TECHNICAL DATA SHEET

GRILON ELX 50 H NZ

General product description

Grilon ELX 50 H NZ is a high viscosity, heat stabilised, impact modified, thermoplastic PA6 elastomer for extrusion blow moulding applications.

Grilon ELX 50 H NZ has the following important properties:

- Very high melt strength
- Very high flexibility
- Excellent toughness at low temperatures
- Processable on conventional as well as on 3 D-machines
- Suitable for sequential blow moulding technology

Grilon ELX 50 H NZ is used typically as flexible part in the sequential blow moulding technology in combination with a rigid PA6 grade such as Grilon EB 50 H or Grilon R 50 H NZ or Grilon EBV-15H. Application examples are air ducts for turbo-chargers and engine air ducts.

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PROPERTIES

Mechanical Properties

		Standard	Unit	State	Grilon ELX 50 H NZ
Tensile E-Modulus	1 mm/min	ISO 527	MPa	dry cond.	220 150
Tensile strength at yield	50 mm/min	ISO 527	MPa	dry cond.	* *
Elongation at yield	50 mm/min	ISO 527	%	dry cond.	* *
Tensile strength at break	50 mm/min	ISO 527	MPa	dry cond.	16 s 12 s
Elongation at break	50 mm/min	ISO 527	%	dry cond.	> 50 > 50
Impact strength	Charpy, 23°C	ISO 179/2-1eU	kJ/m^2	dry cond.	no break no break
Impact strength	Charpy, -30°C	ISO 179/2-1eU	kJ/m^2	dry cond.	no break no break
Notched impact strength	Charpy, 23°C	ISO 179/2-1eA	kJ/m^2	dry cond.	no break no break
Notched impact strength	Charpy, -30°C	ISO 179/2-1eA	kJ/m^2	dry cond.	no break no break
Shore D hardness		ISO 868	-	dry cond.	50 47

Thermal Properties

Melting point	DSC	ISO 11357	°C	dry	210
Heat deflection temperature HDT/A	1.80 MPa	ISO 75	°C	dry	35
Heat deflection temperature HDT/B	0.45 MPa	ISO 75	°C	dry	50
Thermal expansion coefficient long.	23-55°C	ISO 11359	$10^{-4}/K$	dry	1.6
Thermal expansion coefficient trans.	23-55°C	ISO 11359	$10^{-4}/K$	dry	1.7
Maximum usage temperature	long term	ISO 2578	°C	dry	100 - 120
Maximum usage temperature	short term	ISO 2578	°C	dry	180

Electrical Properties

Dielectric strength		IEC 60243-1	kV/mm	dry cond.	29 30
Comparative tracking index	CTI	IEC 60112	-	cond.	575
Specific volume resistivity		IEC 60093	$\Omega \cdot m$	dry cond.	10^{9} 10^{8}
Specific surface resistivity		IEC 60093	Ω	cond.	10^{10}

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	%	-	6.5
Moisture absorption	23°C/50% r.h.	ISO 62	%	-	2
Linear mould shrinkage	long.	ISO 294	%	dry	0.65
Linear mould shrinkage	trans.	ISO 294	%	dry	0.85

Product-nomenclature acc. ISO 1874: PA6/X-HI, BGH, 32-002

s Stress at 50% strain

Processing information for the extrusion blow moulding of Grilon ELX 50 H NZ

This technical data sheet provides you with information on material preparation and processing of Grilon ELX 50 H NZ.

For more detailed information on processing please consult our Technical Datasheet “Extrusion Blow Moulding of Grilamid and Grilon”, available from our Sales Office.

MATERIAL PREPARATION

Grilon ELX 50 H NZ is delivered dry and ready for processing 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

Detailed information can be obtained from the “Material Safety Data Sheet” (MSDS) which can be requested with every material order.

Drying

Grilon ELX 50 H NZ 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 0.1 %.

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:	80°C
Time:	4 - 12 hours

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

Regrind material

Regrind flash material can be reprocessed. The proportion of regrind material should not exceed 50 %, as processing problems could occur due to reduced material properties. It is important that this material is reprocessed immediately in line. If the regrind is exposed to air for more than 30 minutes, it has to be dried again prior to processing.

MACHINE REQUIREMENTS

Grilon ELX 50 H NZ can be processed economically and without problems on extrusion blow moulding machines suitable for polyamides.

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 obtainable blow up ratio, calculated as the ratio between the article- and the parison diameter, is approximately 4:1.

PROCESSING

Basic machine settings

In order to start up the machine for processing Grilon ELX 50 H NZ, the following basic settings can be recommended:

Temperatures

Feeding zone	100 - 140°C
Zone 1	230 - 240°C
Zone 2	230 - 240°C
Zone 3	230 - 240°C
Adapter	225 - 240°C
Die	225 - 240°C
Tool	40 - 80°C
Melt	230 - 250°C

SHRINKAGE

As typical in the blow moulding process the parts show a shrinkage after demoulding. The shrinkage is strongly influenced by the blow moulding process parameters such as:

- Blow moulding process technology
- Melt temperature
- Mould material (steel, aluminium,..)
- Mould temperature
- Demoulding temperature
- Blow pressure
- Purge air for cooling
- Blow up ratio
- ect.

Thus it is only possible to give an indication 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	140°C
Mould temperature	20-30°C	70-90°C	70-90°C
middle Longitudinal Shrinkage	1.3-2.0%	1.5-2.5%	2.0-3.0%
middle Radial Shrinkage	1.3-2.0%	1.5-2.5%	2.0-3.0%

Following process parameters were used:

Technology	Suction blow moulding
Mould Material	Aluminium
Part diameter	50mm
Die diameter	25mm
Melt temperature	265°C
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.

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