Estane® 3D TPU M95A-545 OR UV

Technical Data Sheet

Type: Polyether Thermoplastic Polyurethane (TPU)

Uses: HP Multi-Jet Fusion (MJF)

Base Resin Information:

Physical Properties	Value (Metric)	Unit	Test Method
Hardness (5 sec)	95	Shore A	ASTM D-2240
Specific Gravity	1.17		ASTM D-792
T_m (by DSC)	200	°C	Lubrizol DSC

- Testing samples were injection molded to 80 mils or 2 mm thickness.
- Prior to testing, samples were conditioned at 23°C for 48 hours.
- Listed values are "typical (average) values" and should not/cannot be applied for specification purposes and do not constitute any agreed contractual specification/quality of Estane® 3D TPU M95A-545 OR UV.

Multi-Jet Fusion Printed Part Information:

Physical Properties	Full Print Bed Build	Half Print Bed Build	Unit	Test Method
	100% Fresh Powder (Generation 5)			
Specific Gravity	1.10 - 1.15			ASTM D-792
Properties in X				
Hardness (5 sec)	90		Shore A	ASTM D-2240
Abrasion Volume Loss	100 (140)	80 (100)	mm^3	DIN-53516 / ISO-4649
Tensile Strength	17 (11)	18 (14)	MPa	DIN-53504 / ISO-37
Elongation at Break	400 (180)	430 (340)	%	DIN-53504 / ISO-37
Tear Strength (Die C)	80 (80)	95 (96)	KN/m	ASTM D-624
Flexural Modulus	85		MPa	ASTM D-790
Properties in Z				
Hardness (5 sec)	90		Shore A	ASTM D-2240
Abrasion Volume Loss	90 (120)	80 (100)	mm^3	DIN-53516 / ISO-4649
Tensile Strength	8 (5)	8 (6)	MPa	DIN-53504 / ISO-37
Elongation at Break	90 (30)	110 (70)	%	DIN-53504 / ISO-37
Tear Strength (Die C)	35 (33)	45 (44)	KN/m	ASTM D-624
Dimensional Properties				
Dimensional Accuracy in XY	+/- 1.0		mm	

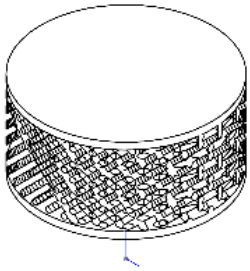
- Listed values are "typical (average) values" and should not/cannot be applied for specification purposes and do not constitute any agreed contractual specification/quality of Estane® 3D TPU M95A-545 OR UV.
- Listed values were printed with using HP 4200 Multi-Jet Fusion printer and print bed density was approximately 7 %.
- Generation 5 values were obtained when 80% recycled and 20% fresh powder blend was used in full bed and half bed printing cycles with 7% print bed density.
- Tensile specimens were printed in Type 2 per ISO-37 or S2 per DIN-53504.
- Dimensional properties were measured with the dimensions ranged from 3 to 100 mm.

The information contained herein is believed to be reliable, but no representations, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications or the results to be obtained. The information often is based on laboratory work with small-scale equipment and does not necessarily indicate end product performance or reproducibility. Formulations presented may not have been tested for stability and should be used only as a suggested starting point. Because of the variations in methods, conditions and equipment used commercially in processing these materials, no warranties or guarantees are made as to the suitability of the products for the applications disclosed. Full-scale testing and end product performance are the responsibility of the user. Lubrizol Advanced Materials, Inc. shall not be liable for and the customer assumes all risk and liability for any use or handling of any material beyond Lubrizol Advanced Materials, Inc.'s direct control. The SELLER MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Nothing contained herein is to be considered as permission, recommendation nor as an inducement to practice any patented invention without permission of the patent owner.

© 2019 The Lubrizol Corporation.
All rights reserved. All marks are the property of The Lubrizol Corporation.

http://go.lubrizol.com/EP

Application Example: MJF Printed Lattice Structure



Design Characteristics	Value	Unit
Outside Diameter	50	mm
Lattice element diameter	1.5	mm
Center to Center distance	4	mm
Solid plate thickness	2	mm

- This geometry is designed to provide physical properties of general lattice structure (as shown).

Physical Properties of Printed Part	80% Reclaimed / 20% Virgin Powder Blend		Test Method
	Value	Unit	
Properties in XY			
Vertical Resiliency	52	%	ASTM D-2632
Swing-arm Resiliency	55	%	DIN-53512
Compression Set at Room Temp	18	%	50% Deflection for 6 hrs
Compression Set at 50 °C	30	%	50% Deflection for 6 hrs
Properties in Z			
Vertical Resiliency	53	%	ASTM D-2632
Swing-arm Resiliency	57	%	DIN 53512
Compression Set at Room Temp	17	%	50% Deflection for 6 hrs
Compression Set at 50 °C	19	%	50% Deflection for 6 hrs

- Properties of lattice parts may vary depending on part design.
- These values should only be taken as exemplary properties of lattice structure printed by Estane® 3D TPU M95A-545 OR UV, should not/cannot be applied for specification purposes and do not constitute any agreed contractual specification/quality of Estane® 3D TPU M95A-545 OR UV.

Reclaimed Powder Information:

- Standard refresh rate of Estane® 3D TPU M95A-545 OR UV is 80% reclaimed and 20% virgin.
- As the powder blend is reclaimed for more printing cycles, the yellowness of the powder blend increases.
- The print mode assumes a high reclaim rate as the blend has been tested up to 10th generation.

- Powder yellowness values can vary significantly depending on measurement location, print bed density and part types.

The information contained herein is believed to be reliable, but no representations, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications or the results to be obtained. The information often is based on laboratory work with small-scale equipment and does not necessarily indicate end product performance or reproducibility. Formulations presented may not have been tested for stability and should be used only as a suggested starting point. Because of the variations in methods, conditions and equipment used commercially in processing these materials, no warranties or guarantees are made as to the suitability of the products for the applications disclosed. Full-scale testing and end product performance are the responsibility of the user. Lubrizol Advanced Materials, Inc. shall not be liable for and the customer assumes all risk and liability for any use or handling of any material beyond Lubrizol Advanced Materials, Inc.'s direct control. The SELLER MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Nothing contained herein is to be considered as permission, recommendation nor as an inducement to practice any patented invention without permission of the patent owner.

© 2019 The Lubrizol Corporation.
All rights reserved. All marks are the property of The Lubrizol Corporation.

Powder Caking Information:

• Estane® 3D TPU M95A-545 OR UV is specially developed to provide EASY and COLD unpacking.
• This feature may provide decreased stress to an operator during powder cleaning and unpacking process.
• The powder caking properties are shown below.

Powder Caking Properties	Estane® M95A	Test Method
Maximum Stress at Break	9.14 kPa	Lubrizol
Strain at Break	4.4 mm	Lubrizol

- Samples were oven aged at 140°C for 18.5 hours and cooled down to 23°C prior to testing.
- Listed values were measured according to Lubrizol's internal test method.
- Listed values are "typical (average) values" and should not/cannot be applied for specification purposes and do not constitute any agreed contractual specification/quality of Estane® 3D TPU M95A-545 OR UV.

Supply Form and Standard Packaging

• **Estane® 3D TPU M95A-545 OR UV** is supplied in powder form and packaged in 30 liter or 300 liter HP certified packaging.

The information contained herein is believed to be reliable, but no representations, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications or the results to be obtained. The information often is based on laboratory work with small-scale equipment and does not necessarily indicate end product performance or reproducibility. Formulations presented may not have been tested for stability and should be used only as a suggested starting point. Because of the variations in methods, conditions and equipment used commercially in processing these materials, no warranties or guarantees are made as to the suitability of the products for the applications disclosed. Full-scale testing and end product performance are the responsibility of the user. Lubrizol Advanced Materials, Inc. shall not be liable for and the customer assumes all risk and liability for any use or handling of any material beyond Lubrizol Advanced Materials, Inc.'s direct control. The SELLER MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Nothing contained herein is to be considered as permission, recommendation nor as an inducement to practice any patented invention without permission of the patent owner.

© 2019 The Lubrizol Corporation.
All rights reserved. All marks are the property of The Lubrizol Corporation.