



Material Technical Data Sheet

Rilsan[®] Invent Black

Application: Additive Manufacturing – Laser Sintering (LS) technology

Rilsan[®] Invent Black is a mass-coloured Polyamide 11 powder made from 100% renewable source (castor oil). Polyamide 11 is a thermoplastic polymer that demonstrates excellent chemical resistance, high UV resistance, low water re-uptake and low density.

The Invent range of powders has been especially designed for use with all LS systems (adjustments to construction parameters may be required depending on the equipment). Rilsan[®] Invent Black is manufactured under strict quality controls and can be used in rapid prototyping of small, complex parts, showing **excellent detail resolution**, together with an **outstanding color stability** eliminating the need for post-processing.

Rilsan[®] Invent Black exhibits consistent performance while maintaining **superior mechanical properties** compared to other polymers such as Polyamide 12. The superior mechanical performance of this material, combined with its low refreshing factor (typically 40%), makes Rilsan[®] Invent Black the best choice for rapid manufacturing of black parts.

MATERIAL – TYPICAL PROPERTIES

METHOD

Mean Diameter:	50 µm	ISO 13320
Particle Size Distribution:		
Fine Particles < 20 µm	10 max. %	ISO 13320
Coarse Particles > 100 µm	10 max. %	ISO 13320
Bulk Packed Density:	0.66 g/cm ³	ISO 1068-1975
Melting Point:	201 °C	ISO 11357-3
Heat Deflection Temperature (HDT @ 1.8MPa):	44 °C	ISO 75f

SINTERED PARTS – TYPICAL PERFORMANCE (x/y direction)*

METHOD

Tensile Modulus:	1500 MPa	ISO 527-2:93-1B
Tensile Strength At Break:	45 MPa	ISO 527-2:93-1B
Elongation At Break:	45 %	ISO 527-2:93-1B
Flexural Modulus:	1200 MPa	ISO 178 (23°C)
Impact Strength (Charpy - unnotched):	No break kJ/m ²	ISO 179 1eU (23°C)
Hardness (Shore D – instantaneous):	77	ISO 868 (20°C)

* Properties are dependant upon process conditions and machine used, so these figures are only given for information

SAFETY - PRECAUTIONS

See our latest Material Safety Data Sheet before using the product. Avoid dust formation and breathing the dust.

HANDLING - STORAGE

Store product in original packaging away from moisture and heat. Under these conditions, the material will maintain its technical properties for 3 years. Once the material passes the 3 year limit, it will be necessary to perform testing of the specified data to restart the shelf life period.

The information contained in this document is based on trials carried out by our Research Centers and data selected from the literature, but shall in no event be held to constitute or imply any warranty, undertaking, express or implied commitment from our part. Our formal specifications define the limit of our commitment.

No liability whatsoever can be accepted by Arkema with regard to the handling, processing or use of the product or products concerned which must in all cases be employed in accordance with all relevant laws and/or regulations in force in the country or countries concerned.

Preliminary

Product Information

INFINAM® PA 6001 P

POLYAMIDE-12 POWDER FOR ADDITIVE FABRICATION PROCESSES

INFINAM® PA 6001 P is a fine powder especially for the use in additive fabrication. It is characterized by a high toughness and softness. Our product is suitable for manufacturing of functional prototypes, manufacturing of individual units as well as serial parts. INFINAM® PA 6001 P is especially suitable for powder bed fusion technologies.

Features

- Exploitable on common systems for powder-based additive fabrication
- Easy-to-process
- High process stability
- Excellent powder flow properties
- Excellent mechanical properties
- Excellent recyclability
- Excellent surface resolution and feature detail
- Nice surface finish
- Good resistance against numerous chemicals

The features and properties presented are to be understood as typical and are intended for reference and comparison purposes only. Due to layer-wise construction and by variation of processing conditions the actual properties of components from additive processes will vary. Due to process-related deviations the user is responsible to ensure the characteristic values required for the respective use and to carry out additional application-related tests if necessary.

Powder properties	dry / cond	Unit	Test Standard
Bulk density, powder	470	g/l	EN ISO 60
Density	1020 / -	kg/m ³	ISO 1183
Powder flow	25	s	ISO 6186
Particle size, D(50)	58	µm	ISO 13320, DIN ISO 8130-13
Rel. solution viscosity	1,62 / *	-	ISO 307
Melting temp., DSC 1st heating, powder	187 / *	°C	ISO 11357

Properties of 3D printed parts acc. ISO	dry / cond	Unit	Test Standard
Tensile modulus flat X	1700 / -	MPa	ISO 527

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Tensile modulus on-edge Y	1700 / -	MPa	ISO 527
Tensile modulus upright Z	1700 / -	MPa	ISO 527
Tensile strength flat X	50 / -	MPa	ISO 527
Tensile strength on-edge Y	50 / -	MPa	ISO 527
Tensile strength upright Z	50 / -	MPa	ISO 527
Nominal strain at break flat X, εB	16 / -	%	ISO 527
Nominal strain at break on-edge Y, εB	8 / -	%	ISO 527
Nominal strain at break upright Z, εB	8 / -	%	ISO 527

Characteristics

Key Features, Industrial Sector

Industry and Engineering, 3D Printing

Key Features, Processing

3D Printing

Key Features, Delivery form

Powder

Key Features, Electrical

Insulating

Key Features, Additives

Unfilled

Processing

Additive manufacturing, Powder bed fusion

Special Characteristics

Semi-crystalline

Delivery form

Fine powder (FP)

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Evonik Operations GmbH
Smart Materials
High Performance Polymers
45772 Marl / Germany
Tel: +49 2365 49-9878
evonik-hp@evonik.com
www.plastics-database.com

Nylon Powder

Product technical specification

Product grade: Wanfab® PN5G3W

TDSNumbering: WHSM_PN5G3W

Revision date: 2020-1-20

Version: V 1.1

Product Description

Wanfab®PN5G3W is a nylon powder composed of white powdered glass microbeads, which can be used to prepare various resin models, handicrafts and industrial parts, and is suitable for a variety of SLS printer.

Features

1. Low volatile content, little impact on equipment
2. Low molding shrinkage and good dimensional stability
3. The post-production parts are easy to clean powder, and the surface of the parts is smooth and delicate

Physical Properties*

Characteristic	Value	Unit	Testing method
Melting point	185	°C	ISO 11357-4-2014
Vicat softening point	140	°C	ISO 30, Method B 50N
Bulk density	0.5	g/cm3	ISO 9136-2-1999
D50 (median diameter)	50-60	µm	ISO 13320-2009
Tensile modulus	2700	MPa	ISO 527-1/2
Tensile Strength	>45	MPa	ISO 527-1/2
Elongation at break	5	%	ISO 527-1/2

* This performance only represents typical results and is not considered as a specification (tensile modulus, etc. are the test results of mechanical properties of printed workpieces).

Processing conditions*

	Preferred value	Scope
Print temperature field	171-172°C	170-173°C
Laser fill power	40-50W	30-55W
Laser Scan Spacing	0.15-0.2mm	0.1-0.3mm
Layer thickness	0.1mm	0.1-0.15mm

* The above typical values are for reference only, and the above process can be adjusted appropriately according to the actual situation of the equipment during the actual printing process.

Store

Before use, check whether the packaging has been damaged during transportation. The material should be stored in a cool and dry place, and the temperature should be adjusted to room temperature before opening to prevent moisture condensation. Once used, the remaining materials should be kept sealed. It is necessary to add a cover to the feed port of the processing equipment.

Disclaimer: Wanhua Chemical Group Co., Ltd. recommends that all customers should follow this product safety data sheet (MSDS) details for safe and reasonable operation of this product. We also recommend that you contact the suppliers of other ingredients in our recommended formulations to determine the characteristics and compatibility of their products before using this product. We believe these recommendations and data are factual and reliable. However, with regard to product characteristics, applications, quality, safety, product specifications, marketability, and suitability for specific purposes, the contents involved in this technical data sheet are for reference only, whether express or implied information, we do not provide no guarantees. Any information provided herein should not be construed as a license to practice the patented technology, nor an inducement to practice the patented technology without the permission of the patent owner.

Preliminary data sheet

LUVOSINT X92A-2

Ester based thermoplastic polyurethane TPU
Powder, white color

Physical Properties	Test Method	Specimen	Units	Typical Value	
Specific Gravity	ISO 1183	Sintered part	g/cm ³	1.2	
Water Absorption	23 °C, 24 h		%	< 0.5	
Melt Volume Rate	MVR 190 °C/2.16 kg	ISO 1133	Power	cm ³ /10 min	18.0
Glass Transition Temp	ISO 6721-1		°C	-13.6	
Shrinkage	Measured on test prints		%	3.0	
Mechanical Properties					
at 23 °C/ 50 % rh (according to build orientation)					
Shore Hardness A	ISO 868	Sintered part	-	88	
Flexural Modulus 20°C	1 Hz, 2 °C/min	ISO 6721-1	Sintered part	MPa	27
Flexural Modulus 60°C	1 Hz, 2 °C/min	ISO 6721-1	Sintered part	MPa	72
Tensile Strength (x-direction)	DIN 53504	Sintered S1-bar	MPa	20	
Tensile Strength (z-direction)	DIN 53504	Sintered S1-bar	MPa	15	
Elongation (x-direction)	DIN 53504	Sintered S1-bar	%	520	
Elongation (z-direction)	DIN 53504	Sintered S1-bar	%	500	
Abrasion Resistance (x-direction)	ISO 4649	Sintered part	mm ³	31	
Abrasion Resistance (z-direction)	ISO 4649	Sintered part	mm ³	28	
Compression Strength (x-direction)	ISO 604	Type A	MPa	33	
Compression Strength (z-direction)	ISO 604	Type A	MPa	40	
Compression Modulus (x-direction)	ISO 604	Type B	MPa	15	
Compression Modulus (z-direction)	ISO 604	Type B	MPa	20	
Poisson ratio (Hencky)	0.2 mm/s			0.45	
Thermal Properties					
Vicat-softening Temperature	VST A	ISO 306	MPTS ISO 3167 A	°C	90
Melting Temperature		ISO 11357		°C	160
Powder Properties					
x10	Laser diff.		µm	20	
x50	Laser diff.		µm	50	
x90	Laser diff.		µm	105	
Bulk Density			g/cm ³	0.457	
Part bed powder density			g/cm ³	0.600	

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Application Examples

Powder for laser sintering (additive manufacturing). Elastic parts with high strength and high abrasive resistance for shoe and sports industry, pipes, sealings, prosthetics and many more applications.



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Preliminary data sheet

LUVOSINT X92A-2

Ester based thermoplastic polyurethane TPU
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Recommended Processing Instructions

General

In general LUVOSINT X92A-2 can be processed on conventional lasersinter machines while observing the usual technical guidelines. In contrast to conventional polyamide powders relatively low temperatures in the process chamber should be used here. At higher temperatures above 100 °C powder flowability and process stability will decrease. Aspiration is recommended due to formation of fume.

Predrying

No predrying necessary.
The powder should be de-agglomerated by using a screening process (250 microns sieve opening) before processing.

Processing Parameters

Due to the large variety of machines and part geometries given process parameters can only be seen as an orientation.

Please use material data base of Polystyrene and change process parameters as follows:

Process Temperature	°C	100
Piston Heater	°C	85
Scan Speed	mm/s	4000
Hatch Distance	mm	0.20
Layer Thickness	mm	0.15
Laser Power	W	40

Delivery Form & Storage

The material will be delivered as 25 kg boxes on pallets.
Preferably storage should be effected in dry and normally temperatured rooms.

Headquarters

Lehmann & Voss & Co.
Alsterufer 19
20354 Hamburg
Germany
Tel +49 40 44 197-250
Fax +49 40 44 197-487
Email: luvocom@lehvoss.de

Americas

LEHVOSS North America, LLC
185 South Broad Street
Pawcatuck, CT 06379
USA
Tel +1-855-681-3226
Fax +1 860 495 2047
Email info@lehvossilc.com

Asia

LEHVOSS (Shanghai) Chemical Trading Co., Ltd.
Unit 1590, L'Avenue,
99 Xianxia Road, Changning District,
Shanghai 200051
China
Tel +86 21 60577297
Email info@lehvoss.cn

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