

Product description

Easy flowing injection moulding grade for fast processing. Uses include highly stressed technical parts such as bearings and gear wheels. Also electrically insulating parts such as terminals and cable connectors.

Physical form and storage

Ultramid® is supplied dry and ready to use in moisture-proof packaging in the form of cylindrical or flat pellets. Its bulk density is about 0,7g/cm³. Standard packs are the special 25kg bag and the 1000kg bulk container (octagonal IBC= intermediate bulk container made from corrugated board with a liner bag). Subject to agreement other forms of packaging and shipment in tankers by road or rail are also possible. All containers are tightly sealed and should be opened only immediately prior to processing. To ensure that the perfectly dry material delivered cannot absorb moisture from the air the containers must be stored in dry rooms and always carefully sealed again after portions of material have been withdrawn. Ultramid® can be kept indefinitely in the undamaged bags. Experience has shown that product supplied in IBCs can be stored for about 3 months without any adverse effects on processing properties due to moisture absorption. Containers stored in cold rooms should be allowed to equilibrate to normal temperature so that no condensation forms on the pellets.

Product safety

Ultramid® melts are thermally stable at the usual temperature for PA66, PA6 and PA66/6 up to 310°C and 330°C for PA6/6T and do not give rise to hazards due to molecular degradation or the evolution of gases and vapors. Like all thermoplastic polymers Ultramid® decomposes on exposure to excessive thermal load, e.g. when it is overheated or as a result of cleaning by burning off. In such cases gaseous decomposition products are formed. Decomposition accelerates above 310°C (PA6/6T >350°C) approximately, the initial products formed being mainly carbon monoxide and ammonia, and caprolactam too in the case of Ultramid® PA6. At temperatures above about 350°C (PA6/6T >400°C) small quantities of pungent smelling vapors of aldehydes, amines and other nitrogenous decomposition products are also formed. Further safety information see safety data sheet of the individual product.

Note

The data contained in this publication are based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, these data do not relieve processors from carrying out their own investigations and tests; neither do these data imply any guarantee of certain properties, nor the suitability of the product for a specific purpose. Any descriptions, drawings, photographs, data, proportions, weights etc. given herein may change without prior information and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed. In order to check the availability of products please contact us or our sales agency.

Product Information

| Typical values for uncoloured product at 23 °C ¹⁾ | Test method ²⁾ | Unit | Values ³⁾ |
|---|---------------------------|------------------------|----------------------|
| Properties | | | |
| Polymer abbreviation | - | - | PA66 |
| Density | ISO 1183 | kg/m ³ | 1130 |
| Viscosity number (0.5% in 96 % H ₂ SO ₄) | ISO 307, 1157, 1628 | cm ³ /g | 150 |
| Water absorption, saturation in water at 23°C | similar to ISO 62 | % | 8 - 9 |
| Moisture absorption, equilibrium 23°C/50% r.h. | similar to ISO 62 | % | 2.50 - 3.10 |
| Processing | | | |
| Melting temperature, DSC | ISO 11357-1/-3 | °C | 260 |
| MVR 275 °C/5 kg | ISO 1133 | cm ³ /10min | 115 |
| Melt temperature, injection moulding/extrusion | - | °C | 280 - 300 |
| Mould temperature, injection moulding | - | °C | 60 - 80 |
| Moulding shrinkage, constrained ⁴⁾ | - | % | 0.85 |
| Molding shrinkage (parallel) | ISO 2577, 294-4 | % | 1.38 |
| Molding shrinkage (normal) | ISO 2577, 294-4 | % | 1.68 |
| Flammability | | | |
| UL 94 rating at 1,6 mm thickness | IEC 60695-11-10 | class | V-2 |
| Automotive materials (Thickness >= 1mm) | FMVSS 302 | - | + |
| Mechanical properties | | | |
| | | | dry / cond. |
| Tensile modulus | ISO 527-1/-2 | MPa | 3100 / 1100 |
| Yield stress, 50 mm/min | ISO 527-1/-2 | MPa | 85 / 50 |
| Yield strain, 50 mm/min | ISO 527-1/-2 | % | 5 / 20 |
| Nominal strain at break, 50 mm/min | ISO 527-1/-2 | % | 30 / >50 |
| Tensile creep modulus, 1000 h, strain <= 0.5%, 23°C | ISO 899-1 | MPa | * / 700 |
| Flexural modulus | ISO 178 | MPa | 2900 / - |
| Charpy unnotched impact strength (23°C) | ISO 179/1eU | kJ/m ² | N / N |
| Charpy notched impact strength (23°C) | ISO 179/1eA | kJ/m ² | 5 / 20 |
| Charpy notched impact strength (-30°C) | ISO 179/1eA | kJ/m ² | 4 / - |
| Izod notched impact strength (23°C) | ISO 180/A | kJ/m ² | 5.5 / N |
| Izod notched impact strength (-30°C) | ISO 180/A | kJ/m ² | 6 / - |
| Thermal properties | | | |
| HDT A (1.80 MPa) | ISO 75-1/-2 | °C | 75 |
| HDT B (0.45 MPa) | ISO 75-1/-2 | °C | 220 |
| Max. service temperature (short cycle operation) | - | °C | 200 |
| Temperature index at 50% loss of tensile strength after 5000 h | IEC 216 | °C | 118 |
| Temperature index at 50% loss of tensile strength after 20000 h | IEC 216 | °C | 101 |
| Coefficient of linear thermal expansion, longitudinal (23-80)°C | ISO 11359-1/-2 | E-6/K | 70 - 100 |
| Thermal conductivity | DIN 52612-1 | W/(m K) | 0.33 |
| Specific heat capacity | - | J/(kg*K) | 1700 |
| Electrical properties | | | |
| | | | dry / cond. |
| Relative permittivity (1 MHz) | IEC 60250 | - | 3.2 / 5 |
| Dissipation factor (1 MHz) | IEC 60250 | E-4 | 250 / 2000 |
| Volume resistivity | IEC 60093 | Ohm*m | 1E13 / 1E10 |
| Surface resistivity | IEC 60093 | Ohm | * / 1E10 |
| Comparative tracking index, CTI, test liquid A | IEC 60112 | - | 600 |

Footnotes

1) If product name or properties don't state otherwise.

2) Specimens according to CAMPUS.

3) The asterisk symbol "*" signifies inapplicable properties.

4) Test box with central gating, dimensions of base (107*47*1,5) mm, processing condition: TM = 290°C, TW = 60°C

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