Version 2021/06/29

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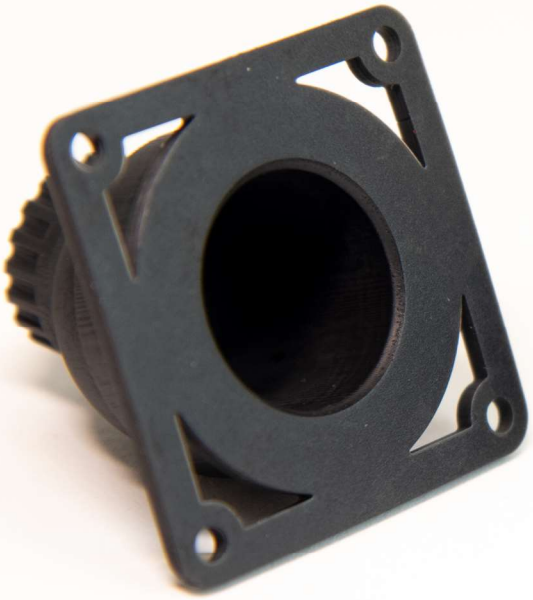

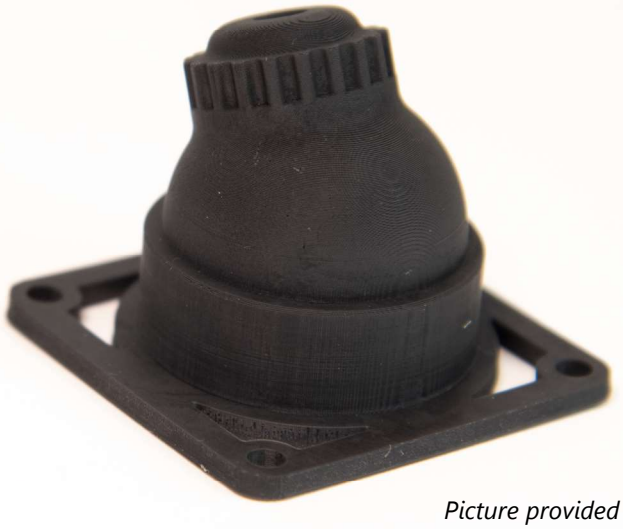

Picture provided by Stratasys

LOCTITE® 3D 3955™

HDT280 FST Photopolymer Black

LOCTITE®
Henkel Corporation
loctite3dp@henkel.com

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BLACK

LOCTITE 3D 3955™

LOCTITE 3D 3955 is a halogen free, high performance, high modulus material with excellent flexural and tensile physical properties.

LOCTITE 3D 3955 passes UL94 V-0 flammability requirements and FST (AITM2-0002, AITM2-0007, AITM3-0005) and its high HDT allows it to withstand harsh environments with negligible deformation.

Parts printed with LOCTITE 3D 3955 showcase an outstanding surface finish making it ideal for connector and interior parts for aerospace and rail.

Benefits:

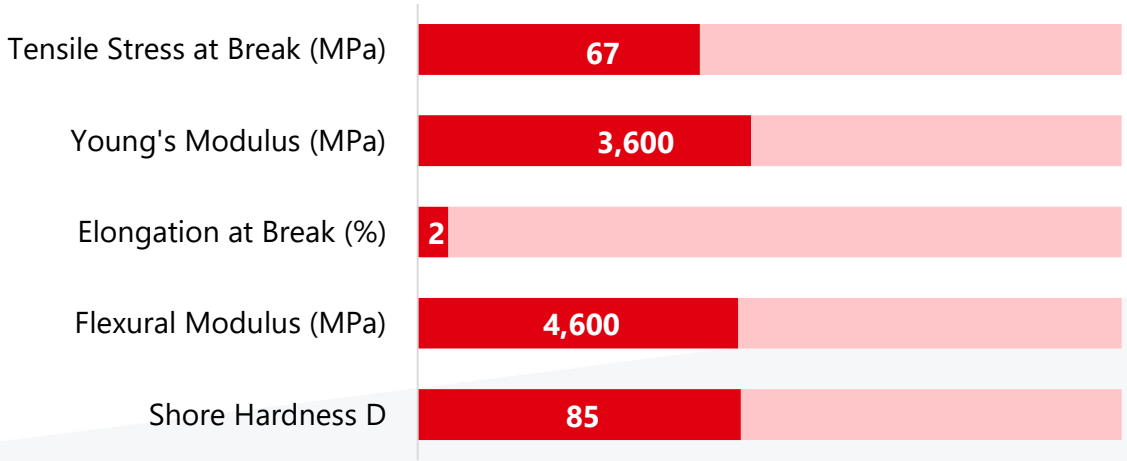
- Fire Safety Material
- Halogen Free
- Excellent flexural and tensile physical properties

Ideal for:

- HVAC Components for Aircraft
- Clips and Plugs for Control Systems/Cabinets
- Connectors, Electronic Housings

Markets:

Industry | Automotive | Aerospace



Values shown are linked to LOCTITE 3955 Black as reference, please refer to the specific mechanical properties for each of the colors shown in this document

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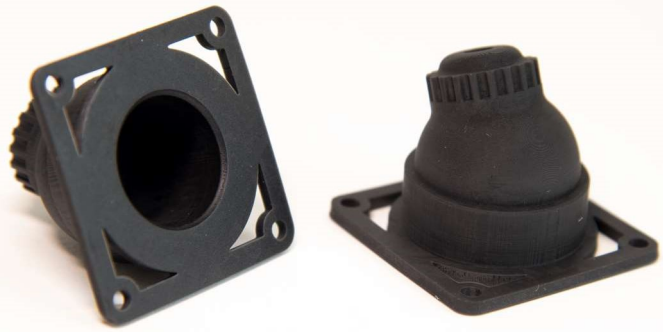

PHYSICAL PROPERTIES

Mechanical Properties	Measure	Method	Green	Post Processed
Tensile Stress at Yield	MPa	ASTM D638	-	66.7 ± 4.7 [1]
Tensile Stress at Break	MPa	ASTM D638	-	65.5 ± 5.4 [1]
Young's Modulus	MPa	ASTM D638	-	3556 ± 194 [1]
Elongation at Break	%	ASTM D638	-	2.1 ± 0.3 [1]
Flexural Modulus	MPa	ASTM D790	-	4643 ± 228 [2]
Flexural Elongation at Break	%	ASTM D790	-	2.6 ± 0.6 [2]
Flexural Stress at Break	MPa	ASTM D790	-	112 ± 20 [2]
IZOD Impact (Notched)	MPa	ASTM D256	-	23 ± 3 [3]
Shore Hardness (0s, 3s)	D	ASTM D2240	-	84, 82 [4]
Other Properties				
Solid Density	g/cm^3	ASTM 792	-	1.39 [5]

Liquid Properties	Measure	Method	Value
Viscosity at 65°C	cP	ASTMD7867	830 [6]
Liquid Density at 65°C	g/cm^3	ASTMD1475	1.26 [7]

"All specimen are printed unless otherwise noted. All specimen were conditioned in ambient lab conditions at 19-23°C / 40-60% RH for at least 24 hours." ASTM Methods: D638 Type IV, 5 mm/min, D790-B, 2 mm/min, D648, D256 Notched IZOD (Printed Notch), 6 mm x 12 mm, D570 0.125" x 2" Disc 24hr@ 25°C, D2240, Type "D" (0, 3 seconds), D7867, D1475

Internal Data Sources:
[1] FOR17914, 18058, 18045 [2] FOR18044, 18059 [3] FOR12561 [4] FOR20025 [5] FOR15859 [6] FOR29635 [7] FOR12989

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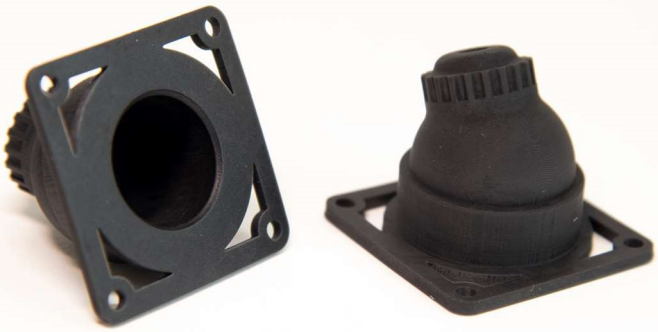

PHYSICAL PROPERTIES

Thermal Properties	Measure	Method	Green	Post Processed
HDT at 0.455 MPa	°C	ASTM D648	-	>300 [1]
HDT at 1.82 MPa	°C	ASTM D648	-	214 [1]
CTE (24°C to 140°C)	(m/m)/°C	ASTM E831	-	81.2 ± 3.3 [2]
CTE (140°C to 280°C)	(m/m)/°C	ASTM E831	-	136.4 ± 2.8 [2]
Thermal Ageing (105°C for 1000 hours)	%	ASTM D790-D	-	<5% [3]

Electrical Properties	Measure	Method	Green	Post Processed
Dielectric Strength	kV/mm	ASTM D149	-	24.9 ± 1.0 [4]
Volume Resistivity (XY)	Ω·cm	ASTM D257	-	2.8 E+17 [5]
Volume Resistivity (Z)	Ω·cm	ASTM D257	-	4.3 E+16 [5]
Surface Resistivity (XY)	Ω·cm	ASTM D257	-	1.4 E+17 [5]
Surface Resistivity (Z)	Ω·cm	ASTM D257	-	2.3 E+17 [5]
AC Relative Permittivity (Dielectric Constant)[6]				
at 50 Hz (XY)	none	ASTM D150	-	2.9
at 1 kHz (XY)	none	ASTM D150	-	3
at 1 MHz (XY)	none	ASTM D150	-	2.9
at 50 Hz (Z)	none	ASTM D150	-	3.5
at 1 kHz (Z)	none	ASTM D150	-	3.5
at 1 MHz (Z)	none	ASTM D150	-	3.3
AC Loss Characteristic (Dissipation Factor)[6]				
at 50 Hz (XY)	none	ASTM D150	-	0.001
at 1 kHz (XY)	none	ASTM D150	-	0.007
at 1 MHz (XY)	none	ASTM D150	-	0.015
at 50 Hz (Z)	none	ASTM D150	-	0.004
at 1 kHz (Z)	none	ASTM D150	-	0.009
at 1 MHz (Z)	none	ASTM D150	-	0.017

Internal Data Sources:
[1] FOR20579 [2] FOR14194 [3] FOR13830 [4] FOR31592 [5] FOR31594 [6] FOR31593

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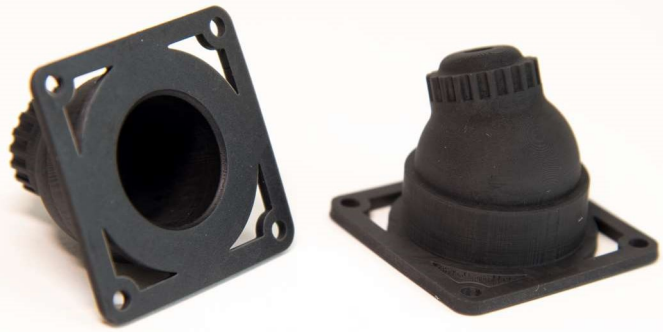

PHYSICAL PROPERTIES

Flame, Smoke, Toxicity	Measure	Method	Green	Post Processed
Flammability, Vertical	V Rating	UL 94	-	V-0 at 3 mm [9]
Flammability, 12 sec	P/F	AITM2-0002	-	Pass at 6 mm [1]
Flammability, 60 sec	P/F	AITM2-0002	-	Pass at 6 mm [2]
Smoke (Gas Components)	P/F	AITM3-0005	-	Pass at 6 mm [3]
Smoke Density	P/F	AITM2-0007	-	Pass at 6 mm [4]
Rate of Smoke Generation	P/F	ASTM E662	-	Pass [5]
Toxic Gas Generation	-	BSS 7239	-	Complete [5]
Caloric Content	MJ/kg	ASTM E1354	-	13 [5]
Flammability	R22	EN 45545-2	-	compliant to HL1 at 3 mm
Flammability	R23, R24	EN 45545-2	-	compliant to HL2 at 3 mm

Chemical Compatibility	Measure	Method	Green	Post Processed
168hr Soak in Gasoline @ 25°C	%	Weight Change	-	< 0.2 [6]
168hr Soak in Diesel @ 25°C	%	Weight Change	-	< 0.2 [7]
168hr Soak in Kerosene @ 25°C	%	Weight Change	-	< 0.2 [8]

Internal Data Sources:
[1] FOR9674 [2] FOR9673 [3] FOR12856 [4] FOR12855 [5] GEN527 [6] FOR23214 [7] FOR23215 [8] FOR23216 [9] FOR20590

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STORAGE CONDITIONS

Best results with LOCTITE 3D 3955 when stored in a dry place from 15°C to 30°C. Storage outside of these conditions may result in reduced performance.

PRE-MELT REQUIREMENTS

LOCTITE 3D 3955 requires pre-melt of material before use. It is recommended to heat it in the provided 1 kg container at 80°C for 4 hours or until the resin is fully liquified in the container. Shake container before pouring material into tray.

Pre-Melt material should be kept at 60°C to maintain fluidity and should be used within 2 weeks of melting for best results.

MACHINE SETTINGS

LOCTITE 3D 3955 Black is formulated to print optimally on any heated DLP machine. It is recommended to print with 385-405 nm wavelength projectors with irradiance between 3-7 mW/cm^2. Layer time is given here at 5 mW/cm^2.

This material must be printed at or above 55°C. It is recommended to print at or above 60°C.

Exposure time for an intensity of 5 mW/cm^2		
Layer Thickness (µm):	50	100
Base Cure Time (s):	20	25
Model Layer Cure Time (s):	2.3	5

LIMITATIONS

Vat Printer: LOCTITE 3D 3955 is not compatible with SLA printing process

LCD printers: LOCTITE 3D 3955 formula shows limited path forward for LCD projector printers at this time.

https://www.loctiteam.com/printer-validation-settings/

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POST PROCESSING

LOCTITE 3D 3955 requires post processing to achieve specified properties. Prior to post curing, support structures and excess resin should be removed from the printed part.

A thermal cure is the only curing method required.
User must wear suitable respiratory protection during cleaning process.

1. Preheat LOCTITE 3D Cleaner T wash to 60°C
2. Cleaner T wash in closed bottle, agitate by hand for 30 seconds at 60°C
3. Manually clean any leftover residue using warm (60°C) LOCTITE 3D Cleaner T
4. Remove excess LOCTITE 3D Cleaner T parts using compressed air at 30 PSI
5. Rinse residual LOCTITE 3D Cleaner T off parts using Acetone Wash Bottle, do not soak in Acetone (optional)
6. Place in room temperature oven (25°C) and power on oven
7. Start heating oven with 3°C per minute ramp from 25°C to 190°C
8. Hold temperature of 190°C for 6 hours
9. Increase oven temperature by 3°C per minute ramp from 190°C to 210°C
10. Hold oven temperature for 1 hour at 210°C
11. Turn off oven and allow enclosed oven to cool

- Do not quench or expose to cold air until oven temperature is below 40°C
- If parts have large cross-sectional areas or large solid cross sections we recommend slower ramping speeds
- Note: Glycol Ether TPM can be used in lieu of Loctite 3D Cleaner T
- Glycol Ether TPM oxidizes at elevated temperatures over time. Consult the MSDS of TPM and contact the supplier for further guidance. Use appropriate antioxidants and regularly measure peroxide concentration.

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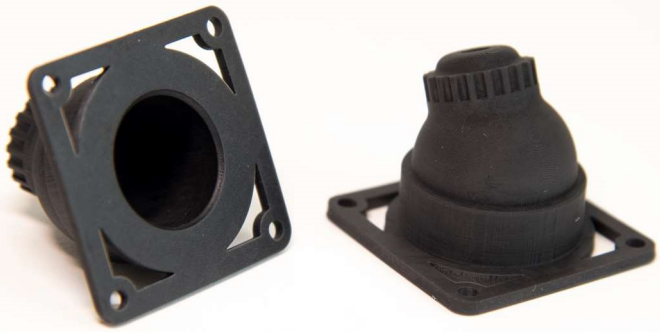

NOTE

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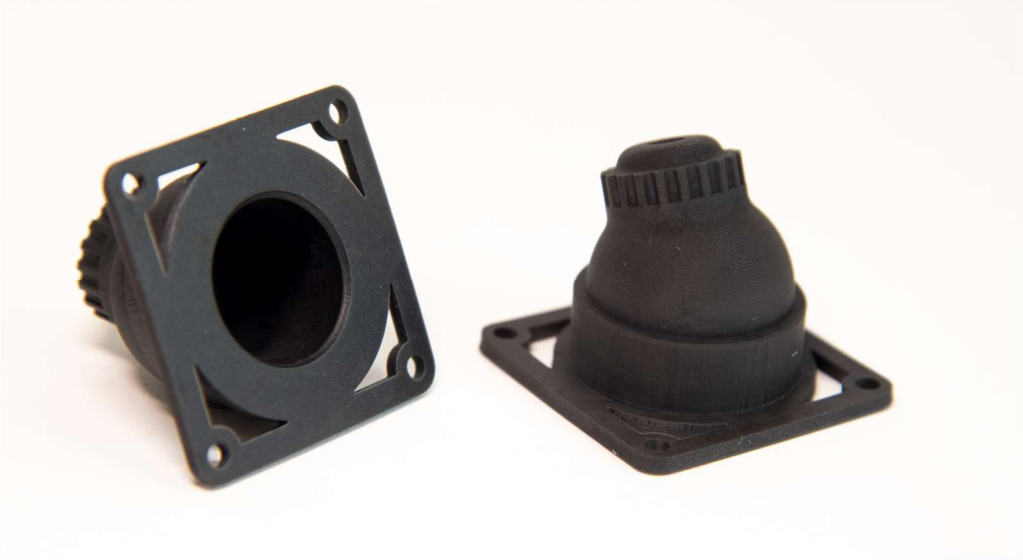

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