

# LOCTITE® 3D IND403 High Modulus

## by Henkel

### Feature capabilities

IND403 has high green stiffness and strength. Prints can achieve the following qualities without distortion:

Color	Black
Maximum unsupported overhang length	1.5 mm
Maximum span length	11.0 mm
Minimum unsupported overhang angle	15°
Minimum vertical wire diameter:	
• 1mm height	0.25 mm
• 3mm height	0.25 mm
• 5mm height	0.25 mm
Minimum unsupported wall thickness:	
• 5mm height	0.5 mm
• 10mm height	0.5 mm
Minimum hole diameter in z	1.0 mm
Minimum hole diameter in xy	1.0 mm



### Support tips

- The contact point diameter for supports should range from 0.2-0.7mm; 0.5mm is typical.
- Contact point spacing of 2-3mm is typical for flat downward facing surfaces. Tighter spacing is useful for flat surfaces, angled surfaces can tolerate wider spacing.

### Printing

Validated settings work well for most geometries. For large cross-sectional areas, you may need to increase delay. For big overhangs to resolve the best, you may want to increase exposure duration.

### Part removal

Large cross sections may be difficult to remove from the platform. Using a metal scraper or razor scraper, slowly work the tool between the print and the build head with gradual, careful movements. Always push the scraper away from your fingers.

### Cleaning

Cleaning your print is a 4-step process, involving two “baths” in the sonicator, with the user drying the part after each bath using an air compressor.

**Tip:** Minimize handling of green parts, as 403 is susceptible to fingerprinting in its green state. Only use clean room wipes wetted with IPA to spot-clean resin (no paper towels or Q-tips as they will mar the surface).

Cleaning step:	Duration:
1st bath is sonication in used IPA	2 minutes
Dry parts with compressed air*	10-60 seconds
2nd bath is sonication in clean IPA	2 minutes
Dry parts with compressed air*	10-60 seconds

If part is not fully clean (still appears wet after compressed air treatment, evaporation is not taking place) repeat 2nd bath followed by compressed air drying.

\*Take care to avoid damaging delicate features. Aim compressed air away from you, ideally into an air cleaning cabinet or a trash can.

### Postcure

- Wait at least 60 minutes after drying before postcure. If parts required 5 minutes sonication, wait at least 3 hours.
- Place in the Dymax ECE 5000 for 2-5 minutes per side.
- Thin-walled parts may warp during the postcure process. To avoid this, postcure for shorter intervals, flipping part between exposures.
- An initial short burst of 10 seconds on each side can help build strength and stiffness to reduce warping in subsequent longer intervals.

# Stratasys® Origin One

## General material processing best practices

### Support considerations

- Supports should be designed with adequate thickness and/or structure to ensure they remain rigid and intact during the print process.
- Tall parts need support structures that are more robust to prevent movement of the part as it grows taller while the build head is moving.
- Support contact points should be large enough so they can sustain the weight of the part and the dynamics of the print process, but always as small as possible to leave the smallest support marks.
- There are many support structures that work well, including bar/tree supports, lattice structures, polylines/fences, and volume supports.
- The optimal support design and type(s) for each print are dependent on part geometry and size.

### Part and support removal

- When the print is complete, remove all parts and the build platform from printer. It's helpful to have a lunch tray or other non-reactive portable surface under the printer to transfer the parts and build platform and avoid dripping resin. Clean up any resin that is spilled immediately.
- A razor scraper or a putty knife is helpful for detaching part/supports from platform. Always push scrapers away from your hands.
- Remove all parts from build platform and wipe clean with a paper towel and acetone after each print is completed.
- Large cross sections may be difficult to remove from the platform. Using a metal scraper or razor scraper, slowly work the tool between the print and the build head with gradual, careful movements. Always push the scraper away from your fingers.
- Supports may be removed before cleaning or after.
- Remove supports before cleaning will extend solvent life and accelerate cleaning, as there will be less resin that needs to be removed. Dense supports can be difficult to clean or block areas of the part from being fully cleaned.

### Printing

- Ensure the glass bottom/membrane of the tray is clean. If smudged, wipe clean with a Kimwipe (or other lint-free wipe) and a small amount of acetone.
- Calibrate if needed using the touchscreen on the front of the machine.
- Fill the tray with enough resin to accommodate the part volume.
- Shake the bottle of resin for 30 seconds before pouring resin into the tray.

- If resin in the tray has been sitting for a while and seems idle, stir resin thoroughly with a flexible silicone spatula.
- If adding fresh resin to an existing tray with resin, stir resin thoroughly with a flexible silicone spatula.
- To achieve the best surface finish for big cross sections, increase model region delay.
- To achieve the best overhangs, increase model region exposure duration.

### Cleaning

- Always aim to minimize the part's exposure to solvent during cleaning. All materials will absorb solvent in their green state to some degree and minimizing time in solvent will lessen the impact on mechanical properties.
- Wash parts in two separate solvent baths, first a previously used IPA bath followed by a "clean bath," using clear 99% IPA.
- Keep dedicated solvent containers for each material. Containers should close with an air-tight seal to prevent IPA evaporation.
- Dry parts between baths with compressed air. Take care to avoid damaging delicate features. Always spray away from body, machinery or other parts.
- Dry parts after second bath with compressed air.
- Inspect the part after the second bath. If not fully clean (still appears wet and evaporation is not evident), repeat the clean bath and subsequent air drying.
- Negative features, interior corners, and blind holes may be difficult to clean. A Q-tip soaked in IPA can be helpful.
- Use a clean room wipe wet with IPA to spot-clean resin.

### Postcure

- Wait at least 60 minutes after the print is completed to allow it to dry before beginning postcure. This allows any absorbed solvent to evaporate.
- Expose the part in the Dymax ECE 5000 for the specified time per side.
- Thin-walled parts may warp during the postcure process. To avoid this, postcure for shorter intervals, flipping part between exposures.
- Specified postcure duration is suitable for dogbone-thickness parts (3-5mm). A longer postcure may be required for thicker parts, and shorter for thinner parts.
- An adequate postcure is required to reach full mechanical properties and achieve part stability over time, both dimensionally and mechanically.