3955™

HDT280

FST

Black

LOCTITE®
5110 Port Chicago Hwy
Concord CA 94520

03/03/2021 **Preliminary v4.2**

3955™ HDT280 FST Black

Description

LOCTITE® 3955™ is a halogen free, high performance, high modulus material with excellent flexural and tensile physical properties. The material passes UL94 flammability V-0 and FST (AirBus AITM2-0002, AITM2-0007, AITM3-0005) and its high HDT allows it to withstand harsh environments with negligible deformation. Parts printed with 3955 showcase an outstanding surface finish making it ideal for connector and interior parts for aerospace and rail. LOCTITE® 3955™ has been tested in QUV exterior weathering conditions (ASTM G-154 @ Cycle 1) for 1600 hours with less than a 15% change in Flexural properties.[16].

Available Colors: Black

Mechanical Properties	Method	Thermal Post Cure
Tensile Stress at Break	ASTM D638	66 ± 4 MPa [5]
Young's Modulus	ASTM D638	3595 ± 126 MPa [5]
Elongation at Failure	ASTM D638	2.27 ± 0.2% [5]
Flexural Stress at Break	ASTM D790-B	138 ± 16 MPa [1]
Flexural Modulus	ASTM D790-B	5200 ± 112 MPa [1]
Flexural Strain at Break	ASTM D790-B	2.9% ± 0.4 [1]
Other Properties		
Heat Deflection Temperature @ 0.455 MPa	ASTM D648	>300°C [13]
Heat Deflection Temperature @ 1.82 MPa	ASTM D648	210°C [13]
24hr Soak in Acetone @ 25C (Weight Change)	Internal	<0.2% [7]
24hr Soak in IPA @ 25C (Weight Change)	Internal	<0.2% [8]
24hr Soak in Water @ 25C (Weight Change)	Internal	0.4% [9]
168hr Soak in Water @ 80C (Weight Change)	Internal	1.0% [10]
168hr Soak in Gasoline @ 25C (Weight Change)	Internal	<0.2 % [23]
168hr Soak in Diesel @ 25C (Weight Change)	Internal	<0.2 % [24]
168hr Soak in Kerosene @ 25C (Weight Change)	Internal	<0.2 % [25]
Liquid Density (g/ml)	ASTM D792	1.27 [18]
Solid Density (g/ml)	ASTM D792	1.39 [18]
Flammability	UL 94 (3mm Thickness)	V-0
Rating (12 second burn)	AirBus AITM2-0002 6mm Thickness	Pass [3]
Rating (60 second burn)	AirBus AITM2-0002 6mm Thickness	Pass [2]
Gas Components of Smoke	AirBus AITM3-0005 6mm Thickness	Pass [11]
Smoke Density	AirBus AITM2-0007 6mm Thickness	Pass [12]
CTE (Coefficient of Thermal Expansion) 25C - 160C	ASTM E831	80.5 µm/m/°C [15]
CTE (Coefficient of Thermal Expansion) 160C - 280C	ASTM E831	136 µm/m/°C [15]
Thermal Aging (105C for 2000 hours)	ASTM D790-B	<5% [19]
Shore Hardness (0s, 3s, D scale)	ASTM D2240	84, 82 [20]
Liquid Properties		
Viscosity @ 65°C (77°F)	ASTM D7867	800—1100 cP @ 65C [6]

"All specimen are printed unless otherwise noted. All specimen were conditioned in ambient lab conditions at 19-23C / 40-60% RH for at least 24 hours." ASTM Methods: D638 Type IV, 5mm/min, D790-B, 2mm/min, D648, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D570 0.125" x 2" Disc 24hr@ 25° C, Type "D" (0, 3 seconds), D792, E831, D2240

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Task References

1. TaskID Reference: FOR14451
2. TaskID Reference: FOR9673
3. TaskID Reference: FOR9674
4. TaskID Reference: FOR9502
5. TaskID Reference: FOR17914
6. TaskID Reference: FOR14443
7. TaskID Reference: FOR7944
8. TaskID Reference: FOR7945
9. TaskID Reference: FOR7942
10. TaskID Reference: FOR8992
11. TaskID Reference: FOR12856
12. TaskID Reference: FOR12855
13. TaskID Reference: FOR20579
14. TaskID Reference:
15. TaskID Reference: FOR14194
16. TaskID Reference: FOR12313
17. TaskID Reference: FOR14455
18. TaskID Reference: FOR15859
19. TaskID Reference: FOR13830
20. TaskID Reference: FOR20025
21. TaskID Reference: FOR10285
22. TaskID Reference: FOR10286
23. TaskID Reference: FOR23214
24. TaskID Reference: FOR23215
25. TaskID Reference: FOR23216

Pre-Melt Requirements

LOCTITE® 3955™ requires pre-melt of material before use. It is recommended to heat 3955™ in the provided 1 kg container at 80°C for 4 hours to fully liquify the material 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® 3955™ 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/cm². Layer time is given below at 6 mW/cm^2. **This material must be printed at or above 55C. It is recommended to print at or above 60C.**

Layer Thickness:	25um	50um	100um
Base Cure Time:	45s	45s	45s
Model Layer Cure Time:	TBD	2.3	4

Ec (mJ/cm^2)	TBD
Dp (mm):	TBD

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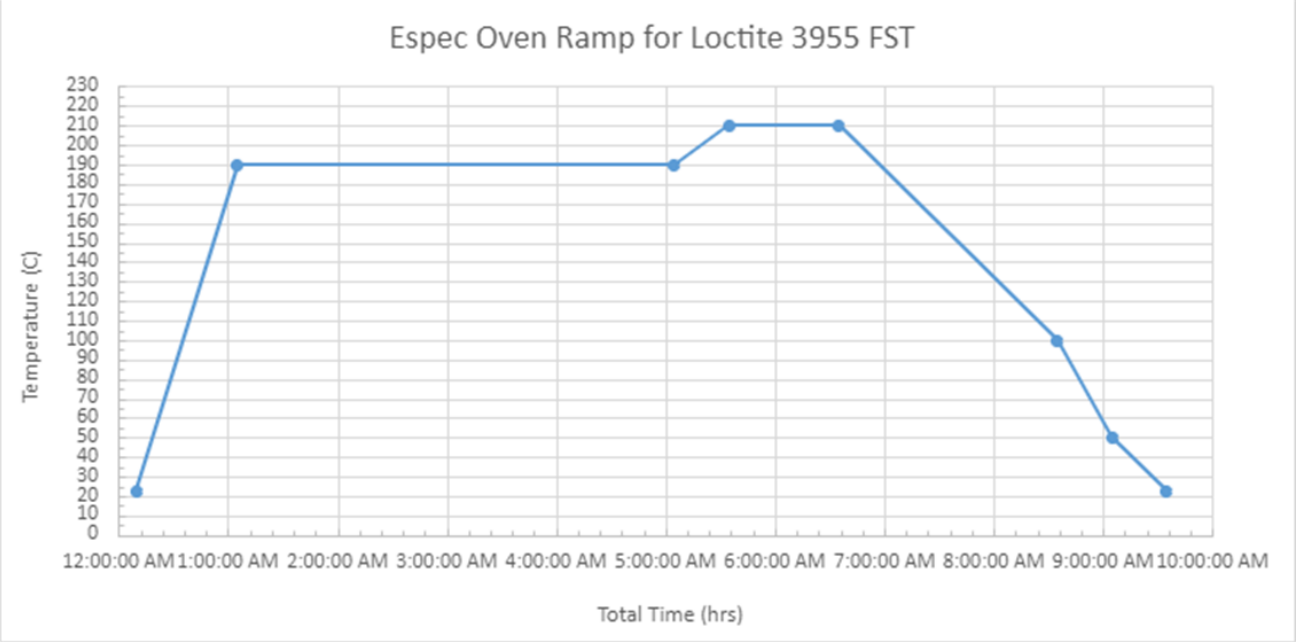
Post Processing / Post Curing

LOCTITE® 3955™ requires post processing to achieve specified properties. Prior to post curing, support structures and excess resin should be removed from the printed part. LOCTITE® 3955™ requires post curing to achieve specified properties.
A thermal cure is the only curing method required.
User must wear suitable respiratory protection during cleaning process.

1. Preheat LOCTITE® Cleaner T wash to 60°C
2. Cleaner T wash in closed bottle, agitate by hand for 30 seconds@60°C
3. Manually clean any leftover residue using warm (60°C) Cleaner T
4. Remove excess Cleaner T parts using compressed air@30 PSI
5. Rinse residual Cleaner T off parts using clean Cleaner T Acetone Spray, do not soak in Acetone (optional)
6. Place in room temperature oven (25°C) and power on oven
7. 3°C per minute ramp from 20°C to 190°C
8. 6 hours@190°C then 3°C per minute ramp from 190°C to 210°C
9. 1 hour@210°C
10. 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 areas we recommend slower ramping speeds.**



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Additional Development Options

Colors: LOCTITE® 3955™ formula can not be made in Clear or White but additional pigment colors are possible.

Vat Printer: LOCTITE® 3955™ formula is likely possible for heated Vat with recirculation as well as heated build area.

LCD printers: LOCTITE® 3955™ formula shows no path forward for LCD projector printers at this time.

Limitations for FST

Printer Envelope: LOCTITE® 3955™ requires a heated tray / printer envelope that maintains 60°C throughout the printing build area.

Post Wash: LOCTITE® 3955™ requires a heated post wash bath held between 60°C—80°C

Formula Modification LOCTITE 3955™ has limited potential for any tensile property adjustments

Other: LOCTITE® 3955™ formula requires a Pre-melt to ready the material for printing.

Validation

Exact workflow validation with detail information can be found by contacting us at www.loctiteAM.com

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Note

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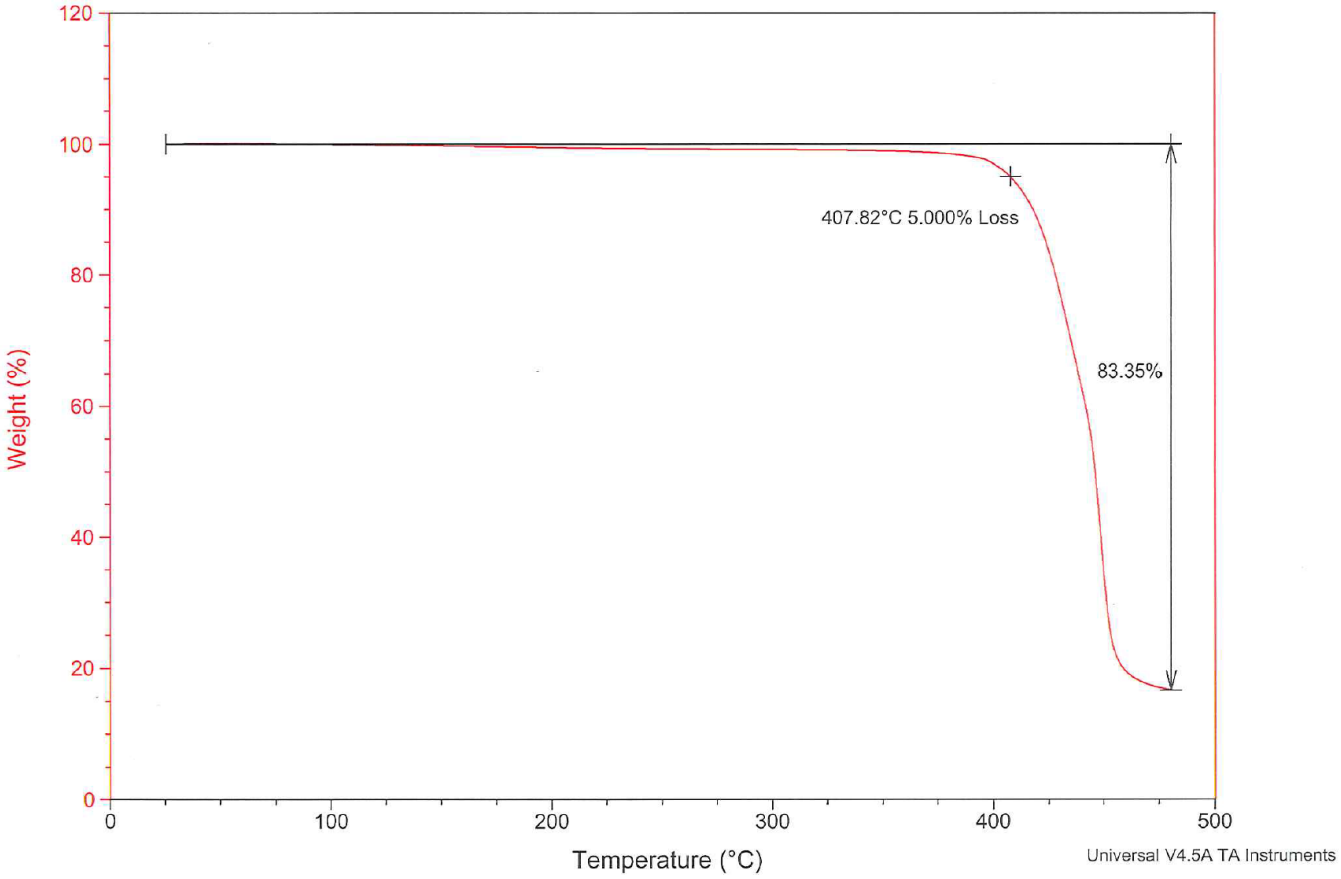
3955™ HDT280 FST Black - Extended TDS

TGA



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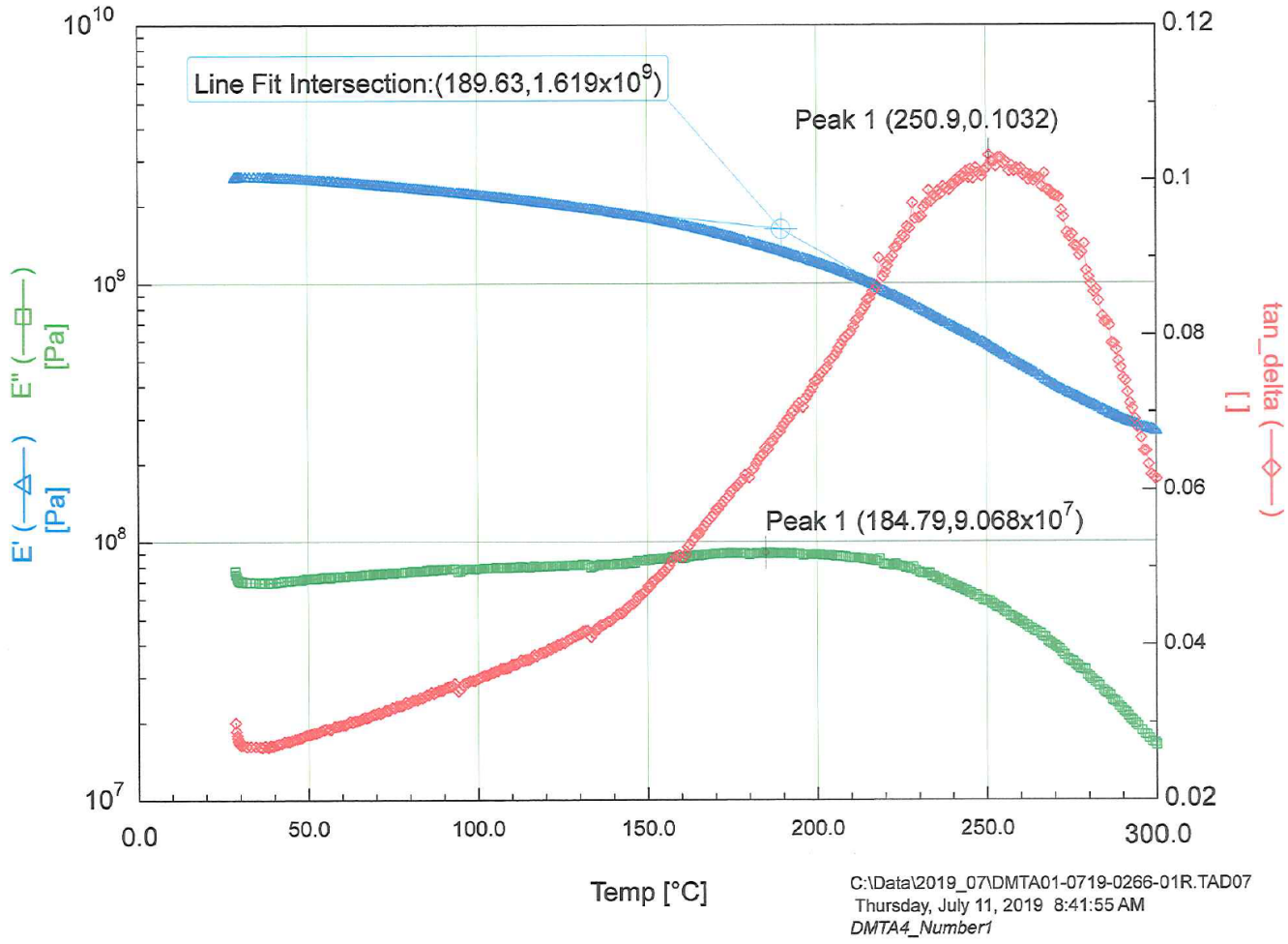
DMA



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DSC