extrusion of Grilamid L 20 L

This technical data sheet for Grilamid L 20 L provides you with useful information on material preparation, machine requirements, tooling and processing.

MATERIAL PREPARATION

Grilamid L 20 L 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 every material order.

Drying

Grilamid L 20 L is dried and packed with a moisture content of less than 0.10 %. Should the packaging become damaged or the material is left open too long, then the material must be dried. A too high moisture content reduces the optical (streaks) and mechanical (embrittlement) qualities of the final product.

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 temperature

Polyamides are subject to the effects 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. In order to detect oxidation it is advised to keep a small amount of granulate (light colour only !) as a comparison sample.

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

MACHINE REQUIREMENTS

Grilamid L 20 L can be processed economically and problem-free on all machines suitable for polyamides.

Screw

Wear protected, universal screws are recommended (3 zones).

Screw

| | |
|--------------------|-------------|
| Length: | 24 D - 25 D |
| Compression ratio: | 2.5 - 3.1 |

Grooved Feeding Zone

A grooved bush is not usually recommended for the extrusion of polyamides grades. In order to obtain a higher through-put by using a grooved bush its depth should not exceed 0.5 mm.

PROCESSING

Basic machine settings

In order to start up the machines for processing Grilamid L 20 L, the following basic settings are recommended:

Temperatures

| | |
|--------------|-------------|
| Feeding zone | 15 - 40°C |
| Zone 1 | 170 - 190°C |
| Zone 2 | 180 - 200°C |
| Zone 3 | 190 - 220°C |
| Head | 200 - 220°C |
| Nozzle | 200 - 220°C |
| Melt | 200 - 220°C |

Cooling bath temperature 15 - 40°C

CUSTOMER SERVICES

EMS-GRIVORY is a specialist for polyamide synthesis and polyamide-processing. Our customer services are not only concerned with the manufacturing and supply of engineering thermoplastics but also provide a full of technical support program:

- Rheological design calculation / FEA
- Material selection
- Processing support
- Tool and component design

For further details concerning extrusion please refer to our Technical Information Booklet "Tube Extrusion" available from your EMS-GRIVORY specialist.

We are happy to advice 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.