Product Information Ultramid®

A3W

03/2024 **PA66**



Product description

An easy flowing, heat aging resistant injection moulding grade for fast processing. Uses include highly stressed parts such as bearings, bearing cages, gear-wheels, coil formers and cable connectors.

Physical form and storage

The product is supplied in the form of granules with a bulk density of approx. 0.7 g/cm³. Standard packs are bag and bulk container (octagonal IBC=intermediate bulk container made from corrugated board with a liner bag). Other packaging materials and shipping in road or rail silo wagons are possible by agreement. The containers should only be opened immediately before processing or drying. To ensure that the delivered product absorbs as little moisture as possible, the containers should be stored in dry rooms and always carefully closed again after partial quantities have been withdrawn. In principle, the product can be stored for a long period of time. Containers stored in cold rooms should be equalized to ambient temperature before opening in order to avoid condensation on the granules. Regardless of the storage conditions, the product should be pre-dried according to our recommendations and the machine should preferably be loaded using a closed conveyor system.

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.

Ultramid® A3W

Product Information



Properties Polymer abbreviation	Typical values for uncoloured product at 23 °C¹)	Test method	Unit	Values ²⁾
Density Six 01183 Kg/m³ 1130 1150 Water absorption, saturation in water at 23°C similar to ISO 62 % 8 - 9 Similar to ISO 62 % Similar to ISO 62 Similar to	Properties			
Sco 3th number (0.5% in 96% H ₂ SO ₂) Slo 307, 1157, 1628 cm²/g S = 9	Polymer abbreviation	-	-	PA66
Water absorption, saturation in water at 23°C similar to ISO 62 % 2.5 - 3.1	•	ISO 1183	kg/m³	1130
Moisture absorption, equilibrium 23°C/50% r.h. Similar to ISO 62 % 2.5 - 3.1		1 1		150
Processing Melting temperature, DSC ISO 11357-1/-3 C 260 MWR 275 °C/5 kg ISO 11357-1/-3 C 260 MWR 275 °C/5 kg ISO 11357-1/-3 C 260 MWR 275 °C/5 kg ISO 11357-1/-3 C 260 280 - 300 Mould temperature, injection moulding °C 60 - 80 Moulding shrinkage, constrained ⇒ °C 60 - 80 Molding shrinkage (parallel) ISO 294-4 % 1.50 Molding shrinkage (parallel) ISO 294-4 % 1.80 Molding shrinkage (parallel) ISO 294-4 Molding shrinkage (parallel) ISO 297-1/-2 % 25/-50 ISO 2900 ISO 297-1/-2 % 25/-50 ISO 299-1 ISO 299-1 ISO 299-1 ISO 299-1 ISO 299-1 IS				
Melting temperature, DSC ISO 11357-11-3 CC 260 MYR 275 °C/5 kg ISO 1133 cm*/10min 100	Moisture absorption, equilibrium 23°C/50% r.h.	similar to ISO 62	%	2.5 - 3.1
MVR 275 °C/5 kg	Processing			
Melt temperature, injection moulding/extrussion - °C 60 - 80			-	
Moulding shrinkage, constrained 3\) C 60 - 80		ISO 1133		
Moulding shrinkage (parallel) ISO 294-4 % 1.50		-		
Molding shrinkage (parallel) ISO 294-4 % 1.50 1.80 ISO 294-4 % 1.50 1.80 ISO 294-4 % 1.50 1.80 ISO 294-4 % 1.80 ISO 294-1 %	· · · · · · · · · · · · · · · · · · ·	-	-	
So 294-4		-		
Plammability UL.94 flammability rating at nominal 1.5 mm (thickness tested) IEC 60695-11-10 class (mm) V-2 (1.47) yes UL.94 flammability rating (thickness tested) IEC 60695-11-10 class (mm) V-2 (0.75) yes UL.94 flammability rating (thickness tested) IEC 60695-11-10 class (mm) V-2 (0.75) yes UL.94 flammability rating (thickness tested) IEC 60695-11-10 class (mm) V-2 (0.75) yes UL.94 flammability rating (thickness tested) IEC 60695-11-10 class (mm) V-2 (0.75) yes UL.94 flammability rating (thickness tested) IEC 60695-11-10 class (mm) V-2 (0.75) yes UL.94 flammability rating (thickness tested) IEC 60695-11-10 class (mm) V-2 (0.75) yes UL.94 flammability rating (thickness tested) IEC 60695-11-10 class (mm) V-2 (1.47) yes UL.94 flammability rating (thickness tested) IEC 60695-11-10 class (mm) V-2 (0.75) yes UL.94 flammability (thickness tested) IEC 60695-11-10 class (mm) V-2 (0.75) yes UL.94 flammability rating (thickness tested) IEC 60695-11-10 class (mm) V-2 (0.75) yes UL.94 flammability rating (thickness tested) UL.94 flammability (thickness tested) UL.	3			
UL94 flammability rating at nominal 1.5 mm (thickness tested) IEC 60695-11-10 class (mm) yes V-2 (1.47) V-2 (1.47	Molding shrinkage (normal)	ISO 294-4	%	1.80
Vellow Card available	·			
UL94 flammability rating (thickness tested) IEC 60695-11-10 class (mm) V-2 (0.75) yes ves ves		IEC 60695-11-10	class (mm)	, ,
Yellow Card available		IEC 60695-11-10	class (mm)	-
Automotive materials (Thickness 1 mm) 4) ISO 3795, FMVSS 302 - +		-	-	
Tensile modulus	Automotive materials (Thickness 1 mm) ⁴⁾	ISO 3795, FMVSS 302	-	•
Yield stress, 50 mm/min ISO 527-1/-2 MPa 85 / 50 Yield strain, 50 mm/min ISO 527-1/-2 % 4.4 / 20 Nominal strain at break, 50 mm/min ISO 527-1/-2 % 25 / >50 Tensile creep modulus, 1000 h, strain <= 0.5%, 23°C	Mechanical properties			dry / cond.
Yield strain, 50 mm/min ISO 527-1/-2 lsO 52	Tensile modulus	ISO 527-1/-2	MPa	3000 / 1100
Nominal strain at break, 50 mm/min ISO 527-1/-2 % 25 / >50	Yield stress, 50 mm/min	ISO 527-1/-2	MPa	85 / 50
Tensile creep modulus, 1000 h, strain <= 0.5%, 23°C	Yield strain, 50 mm/min	ISO 527-1/-2	%	4.4 / 20
SO 178	Nominal strain at break, 50 mm/min	ISO 527-1/-2	%	25 / >50
Charpy unnotched impact strength (23°C)	Tensile creep modulus, 1000 h, strain <= 0.5%, 23°C	ISO 899-1	MPa	* / 700
Charpy unnotched impact strength (-30°C) ISO 179/1eU (AJ/m²) kJ/m² (AJ/m²) N / - 6/20 Charpy notched impact strength (23°C) ISO 179/1eA (AJ/m²) 6 / 20 Charpy notched impact strength (-30°C) ISO 179/1eA (AJ/m²) 5 / - (AJ/m²) Izod notched impact strength (23°C) ISO 180/A (AJ/m²) 5 / - (AJ/m²) Izod notched impact strength (-30°C) ISO 180/A (AJ/m²) 6 / - (AJ/m²) Thermal properties Deflection temp. under load 1.8 MPa (HDT A) ISO 75-1/-2 (C) °C 75 Deflection temp. under load 0.45 MPa (HDT B) ISO 75-1/-2 (C) °C 220 Max. service temperature (short cycle operation) - (C) 200 Temperature index at 50% loss of tensile strength after 5000 h IEC 60216 (C) °C 130 Temperature index at 50% loss of tensile strength after 20000 h IEC 60216 (C) °C 109 Coefficient of linear thermal expansion, longitudinal (23-55)°C ISO 11359-1/-2 (C) E-6/K 98 Thermal conductivity DIN 52612-1 (M/m K) 0.33 J/(kg*K) 1700 Electrica	Flexural modulus	ISO 178	MPa	2900 / -
Charpy notched impact strength (23°C)	Charpy unnotched impact strength (23°C)	ISO 179/1eU	kJ/m²	N/N
Charpy notched impact strength (-30°C) ISO 179/1eA kJ/m² 5.7- Izod notched impact strength (23°C) ISO 180/A kJ/m² 5.5 / N Izod notched impact strength (-30°C) ISO 180/A kJ/m² 6.7- Isod notched impact strength (-30°C) ISO 180/A kJ/m² 6.7- Isod notched impact strength (-30°C) ISO 180/A kJ/m² 6.7- Isod notched impact strength (-30°C) Isod 180/A kJ/m² 6.7- Isod notched impact strength (-30°C) Isod 180/A kJ/m² 6.7- Isod 180/A kJ/m² kJ/m² kJ/m² 6.7- Isod 180/A kJ/m²	Charpy unnotched impact strength (-30°C)	ISO 179/1eU	kJ/m²	N / -
ISO 180/A KJ/m² 5.5 / N ISO 180/A ISO 180/A	Charpy notched impact strength (23°C)	ISO 179/1eA	kJ/m²	6 / 20
ISO 180/A kJ/m² 6 /-		ISO 179/1eA	kJ/m²	5/-
Thermal properties	, , ,			
Deflection temp. under load 1.8 MPa (HDT A)	Izod notched impact strength (-30°C)	ISO 180/A	kJ/m²	6 / -
Deflection temp. under load 0.45 MPa (HDT B)	•			
Max. service temperature (short cycle operation) - °C 200 Temperature index at 50% loss of tensile strength after 5000 h IEC 60216 °C 130 Temperature index at 50% loss of tensile strength after 20000 h IEC 60216 °C 109 Coefficient of linear thermal expansion, longitudinal (23-55)°C ISO 11359-1/-2 E-6/K 98 Thermal conductivity DIN 52612-1 W/(m K) 0.33 Specific heat capacity - J/(kg*K) 1700 Electrical properties Relative permittivity (1 MHz) IEC 62631-2-1 - 3.2 / 5 Dissipation factor (1 MHz) IEC 62631-2-1 E-4 250 / 2000 Volume resistivity IEC 62631-3-1 Ohm*m 1E13 / 1E9 Surface resistivity IEC 62631-3-2 Ohm 1E13 / 1E9				
Temperature index at 50% loss of tensile strength after 5000 h IEC 60216 °C 130	. , ,	ISO 75-1/-2		220
Temperature index at 50% loss of tensile strength after 20000 h IEC 60216 °C 109 Coefficient of linear thermal expansion, longitudinal (23-55)°C ISO 11359-1/-2 E-6/K 98 Thermal conductivity DIN 52612-1 W/(m K) 0.33 Specific heat capacity - J/(kg*K) 1700 Electrical properties Relative permittivity (1 MHz) IEC 62631-2-1 - 3.2 / 5 Dissipation factor (1 MHz) IEC 62631-2-1 E-4 250 / 2000 Volume resistivity IEC 62631-3-1 Ohm*m 1E13 / 1E9 Surface resistivity IEC 62631-3-2 Ohm 1E13 / 1E9				
Coefficient of linear thermal expansion, longitudinal (23-55)°C ISO 11359-1/-2 DIN 52612-1 Specific heat capacity E-6/K W/(m K) Specific heat capacity 98 W/(m K) Specific heat capacity 0.33 Specific heat capacity 1700 Electrical properties dry / cond. Relative permittivity (1 MHz) IEC 62631-2-1 Specific heat capacity - 3.2 / 5 Dissipation factor (1 MHz) IEC 62631-2-1 Specific heat capacity - 3.2 / 5 Dissipation factor (1 MHz) IEC 62631-2-1 Specific heat capacity - 3.2 / 5 Dissipation factor (1 MHz) IEC 62631-2-1 Specific heat capacity - 3.2 / 5 Dissipation factor (1 MHz) IEC 62631-2-1 Specific heat capacity - 3.2 / 5 Dissipation factor (1 MHz) IEC 62631-2-1 Specific heat capacity - 3.2 / 5 Dissipation factor (1 MHz) IEC 62631-3-1 Specific heat capacity Volume resistivity Ohm* 1E13 / 1E9 Surface resistivity Ohm 1E13 / 1E9			-	
Electrical properties J/(kg*K) U/(m K) J/(kg*K) 0.33 1700 Relative permittivity (1 MHz) IEC 62631-2-1 IEC 62631-2-1 IEC 62631-2-1 IEC 62631-2-1 IEC 62631-3-1 IEC 62631-3-1 IEC 62631-3-1 IEC 62631-3-1 IEC 62631-3-2 IEC 62631-3	·			
Electrical properties dry / cond. Relative permittivity (1 MHz) IEC 62631-2-1	,			
Electrical properties Relative permittivity (1 MHz) IEC 62631-2-1 - 3.2 / 5 Dissipation factor (1 MHz) IEC 62631-2-1 E-4 250 / 2000 Volume resistivity IEC 62631-3-1 Ohm*m 1E13 / 1E9 Surface resistivity IEC 62631-3-2 Ohm 1E13 / 1E9	•			
Relative permittivity (1 MHz) IEC 62631-2-1 - 3.2 / 5 Dissipation factor (1 MHz) IEC 62631-2-1 E-4 250 / 2000 Volume resistivity IEC 62631-3-1 Ohm*m 1E13 / 1E9 Surface resistivity IEC 62631-3-2 Ohm 1E13 / 1E9	Specific heat capacity	-	J/(kg*K)	1700
Dissipation factor (1 MHz) IEC 62631-2-1 E-4 250 / 2000 Volume resistivity IEC 62631-3-1 Ohm*m 1E13 / 1E9 Surface resistivity IEC 62631-3-2 Ohm 1E13 / 1E9				-
Volume resistivity IEC 62631-3-1 Ohm*m 1E13 / 1E9 Surface resistivity IEC 62631-3-2 Ohm 1E13 / 1E9				
Surface resistivity IEC 62631-3-2 Ohm 1E13 / 1E9	. ,			
,	· · · · · · · · · · · · · · · · · · ·			
Comparative tracking index, CTI, test liquid A IEC 60112 - 500	·		Ohm	
	Comparative tracking index, CTI, test liquid A	IEC 60112	-	500

Footnotes

Footnotes

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

2) The asterisk symbol ** signifies inapplicable properties.

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

4) += passed