TECHNICAL DATA SHEET

GRIVORY HB 5299 HV

General product description

Grivory HB 5299 HV is a lubricated, lactam free copolyamide, especially developed for high barrier (oxygen, carbon dioxide) packaging solutions. HV indicates high viscosity, suitable for blown film- and extrusion blow moulding applications.

- Excellent oxygen and carbon dioxide barrier, especially in interaction with moisture (50 up to 100% relative humidity)
- Excellent transparency, even for thicker components
- Suitable as a middle layer in multi-layer films and components
- Suitable for co-extruded and oriented multilayer films in conjunction with all polyamides, polyesters and polyolefins
- Barrier properties are hardly affected by steam sterilisation. Transparency depends on layer structure and other polymers used.

Application

Grivory HB 5299 HV is used in various multi layer structures providing high barrier (oxygen, carbon dioxide, nitrogen, …) e.g. Co-extruded blown films and EBM containers

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EMS

PROPERTIES

Thermal Properties

		Standard	Unit	Grivory HB 5299 HV
Melting point	DSC	ISO 11357	°C	218
Melt volume rate (MVR)	275°C / 5 kg	ISO 1133	ml/10 min	30

General Properties

Density		ISO 1183	g/cm³	1.21
Water absorption	23°C/sat.	ISO 62	%	5.5
Moisture absorption	23°C/50 % r.h.	ISO 62	%	2.0
Shrink[1)]		EMS	%	-
Gloss	60°	ISO 2813	-	150
Haze		ISO 14782	%	-

Barrier Properties (50 µm films)

O_2-Transmission rate	23°C/ 0 % RH	DIS/ISO 15105-1	cm³/m² 24h bar	4
	23°C/85 % RH		cm³/m² 24h bar	4
CO_2-Transmission rate	23°C/ 0 % RH	DIS/ISO 15105-2	cm³/m² 24h bar	15
	23°C/85 % RH		cm³/m² 24h bar	15
Moisture vapour transmission rate	23°C/85 % RH	DIS/ISO 15106-1	g/m² 24h	6

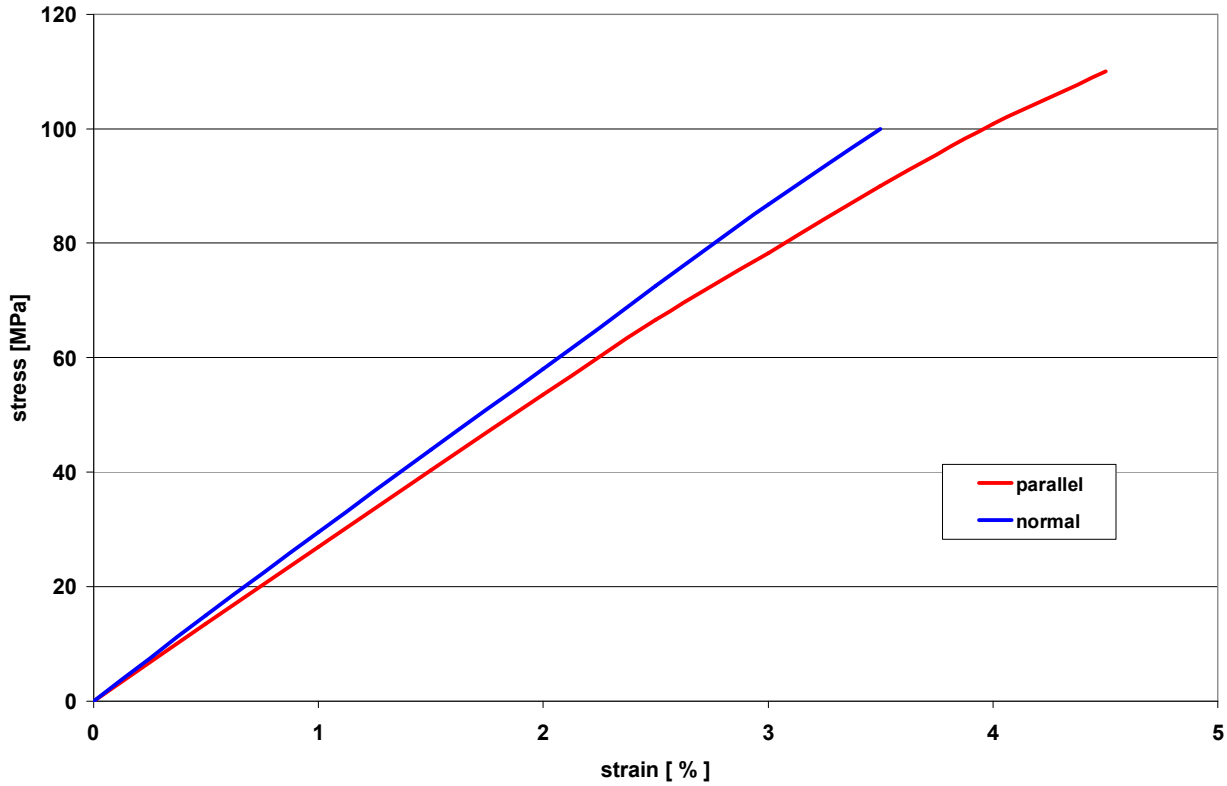
Mechanical Properties

Tensile E-Modulus	4 mm bar	ISO 527-2	MPa	4000
Stress at yield	parallel normal	ISO 527-3	MPa	* *
Strain at yield	parallel normal	ISO 527-3	%	* *
Stress at break	parallel normal	ISO 527-3	MPa	110 100
Strain at break	parallel normal	ISO 527-3	%	4.5 3.5
Tear resistance	parallel normal	ISO 6383-1	N/mm	10 10
Elmendorf tear resistance	parallel normal	ISO 6383-2	N	5 5
Dart drop impact	A B	ISO 7765-1	g	- -
Gelboflextest	900 cycles	EMS	holes/ m²	-

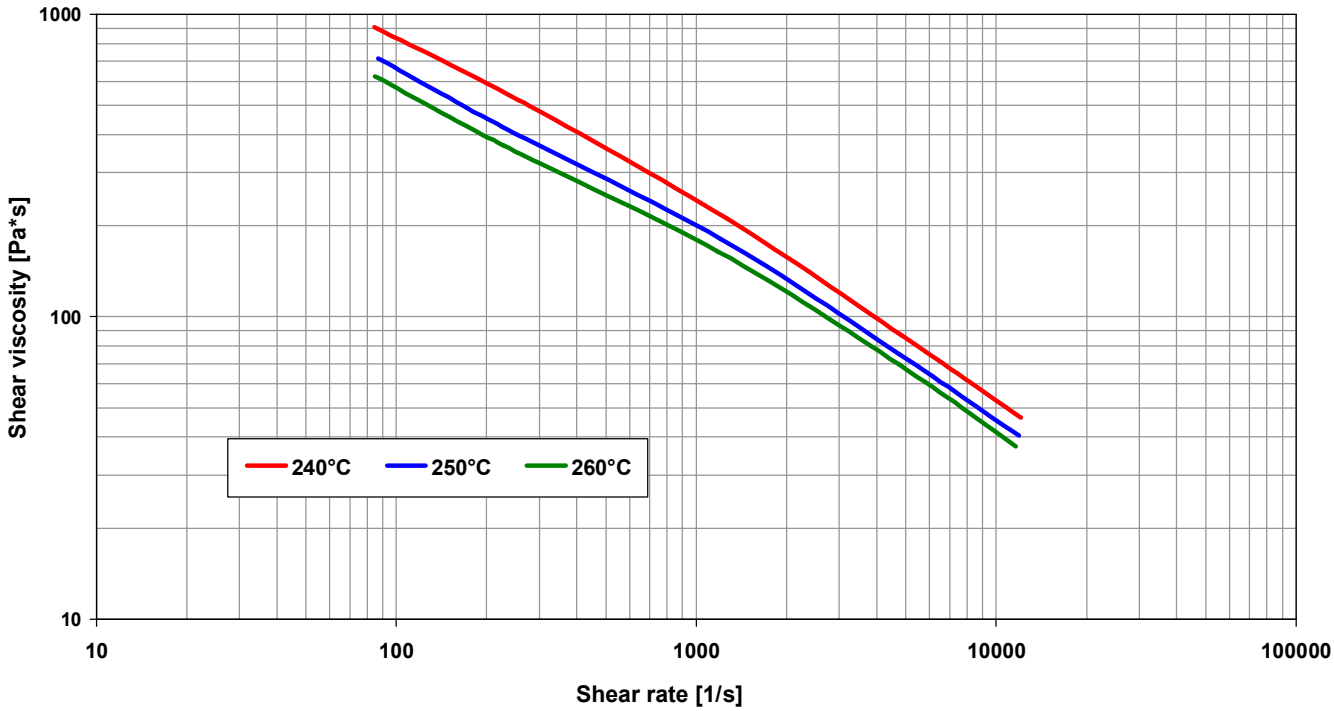
Product nomenclature acc. ISO 1874: PA MXD6/MXDI, FNST, 12-040

[1)] 80 µm film applied on 160 µm Iononmer, biaxially oriented at 70°C (draw ratio 2:1), afterwards shrunk in water at 85°C

Stress & Strain for Grivory HB 5299 HV



Viscosity function for Grivory HB 5299 HV



Processing information for the extrusion of Grivory HB 5299 HV

This technical data sheet for Grivory HB 5299 HV provides you with useful information on material preparation, machine requirements and processing.

MATERIAL PREPARATION

Grivory HB 5299 HV 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
Grivory HB 5299 HV 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 final product. A 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:	-40°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 minimum drying time will be sufficient. Material, which has been stored open for days, where the melt exhibits significant foaming, is unusually easy flowing or shows streaks on the end product, requires the maximum drying time.

Drying temperature
Polyamides are subjected to the affects of oxidation at temperatures above 80°C in the presence of air. 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.

For longer processing residence times (over 15 minutes) hopper heating or a hopper dryer (80°C) is useful.

MACHINE REQUIREMENTS

Grivory HB 5299 HV 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 capable of being heated.

PROCESSING

Temperatures
For start up of film extrusion lines the following parameters are recommended for Grivory HB 5299 HV:

Temperatures

Hopper	15 - 60°C
Zone 1	240 - 260°C
Zone 2	240 - 260°C
Zone 3	240 - 260°C
Adapter	240 - 260°C
Die	240 - 260°C
Melt	240 - 260°C

In cases where a grooved feed zone is employed it is recommended to temper this zone between 60 and 120°C. NB Not suitable for high output LDPE extruders with a grooved feed zone.

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.

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This version replaces all previous product specific data sheets

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