

Preliminary datasheet

07/2007

Ultramid[®] T 4381 LDS

PA6/6T



Product description

Glass fibre and mineral reinforced injection-moulding grade. Good toughness, stiffness and strength, low water absorption, high melting point (295 °C). After the material has been conditioned, its mechanical properties remain stable up to 60 °C. The product is especially tailored for laser direct structuring (LDS). The structured areas can be metallized selectively. *

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air the containers must be stored in dry rooms and always carefully sealed again after portions of material have been withdrawn.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 A, B and C up to 310°C and 350°C for T 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 (T >350°C) approximately, the initial products formed being mainly carbon monoxide and ammonia, and caprolactam too in the case of Ultramid B. At temperatures above about 350°C (T >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 products.

Note

The information submitted in this publication is based on our current knowledge and experience. In view of the many factors that may affect processing and application, these data do not relieve processors of the responsibility of carrying out their own tests and experiments; neither do they imply any legally binding assurance of certain properties or of suitability for a specific purpose. It is the responsibility of those to whom we supply 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 agencies.

**The compound is intended specifically for the use in the process of manufacturing conducting path designs according to the German application of the patent 101 32 092 of LPKF Laser & Electronics AG (Osteriede 7 • 30827 Garbsen • Germany). The use of this process asserts a claim for compensation. After purchasing a LPKF laser system the claim is satisfied.*

Please address straight to LPKF Laser & Electronics AG (www.LPKF.com).

Ultramid[®] T 4381 LDS

Experimental product for LDS technology

Typical values at 23°C	Test method	Unit	Condition	Values
Properties				
Abbreviated term	ISO 1043	-	-	PA6/6T GF10M25
Density	ISO 1183	g/cm ³	-	1,52
Viscosity number (solution 0.005 g/ml sulfuric acid)	ISO 307	ml/g	-	120
Colour: natural (n), coloured (c), black (bk)	-	-	-	Bk
Water absorption, equilibrium in water at 23°C	ISO 62	%	-	4,2-5,2
Moisture absorption, equilibrium 23°C/50% r.h.	ISO 62	%	-	0,8-1,2
Processing				
Melting temperature, DSC	ISO 3146	°C	-	295
Melt temperature, injection moulding	-	°C	-	320-340
Mould temperature, injection moulding	-	°C	-	100-120
Moulding shrinkage, constrained ¹⁾	-	%	-	0,47
Flammability				
UL94 rating at 1.6 mm thickness	UL 94	class	-	
Mechanical properties				
Tensile modulus	ISO 527-2	MPa	dry/cond.	9000
Stress at break (v = 5 mm/min)	ISO 527-2	MPa	dry/cond.	110
Strain at break (v = 5 mm/min)	ISO 527-2	%	dry/cond.	2,0
Charpy unnotched impact strength +23°C	ISO 179/1eU	kJ/m ²	dry/cond.	40
Charpy notched impact strength -30°C	ISO 179/1eA	kJ/m ²	dry/cond.	40
Thermal properties				
Deflection temperature 0.45 MPa (HDT B)	ISO 75-2	°C	-	265
Thermal coefficient of linear expansion, longitudinal / transverse (-40-80)°C	DIN 53752	10 ⁻⁴ /K	-	0,3/0,5
Electrical properties				
Dielectric constant at 1 MHz	IEC 60250	-	dry/cond.	4,4 / 4,2
Dissipation factor at 1 MHz	IEC 60250	10 ⁻⁴	dry/cond.	150 / 380
Volume resistivity	IEC 60093	Ω · m	dry/cond.	4E13 / 3E12
Surface resistivity	IEC 60093	Ω	dry/cond.	>1E16
CTI, solution A	IEC 60112	-	cond.	600

Footnotes:

1) Test box with central gating, dimensions of base (107·47·1,5) mm, processing conditions: T_{Melt} = 320°C, mould surface temp. MST = 120°C