

Polyphthalamide

Technical Data Sheet

Material Information: Partially Aromatic copolyamide with a combination of semi-crystalline polyamide reinforced with 30% Glass fiber, heat stabilized and lubricated for injection molding process.

Notes: Eplamid HT03 grades offer the following unique properties in general conditions, and even after moisture absorption: Good Surface Finish, Good Dimensional Stability, Good High Temperature Properties, Good Chemical Resistance to Glycols and Oils and Excellent Creep Resistance. Eplamid HT03 grades are used for molding technical parts where high operating temperatures and high stiffness in moist environments are required. This material is available in natural and colours on request.

| Properties | Test Method | Unit | Value | |
|---------------------------------------|-------------|-------------------|---------|------|
| | | | Dry | Cond |
| Physical properties | | | | |
| Density (23°C) | ISO 1183 | g/cm ³ | 1,37 | |
| Filler content | Epsan Int. | % | 30 | |
| Determination of water content | ISO 15512 | % | 0,1 | |
| Mold shrinkage- parallel/normal (3mm) | ISO 294-4 | % | 0,1/0,6 | |

Mechanical properties

| | | | | |
|--|-------------|-------------------|-------|-------|
| Tensile modulus (1mm/min) (23°C) | ISO 527-2 | MPa | 11000 | 10000 |
| Tensile stress at break (5mm/min) (23°C) | ISO 527-2 | MPa | 190 | 170 |
| Tensile strain at break (5mm/min) (23°C) | ISO 527-2 | % | 3 | 3 |
| Notched charpy impact (23°C) | ISO 179/1eA | kJ/m ² | 10 | 10 |
| Unnotched charpy impact (23°C) | ISO 179/1eU | kJ/m ² | 70 | 70 |
| Notched charpy impact (-30°C) | ISO 179/1eA | kJ/m ² | 8 | 8 |
| Ball indentation hardness | ISO 2039-1 | Mpa | 235 | 215 |

Thermal properties

| | | | | |
|---|----------------|----|-----|--|
| Melting point (10°K/min) | ISO 11357/1-/3 | °C | 260 | |
| Temp. of deflection under load (1,80 MPa) | ISO 75-2/A | °C | 230 | |
| Temp. of deflection under load (8,00 MPa) | ISO 75-2/C | °C | 105 | |
| Maximum working temp. long term | ISO 2578 | °C | 110 | |
| Maximum working temp. short term | ISO 2578 | °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 | 600 | |
| Dielectric strength | IEC 60243-1 | kV/mm | 33 | 33 |

Test conditions

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

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EPLAMID HT GRADES PROCESSING CONDITIONS

Handling EPLAMID HT Polymer

For optimum properties the polymer must be kept below 0.1 % moisture level. Flow in thin sections will be reduced at high moisture levels. Dried resin, resin from opened bags, or regrind that is not going to be used immediately should be stored in a way that prevents moisture pickup.

Drying

For best properties Eplamid HT polymer must be dried to less than 0.1% moisture. This low level of moisture must be maintained throughout the molding run by the use of dehumidified dryers.

Typical times to dry the Eplamid HT polymer approximately 7 to 9 hours at 80°C to 100°C in a desiccant dryer with more than one desiccant element. It is normally recommended to dry the resin in a dehumidified hopper dryer that has air flow rates of 3.0 to 3.7 m³/hr per kg/hr of resin being processed. The air velocity should be about 0.25 m/s.

Regrind

For optimum physical properties, the amount of regrind must be kept below 25%. The use of up to 25% regrind reduces the elongation, tensile strength, and Izod impact properties of the Eplamid HT polymer.

- * 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.

Machine and Operating Conditions

The preferred shot size should be from 25% to 70% of the maximum stroke. Typical cylinder temperatures are as below.

| Material | HT00 | HT01 | HT02 | HT03 |
|------------------|-----------|-----------|-----------|-----------|
| Pref. Melt Temp. | 300-330°C | 300-325°C | 300-320°C | 265-300°C |
| Rear | 310-325°C | 305-325°C | 305-320°C | 280-290°C |
| Center | 305-325°C | 315-325°C | 310-320°C | 280-290°C |
| Front | 320-325°C | 320-330°C | 320-325°C | 285-290°C |
| Nozzle | 320-330°C | 320-330°C | 320-330°C | 285-300°C |

If the shot size is small compared to the machine rated shot size and/or if long cycles are used, then the rear zone temperatures should be reduced. The recommended melt temperatures are also given above. To limit the thermal degradation of the Eplamid HT polymer, the residence time of the polymer in the cylinder should be less than 8 min. The preferred residence time is 4 to 6 min.

Nozzle Temperature

The nozzle temperature should be adjusted so that the resin does not drool or prematurely freeze off. Above table also gives more details on temperature profiles.

Mould Temperature

Below table lists the preferred mold surface temperatures for maximum polymer crystallinity as a function of part thickness. To mold the HT00 series resins, oil heaters with high temperature rated hoses or electric mold heating will be needed.

Polymers in the HT01, HT02 and HT03 series can be molded in waterheated molds. At the temperatures listed below, the mold shrinkage will be maximized and the post-mold shrinkage or annealing shrinkage will be minimized.

| Tool Surface Temperatures | |
|---------------------------|------------|
| HT00 series | ≥ 140°C |
| HT01 and HT02 series | 90 - 140°C |
| HT03 series | 60 - 110°C |

Screw Speed and Back Pressure

To minimize glass fiber breakage in the reinforced Eplamid HT polymer, the screw speed should be selected so that the screw retraction time is at least 90% of the mold closed time. Maximum tangential screw speeds should be 9.0 m/min. The minimum amount of hydraulic back pressure should be used consistent with uniform screw recovery times, typically no higher than 3 bar.

Packaging

- * Eplamid HT grades are delivered in dry and ready to process 25Kg Aluminum bags.
- * Pre-drying is not necessary in Eplamid HT grades.
- * Upon request, materials can be packed into 1.000 kg to 1.250 kg octabins and big bags with PE in-liner bags.
- * For other packing options, please contact your sales representatives.

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