

Ingeo™ 3D870

NatureWorks® LLC - Polylactic Acid

Monday, March 11, 2019

General Information

Product Description

Ingeo 3D870 is a grade developed for manufacturing 3D printer monofilament. Engineered to deliver improved heat-resistance and high impact strength to 3D printed parts, this formulated grade achieves thermal and mechanical properties similar to ABS while offering an alternative to styrenic-based materials. Monofilaments made with Ingeo 3D870 provide excellent 3D printing characteristics such as precise detail, good adhesion to build plates, less warping or curling, and low odor.

General

Material Status	• Commercial: Active		
Availability	• Africa & Middle East • Asia Pacific	• Europe • Latin America	• North America
Features	• Compostable • Good Adhesion • Good Heat Resistance	• High Impact Resistance • Low Odor • Low Warpage	• Renewable Resource Content
Uses	• Additive Manufacturing (3D Printing)	• Filaments	• Monofilaments
Appearance	• Opaque		
Forms	• Pellets		
Processing Method	• 3D Printing, Fused Filament Fabrication (FFF)		

ASTM & ISO Properties ¹

Physical	Nominal Value	Unit	Test Method
Density / Specific Gravity	1.22	g/cm ³	ASTM D792
Melt Mass-Flow Rate (MFR) (210°C/2.16 kg)	9.0 to 15	g/10 min	ASTM D1238
Mechanical	Nominal Value	Unit	Test Method
Tensile Modulus			ASTM D638
-- 2	2870	MPa	
-- 3	2450	MPa	
-- 4	2480	MPa	
Tensile Strength			ASTM D638
-- 2	40.0	MPa	
-- 3	32.0	MPa	
-- 4	24.0	MPa	
Flexural Modulus			ASTM D790
-- 2	2410	MPa	
-- 3	1980	MPa	
-- 4	2350	MPa	
Flexural Strength			ASTM D790
-- 2	73.0	MPa	
-- 3	49.0	MPa	
-- 4	46.0	MPa	

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Impact	Nominal Value	Unit	Test Method
Notched Izod Impact			ASTM D256
-- 5	160	J/m	
-- 6	120	J/m	
-- 7	110	J/m	
-- 8	230	J/m	
-- 9	200	J/m	
-- 10	64	J/m	

Thermal	Nominal Value	Unit	Test Method
Deflection Temperature Under Load ¹¹			ASTM E2092
0.45 MPa, Unannealed	75.0 to 85.0	°C	
Glass Transition Temperature	55.0 to 60.0	°C	ASTM D3418
Peak Melting Temperature	165 to 180	°C	ASTM D3418

Additional Information

3D Printing Temperature: 190 to 230°C
 Annealing Temperature: 110 to 120°C
 Print Bed Temperature: None needed (or 50 to 70°C if applicable)

Processing Information

Extrusion	Nominal Value	Unit
Cylinder Zone 1 Temp.	179	°C
Cylinder Zone 2 Temp.	191	°C
Cylinder Zone 3 Temp.	199	°C
Adapter Temperature	199	°C
Melt Temperature	210	°C
Die Temperature	199	°C

Extrusion Notes

Screw Speed: 20 to 150 rpm

Notes

¹ Typical properties: these are not to be construed as specifications.

² XY Axis, 3D printed part, 100% in-fill, annealed at 110°C/15 min

³ YX Axis, 3D printed part, 100% in-fill, annealed at 110°C/15 min

⁴ ZX Axis, 3D printed part, 100% in-fill, annealed at 110°C/15 min

⁵ XY Axis, Amorphous, 3D printed part, 100% in-fill, annealed at 110°C/15 min

⁶ YX Axis, Amorphous, 3D printed part, 100% in-fill, annealed at 110°C/15 min

⁷ ZX Axis, Amorphous, 3D printed part, 100% in-fill, annealed at 110°C/15 min

⁸ XY Axis, Crystalline, 3D printed part, 100% in-fill, annealed at 110°C/15 min

⁹ YX Axis, Crystalline, 3D printed part, 100% in-fill, annealed at 110°C/15 min

¹⁰ ZX Axis, Crystalline, 3D printed part, 100% in-fill, annealed at 110°C/15 min

¹¹ 3D printed part, 100% in-fill, annealed at 110°C/15 min