

## Polyamide 66 - Halogen Free

### Technical Data Sheet

**Material Information:** Flame retardant polyamide 66 reinforced with 25% glass fiber, heat stabilized for injection molding.

**Notes:** Halogen free based on red phosphorus flame retardant grades, compliance with RoHS derivatives, with rating UL94 V0 and glow-wire at 960°C, which is used in many sectors of industry and has excellent mechanical properties.

This material is available in natural and colours on request.

Properties	Test Method	Unit	Value
<b>Physical properties</b>			<b>Dry</b>
Density (23°C)	ISO 1183	g/cm <sup>3</sup>	1,37
Humidity absorption (equilibrium)	ISO 62	%	1,4
Water absorption(saturation)	ISO 62	%	6
Mold shrinkage- parallel/normal (2mm)	ISO 294-4	%	0,4/1,2
<b>Mechanical properties</b>			
Tensile modulus (1mm/min) (23°C)	ISO 527-2	MPa	9500
Tensile stress at break (5mm/min) (23°C)	ISO 527-2	MPa	150
Tensile strain at break (5mm/min) (23°C)	ISO 527-2	%	3
Flexural modulus (2mm/min) (23°C)	ISO 178	MPa	8500
Flexural strength (2mm/min) (23°C)	ISO 178	MPa	255
Notched izod impact (23°C)	ISO 180/1A	kJ/m <sup>2</sup>	9
Unnotched izod impact (23°C)	ISO 180/1U	kJ/m <sup>2</sup>	55
Notched charpy impact (23°C)	ISO 179/1eA	kJ/m <sup>2</sup>	10
Unnotched charpy impact (23°C)	ISO 179/1eU	kJ/m <sup>2</sup>	60
<b>Thermal properties</b>			
Melting point (10°K/min)	ISO 11357/1-3	°C	260
Temp. of deflection under load (0,45 MPa)	ISO 75-2/B	°C	245
Temp. of deflection under load (1,80 MPa)	ISO 75-2/A	°C	235
<b>Flammability &amp; electrical properties</b>			
Flammability classification (0,8mm) - UL 94	EN 60695-11-10	-	V0
Glow wire flammability index - GWFI (0,8 mm)	EN 60695-2-12	°C	960
Glow wire ignition temperature - GWIT (1,6 mm)	EN 60695-2-13	°C	775
Comparative tracking index - CTI (Solution A)	EN 60112	V	400
Surface resistivity	ASTM D257	Ω/sq	1,00E+14
Flammability of interior materials	ISO 3795 / FMVSS 302	mm/min	<100

### Test conditions

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

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### EPLAMID 66 GRADES PROCESSING CONDITIONS

#### Injection moulding of EPLAMID 66

Polyamide 66 is easy to mould material, which is not particularly sensitive to moulding conditions. A few general guidelines are given here.

##### Pre-drying

Polyamide 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 4 hours at 80°C to 85°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

For polyamide 66, the melt temperature must be kept below 300°C. Any higher temperature will cause rapid degradation, which can be recognized by foaming of the material or splash marks on the surface of the part.

The following barrel settings are recommended:

Material	Zone 1 (Hopper)	Zone 2	Zone 3	Zone 4 (Nozzle)
Impact M. Grades	260-275°C	260-280°C	270-280°C	275-285°C
Flame Ret. Grades	260-280°C	260-280°C	270-280°C	275-285°C
Unfilled Grades	260-295°C	270-295°C	275-290°C	275-295°C
Reinforced Grades	270-290°C	270-295°C	270-295°C	275-295°C

##### Tool temperature

Mould temperature is always a compromise. Moreover, tool temperature should be as 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 Polyamide 66, 80°C should be maintained as a minimum. For reinforced grades values of 90-110°C are preferred.

##### Pressure and speed

Injection pressure should generally be around 70 to 120 Mpa; this results in a minimum clamping force of the moulding machine in tonnes of 0,7 times the projected surface area in cm<sup>2</sup>.

Holding pressure is generally in the area of 90 Mpa.

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

Screw diameter (mm)	Maximum rpm
20	150
30	100
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 ratios 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.