

# Hi-Wax Cast Resin

NOVA3D 「Hi-Wax Cast」 is developed specifically for thick-wall castings.

In an era pursuing 3D printing speed, we return to the essence of casting — exceptional burnout and smooth casting surface. Hi-wax casting resin elevates wax content to the core. Not a simple material blend, but re-engineered at the molecular level, giving digital models a burnout experience as pure as traditional wax patterns.





## Pre-Printing Setup

- ◆ **Release Film Selection:** Prefer 127µm or 150µm low-release-force ACF films. For smoother surfaces, use NFEP or PFA films.
- ◆ **Printer Heating:** Enable heating, set to 30°C, and begin printing once stabilized. Maintain temperature during printing to prevent resin solidification.
- ◆ **Resin Preheating:** Preheat unopened resin at 30–40°C for 10 minutes, then shake for 1 minute to ensure optimal consistency.

## Printing Parameter Settings

For higher success rates, set exposure to overexposure mode and apply scaling compensation.

## NovaMaker Slicing Parameters

Thickness	0.04mm	+	-	Initial Lifting Height	3.00mm	+	-	+	5.00mm	+	-
Exposure Time	3.5s	+	-	Lifting Height	3.00mm	+	-	+	5.00mm	+	-
Initial Layer Exposure Time	45.0s	+	-	Initial Retract Height	4.96mm	+	-	+	3.00mm	+	-
Initial Layer Quantity	3layer	+	-	Retract Height	4.96mm	+	-	+	3.00	+	-
Transition Layer Quantity	10layer	+	-	Lifting Speed	80mm/min	+	-	+	240mm/min	+	-
Waiting Time	5.0s	+	-	Lowering Speed	180mm/min	+	-	+	80mm/min	+	-

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### Scale

X	0.00mm	+	-	100.30%	+	-
Y	0.00mm	+	-	100.30%	+	-
Z	0.00mm	+	-	100.00%	+	-

Adapt To The Platform

Scale Proportionally

## Chitubox Slicing Parameters

Machine	Resin	Print	Gcode	Advanced
Layer Height:	0.040 mm	Bottom Lift Distance:	3.000 + 5.000 mm	
Bottom Layer Count:	3	Lifting Distance:	3.000 + 5.000 mm	
Exposure Time:	3.5 s	Bottom Retract Distance:	5.000 + 3.000 mm	
Bottom Exposure Time:	45.000 s	Retract Distance:	5.000 + 3.000 mm	
Transition Layer Count:	10	Bottom Lift Speed:	80.000 & 240.000 mm/min	
Transition Type:	Linear	Lifting Speed:	80.000 & 240.000 mm/min	
Transition Time Decrement:	3.770 s	Bottom Retract Speed:	180.000 & 80.000 mm/min	
Waiting Mode During Printing:	Restin...	Retract Speed:	180.000 & 80.000 mm/min	
Rest Time Before Lift:	0.000 s			
Rest Time After Lift:	0.000 s			
Rest Time After Retract:	5.000 s			

### Shrinkage Compensation:

X : 100.300 %

Y : 100.300 %

Z : 100.000 %

## Post-Printing Processing

### Ultrasonic Cleaning

- ◆ **Rough Cleaning:** Clean prints in the first ultrasonic bath with alcohol for 5 minutes to remove most uncured resin.
- ◆ **Fine Cleaning:** Transfer to a second clean alcohol bath and ultrasonicate for 3 minutes to ensure complete residue removal.

## Drying

Use clean compressed air to thoroughly dry the print surface and complex structures, ensuring no liquid remains.

## Post-Curing

- ◆ Cure prints in a UV curing station with intensity  $\geq 60\text{mW}/\text{cm}^2$ .
- ◆ Curing Time: Thin-walled parts: ~5 minutes; thick-walled/large parts: 15–20 minutes.
- ◆ Process Optimization (Optional): Bake prints at  $80^\circ\text{C}$  for 10 minutes before UV curing to reduce thermal expansion and improve casting dimensional stability.

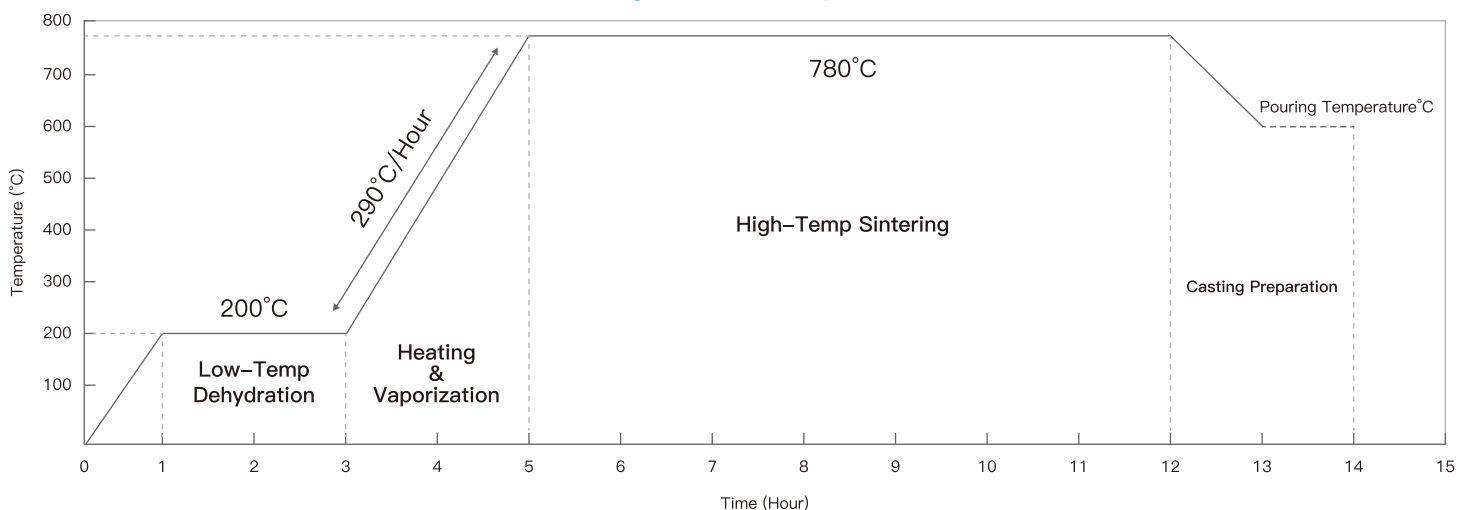
## Mold Preparation

- ◆ **Material Preparation:** Use specialized investment powder for 3D printed resin casting (e.g., SRS 3D CAST, Prestige Optima).
- ◆ **Mixing Ratio:** Strictly weigh materials by weight ratio: Investment Powder : Water = 100 : 38.
- ◆ **Mixing & Degassing:** 1. Pour water into a mixing container; 2. Slowly add investment powder and mix mechanically for 3–5 minutes; 3. Vacuum degas the slurry for ~2 minutes to remove large bubbles.
- ◆ **Pouring & Venting:** 1. Slowly pour slurry along the wall into the casting flask containing the printed model (ensure sprue is downward and sufficiently large).  
2. Vacuum degas the entire flask for 2 minutes to fill cavities and remove residual air.
- ◆ **Curing & Setting:** After pouring, let the flask rest at room temperature for 2–2.5 hours until fully set and strengthened.

## Casting Process Schedule

Process Step	Time Setting	Temperature Setting	Operation Details
Furnace Heating	1 hour	$200^\circ\text{C}$	Heat furnace from room temperature to $200^\circ\text{C}$ .
Low-Temp Dehydration	2 hour	$200^\circ\text{C}$	Place invested flask in furnace, hold at $200^\circ\text{C}$ for thorough dehydration.
Heating & Vaporization	2 hour	$780^\circ\text{C}$	Ramp uniformly from $200^\circ\text{C}$ to $780^\circ\text{C}$ .
High-Temp Sintering	7 hour	$780^\circ\text{C}$	Hold at $780^\circ\text{C}$ to fully burn out and vaporize resin.
Casting Preparation	2 hour	/	Cool to target metal casting temperature, stabilize for 1 hour before pouring.

## Casting Process Cycle Table



## Common Issues & Solutions

Issue	Cause Analysis	Solution
Model Not Adhering to the Build Plate	The build platform's starting position is too high, resulting in an overly thick first layer and insufficient light penetration for proper curing	After homing the platform, lower it by one step (0.04mm) and save the new starting position.
	Insufficient base layer exposure time	Increase the base layer exposure time.
	The build platform is not level	Re-level the build platform to ensure it is parallel to the exposure screen.
	The build platform surface is too smooth, causing poor adhesion	Sand the platform with sandpaper or replace it with a platform featuring a higher surface roughness.
Model Deformation or Breakage at Support Points	Insufficient support quantity or poorly designed supports	Increase support density (recommended 50%–70%), ensuring the minimum support contact point is $\geq 0.2\text{mm}$ . Increase the support contact point diameter and support pillar diameter according to the model size.
	Support contact points are too small	Modify the model's support contact points to be $\geq 0.2\text{mm}$ .
	Model design details are too fine	Check that the model's minimum wall thickness is not less than 0.2mm and other details are not less than 0.18mm.
	Layer exposure time is too short	When using GEM3 series printers, the layer exposure time should be greater than 3 seconds (Note: apply a global scaling factor of 100.3%).
	Incorrect motor speed	The motor speed should be controlled within 80–120 mm/min.
Unclear Printed Details	Overexposure causing blurred details	High-wax casting resin is relatively soft. While slight overexposure can improve success rate, adjust the global scaling factor to 100.3% to compensate.
	Exposure time is too long	For GEM3 series printers, the layer exposure time should be less than 3.5 seconds (Note: apply a global scaling factor of 100.3%).
	Model design details are too fine	Increase support density (recommended 50%–70%), ensuring the minimum support contact point is $\geq 0.2\text{mm}$ . Increase the support contact point and pillar diameter according to the model size.
	Incomplete cleaning	Use an ultrasonic cleaner (frequency 20–40kHz) to remove residual resin.
Printed Models are Brittle or Fragile	Resin is expired	Regularly check the resin's expiration date. Replace promptly if expired.
	Insufficient or excessive curing	Cure prints in a UV curing station with an intensity of no less than 60 mW/cm <sup>2</sup> . Thin-walled parts require approximately 5 minutes; thick-walled or large-volume parts recommend 15–20 minutes.
Sticky Surface or Residue	Incomplete cleaning	Use an ultrasonic cleaner (frequency 20–40kHz) to remove residual resin. Replace the cleaning solvent if saturated and unable to dissolve further residue.
	Anhydrous ethanol is contaminated	Use an ultrasonic cleaner (frequency 20–40kHz) to extend cleaning time. Replace with new anhydrous ethanol if necessary.
	Insufficient post-curing time	Use NOVA3D's dedicated curing equipment for post-curing, at maximum power for 5 minutes. If using other curing equipment, appropriately increase the curing time.
Residue on Cast Metal Part	Heating ramp rate is too fast	Prioritize a gradual heating process, controlling the heating rate to 290°C/hour or less.
	Incorrect burnout curve followed	Strictly adhere to the provided resin-specific burnout curve.
Bubbles in Cast Metal Part	Investment slurry was not vacuum degassed	Ensure the investment slurry is sufficiently vacuum degassed to eliminate bubbles, preventing pores or residue in the final cast metal.
	Printed model was not cleaned thoroughly	Use an ultrasonic cleaner (frequency 20–40kHz) to remove residual resin. Replace the cleaning solvent if saturated and ensure the model is completely dry before investing.
Flashes or Burrs on Casting	Investment powder is expired	Select a new type compliant with ISO 9926:2017 standard. Regularly check the investment powder's expiration date and storage conditions.
	Investment powder stored incorrectly	Investment powder should be stored in an environment with <35% humidity. Use a sealed container and use within 3 months after opening.
	Investment mold dried out completely before burnout	The investment mold must not be allowed to dry completely before the burnout cycle. If necessary, cover the mold with a damp cloth.