N3XTDIMENSION®
BIO-BASED

TECHNICAL DATA SHEET

N3D-PR184-BIO

Bio-based modeling material

SLA | DLP | LCD

N3D-PR184-BIO, the first in a family of bio-renewable content materials, has 53% bio-content. N3D-PR184-BIO provides reliable, accurate, high-resolution printing for modeling and prototyping applications.

KEY PROPERTIES

N3D-PR184-BIO	
Liquid	
Appearance	Gray
Viscosity @ 25°C	750
Material	
Tensile Strength	32 MPa
Tensile Modulus	1970 MPa
Tensile Elongation at Break	7%
Flexural Strength	70 MPa
Flexural Modulus	2030 MPa
HDT @ 0.455 MPa	81°C
HDT @ 1.8 MPa	45°C
T_{α}, by DMA	118°C

KEY FEATURES

- → 53% bio-content
- → High stiffness
- → High accuracy & resolution
- → Easy processability
- → Good feature visualization

APPLICATIONS

- → Functional prototyping
- → Modeling

MAIN MARKETS

- → Dental
- → Industrial

ARKEMA

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MATERIAL PROPERTIES

Property	Units	Method	Final Properties[1]
Bio-renewable Carbon Content	%	ASTM D6866	53
Tensile Strength	MPa	ASTM D638	32 ± 1
		ISO 527	34 ± 2
Tensile Modulus	MPa	ASTM D638	1970 ± 100
		ISO 527	1800 ± 80
Tensile Elongation at Break	%	ASTM D638	7 ± 1
		ISO 527	4 ± 1
Flexural Strength	MPa	ASTM D790	70 ± 10
		ISO 178	41 ± 6
Flexural Modulus	MPa	ASTM D790	2030 ± 90
		ISO 178	1450 ± 40
Notched Izod Impact Resistance	J/m	ASTM D256[2]	12 ± 1
	kJ/m^2	ISO 180-A[2]	1.6 ± 0.1
Unnotched Izod Impact Resistance	J/m	ASTM D4812	103 ± 33
	kJ/m^2	ISO 180-U	6.4 ± 1.6
HDT @ 0.455 MPa	°C	ASTM D648	81 ± 3
HDT @ 1.8 MPa	°C	ASTM D648	45 ± 1
		ISO 75 A	44
Shore Hardness	Shore D	ASTM D2240	87
		ISO 7619	76
T_α, by DMA	°C	ASTM D4065	118
Loss Modulus (E") Peak	°C	ASTM D4065	77
Volumetric Shrinkage	%	Archimedes principle	7.1
Water Absorption	% weight gain, 24 hours	ASTM D570	0.2
Solid Density	g/cm^3	Density kit[3]	1.14

1 Parts were printed in the XZ orientation with a 100 µm layer thickness on a 385 nm bottom-up DLP printer with an irradiance of 7 mW/cm^2. Parts were post-cured for five minutes per side with approximately 41-43 J/cm^2 of total UVA & UVV energy dosage. Samples were conditioned for 40-80 hours following ASTM D618 Procedure A before testing.

2 Parts were printed without a notch and a notch was generated with a manual notch cutting plane.

3 Solid density was determined on 10 mm x 10 mm x 10 mm 3D printed cubes via Archimedes principle.

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LIQUID PROPERTIES

Property	Units	Method	Value
Appearance	—	—	Gray
Viscosity, 25°C	cP	Brookfield SP #31	750
Liquid Density	g/cm³	Gardco cup	1.0602

PRINTING CONDITIONS

Reactivity values were generated on a 405 nm wavelength bottom-up 3D printer with an irradiance of 3 mW/cm².

Working-Curves	Units	Value
Critical Exposure (E_c)	mJ/cm²	3.0
Penetration Depth (D_p)	mils	3.9

3D printing parameters that can be used as starting points on LCD and DLP 3D printers are shown in the table below. Although not explicitly stated, other 3D printing parameters may be realized through process development.

3D Printing Parameter	Units	Printing & Reactivity	
Layer Thickness	µm	50	100
Wavelength	nm	405	385
Intensity	mW/cm²	3	7
Standard Exposure Time	Sec	5	4
Burn in Exposure Time	Sec	30	18

For additional guidance on print parameter setup for specific 3D printers, consult with Arkema technical service teams.

POST-CURING CONDITIONS

Post-curing conditions that can be used as starting points are shown in the table below. Although not explicitly stated, other post-processing conditions may be realized through process development.

	IntelliRay 400
Time (sec)	300
UVA Irradiance (mW/cm²)	140
UVV Irradiance (mW/cm²)	140

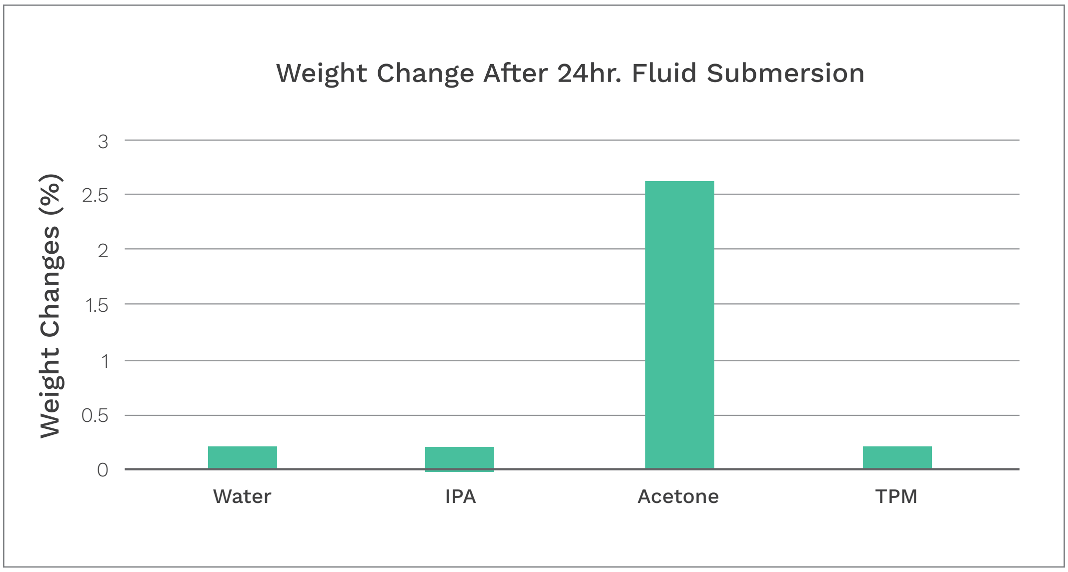
CLEANING PROCESS

Submerge 3D printed parts in traditional 3D printing solvents and agitate and/or sonicate for approximately 10 minutes. Incorporate two-stage cleaning baths for optimal cleaning. Use compressed air to remove any residual liquid material. Repeat steps as necessary until parts are free of residual material, and then proceed to post curing. Although not explicitly stated, other cleaning procedures may be realized that adequately clean 3D printed parts.

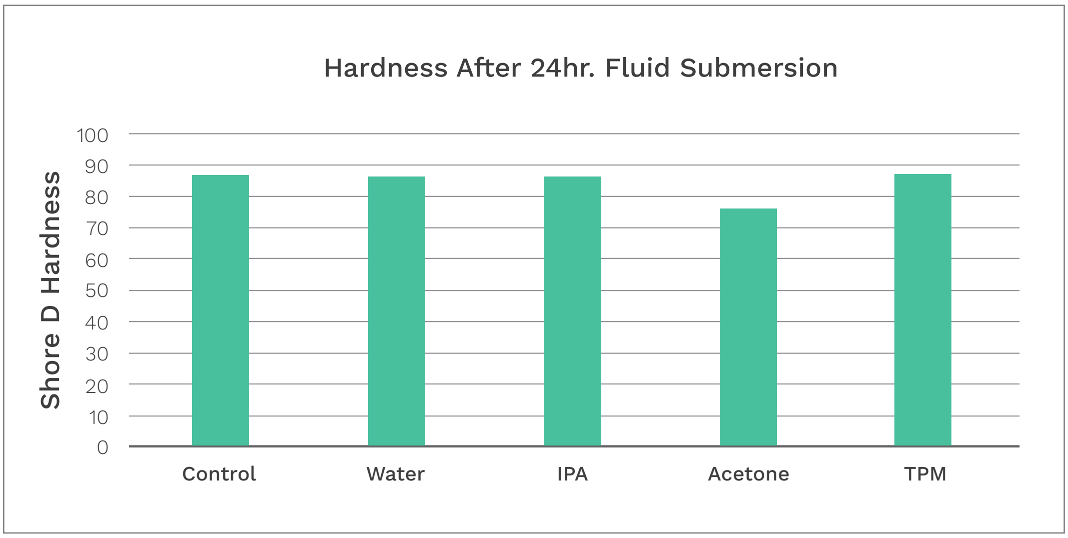
STORAGE & HANDLING

Manually shake bottle before use. Store bottles in a cool, dry place. Do not freeze. The material is light sensitive. Keep open bottles away from ambient lighting or sunlight, and shield material from ambient light. Once opened, packaging should be resealed immediately after use. See Safety Data Sheet for additional storage & handling considerations.

CHEMICAL RESISTANCE



2” diameter discs (1/8” thickness) were 3D printed & post-processed, dried for 24 hours at 50°C, and submerged at room temperature conditions for 24 hours complying with ASTM D570 for water resistance and ASTM D543 for chemical resistance. Weight before and after submersion was measured & resulting percent changes were calculated.



2” diameter discs (1/8” thickness) were 3D printed & post-processed, dried for 24 hours at 50°C, and submerged at room temperature conditions for 24 hours complying with ASTM D543 & ASTM D570. Resulting Shore D hardness was measured via ASTM D2240.

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