

### N3D-FR512

Flame-retardant material

DLP LCD

N3D-FR512 is a halogen-free, flame-retardant material that achieves a UL-94 rating of V-0 at 0.8 mm while maintaining good print accuracy with fine feature parts. N3D-FR512 is characterized by excellent green strength allowing for robust printing and easy cleanup and processing.



#### KEY PROPERTIES

N3D-FR512	
Liquid	
Appearance	Black
Viscosity @ 25°C	2000 cP
Material	
UL-94V	V-0 @ 0.8 mm
Tensile Strength	42 MPa
Tensile Modulus	5100 MPa
Tensile Elongation at Break	4.2%
Flexural Strength	57 MPa
Flexural Modulus	3300 MPa
Deflection	2.0%
HDT @ 0.455 MPa	170°C



#### KEY FEATURES

- High strength & HDT
- Liquid at room temperature
- Robust printing and processing
- Halogen-free



#### APPLICATIONS

- Flame retardant materials
- Electrical connectors



#### MAIN MARKETS

- Electronics
- Transportation



## MATERIAL PROPERTIES

Property	Units	Method	Green <sup>(1)</sup>	UV post-curing <sup>(2)</sup>
Flame Retardancy	Rating	UL-94V	—	V-0 @ 0.8 mm
Ultimate Tensile Strength	MPa	ASTM D638	25	42
Tensile Young's Modulus	MPa	ASTM D638	1800	4500
Tensile Strain at Break	%	ASTM D638	6.7	4.2
Ultimate Flexural Strength	%	ASTM D790	38	57
Flexural Modulus	%	ASTM D790	1300	3300
Deflection	%	ASTM D790	5.8	2.0
HDT @ 0.455 MPa	°C	ASTM D648	—	170
HDT @ 1.82 MPa	°C	ASTM D648	—	94

1 Parts were printed in the XZ orientation with a 50 µm layer thickness on a 405 nm bottom-up DLP printer with an irradiance of 4 mW/cm<sup>2</sup>. Green samples were conditioned for 40-80 hours following ASTM D618 Procedure A before testing.

2 Parts were printed in the XZ orientation with a 50 µm layer thickness on a 405 nm bottom-up DLP printer with an irradiance of 4 mW/cm<sup>2</sup>. Parts were post-cured for 5 minutes per side with 21,400 mJ/cm<sup>2</sup> of UVV energy dosage & 21,100 mJ/cm<sup>2</sup> of UVA energy dosage. Samples were conditioned for 40-80 hours following ASTM D618 Procedure A before testing.

## LIQUID PROPERTIES

Property	Units	Method	Value
Appearance	—	—	Black
Viscosity, 25°C	cP	ASTM D2983	2000

## PRINTING CONDITIONS

Printing conditions may be fine tuned depending on individual printer performance.

3D printing parameter	Units		
Layer Thickness	µm	50	100
Wavelength	nm	405	405
Intensity	mW/cm <sup>2</sup>	1.8	4
Standard Exposure Time	Sec	5	5
Burn in Exposure Time	Sec	60	60

Specific printing parameters are available on printers including Axtra, Phrozen, RapidShape and Stratasys P3™ Origin®. For additional guidance on print parameter setup for specific 3D printers, consult with Arkema technical service teams.

## POST-CURING CONDITIONS

Value	Units	Intelliray 400
Time per side	Sec	300
UVA irradiance	mW/cm <sup>2</sup>	100-120
UVV irradiance	mW/cm <sup>2</sup>	100-120

## CLEANING PROCESS

Submerge 3D printed parts in isopropyl alcohol and agitate or sonicate for no more than 10 minutes. Incorporate two-stage cleaning baths for improved efficacy. Use compressed air to remove any residual liquid material.

## STORAGE, HANDLING, & SHELF LIFE

Shake the bottle manually before use. Store N3D-FR512 in a cool, dry place. Since N3D-FR512 is a photo-reactive material, avoid exposing open bottles to ambient lighting or sunlight. Reseal the packaging immediately after use. Refer to the Safety Data Sheet (SDS) for more detailed storage and handling recommendations.

## HEALTH AND SAFETY

For health and safety guidelines related to N3D-FR512, please refer to the Safety Data Sheet (SDS).

**Arkema Inc.**  
502 Thomas Jones Way  
Exton, PA 19341  
America

**Arkema France**  
420, rue d'Estienne d'Orves  
92705 Colombes Cedex  
France