Ingeo™ 3D860

Polylactic Acid

NatureWorks® LLC

Message:

Ingeo[™] 3D860 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 3D860 provide excellent 3D printing characteristics such as precise detail, good adhesion to build plates, less warping or curling, and low odor.

General Information				
Features	Low warpage			
	Crystallization Impact resistance, high			
	Comstable			
	Updatable resources			
	Good adhesion			
	The smell is low to none			
	Compliance of Food Exposure			
Uses	monofilament			
	Filament			
Agency Ratings	FDA Food Exposure, Not Rated			
	Europe 10/1/2011 12:00:00 AM			
Appearance	Opacity			
Processing Method	3D Printing, Fused Filament Fabrication (FFF)			
Physical	Nominal Value	Unit	Test Method	
Specific Gravity	1.22	g/cm³	ASTM D792	
Melt Mass-Flow Rate (MFR) (210°C/2.16				
kg)	5.0 - 7.0	g/10 min	ASTM D1238	
Relative Viscosity ' (30°C)	4.00		ASTM D5225	
Mechanical	Nominal Value	Unit	Test Method	
Tensile Modulus ²	2400	MPa	ASTM D638	
Tensile Strength ³			ASTM D638	
Yield	32.8	MPa	ASTM D638	
	30.0	MPa	ASTM D638	
Tensile Elongation ⁴ (Break)	2.3	%	ASTM D638	
Impact	Nominal Value	Unit	Test Method	
Notched Izod Impact ⁵	320	J/m	ASTM D256	
Thermal	Nominal Value	Unit	Test Method	

Deflection Temperature Under Load ⁶ (0.45 MPa, Unannealed)	80.0 - 90.0	°C	ASTM E2092	
Glass Transition Temperature	55.0 - 60.0	°C	ASTM D3418	
Peak Crystallization Temperature (DSC)	165 - 180	°C	ASTM D3418	
Additional Information				
3D Printing Temperature: 190 to 230°CAnnealing Temperature: 80 to 130°CPrint Bed Temperature: None needed (or 50 to 70°C if applicable)				
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 instructions				
Screw Speed: 20 to 150 rpm				
NOTE				
1.	1.0 g/dL in chloroform			
2.	3D printed part, 100% in-fill, annealed at 110°C/15 min			
3.	3D printed part, 100% in-fill, annealed at 110°C/15 min			
4.	3D printed part, 100% in-fill, annealed at 110°C/15 min			
5.	3D printed part, 100% in-fill, annealed at 110°C/15 min			
6.	3D printed part, 100% in-fill, annealed at 110°C/15 min			

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