

LUVOSINT®

Additive manufacturing solutions



Experience
the
3Difference



3D printed midsole, LUVOSINT® TPU X92A-2, Under Armour, USA

LUVOSINT® Materials for laser sintering

Laser sintering is a technique for the additive manufacturing of plastic components. The layered structure offers a level of design freedom as well as engineering opportunities that cannot be achieved with injection moulding and other techniques. Consequently, laser sintering does not compete with these methods but complements them. This requires that materials and their properties should correspond to those that you know and use today.

Our LUVOSINT® materials meet this requirement. Material and laser sintering machine are adapted exactly to your individual component. Together with our technology partners, we offer you complete solutions – for the quality-assured manufacturing of additively produced components.



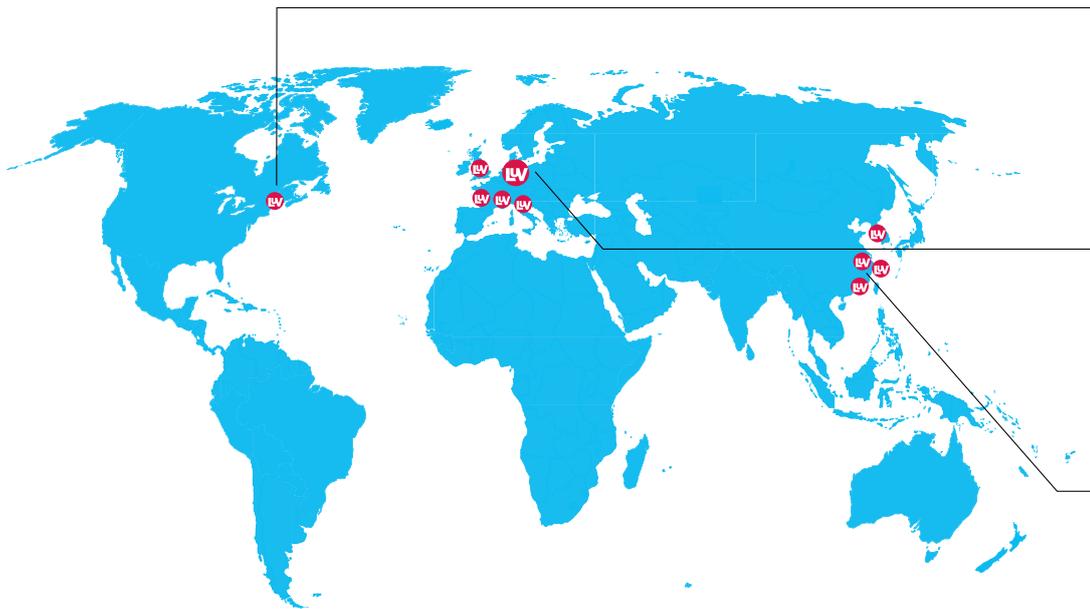
Tactile robot safety system AIRSKIN® for man-machine interaction (see front page), LUVOSINT® TPU X92A-2 WT, printed by Bernstein Innovation



**CUSTOMIZED
POLYMER MATERIALS**

Our service offer

Are your business ideas aimed at the individualization of products? If this is the case, we will be glad to offer you support by working with our partners to develop the material, procedure and production process. We are permanently developing base polymers for laser sintering, from PP to PEEK, which are then modified to your requirements, regardless of whether these requirements relate to the mechanical aspects, colour or functionality. After all, one thing is certain: materials for individual components have to be equally individual!



Pawcatuck, CT, USA



Hamburg, Germany



Kunshan, China



Global presence and support

We are represented around the world. To help us react better to individual client and market requirements as well as to shorten routes and processing times, we produce on three continents. Apart from our main plant in Hamburg, Germany, we also have production sites in the USA and China. Please feel invited to visit our local 3D printing labs.



LUVOSINT®

Base polymers and variants

LUVOSINT® TPU

LUVOSINT® TPU is a thermoplastic polyurethane powder. The molecular bonding pattern of TPU resembles the structure of classic polyurethanes. However, in this case the three-dimensional structure of the cross-linked building blocks is linear. Polymer chains are able to slide off each other. TPUs are thus fusible and can be processed like other thermoplastics. Yet, at the same time, they still possess properties of “classical” polyurethanes. This combination makes them very interesting – for laser sintering as well. We offer the following variants:

LUVOSINT® TPU X92A-1 NT

As a strong, wear-resistant and elastic substance, LUVOSINT® TPU X92A-1 offers new application opportunities. Thanks to its convenient processing window and full recyclability of the powder cake, it is a natural choice for series production; tailor-made shoes and clothes, complex tube geometries or orthopaedic parts are some examples of new 3D print applications.



STRUCTURAL



Customized midsoles.
LUVOSINT® TPU X92.

LUVOSINT® TPU X92A-2 WT

This grade is a refinement of LUVOSINT® TPU X92A-1 with enhanced reproduction of fine detail while maintaining the same mechanical performance. This TPU type has a white background coloration, thus improving subsequent dye coloring of the components.

LUVOSINT® TPU X92A-1064 WT

This TPU grade is a special version of X92A grade, designed to work with fiber and diode lasers, which you will find in desktop printers as well as highly productive industrial printers. Wavelength 900 to 1064 nm. Color is light grey which offers the opportunity for dye coloring.

LUVOSINT® TPU Z86A-1 WT

LUVOSINT® TPU Z86A-1 WT is based on an aliphatic TPU grade. It offers a lower Shore hardness and more elasticity compared to LUVOSINT® TPU X92A grades. It is designed for printed footwear application as it offers an outstanding high energy return performance. It is also very much chemically resistant and UV-safe and can therefore be used in rough industrial or outdoor applications as well.



LUVOSINT®

Base polymers and variants

LUVOSINT® PP

LUVOSINT® PP is a polypropylene powder. Polypropylene is an everyday material and is used in almost every sector of industry. The diversity of PP materials is therefore correspondingly large. Although the strength of PP does not match that of high-performance polymers, laser-sintered PP with its excellent resistance to chemicals, minimal water absorption and water permeability, opens up new applications in the fields of packaging, cosmetics, automotive, robotics and many other areas.

LUVOSINT® PP 9703

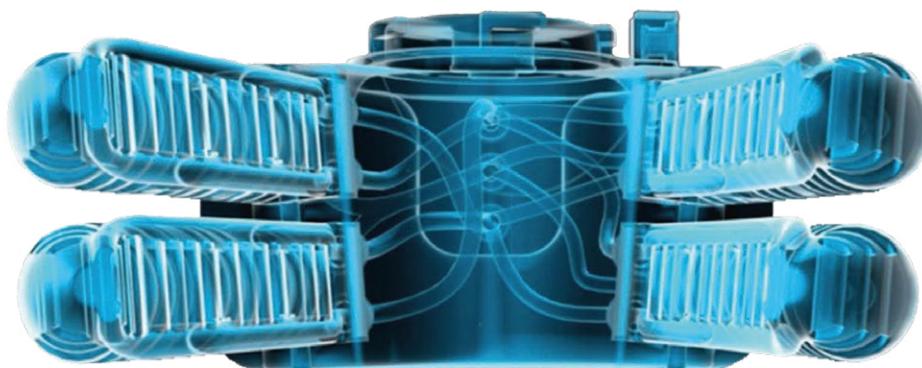
LUVOSINT® PP 9703 is a tough and hard PP type based on a random copolymer. The impact strength of the material makes it suitable for use in applications such as the design of air-powered actuators. LUVOSINT® PP 9703 absorbs practically no moisture and therefore does not become brittle due to the effect of dry compressed air. The exceptional chemical resistance of the PP makes it suitable for applications in aggressive atmospheres or media, such as in battery technology. We offer LUVOSINT® PP 9703 in white and black color.

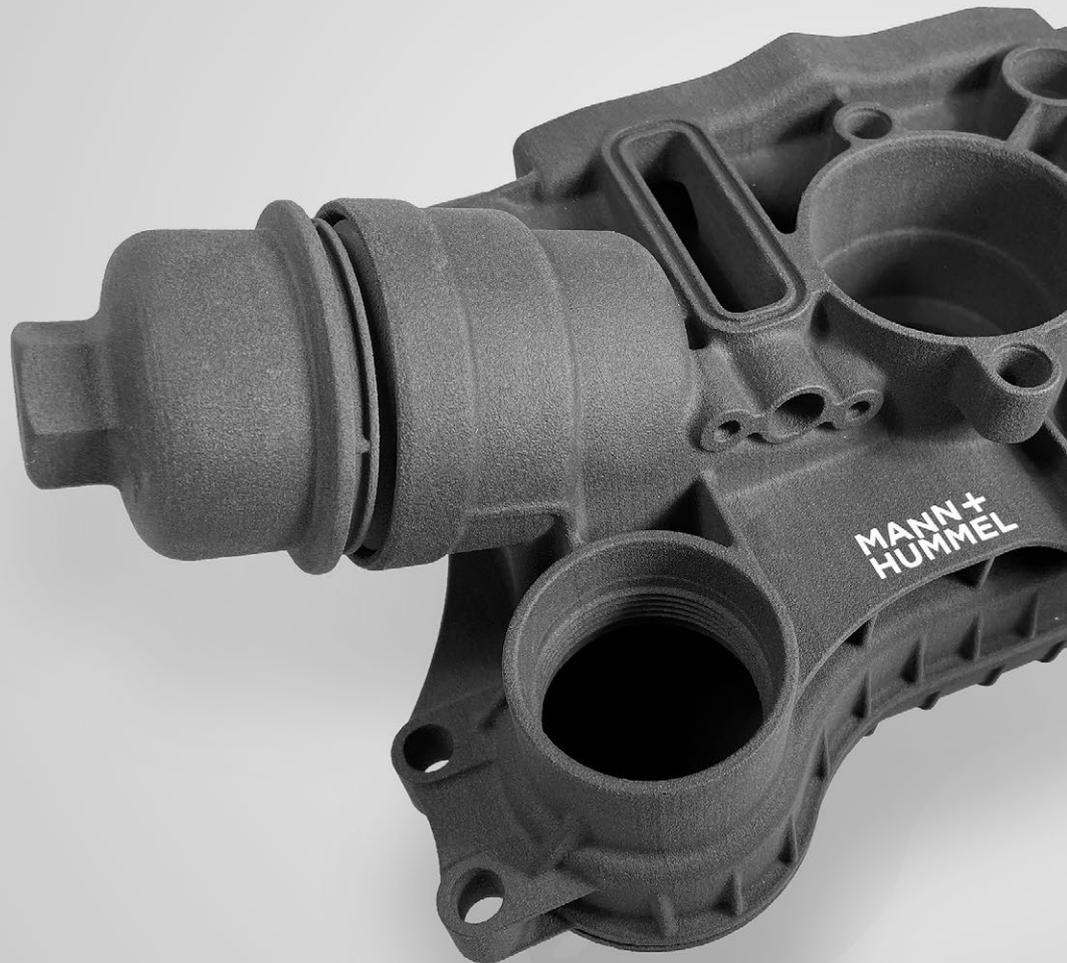


Printed automotive brake fluid container
with LUVOSINT® PP 9703



STRUCTURAL





LUVOSINT® PA12

fully re-usable powder for higher efficiency

Fully re-usable

Part bed powder of LUVOSINT® PA12 9270 BK can be recycled entirely. It avoids waste and improves cost efficiency.

Truly black

LUVOSINT® PA12 9270 BK is based on a black compound, perfect for automotive applications. IMDS ID number available.

Good mechanical properties

LUVOSINT® PA12 9270 BK allows manufacturing of components with high strength and toughness.

Dimensional stability & low warpage

LUVOSINT® PA12 9270 BK is a perfect material for production of large part geometries due to its low warping tendency.



STRUCTURAL

Oil filter system for E-axis and hydraulic gear box.
LUVOSINT® PA12 9270 BK.

Good chemical resistance

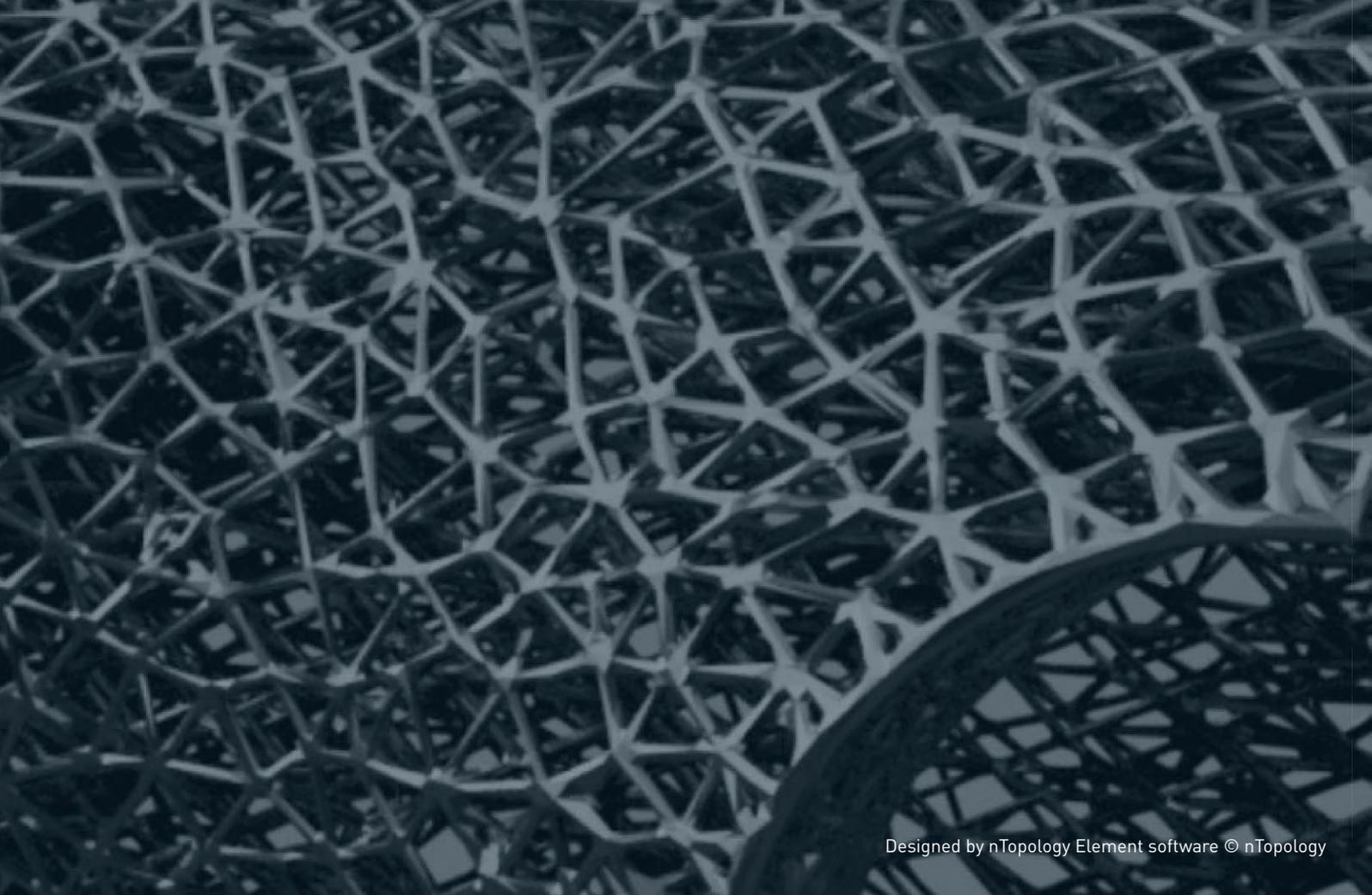
LUVOSINT® PA12 9270 offers good chemical resistance to fuels, lubricants, oils, solvents or salt solutions.

Low water absorption

Due to the high specific density, the water absorption of LUVOSINT® PA12 9270 BK is significantly decreased compared to comparable PA12 materials for laser sintering.

Flame retardance

LUVOSINT® PA12 9270 BK meets the requirements of UL94V-2 at a wall thickness of 3 mm.



Designed by nTopology Element software © nTopology

LEHVOSS

a solution provider

New materials need adjustments of process technology. We therefore closely cooperate with machine suppliers when developing new materials. But we also do with suppliers of post processing technology, topology software and others. Please contact us directly to learn more about the state of the art of industrial 3D printing. We would like to support your business as a partner right from the beginning.

Product data*

LUVOSINT® PP 9703 - Random copolymer polypropylen PP-R, white or black color

Physical Properties	Test Method	Specimen	Unit	Typical Value
Specific Gravity	ISO 1183-3	Sintered part	g/cm ³	0.9
Water Absorption		23 °C, 24 h	%	< 0.2
Shrinkage			%	3.0
Mechanical Properties at 23 °C / 50% rh (according to build orientation)				
Tensile Modulus (y-direction)	ISO 527-1,-2	Sintered bar	GPa	1.00
Tensile Modulus (z-direction)	ISO 527-1,-2	Sintered bar	GPa	0.99
Tensile Strength (y-direction)	ISO 527-1,-2	Sintered bar	MPa	24
Tensile Strength (z-direction)	ISO 527-1,-2	Sintered bar	MPa	21
Elongation at FMAX (y-direction)	ISO 527-1,-2	Sintered bar	%	11
Elongation at FMAX (z-direction)	ISO 527-1,-2	Sintered bar	%	8
Elongation at break (y-direction)	ISO 527-1,-2	Sintered bar	%	22
Elongation at break (z-direction)	ISO 527-1,-2	Sintered bar	%	17
Thermal Properties				
Vicat-softening Temperature	ISO 306	MPTS ISO 3167 A	°C	118
Melting Temperature (DCS peak)	ISO 11357		°C	149
Onset of Crystallization Temp. (peak)	ISO 11357		°C	110
Powder Properties				
x10	Laser diff.		µm	25
x50	Laser diff.		µm	65
x90	Laser diff.		µm	115
Bulk Density			g/cm ³	0.345

LUVOSINT® TPU X92A-2 WT - Ester-based thermoplastic polyurethane TPU - powder, white colour

Physical Properties	Test Method	Specimen	Unit	Typical Value
Specific Gravity	ISO 1183	Sintered part	g/cm ³	1.2
Water Absorption			%	< 0.5
Melt Volume Rate	ISO 1133	Powder	cm ³ /10 min	18
Mechanical Properties at 23 °C / 50% rh (according to build orientation)				
Shore Hardness A	ISO 868	Sintered part		88
Flexural Modulus 20 °C	ISO 6721-1	Sintered part	MPa	72
Flexural Modulus 60 °C	ISO 6721-1	Sintered part	MPa	27
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	%	267
Elongation (z-direction)	DIN 53504	Sintered S1-bar	%	180
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
Thermal Properties				
Vicat-softening Temperature	ISO 306	MPTS ISO 3167 A	°C	90
Melting Temperature	ISO 11357		°C	160
Powder Properties				
x10	Laser diff.	Powder	µm	20
x50	Laser diff.	Powder	µm	50
x90	Laser diff.	Powder	µm	105
Bulk Density		Powder	g/cm ³	0.457
Part Bed Powder Density		Powder	g/cm ³	0.600

* Further data and data sheets, also for other products, available on request.

Any recommendations made for use of Seller's materials are made to the best of Seller's knowledge and are based upon prior tests and experience of the Seller believed to be reliable; however, Seller does not guarantee the results to be obtained and all such recommendations are non-binding – also with regard to the protection of third party's rights –, do not constitute any representation and do not affect in any way Buyer's obligation to examine and/or test the Seller's goods with regard to their suitability for Buyer's purposes. No information given by the Seller is to be construed in any way as a guarantee regarding characteristics or duration of use, unless such information has been explicitly given as a guarantee.

Europe & Head Office

Lehmann&Voss&Co. KG
Alsterufer 19
20354 Hamburg
Germany
Tel +49 40 44 197 412
E-mail luvocom@lehvoss.de

North America

LEHVOSS North America, LLC
185 South Broad Street
Pawcatuck, CT 06379
USA
Tel +1 855 681 3226
E-mail info@lehvoss.us

Asia

LEHVOSS (Shanghai) Chemical Co., Ltd.
Unit 4805 Maxdo Centre
8 Xingyi Road, Changning District
Shanghai 200336
China
Tel +86 21 6278 5181
E-mail info@lehvoss.cn

Our expertise in materials



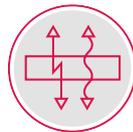
STRUCTURAL



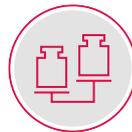
RESISTANT



TRIBOLOGICAL



CONDUCTIVE



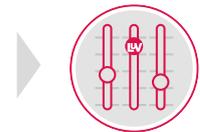
WEIGHT



PROTECTION



SURFACE



CUSTOMIZED
POLYMER MATERIALS