



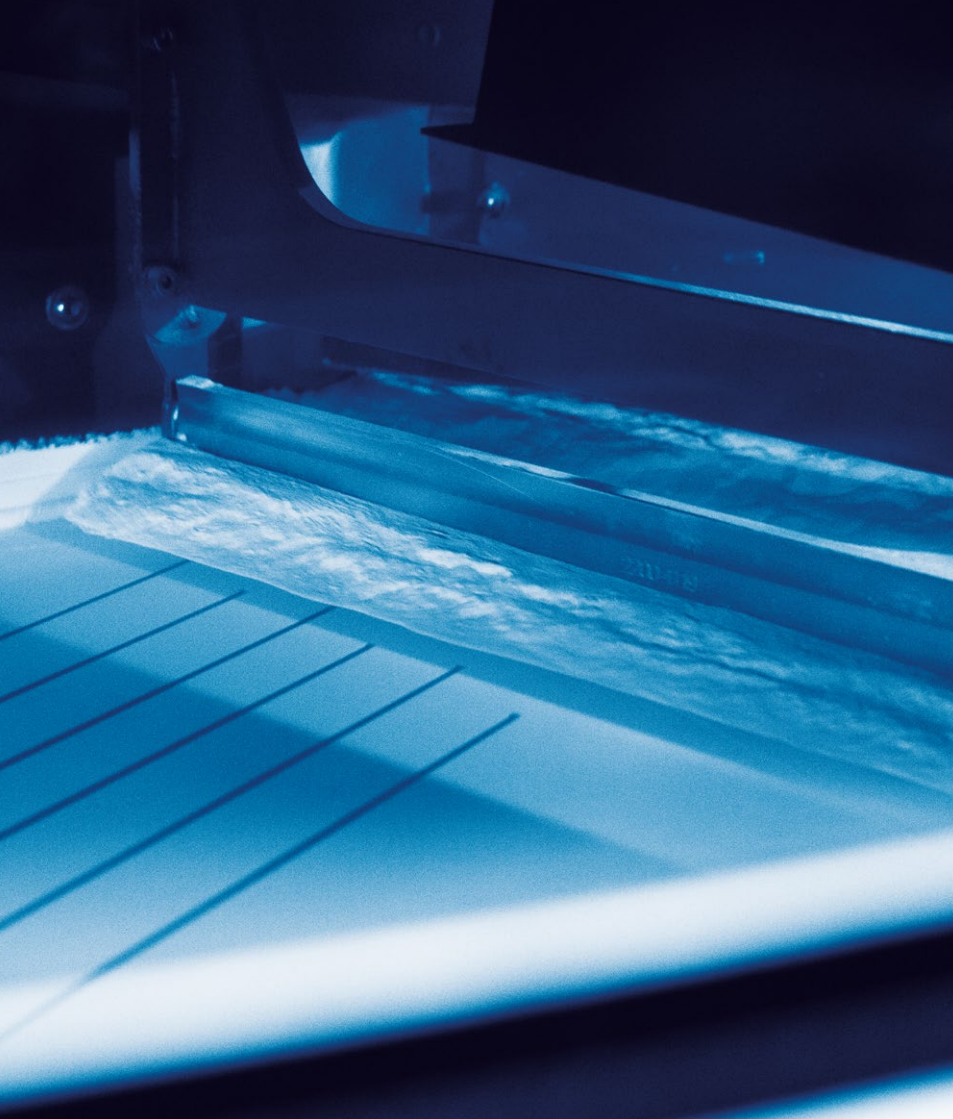
# 3D Printing Materials

## Powder Bed Fusion - 2024



## Discover one of the largest portfolios of high-performance materials for Additive Manufacturing

At Forward AM, we accompany you from first idea to final printed part. Our portfolio includes materials and solutions for all major Additive Manufacturing technologies - from powders to plastic and metal filaments to photopolymers.



## POWDER BED FUSION

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Explore the Ultrasint® line of performance polymers that are perfectly adapted to scaled Additive Manufacturing production for any application.

# Mechanical Properties Comparison

		PP Line	PA11 Line					TPU Line			
		PP 1400 Black	PA11 (Conditioned)	PA11 Black (Conditioned)	PA11 CF (Conditioned)	PA11 rCF (Conditioned)	PA11 ESD (Conditioned)	TPU01 for HP MJF	TPU 88A	TPU 88A Black	TPU 90A LT
<b>HDT A</b> [°C] ISO 75-2		62	76	62	151	182	111	97 <sup>(3)</sup>	98 <sup>(3)</sup>	101,7 <sup>(3)</sup>	
<b>HDT B</b> [°C] ISO 75-2		102	176	177	189	191	186				
<b>Shore A Hardness</b> DIN ISO 7619-1		-	-	-	-	-	-	88-90	88-90	86-88	90
<b>Tensile Strength</b> [MPa] ISO 527-2 (23 °C)	XY	29	45	45	71	69	55	9	8	8	9
	ZX	29	46	45	48	42	47	7	7	5	7
<b>Elongation at Break</b> [%] ISO 527-2 (23 °C)	XY	25	45	42	11	10	22	280 <sup>(1)</sup>	270 <sup>(1)</sup>	360 <sup>(1)</sup>	280 <sup>(1)</sup>
	ZX	25	31	34	17	9	31	150 <sup>(1)</sup>	130 <sup>(1)</sup>	100 <sup>(1)</sup>	120 <sup>(1)</sup>
<b>E Modulus</b> [MPa] ISO 527-2 (23 °C)	XY	1250	1100	1150	4500	4300	2300	85 <sup>(2)</sup>	75 <sup>(2)</sup>	85 <sup>(2)</sup>	110 <sup>(1)</sup>
	ZX	1300	1250	1200	2000	1750	1500	-	-	-	
<b>Charpy Impact Strength (notched)</b> [kJ/m <sup>2</sup> ] ISO 179-1	XY	4,0	8,3	11	6,7	7,2	7,3	No break	No break	No break	No break
	ZX	4,0	4,5	11	4,7	2,7	5,3	No break	No break	No break	No break
<b>Charpy Impact Strength (unnotched)</b> [kJ/m <sup>2</sup> ] ISO 179-1	XY	34	198	No break	63	52	101	-	-	-	-
	ZX	28	85	75	51	38	107	-	-	-	-

(1) DIN 53504, S2

(2) ISO 527-2, 1A

(3) Vicat/A (10 N) / °C - DIN EN ISO 306

(4) Izod Test Method A with notched ASTM D256

# Printer Compatibility

- Compatible
- Open parameter kit required

		PP Line	PA11 Line					TPU Line			
		PP 1400 Black	PA11	PA11 Black	PA11 CF	PA11 rCF	PA11 ESD	TPU01 for HP MJF	TPU 88A	TPU 88A Black	TPU 90A LT
HP	5200 Series							■			
Prodways	P1000 / P1000 S / P1000 X	□	□	□	□	□	□		□	□	□
3D Systems	Sinterstation / Vanguard / sPro 60	■	■	■	■	■	■		■	■	■
Nexa3D	QLS 230 / QLS 236 / QLS 260 / XYZprinting MfgPro Series		■	■	■	■	■		■	■	■
Farsoon	Flight Series	■		■	■	■				■	
	252P Series / 403P Series / eForm	■	■	■	■	■	■		■	■	■
EOS	P1 Series / P3 Series / P7 Series		□	□					□	□	□

# Tests & Certification Summary

- Statement Available
- Test in Progress

		PP Line	PA11 Line				TPU Line				
		PP 1400 Black	PA11	PA11 Black	PA11 CF	PA11 rCF	PA11 ESD	TPU01 for HP MJF	TPU 88A	TPU 88A Black	TPU 90A LT
Product Statements	Skin Contact	■	■					■	■	■	■
	USP Class IV		■								
	Food Contact		■								
	UL Blue Card							■			
Application Specific Testing	Long Term Heat Aging										
	UV Resistance ISO 4892-2	■	■	■				■	■	■	■
	Hydrolysis Resistance							■	■		■
	Air Tightness / Burst Pressure							■	■		
	Temperature Performance High Temperature Mechanicals	■	■		■	■	■	■	■		

		PP Line	PA11 Line					TPU Line			
		PP 1400 Black	PA11	PA11 Black	PA11 CF	PA11 rCF	PA11 ESD	TPU01 for HP MJF	TPU 88A	TPU 88A Black	TPU 90A LT
Electrical	Specific Volume Resistivity IEC 62631-3-1	■	■	■	■	■	■	■			
	Specific Surface Resistivity IEC 62631-3-2	■	■	■	■	■	■				
	Dielectric Strength IEC 60234-1	■	■	■	■	■	■	■			
	CTI IEC 60112										
Flame Retardance	Fatigue Rossflex							■	■	■	■
	Flammability UL 94	■	■	■	■	■	■	■			
	Flammability FMVSS 302							■	■		



# Sustainability Summary

- Currently Available
- In Progress

	PP Line	PA11 Line					TPU Line			
	PP 1400 Black	PA11	PA11 Black	PA11 CF	PA11 rCF	PA11 ESD	TPU01 for HP MJF	TPU 88A	TPU 88A Black	TPU 90A LT
Recyclable	■	■	■	■	■	■	■	■	■	■
Refresh Rate (Old/New in %) *	60/40	50/50	50/50	50/50	50/50	50/50	80/20	80/20	80/20	80/20
Take Back Program		■	■				■	■	■	■
Life Cycle Assessment	■	■	■				■	■	■	
Carbon Compensation	■						■	□	□	□

\*Typical value. The exact refresh rate depends on the machine type and printing technology, processing parameters, material usage intensity, packing density, part geometry and individual part property requirements.

**Life Cycle Assessment (LCA):** Study that calculates how much environmental impact is associated with every step of a product. The environmental score for these materials is representative of the stages of “Raw material extraction and production” and “Material preparation for 3D printing”.

**Carbon Compensation:** A strategy to reduce carbon emissions by investing in practices that absorb or mitigate CO2.

**Take Back Program:** The collection of powder and end parts to reduce plastic waste and promote sustainability.

**Refresh Rate:** minimum ratio of fresh / virgin powder one needs to add to your pre-used, unsintered powder to maintain its best printing quality.



# Post-Processing Summary

■ Compatible

	PP Line	PA11 Line					TPU Line			
	PP 1400 Black	PA11	PA11 Black	PA11 CF	PA11 rCF	PA11 ESD	TPU01 for HP MJF	TPU 88A	TPU 88A Black	TPU 90A LT
Chemical Smoothing	■	■	■	■	■	■	■	■	■	■
Ultracur3D® Coat F+		■	■				■	■	■	■
Dyeing		■					■	■		■

# Materials enabled by BASF

Available through Printer Manufacturers



HP 3D HR PP



FLEXA Performance  
PA11 Onyx  
PA11 CF  
PA11 ESD

# Ultrasint® PP 1400 Black



## Technology:

Powder Bed Fusion

## Color:

Black

## Machine Compatibility:

SLS machines equipped with roller recoater  
Farsoon - Prodways - 3D Systems - Alternative laser systems (e.g. diode or fiber lasers)



## Easy to Process

Time and cost savings



## Isotropic Behaviour

Facilitates data preparation and gives printing flexibility



## Chemical Resistance

Ideal for media flow and storage parts

# Ultrasint® PP 1400 Black

## Suited for:



Transportation



Industrial



Insoles



Automotive

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## Technical Specifications

Mechanical properties	Standard	X / Z
Charpy Impact Strength Unnotched (kJ/m <sup>2</sup> )	ISO 179-1	34 / 28
E-Modulus (MPa)	ISO 527-2	1250 / 1300
Tensile Strength (MPa)	ISO 527-2	29 / 29
Elongation at Break (%)	ISO 527-2	25 / 25



[Complete TDS](#)

## Post-Processing

### Chemical Smoothing



Read the whitepaper to learn in detail how to surface treat thermoplastic polymer 3D-printed parts and obtain parts with improved airtightness.

Whitepaper available.

### Ultracur3D UV Adhesion Promoter



A solvent-borne UV-Primer to improve the adhesion for rigid 3D-Printing Materials. It is compatible with commercially available topcoats and clearcoats.

# Ultrasint® PA11



## Technology:

Powder Bed Fusion

## Color:

White/Black

## Machine Compatibility:

SLS machines

EOS - Farsoon - Prodways - 3D Systems - XYZprinting



## High Toughness

Able to withstand high mechanical loads and not splinter



## Bio-sourced

Bio-derived from sustainable castor oil



## High Elongation at Break

Elongation at Break up to 45%

# Ultrasint® PA11

## Suited for:



Medical  
Applications



Industrial



Consumer  
Goods



Automotive

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## Technical Specifications

Mechanical properties	Standard	X / Z
Charpy Impact Strength Unnotched (kJ/m²)	ISO 179-1	198 / 85
E-Modulus (MPa)	ISO 527-2	1100 / 1250
Tensile Strength (MPa)	ISO 527-2	45 / 46
Elongation at Break (%)	ISO 527-2	45/31



[Complete TDS](#)

## Tests & Certifications

[Skin Contact /](#)

[Biocompatibility](#)

[Food Contact](#)

ISO 10993-10

ISO 10993-5

USP Class IV

Statement Available

## Post-Processing

### Chemical Smoothing



Both mechanical and chemical smoothing will improve material performance while enhancing the appeal, durability, surface roughness and overall quality.

### Ultrasur3D® Coat F+



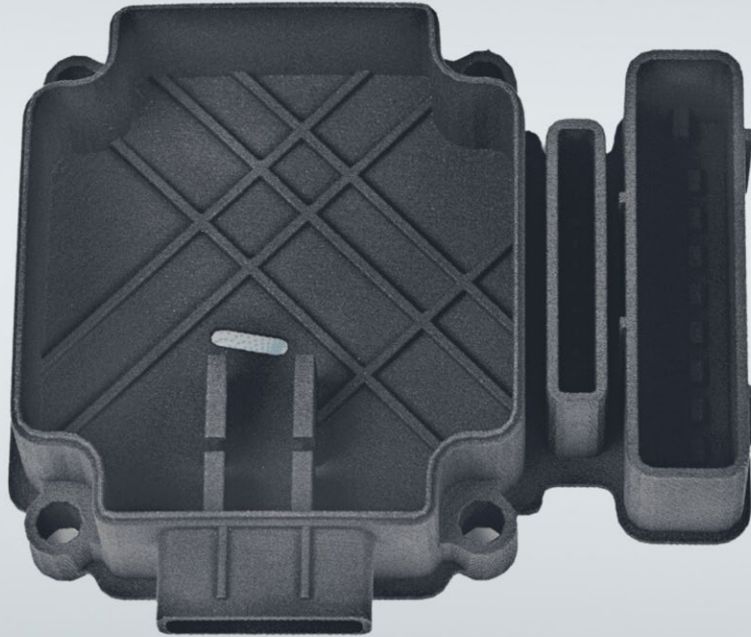
The Forward AM Ultrasur3D® Coat F+ is a flexible waterborn 2k-basecoat designed to offer exceptional flexibility for 3D Printing Materials and enables new possibilities for advanced applications.

### Dyeing



Liquid dyeing ensures that color evenly reaches all surfaces of the parts including small cavities, lattices, and hollowed parts.

# Ultrasint® PA11 Black



## Technology:

Powder Bed Fusion

## Color:

White/Black

## Machine Compatibility:

SLS machines

EOS - Farsoon - Prodways - 3D Systems - XYZprinting



## High Toughness

Able to withstand high mechanical loads and not splinter



## Bio-sourced

Bio-derived from sustainable castor oil



## High Elongation at Break

Elongation at Break up to 45%



# Ultrasint® PA11 Black

## Suited for:



Medical  
Applications



Industrial



Consumer  
Goods



Automotive

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## Technical Specifications

Mechanical properties	Standard	X / Z
Charpy Impact Strength Unnotched (kJ/m <sup>2</sup> )	ISO 179-1	no break / 75
E-Modulus (MPa)	ISO 527-2	1150 / 1200
Tensile Strength (MPa)	ISO 527-2	28 / 26
Elongation at Break (%)	ISO 527-2	42 / 34



[Complete TDS](#)

## Post-Processing

### Chemical Smoothing



Both mechanical and chemical smoothing will improve material performance while enhancing the appeal, durability, surface roughness and overall quality.

### Ultrasur3D® Coat F+



The Forward AM Ultrasur3D® Coat F+ is a flexible waterborn 2k-basecoat designed to offer exceptional flexibility for 3D Printing Materials and enables new possibilities for advanced applications.

# Ultrasint® PA11 CF

Carbon Fiber



## Technology:

Powder Bed Fusion

## Color:

Black

## Machine Compatibility:

SLS machines

Farsoon - Prodways - 3D Systems



### Carbon-Fiber Reinforced

Excellent for high strength and rigidity applications



### High impact resistance

Charpy impact unnotched up to 63 kJ/m<sup>2</sup>, good option to replace metal parts



### High Strength to Weight Ratio

Key for lightweight structures

# Ultrasint® PA11 CF

## Suited for:



Manufacturing



Industrial



Consumer Goods



Automotive

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## Technical Specifications

Mechanical properties	Standard	X / Z
Charpy Impact Strength Unnotched (kJ/m <sup>2</sup> )	ISO 179-1	63 / 45
E-Modulus (MPa)	ISO 527-2	4550 / 1700
Tensile Strength (MPa)	ISO 527-2	71 / 37
Elongation at Break (%)	ISO 527-2	11 / 5.2



Complete TDS

## Tests & Certifications

### Bio-sourced

Bio-derived from sustainable castor oil

### Thermal Performance

Good heat-ageing performance

## Post-Processing

### Chemical Smoothing



Both mechanical and chemical smoothing will improve material performance while enhancing the appeal, durability, surface roughness and overall quality.

### Ultracur3D® Coat F+



The Forward AM Ultracur3D® Coat F+ is a flexible waterborn 2k-basecoat designed to offer exceptional flexibility for 3D Printing Materials and enables new possibilities for advanced applications.



# Ultrasint® PA11 rCF

Carbon Fiber

## Technology:

Powder Bed Fusion

## Color:

Black

## Machine Compatibility:

SLS machines

Farsoon - Prodways - 3D Systems



### Carbon-Fiber Reinforced

Excellent for high strength and rigidity applications



### High impact resistance

Charpy impact unnotched up to 63 kJ/m<sup>2</sup>, good option to replace metal parts



### High Strength to Weight Ratio

Key for lightweight structures



### Recycled Carbon Fiber

# Ultrasint® PA11 rCF

## Suited for:



Manufacturing



Industrial



Consumer Goods



Automotive

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## Technical Specifications

Mechanical properties	Standard	X / Z
E-Modulus (MPa)	ISO 527-2	4300 / 1750
Tensile Strength (MPa)	ISO 527-2	69 / 42
Elongation at Break (%)	ISO 527-2	10 / 9



Complete TDS

## Post-Processing

### Chemical Smoothing

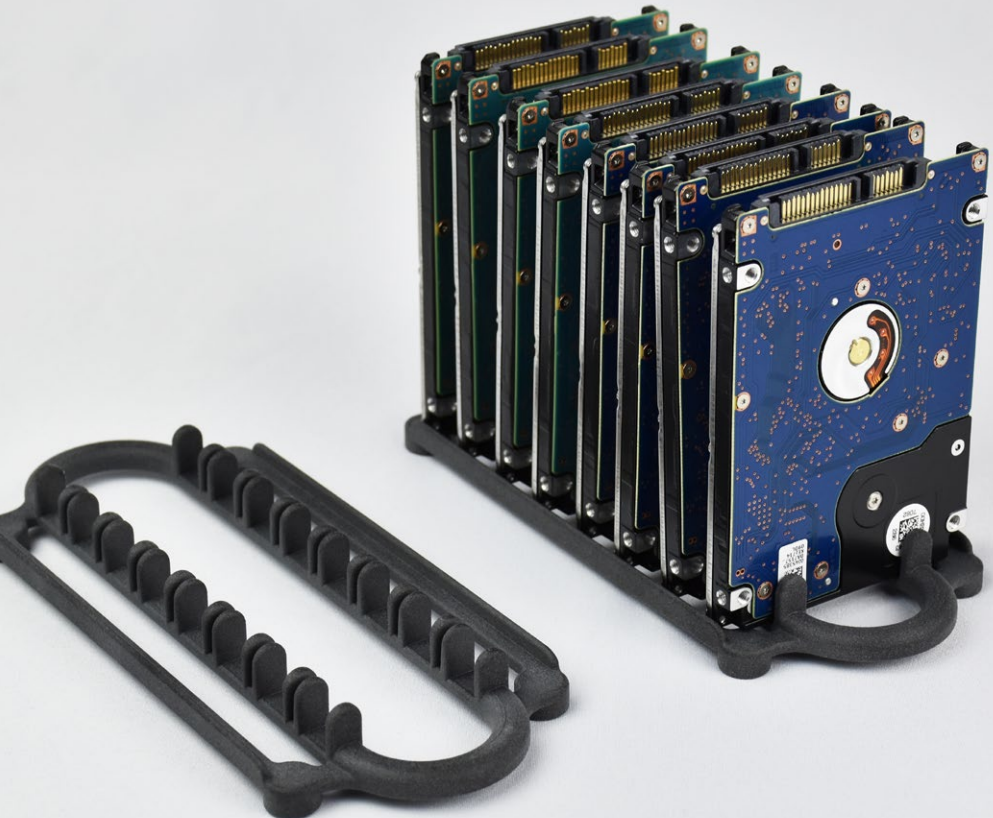


Both mechanical and chemical smoothing will improve material performance while enhancing the appeal, durability, surface roughness and overall quality.

### Ultracur3D® Coat F+



The Forward AM Ultracur3D® Coat F+ is a flexible waterborn 2k-basecoat designed to offer exceptional flexibility for 3D Printing Materials and enables new possibilities for advanced applications.



# Ultrasint® PA11 ESD

Electrostatic Safety Discharge

**Technology:**

Powder Bed Fusion

**Color:**

Gray

**Machine Compatibility:**

SLS machines

Farsoon - Prodways - 3D Systems



**High Toughness**

Able to withstand high mechanical loads and not splinter



**Electrostatic Safety Discharge**

Reduces the risk of electrostatically induced damage or failure



**Bio-sourced**

Bio-derived from sustainable castor oil

# Ultrasint® PA11 ESD

## Suited for:



Electronics



Industrial



Robotics



Automotive

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## Technical Specifications

Mechanical properties	Standard	X / Z
Charpy Impact Strength Unnotched (kJ/m <sup>2</sup> )	ISO 179-1	101 / 107
E-Modulus (MPa)	ISO 527-2	2300 / 1550
Tensile Strength (MPa)	ISO 527-2	55 / 47
Elongation at Break (%)	ISO 527-2	22 / 31



Complete TDS

## Tests & Certifications

Electrical Volume & Surface Resistivity

IEC 62631-3-1

IEC 62631-3-2

Thermal Performance

Good heat-ageing

performance

## Post-Processing

Chemical Smoothing



Both mechanical and chemical smoothing will improve material performance while enhancing the appeal, durability, surface roughness and overall quality.

Ultrasur3D® Coat F+



The Forward AM Ultrasur3D® Coat F+ is a flexible waterborn 2k-basecoat designed to offer exceptional flexibility for 3D Printing Materials and enables new possibilities for advanced applications.



# Ultrasint® TPU01



## Technology:

Powder Bed Fusion

## Color:

Gray

## Machine Compatibility:

MJF Machines

HP Jet Fusion 5200 Series



## Highly flexible

Shore A 88 hardness



## High Reusability

Up to 80% of powder  
reusability



## Lattice Structures

Enabled by  
BASF Ultrasim®

# Ultrasint® TPU01

## Suited for:



Footwear



Industrial



Sports



Automotive



Medical  
Applications

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QR code



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## Technical Specifications

Mechanical properties	Standard	X / Z
Charpy Impact Strength Notched -10°C (kJ/m <sup>2</sup> )	ISO 179-1	46 / 44
E-Modulus (MPa)	ISO 527-2, 1A	85 / 85
Tensile Strength (MPa)	DIN 53504, S2	9 / 7
Elongation at Break (%)	DIN 53504, S2	280 / 150



Complete TDS

## Tests & Certifications

### Skin Contact

ISO 10993-10  
& ISO 10993-5

### UV Stability

ISO 4892-2B Cycle 3  
ISO 4892-2A Cycle 1

## Post-Processing and Related Services

### Chemical Smoothing



Both mechanical and chemical smoothing will improve material performance while enhancing the appeal, durability, surface roughness and overall quality.

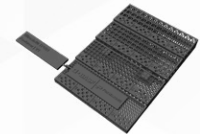
Whitepaper available.

### Ultracur3D® Coat F+



Flexible waterborn 2k-basecoat designed to offer exceptional flexibility for elastic 3D Printing Materials and enables new possibilities for advanced applications.

### Ultrasim® 3D Lattice Design



Lattice engineering unlocks the potential of high-performance materials for any application. Customized lattices can be engineered to specific mechanical properties.

# Ultrasint® TPU 88A



## Technology:

Powder Bed Fusion

## Color:

White

## Machine Compatibility:

All SLS machines

Farsoon - EOS - 3D Systems - XYZprinting



## High Reusability

Up to 80% of powder reusability



Excellent  
Surface Quality  
and High Level  
of Detail



## Highly flexible

Shore A 88 hardness

# Ultrasint® TPU 88A

## Suited for:



Footwear



Industrial



Sports



Automotive



Medical  
Applications

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## Technical Specifications

Mechanical properties	Standard	X / Z
Charpy Impact Strength Notched -10°C (kJ/m <sup>2</sup> )	DIN EN ISO 179-1	60 / 58
E-Modulus (MPa)	ISO 527-2, 1A	75 / 75
Tensile Strength (MPa)	DIN 53504, S2	8 / 7
Elongation at Break (%)	DIN 53504, S2	270 / 130



Complete TDS

## Tests & Certifications

### Skin Contact

ISO 10993-10  
& ISO 10993-5

### UV Stability

ISO 4892-2B Cycle 3  
ISO 4892-2A Cycle 1

## Post-Processing and Related Services

### Chemical Smoothing



Both mechanical and chemical smoothing will improve material performance while enhancing the appeal, durability, surface roughness and overall quality.

### Ultracur3D® Coat F+



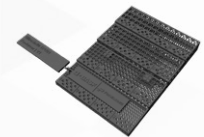
The Forward AM Ultracur3D® Coat F+ is a flexible waterborn 2k-basecoat designed to offer exceptional flexibility for 3D Printing Materials and enables new possibilities for advanced applications.

### Dyeing



Liquid dyeing ensures that color evenly reaches all surfaces of the parts including small cavities, lattices, and hollowed parts.

### Ultrasim® 3D Lattice Design



Lattice engineering unlocks the potential of high-performance materials for any application. Customized lattices can be engineered to specific mechanical properties.

# Ultrasint® TPU 88A Black

## Technology:

Powder Bed Fusion

## Color:

Black

## Machine Compatibility:

SLS machines including Desktop Machines

EOS - Farsoon - XYZprinting - 3D Systems



Suitable for  
Desktop  
Machines



High Reusability  
Up to 80% of powder  
reusability



High Elasticity  
and Rebound

Elongation at Break

- up to 360%



# Ultrasint® TPU 88A Black

## Suited for:



Footwear



Industrial



Sports



Automotive



Medical  
Applications

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## Technical Specifications

Mechanical properties	Standard	X / Z
Charpy Impact Strength Notched -30°C (kJ/m <sup>2</sup> )	DIN EN ISO 179-1	No break / No break
E-Modulus (MPa)	ISO 527-2, 1A	85/85
Tensile Strength (MPa)	DIN 53504, S2	8/5
Elongation at Break (%)	DIN 53504, S2	360/100



[Complete TDS](#)

## Tests & Certifications

[UV Stability](#)

[Skin Contact](#)

ISO 4892-2A Cycle 1

ISO 10993-10  
& ISO 10993-5

## Post-Processing

[Chemical Smoothing](#)



Read the whitepaper to learn in detail how to surface treat thermoplastic polymer 3D-printed parts and obtain parts with improved airtightness.

Whitepaper available.

[Ultracur3D® Coat F+](#)



Flexible waterborn 2k-basecoat designed to offer exceptional flexibility for elastic 3D Printing Materials and enables new possibilities for advanced applications.



# Ultrasint® TPU 90A LT

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## Technology:

Powder Bed Fusion

## Color:

White

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## Machine Compatibility:

All SLS machines

Farsoon - EOS - 3D Systems - XYZprinting



Lightweight



High Rebound



Highly flexible



# Ultrasint® TPU 90A LT

Suited for:



Footwear



Industrial



Sports



Automotive



Medical  
Applications

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## Technical Specifications

Mechanical properties	Standard	X / Z
Tensile Modulus (MPa)	ISO 527-2, 1A	110
Energy Return (%)	DIN 53512	66
Density (g/kg)	DIN EN ISO 1183-1	1.05
Elongation at Break (%)	DIN 53504, S2	280



[Complete TDS](#)

## Tests & Certifications

Cytotoxicity

Passed

## Post-Processing and Related Services

### Chemical Smoothing



Both mechanical and chemical smoothing will improve material performance while enhancing the appeal, durability, surface roughness and overall quality.

### Ultracur3D® Coat F+



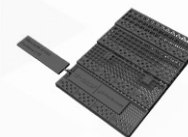
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### Dyeing



Liquid dyeing ensures that color evenly reaches all surfaces of the parts including small cavities, lattices, and hollowed parts.

### Ultrasim® 3D Lattice Design



Lattice engineering unlocks the potential of high-performance materials for any application. Customized lattices can be engineered to specific mechanical properties.



## Have a 3D printing project in mind?

At Forward AM, we drive the industrialization of Additive Manufacturing.

We accompany customers from first idea to final printed part - on global scale, at highest quality.

Get in touch with us:

[sales@basf-3dps.com](mailto:sales@basf-3dps.com)



Speyerer Straße 4  
69115 Heidelberg, Germany

+49 6221 67417900

[sales@basf-3dps.com](mailto:sales@basf-3dps.com)

**[forward-am.com](http://forward-am.com)**