

## Product Information **Ultramid®**

### A3UG5

11/2017

### PA66-GF25 FR(40)



#### Product description

Without halogenes and red phosphorus a flame retarded glass fiber reinforced injection moulding grade; light in colour with outstanding mechanical and electrical properties.

#### Physical form and storage

The product is supplied dry and ready to use in moisture-proof packaging. The material is in the form of cylindrical or flat pellets. Its bulk density is about 0,7 g/cm<sup>3</sup>. Standard packs are the special 25 kg bag and the 1000 kg 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air the containers must be stored in dry rooms and always carefully sealed again after some of the material has been withdrawn. Ultramid® can be stored for a longer period of time in dry, well vented rooms without any change to properties. After longer storage times (> 3 months for IBC or > 2 years for bags) or if material from previously opened containers is used, drying is recommended to remove absorbed moisture. Containers stored in cold rooms should be allowed to equalise to normal temperature so that no condensation forms on the pellets.

#### Product safety

In case processing is done under conditions as recommended (cf. processing data sheet) melts are thermally stable and do not generate hazards by molecular degradation or the evolution of gases and vapors. Like all thermoplastic polymers the product decomposes on exposure to excessive thermal load, e.g. when it is overheated or as a result of cleaning by burning off. Further information is available from the safety data sheet.

#### 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 <sup>1)</sup>                                   | Test method         | Unit                   | Values <sup>2)</sup>    |
|--|---------------------|------------------------|-------------------------|
| <b>Properties</b>  |                     |                        |                         |
| Polymer abbreviation   | -                   | -                      | <b>PA66-GF25 FR(40)</b> |
| Density  | ISO 1183            | kg/m <sup>3</sup>      | <b>1390</b>             |
| Viscosity number (0.5% in 96 % H <sub>2</sub> SO <sub>4</sub> )                                | ISO 307, 1157, 1628 | cm <sup>3</sup> /g     | <b>165</b>              |
| Water absorption, saturation in water at 23°C  | similar to ISO 62   | %                      | <b>4.0 - 4.6</b>        |
| Moisture absorption, equilibrium 23°C/50% r.h.   | similar to ISO 62   | %                      | <b>1.10 - 1.50</b>      |
| <b>Processing</b>  |                     |                        |                         |
| Melting temperature, DSC   | ISO 11357-1/-3      | °C                     | <b>260</b>              |
| MVR 275 °C/5 kg  | ISO 1133            | cm <sup>3</sup> /10min | <b>25</b>               |
| Melt temperature, injection moulding/extrusion   | -                   | °C                     | <b>280 - 300</b>        |
| Mould temperature, injection moulding  | -                   | °C                     | <b>80 - 90</b>          |
| Molding shrinkage, model-housing 1.5 mm  | -                   | %                      | <b>0.4</b>              |
| Molding shrinkage (parallel)   | ISO 294-4           | %                      | <b>0.40</b>             |
| Molding shrinkage (normal)   | ISO 294-4           | %                      | <b>1.20</b>             |
| <b>Thermal properties</b>  |                     |                        |                         |
| Deflection temp. 1.8 (HDT A)   | ISO 75-1/-2         | °C                     | <b>245</b>              |
| Deflection temp. under load 0.45 MPa (HDT B)   | ISO 75-1/-2         | °C                     | <b>260</b>              |
| Temperature limit for high temperatures, 20000 h , related to 50% decrease of tensile strength | IEC 60216           | °C                     | <b>130</b>              |
| Temperature limit for high temperatures, 5000 h, related to 50% decrease of tensile strength   | IEC 60216           | °C                     | <b>155</b>              |
| <b>Flammability (UL-yellow card see attachment)</b>  |                     |                        |                         |
| GWFI (thickness)   | IEC 60695-2-12      | °C (mm)                | <b>960 (0.75)</b>       |
| GWIT (thickness)   | IEC 60695-2-13      | °C (mm)                | <b>775 ( 2)</b>         |
| Railway: Hazard level acc. to requ. sets R22 and R23   | EN 45545-2          | class                  | <b>HL3 (0,8 - 6mm)</b>  |
| <b>Electrical properties</b>   |                     |                        |                         |
|  |                     |                        | <b>dry / cond.</b>      |
| Relative permittivity (1 MHz)  | IEC 60250           | -                      | <b>3.8 / 4.6</b>        |
| Dissipation factor (1 MHz)   | IEC 60250           | E-4                    | <b>170 / 1000</b>       |
| Volume resistivity   | IEC 60093           | Ohm*m                  | <b>1E14 / 1E11</b>      |
| Surface resistivity  | IEC 60093           | Ohm                    | <b>* / 1E15</b>         |
| CTI, solution A  | IEC 60112           | -                      | <b>600</b>              |
| <b>Mechanical properties</b>   |                     |                        |                         |
|  |                     |                        | <b>dry / cond.</b>      |
| Tensile modulus  | ISO 527-1/-2        | MPa                    | <b>9500 / 6100</b>      |
| Stress at break  | ISO 527-1/-2        | MPa                    | <b>145 / 90</b>         |
| Strain at break  | ISO 527-1/-2        | %                      | <b>3 / 5</b>            |
| Flexural modulus   | ISO 178             | MPa                    | <b>9500 / 6100</b>      |
| Flexural strength  | ISO 178             | MPa                    | <b>230 / 160</b>        |
| Charpy unnotched impact strength, 23°C   | ISO 179/1eU         | kJ/m <sup>2</sup>      | <b>65 / 65</b>          |
| Charpy unnotched impact strength, -30°C  | ISO 179/1eU         | kJ/m <sup>2</sup>      | <b>63 / -</b>           |
| Charpy notched impact strength, 23°C   | ISO 179/1eA         | kJ/m <sup>2</sup>      | <b>7.5 / 9</b>          |

### Footnotes

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

2) The asterisk symbol "\*" signifies inapplicable properties.

BASF SE

67056 Ludwigshafen, Germany

UL - Yellow Card

The information presented on the UL Prospector datasheet was acquired by UL Prospector from the producer of the material. UL Prospector makes substantial efforts to assure the accuracy of this data. However, UL Prospector assumes no responsibility for the data values and strongly encourages that upon final material selection, data points are validated with the material supplier.



Component - Plastics

E41871

**BASF SE**

Performance Materials Europe, E-PME/NQ - H201, Ludwigshafen 67056 DE

**A3UG5(t)(f2)**

Polyamide 66 (PA66) "Ultramid", furnished as pellets

| Color  | Min. Thk (mm) | Flame Class | HWI | HAI | RTI Elec | RTI Imp | RTI Str |
|--------|---------------|-------------|-----|-----|----------|---------|---------|
| ALL    | 0.75          | V-0         | 0   | 0   | 120      | 90      | 130     |
| BK, GY | 1.5           | V-0, 5VA    | 0   | 0   | 120      | 90      | 130     |

Comparative Tracking Index (CTI): 0

Inclined Plane Tracking (IPT) kV: -

Dielectric Strength (kV/mm): 21

Volume Resistivity (10<sup>x</sup>ohm-cm): -

High-Voltage Arc Tracking Rate (HVTR): -

High Volt, Low Current Arc Resis (D495): -

Dimensional Stability (%): -

(f2) - Subjected to one or more of the following tests: Ultraviolet Light, Water Exposure or Immersion in accordance with UL 746C, where the acceptability for outdoor use is to be determined by UL.

(t) - May be followed by the letters LS and a color code indicating laser sensitive coloring.

ANSI/UL 94 small-scale test data does not pertain to building materials, furnishings and related contents. ANSI/UL 94 small-scale test data is intended solely for determining the flammability of plastic materials used in the components and parts of end-product devices and appliances, where the acceptability of the combination is determined by UL.

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Last Revised: 2017-03-31

**IEC and ISO Test Methods**

| Test Name                      | Test Method                      | Units             | Thk (mm) | Value             |
|--------------------------------|----------------------------------|-------------------|----------|-------------------|
| Flammability                   | IEC 60695-11-10, IEC 60695-11-20 | Class (color)     | 0.75     | V-0 (ALL)         |
|                                |                                  |                   | 1.5      | V-0, 5VA (BK, GY) |
| Glow-Wire Flammability (GWFI)  | IEC 60695-2-12                   | °C                | 0.75     | 960               |
|                                |                                  |                   | 1.5      | 960               |
| Glow-Wire Ignition (GWIT)      | IEC 60695-2-13                   | °C                | -        | -                 |
| IEC Comparative Tracking Index | IEC 60112                        | Volts (Max)       | -        | -                 |
| IEC Ball Pressure              | IEC 60695-10-2                   | °C                | -        | -                 |
| ISO Heat Deflection (1.80 MPa) | ISO 75-2                         | °C                | -        | -                 |
| ISO Tensile Strength           | ISO 527-2                        | MPa               | -        | -                 |
| ISO Flexural Strength          | ISO 178                          | MPa               | -        | -                 |
| ISO Tensile Impact             | ISO 8256                         | kJ/m <sup>2</sup> | -        | -                 |

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|                   |           |                   |   |   |
|-------------------|-----------|-------------------|---|---|
| ISO Izod Impact   | ISO 180   | kJ/m <sup>2</sup> | - | - |
| ISO Charpy Impact | ISO 179-2 | kJ/m <sup>2</sup> | - | - |

## UL - Yellow Card

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**PROSPECTOR®**

Component - Plastics

E41871

### BASF SE

Performance Materials Europe, E-PME/NQ - H201, Ludwigshafen 67056 DE

### A3UG5(f1)

Polyamide 66 (PA66) "Ultramid", furnished as pellets

| Color  | Min. Thk (mm) | Flame Class | HWI | HAI | RTI Elec | RTI Imp | RTI Str |
|--------|---------------|-------------|-----|-----|----------|---------|---------|
| BK, GY | 0.75          | V-0         | 0   | 0   | 120      | 90      | 130     |
|        | 1.5           | V-0, 5VA    | 0   | 0   | 120      | 90      | 130     |

Comparative Tracking Index (CTI): 0

Inclined Plane Tracking (IPT) kV: -

Dielectric Strength (kV/mm): 21

Volume Resistivity (10<sup>x</sup>ohm-cm): -

High-Voltage Arc Tracking Rate (HVTR): -

High Volt, Low Current Arc Resis (D495): -

Dimensional Stability (%): -

(f1) - Suitable for outdoor use with respect to exposure to Ultraviolet Light, Water Exposure and Immersion in accordance with UL 746C.

ANSI/UL 94 small-scale test data does not pertain to building materials, furnishings and related contents. ANSI/UL 94 small-scale test data is intended solely for determining the flammability of plastic materials used in the components and parts of end-product devices and appliances, where the acceptability of the combination is determined by UL.

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#### IEC and ISO Test Methods

| Test Name                      | Test Method                      | Units             | Thk (mm) | Value             |
|--------------------------------|----------------------------------|-------------------|----------|-------------------|
| Flammability                   | IEC 60695-11-10, IEC 60695-11-20 | Class (color)     | 0.75     | V-0 (BK, GY)      |
|                                |                                  |                   | 1.5      | V-0, 5VA (BK, GY) |
| Glow-Wire Flammability (GWFI)  | IEC 60695-2-12                   | °C                | 0.75     | 960               |
|                                |                                  |                   | 1.5      | 960               |
| Glow-Wire Ignition (GWIT)      | IEC 60695-2-13                   | °C                | -        | -                 |
| IEC Comparative Tracking Index | IEC 60112                        | Volts (Max)       | -        | -                 |
| IEC Ball Pressure              | IEC 60695-10-2                   | °C                | -        | -                 |
| ISO Heat Deflection (1.80 MPa) | ISO 75-2                         | °C                | -        | -                 |
| ISO Tensile Strength           | ISO 527-2                        | MPa               | -        | -                 |
| ISO Flexural Strength          | ISO 178                          | MPa               | -        | -                 |
| ISO Tensile Impact             | ISO 8256                         | kJ/m <sup>2</sup> | -        | -                 |
| ISO Izod Impact                | ISO 180                          | kJ/m <sup>2</sup> | -        | -                 |

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## UL - Yellow Card

ISO Charpy Impact    ISO 179-2

kJ/m<sup>2</sup>

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