EPIMIX PBT GFHR 30 NC Q3D001

Polybutylene Terephthalate

Technical Data Sheet

Material Information: EPIMIX PBT, 30% Glass fiber reinforced, improved hydrolysis and automotive cooling liquids resistance, heat stabilized and lubricated for injection moulding.

Notes: EPIMIX PBT glass fiber reinforced grades are used in all sectors of industry, has and excellent surface finish, low warpage and all around excellent mechanical properties.Its recommended for long term hydrolysis resistant applications.This material is available in natural and colours on request.

Properties	Test Method	Unit	Value
Physical properties			**Dry**
Density (23°C)	ISO 1183	g/cm^3	1,51
Humidity absorption (equilibrium)	ISO 62	%	0,15
Water absorption(saturation)	ISO 62	%	0,35
Mold shrinkage- parallel/normal (2mm)	ISO 294-4	%	0,3/1,0
Melt mass - flow rate (250°C/2.16Kg)	ISO 1133	g/10min	17
Melt volume - flow rate (250°C/2.16Kg)	ISO 1133	cm^3/10min	13
Mechanical properties			
Tensile modulus (1mm/min) (23°C)	ISO 527-2	MPa	9500
Tensile stress at break (5mm/min) (23°C)	ISO 527-2	MPa	125
Tensile strain at break (5mm/min) (23°C)	ISO 527-2	%	3
Flexural modulus (2mm/min) (23°C)	ISO 178	MPa	8800
Flexural strength (2mm/min) (23°C)	ISO 178	MPa	205
Notched izod impact (23°C)	ISO 180/1A	kJ/m²	10
Unnotched izod impact (23°C)	ISO 180/1U	kJ/m²	60
Notched charpy impact (23°C)	ISO 179/1eA	kJ/m²	11
Unnotched charpy impact (23°C)	ISO 179/1eU	kJ/m²	65
Thermal properties			
Melting point (10°K/min)	ISO 11357/1-/3	°C	225
Temp. of deflection under load (0,45 MPa)	ISO 75-2/B	°C	220
Temp. of deflection under load (1,80 MPa)	ISO 75-2/A	°C	205
Vicat softening temperature	ISO 306/B50	°C	215
Flammability & electrical properties			
Flammability classification (0,8mm) - UL 94	EN 60695-11-10	-	HB
Comparative tracking index - CTI (Solution A)	EN 60112	V	375
Surface resistivity	ASTM D257	Ω/sq	1,00E+13

Test conditions

Laboratory conditions are 23 ±2°C and 45-55 % RH.

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EPIMIX PBT GRADES PROCESSING CONDITIONS

Injection moulding of EPIMIX PBT

PBT is easy to mould material, with a very wide processing window. A few general guidelines are given here.

Pre-drying

PBT is hygroscopic and moisture sensitive, so pre-drying is recommended as a matter of rule. Material that is not pre-dried to a moisture level below 0,1 % will degrade, causing surface defects, parts that are out of dimension and brittle parts. It is recommended to dry material for 2-4 hours at 120°C to 140°C in a desiccant dryer with more than one desiccant element.

A few tips to ensure proper operation of the dryer:

* Ensure the thermocouple that regulates the temperature is placed immediately before the entry of the air into the dryer. There can be a significant temperature drop in the air-conveyance system.

* The temperature of the air going out of the dryer silo should not be more than 30°C lower than the air entering the system. If this is the case, you have insufficient air capacity.

* From time to time, monitor the dew point of the dry air to ensure the desiccant elements are functioning properly.

* Often, less air runs through the very bottom part of a dryer silo. Therefore, it is recommended that you take the material out of the bottom of the dryer and feed back into the top when you start up your process.

Moulding temperatures

PBT can be processed between 220 and 270°C, depending on the grade used.

The following barrel settings are recommended:

Material	Zone 1 (Hopper)	Zone 2	Zone 3	Zone 4 (Nozzle)
Unfilled Grades	230-240°C	235-250°C	235-250°C	240-260°C
Impact M. Grades	220-235°C	225-240°C	225-240°C	235-255°C
Flame Ret. Grades	220-230°C	225-240°C	230-245°C	235-260°C
Reinforced Grades	235-260°C	240-260°C	250-265°C	260-270°C

Tool temperature

Mould temperature is always a compromise. Moreover, tool temperature should be as a high as possible to give optimum crystallization, dimensional, good surface finish and excellent mechanical performance. On the other hand, lower tool temperature can significantly cut cycle time. For PBT, 80°C should be maintained as a minimum. For different grades values of 90-110°C are preferred.

Pressure and speed

Injection pressure should generally be around 70 to 100 Mpa; this results in a minimum clamping force of the moulding machine in tonnes of 0,7 times the projected surface area in cm^2.

Holding pressure is generally in the area of 80 Mpa.

For glassfibre reinforced compounds, the screw speed should be kept low, a rough indication is as follows:

Screw diameter (mm)	Maximum rpm
20	100
30	95
40	70
50	60
60	50
70	40
80	35
>80	30

Back pressure should be kept to a practical minimum.

Use of regrind

Regrind sprues and runners can be used on most materials. It is not recommended to use regrind on FR grades. When regrind is used, observe these simple rules:

* Use a constant ratio of regrind and virgin material. When a material has been processed once, its viscosity and fibre length have been decreased. Using varying rations of regrind can lead to variations in dimensions, mechanical performance and processing characteristics.

* Either feed the regrind straight back into the machine or pre-dry the regrind before usage.

* Store regrind in a dry, clean place to avoid contamination and excess moisture.

* Ensure sharp cutting blades to keep dust generation to a minimum; cut glass fibre reinforced material when it is still hot.

* Clean the grinder regularly to avoid build up of dust.

* Do not use splayed, discoloured or degraded parts and runners.