Product Information **Ultramid®**

A 221 NATURAL-1

PA66

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Product description

Ultramid® A 221 Natural-1 is an unfilled polyamide 66, for injection moulding, with a special crystallizing agent, for fast cycles. This grade offers a good combination between primary properties of the unreinforced polyamide 66 and processing properties leading to increased productivity. These performances are associated with excellent dimensional stability and good rigidity of moulded parts.

Injection Notes

The material is supplied in airtight bags, ready for use. In case that the virgin material has absorbed moisture, it must be dried with a dehumidified air drying equipment, dew point mini -20°C. Recommended time 2-4h

Injection Advice:
• For reinforced polyamides, BASF SE recommends the use of steel with a high content of carbon, and purified for polishing, to avoid or limit the abrasion. For example: X38CrMoV5-1 (EN Norm) - 1.2367 /1.2343 (DIN Norm) or X160CrMoV12 (EN Norm) - 1.2601 /1.2379 (DIN Norm). In the case of high requirements on surface quality a mould temperature of up to 120°C can be considered.
• The processing parameters like processing temperatures are a recommendation and can be adjusted in function of injection machine size, part geometry / design.

Disclaimer

The information contained in this document is given in good faith based on our current knowledge. It is only an indication and it is in no way binding. This information must on no account be used as a substitutive for necessary prior tests which alone can ensure that a product is suitable for a given use. ANY WARRANTY OF PRODUCT PERFORMANCE, MERCHANDABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS EXPRESSLY EXCLUDED. Users are responsible for ensuring compliance with local legislation and for obtaining the necessary certifications and authorizations. Users are requested to check that they are in possession of the latest version of this document, and BASF SE is at their disposal to supply any additional information.

Safety Information

Detailed information regarding safety are available on the safety data sheet (MSDS). MSDS is sent with the first material order or available by contacting our customer services

Regulations Compliance

This product is not intended to be used for the following regulated market: food contact, drinking water, toys, cosmetics or medical devices.

This grade complies with RoHS Directive 2011/65/EU, 2015/863 and local regulations as amended.

Customer Services

Our customer services are not only concerned with manufacturing and supply of Engineering Plastics products. We are available to assist our customers in finding technical solutions that meet their requirements. Specific support is in particular offered on:
- Material selection
- Material testing
- Parts design advice, training for design engineers
- Part testing
- Design simulation
- Processing through different technologies
- Assembly and post-processing technology expertise
- Parts optimization through Computer Aided Design

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Typical values for uncoloured product at 23 °C[1)]	Test method	Unit	Values[2)]
General Properties			
Asia Pacific	-	-	**+**
Processing: Injection moulding (M), Extrusion (E), Blow moulding (B)	-	-	**M**
Colour; black (bk), uncoloured (un), coloured (co), transparent (tr)	-		**un**
Pellets	-	-	**+**
Physical			
Water absorption, 24 h in water, 23 °C	ISO 62	%	**1.1**
Moisture absorption, equilibrium 23°C/50% r.h	similar to ISO 62	%	**2.90**
Density	ISO 1183	kg/m³	**1140 / -**
Mechanical properties			**dry / cond.**
Tensile modulus	ISO 527-1/-2	MPa	**3200 / 1700**
Yield stress, 50 mm/min	ISO 527-1/-2	MPa	**95 / 65**
Tensile stress at yield, 2 in/min (ASTM)	ASTM D 638	MPa	**98 / -**
Stress at break	ISO 527-1/-2	MPa	**90 / 45**
Strain at break	ISO 527-1/-2	%	**20 / > 100**
Tensile elongation at break, 2 in/min (ASTM)	ASTM D 638	%	**15 / -**
Flexural modulus	ISO 178	MPa	**3150 / 1400**
Flexural modulus (ASTM)	ASTM D 790	MPa	**3200 / -**
Flexural strength	ISO 178	MPa	**125 / 55**
Flexural strength (ASTM)	ASTM D 790	MPa	**120 / 120**
Charpy notched impact strength ISO 179/1eA (23°C)	ISO 179/1eA	kJ/m²	**4 / 12**
Charpy impact strength ISO 179-1eU (23°C)	ISO 179/1eU	kJ/m²	**N / N**
Izod notched impact strength ASTM D 256 (23 °C)	ASTM D 256	J/m	**80 / -**
Izod impact strength ISO 180/U (23°C), MPTS	ISO 180/U	kJ/m²	**60 / -**
Thermal properties			
HDT B (0.45 MPa)	ISO 75-1/-2	°C	**200**
HDT A (1.80 MPa)	ISO 75-1/-2	°C	**90**
HDT A (1.82 MPa), ASTM	ASTM D 648	°C	**80**
Melting temperature, DSC (10°C/min)	ISO 11357-1/-3	°C	**262**
HDT A (1.80 MPa), ASTM	ASTM D 648	°C	**80**
Electrical properties			**dry / cond.**
Surface resistivity	IEC 62631-3-2	Ohm	**1E15 / 1E13**
Volume resistivity	IEC 62631-3-1	Ohm*m	**1E13 / 1E14**
Electric strength (d = 0.8 mm)	IEC 60243-1	kV/mm	**35 / -**
Electric strength (d = 2.0 mm)	IEC 60243-1	kV/mm	**22 / -**
Relative permittivity (1 MHz)	IEC 62631-2-1	-	**3.5 / -**
Dissipation factor (1 MHz)	IEC 62631-2-1	E-4	**0.033 / -**
Comparative tracking index, CTI, test liquid A	IEC 60112	-	**600 / 600**
Comparative tracking index, CTI M, test liquid B	IEC 60112	-	**500 / -**
Flammability			
Burning Behav. at 1.6 mm nom. thickn.	IEC 60695-11-10	class	**V-2**
Burning Behav. at thickness 0.8 mm	IEC 60695-11-10	class	**V-2**
Glow Wire Flammability Index (1.6 mm)	IEC 60695-2-12	°C	**700**
Injection			
Pre/Post-processing, Pre-drying, Temperature	-	°C	**80**
Pre/Post-processing, max. allowed water content	-	%	**0.2**
Injection molding cylinder temperature 1 (feed zone)	-	°C	**265 - 275**
Injection molding cylinder temperature 2 (compression)	-	°C	**270 - 280**
Injection molding cylinder temperature 3 (metering-zone, head room of screw)	-	°C	**280 - 285**
injection molding, Mold temperature, range	ISO 294	°C	**60 - 80**