TECHNICAL DATA SHEET

GRILAMID 2D 25 W 20 HL X BLACK 9992

General product description

Grilamid 2D 25 W 20 HL X black 9992 is a semi-flexible high viscosity, plasticized, high impact and highly heat resistant polyamide 612 (PA612) grade.

Unique properties of Grilamid 2D 25 W 20 HL X black 9992 are:

- High strength, high burst pressure (tube)
- High heat resistance
- Significantly lower water absorption compared to standard polyamides
- Good chemical and hydrolysis resistance
- Low density
- Easy processing

Application examples

Grilamid 2D 25 W 20 HL X black 9992 has been developed for media lines in passenger cars and trucks. Thanks to its excellent heat resistance it is particularly suitable for diesel, air brake, cooling, oil and hydraulic tubes. The product is not recommended for direct permanent contact with gasoline. One particular application is the use as outer layer of multilayer ECOSYS coolant tubes.

ECOSYS (EMS Cooling System) is the designation for tube solutions developed by EMS-GRIVORY for automotive heating and cooling systems.

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PROPERTIES

Mechanical Properties

		Standard	Unit	State	Grilamid 2D 25 W 20 HL X black 9992
Tensile E-Modulus	1 mm/min	ISO 527	MPa	dry cond.	550 380
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 50% elongation	50 mm/min	ISO 527	MPa	dry cond.	30 25
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.	15 13
Ball indentation hardness		ISO 2039-1	MPa	dry cond.	39 30

Thermal Properties

Melting point	DSC	ISO 11357	°C	dry	210
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	100
Thermal expansion coefficient long.	23-55°C	ISO 11359	$10^{-4}/K$	dry	2.5
Thermal expansion coefficient trans.	23-55°C	ISO 11359	$10^{-4}/K$	dry	1.0
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.	37
Comparative tracking index	CTI	IEC 60112	-	cond.	600
Specific volume resistivity		IEC 60093	$\Omega \cdot m$	cond.	10^7
Specific surface resistivity		IEC 60093	Ω	cond.	10^{10}

General Properties

Density		ISO 1183	g/cm^3	dry	1.04
Flammability (UL94)	0.8 mm	ISO 1210	rating	-	HB
Water absorption	23°C/sat.	ISO 62	%	-	2.1
Moisture absorption	23°C/50% r. h.	ISO 62	%	-	0.9

Product-nomenclature acc. ISO 1874: PA612-HIP, E, 22-005

Processing information for the extrusion of Grilamid 2D 25 W 20 HL X black 9992

This technical datasheet for Grilamid 2D 25 W 20 HL X black 9992 provides you with information on material preparation, machine requirements, tooling and processing.

MATERIAL PREPARATION

Grilamid 2D 25 W 20 HL X black 9992 is delivered dry in sealed, air tight packaging.

Storage
The sealed bags have to be stored dry and protected from any 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 2D 25 W 20 HL X black 9992 is delivered with a moisture content of ≤ 0.10 %. Should the packaging become damaged or be left open too long, then the material must be dried. A too high moisture content affects the processability and also the mechanical properties of the extruded tube. With longer residence times of the material in the hopper (over 0.5 hour) we recommend to use a smaller hopper or a hopper dryer (80°C).

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
The material should not be dried with temperatures above 80°C for desiccant dryers. Temperatures above 100°C for vacuum ovens should be avoided.

MACHINE REQUIREMENTS

Grilamid 2D 25 W 20 HL X black 9992 can be processed on all machines suitable for polyamides.

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

Screw

Length:	24 D - 26 D
Compression ratio:	2.8:1 - 3.5:1

Grooved Feeding Zone
The material can be extruded with smooth or grooved feeding zone where the grooves do not exceed a depth of 0.5 mm. It is recommended to keep the hopper zone within a temperature range of 40 - 90 °C.

PROCESSING

Basic machine settings
As basic settings we recommend the following parameters for the processing Grilamid 2D 25 W 20 HL X black 9992:

Temperatures

Hopper zone	40-90°C
Feeding zone	230-260°C
Compression zone	230-260°C
Metering zone	230-260°C
Head	230-260°C
Nozzle	230-260°C
Melt	230-260°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.

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This version replaces all previous product specific data sheets.

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