# TECHNICAL DATA SHEET

# GRILON EBGM-20 HX BLACK 9992

## General product description

Grilon EBGM-20 HX black 9992 is a high viscosity, high heat stabilized PA66 + PA6 extrusion blow moulding grade with 15% glass fibers.

The special features of Grilon EBGM-20 HX black 9992 are:

- High melt strength
- High heat ageing resistance
- Easy to process
- Processable in Blow Moulding
- Processable in Injection Moulding

Grilon EBGM-20 HX black 9992 is typically used in the automotive industry for applications such as charged air ducts and associated parts.

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## PROPERTIES

**Mechanical Properties**

| | | Standard | Unit | State | Grilon EBGM-20 HX black 9992 |
|---|---|---|---|---|---|
| Tensile E-Modulus | 1 mm/min | ISO 527 | MPa | dry<br>cond. | 6300<br>3300 |
| Tensile strength at break | 5 mm/min | ISO 527 | MPa | dry<br>cond. | 105<br>55 |
| Elongation at break | 5 mm/min | ISO 527 | % | dry<br>cond. | 3<br>7 |
| Impact strength | Charpy, 23°C | ISO 179/2-1eU | kJ/m² | dry<br>cond. | 50<br>65 |
| Impact strength | Charpy, -30°C | ISO 179/2-1eU | kJ/m² | dry<br>cond. | 50<br>50 |
| Notched impact strength | Charpy, 23°C | ISO 179/2-1eA | kJ/m² | dry<br>cond. | 8<br>10 |
| Notched impact strength | Charpy, -30°C | ISO 179/2-1eA | kJ/m² | dry<br>cond. | 5<br>5 |
| Ball indentation hardness | | ISO 2039-1 | MPa | dry<br>cond. | 150<br>75 |

**Thermal Properties**

| | | | | | |
|---|---|---|---|---|---|
| Melting point | DSC | ISO 11357 | °C | dry | 260 |
| Heat deflection temperature HDT/A | 1.8 MPa | ISO 75 | °C | dry | 195 |
| Heat deflection temperature HDT/C | 8.0 MPa | ISO 75 | °C | dry | 65 |
| Thermal expansion coefficient long. | 23-55°C | ISO 11359 | $10^{-4}$/K | dry | 0.3 |
| Thermal expansion coefficient trans. | 23-55°C | ISO 11359 | $10^{-4}$/K | dry | 1.0 |

**Electrical Properties**

| | | | | | |
|---|---|---|---|---|---|
| Dielectric strength | | IEC 60243-1 | kV/mm | dry<br>cond. | 40<br>30 |
| Comparative tracking index | CTI | IEC 60112 | - | cond. | 550 |
| Specific volume resistivity | | IEC 60093 | Ω · m | dry<br>cond. | $10^{10}$<br>$10^{9}$ |
| Specific surface resistivity | | IEC 60093 | Ω | cond. | $10^{10}$ |

**General Properties**

| | | | | | |
|---|---|---|---|---|---|
| Density | | ISO 1183 | g/cm³ | dry | 1.24 |
| Flammability (UL94) | 0.8 mm | ISO 1210 | rating | - | HB |
| Water absorption | 23°C/sat. | ISO 62 | % | - | 8 |
| Moisture absorption | 23°C/50% r.h. | ISO 62 | % | - | 3 |
| Linear mould shrinkage | long. | ISO 294 | % | dry | 0.40 |
| Linear mould shrinkage | trans. | ISO 294 | % | dry | 0.70 |

Product-nomenclature acc. ISO 1874: PA66+PA6-HI, 22-060, GF15

# Processing information for the extrusion blow moulding of Grilon EBGM-20 HX black 9992

This technical data sheet provides you with information on material preparation and processing of Grilon EBGM-20 HX black 9992.

## MATERIAL PREPARATION

Grilon EBGM-20 HX black 9992 is delivered dry in sealed, air tight packaging.

### 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

For the processing of Grilon EBGM-20 HX black 9992 a good ventilation/suck off in the working area is recommended. Additional detailed information can be obtained from the "Material Safety Data Sheet" (MSDS) which can be requested with every material order.

### Drying

Grilon EBGM-20 HX black 9992 has to be processed in a dry state due to its hygroscopic character and the resulting water absorption. It is recommended to dry the material prior to processing, although the material is delivered dry. The permissible water content is 0.06 %. For the processing the recommended water content is 0.01-0.03%.

Drying can be done as follows:

**Desiccant dryer**

| | |
|---|---|
| Temperature: | 60 - 80°C |
| Time: | 6 - 8 hours |
| Dew point of the dryer: | -30°C |

**Vacuum oven**

| | |
|---|---|
| Temperature: | max. 100°C |
| Time: | 4 - 12 hours |

Longer residence time of the material in environmental air over more than 30 minutes (also in the hopper) has to be avoided.

### Regrind material

Regrind material can be reprocessed. The proportion of regrind material should not exceed 30 %, as processing and application problems could occur due to reduced material properties. It is important that this material is reprocessed immediately. If the regrind is exposed to air for more than 30 minutes, it has to be dried again prior to processing. If the material is used for high temperature air ducts, it has to be checked if regrind could be used.

## MACHINE REQUIREMENTS

Grilon EBGM-20 HX black 9992 can be processed economically and without problems on extrusion blow moulding machines suitable for polyamides. The extruder unit has to be protected against abrasion and corrosion.

Barrels having a grooved feeding bush, should be heated with an oil circulation heater, in order to avoid the risk of blocking the extruder during start-up.

The material can be used also for conventional blow moulding, but with reduced weld line strength compared to our standard PA6-GF15.

## PROCESSING

The obtainable blow up ratio, calculated as the ratio between the article- and the parison diameter, is approximately 2:1.

### Basic machine settings

In order to start up the machine for processing Grilon EBGM-20 HX black 9992, the following basic settings are recommended:

**Temperatures**

| | |
|---|---|
| Feeding zone | 80 -120°C |
| Zone 1 | 270 - 290°C |
| Zone 2 | 270 - 290°C |
| Zone 3 | 270 - 290°C |
| Adapter | 270 - 290°C |
| Die | 270 - 290°C |
| Tool | 40 - 90°C |
| Melt | 270- 290°C |

The mass temperature should not be higher than 290°C otherwise the mechanical performance could be reduced.

## SHRINKAGE

After demoulding the parts show a shrinkage. A general useable value could not be provided, because the shrinkage is strongly influenced by the blow moulding process parameters.
The following parameters have influences on the shrinkage:

- Blow moulding process technology
- Mass temperature
- Mould material (Steel, Aluminium,..)
- Mould temperature
- Demoulding temperature
- Blow pressure
- Purge air for cooling
- Blow up ratio
- ect.

It is just possible to give an index for the shrinkage. In the following table the results of trials with the blow moulding machine "FMB 40-2 SB Coex3" are shown:

| Demoulding temperature | 70°C | 110°C | 150°C |
|---|---|---|---|
| Mould temperature | 20-30°C | 70-90°C | 70-90°C |
| middle Longitudinal Shrinkage | 0.2-0.3% | 0.2-0.3% | 0.2-0.3% |
| middle Radial Shrinkage | 1.0-1.5% | 1.5-2.3% | 2.1-3.1% |

Following process parameters were used:

| | |
|---|---|
| Technology | Suction blow moulding |
| Mould Material | Aluminium |
| Part diameter | 50mm |
| Die diameter | 25mm |
| Mass temperature | 285°C |
| cycle time | 70s |
| Wall Thickness | ~2.7mm |

## 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.



Generated / updated: KER / 10.2006 / 02.2008

This version replaces all previous product specific data sheets.

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