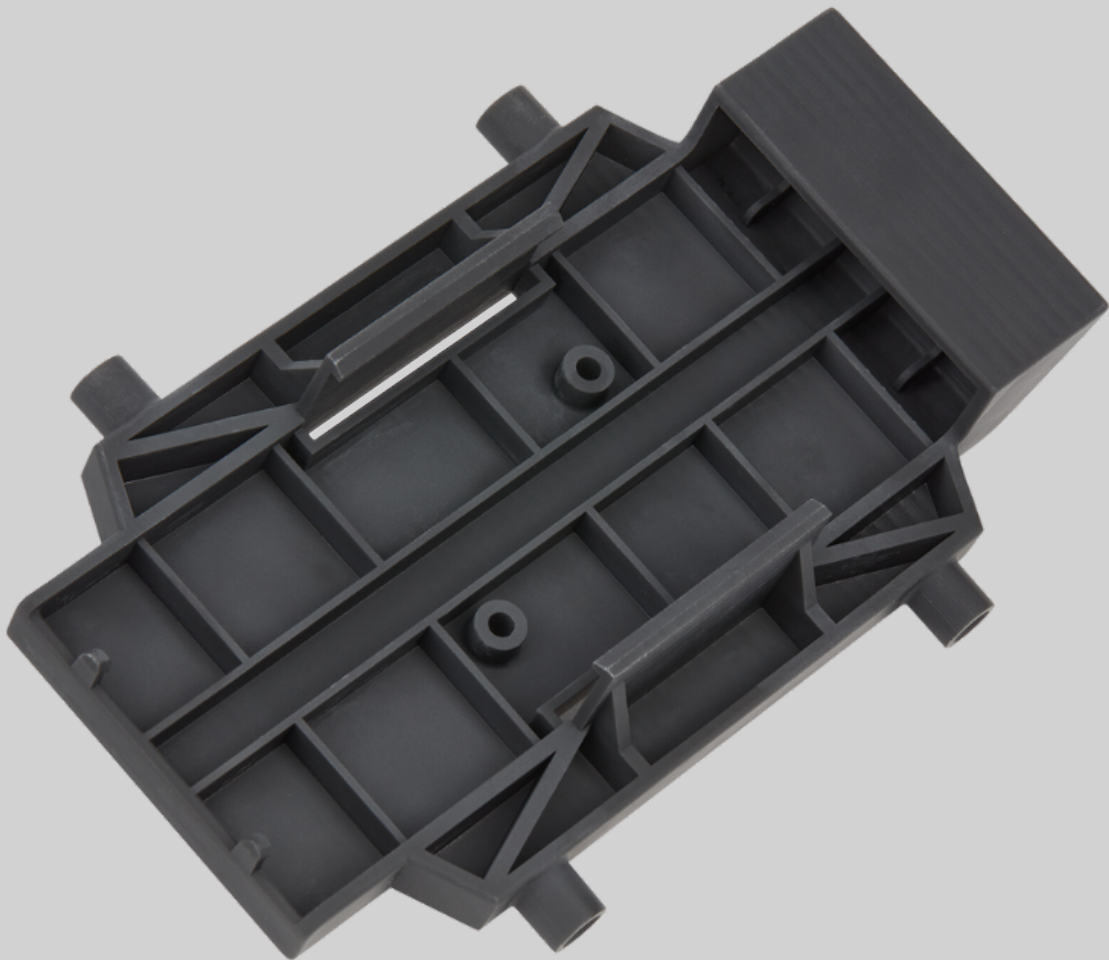

Material Best Practice Guide for Pro XL™, Xtreme 8K™, & Envision One™



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History of Changes

Date	Changes	Revision
September 2022	Document creation	1.0
January 2024	<ul style="list-style-type: none">▪ Updated About LOCTITE 3D IND405▪ Updated Getting Started▪ Updated Software▪ Updated Print Preparation▪ Updated Post-Processing	2.0

About This Guide

This document helps you prepare, post-process, and finish parts using LOCTITE 3D IND405 material.

LOCTITE 3D IND405 Material Best Practice Guide: 81-00271_Rev02_EN January 2024

About LOCTITE 3D IND405

LOCTITE IND405 is a high-strength engineering plastic with good impact resistance and excellent surface finish. Ideal for a wide variety of tools on the production floor as well as end-use functional high production parts in a variety of industries. IND405 is available in black or clear.

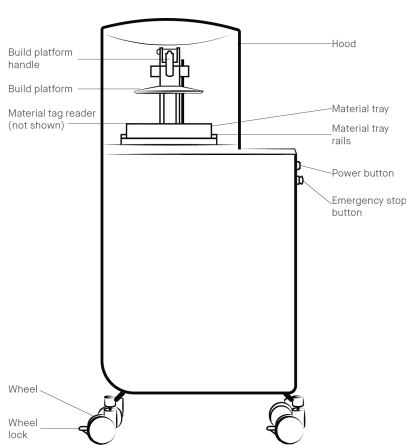
Applicable Printers

LOCTITE IND405 Black is tested and approved for the following printers:

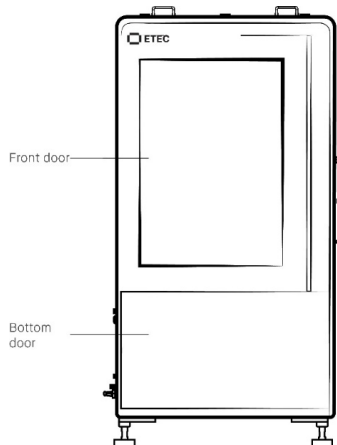
- Xtreme 8K™
- Envision One™

LOCTITE IND405 Clear is tested and approved for the following printers:

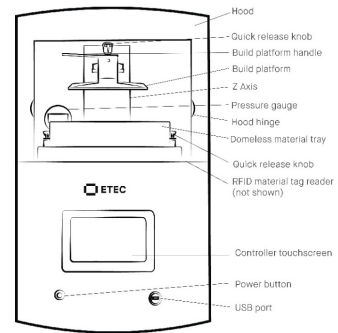
- Pro XL™
- Envision One™



Pro XL Front View



Xtreme 8K Front View



Envision One Front View

Getting Started

Primary Supplies

Acquire primary supplies prior to product delivery. Obtain the proper tools to prepare for successful printing and post-processing.

The following supplies are required to print LOCTITE 3D IND405 material:

- LOCTITE 3D IND405, Product Codes:
 - Xtreme 8K, Envision One: RES-01-7067 - Black (1 kg).
 - Pro XL, Envision One: RES-01-7069 - Clear (1 kg).
 - Xtreme 8K, Envision One: RES-99-1026 - Black (5 kg).
- Personal Protective Equipment (PPE).
- Paper towels or parchment paper.
- Material mixing:
 - Xtreme 8K: Silicone mixing blade attachment and industrial mixing drill.
 - Pro XL, Envision One: Dual Motion Bottle Roller, Product Codes ACC-26-1000 (110V) and ACC-26-1000 (220V), and rubber spatula.
- Material filtering:
 - Xtreme 8K: 5-gallon bucket and paint strainer.
 - Pro XL, Envision One: Cone-shaped paint filter and spare material storage bottle.
- Part removal:
 - Xtreme 8K: Razor scraper.
 - Pro XL, Envision One: Paint scraper.
- Washing unit options:
 - Small parts: PWA 2000, Product Code ACC-22-2000.
 - Medium and large parts: Desktop Orbital Shaker Washer, Product Code ACC-02-6000.
- Washing agent: 99% Isopropyl alcohol (IPA).
- Spray bottle.
- Air compressor.
- Curing unit options:
 - PCA 4000: Product Code ACC-06-1000.
 - Xtreme 8K only: UVCA 3000, Product Code ACC-02-1001.



Note: See [Xtreme 8K Site Prep Guide](#), [Pro XL Site Prep Guide](#), and [Envision One Site Prep Guide](#) for more information.

Design Parts LOCTITE 3D IND405

It is recommended to add channels or drainage holes to hollow parts. This allows uncured material to drain from the hollow feature during the printing process.



Xtreme 8K Tip: Parts placed on the Xtreme 8K build platform will have a pattern imprinted on the mating surface. To avoid this, print parts using the recommended support settings.

Minimum Feature Size

Minimum feature size is dependent on:

- Printer
- Material
- Feature geometry

All design features include recommendations for absolute minimum feature size and recommended minimum feature size. Absolute minimums are the smallest resolvable feature size based on printability. Recommended minimums are provided to minimize potential warpage and account for part fragility. Part feature dimensions that are lower than the recommended minimum can fracture with minimal force.



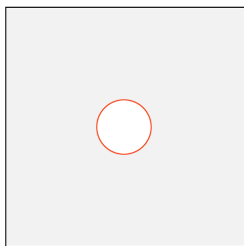
Note: Absolute minimum feature sizes are only valid for smaller features within the part geometry (text, small channels, etc.). They should not be used for the main components of design methodology.

ETEC recommends the following minimum feature sizes for parts printed in LOCTITE 3D IND405:

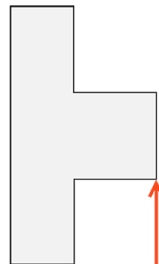
Design Feature	Pro XL Absolute Minimum	Xtreme 8K Absolute Minimum	Envision One Absolute Minimum	Pro XL, Xtreme 8K, & Envision One Recommended Minimum
Wall Thickness	0.40 mm	0.30 mm	0.30 mm	2.0 mm
Engraving Depth	0.30 mm	0.30 mm	0.30 mm	0.60 mm
Embossing Height	0.30 mm	0.30 mm	0.30 mm	0.60 mm
Positive Features	0.45 mm	0.45 mm	0.45 mm	0.90 mm
Negative Features	0.45 mm	0.45 mm	0.30 mm	0.90 mm
Hole Diameter	0.50 mm	0.60 mm	0.50 mm	1.50 mm
Unsupported Walls	0.30 mm	0.30 mm	0.30 mm	1.0 mm
Bridge Gap Note: The value is maximum, not minimum.	0.40 - 5.0 mm	0.40 - 5.0 mm	0.40 - 5.0 mm	0.60 mm - 2.0 mm
Unsupported Horizontal Overhang Note: The value is maximum, not minimum.	1.50 mm	2.0 mm	1.50 mm	1.50 mm



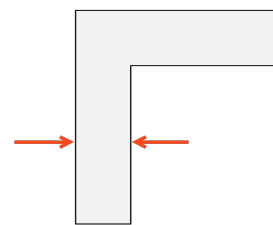
Tip: Thin walls and long overhangs can experience part warping. Additional supports in those areas or specific part orientation can help reduce part warping.



Hole Diameter



Unsupported Horizontal Overhang

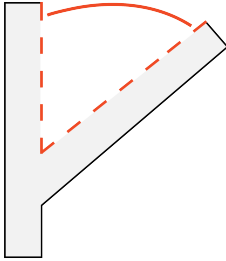


Minimum Wall Thickness

Self-Supporting Angle

The maximum self-supporting angle for parts printed on the Xtreme 8K is 30° from vertical. Angles as high as 60° may be printed without supports, but some deformation can occur.

The maximum self-supporting angle for parts printed on the Pro XL and Envision One is 50° from vertical.



Self-supporting angle from vertical

Software

Orient Parts Live Build DLP

Live Build DLP automatically orients your model, adds supports, and sends the file to the printer, resulting in your three-dimensional model. Everything that is printed using ETEC printers must pass through this software successfully.

	Pro XL	Xtreme 8K	Envision One
Spacing	Place parts a minimum of 0.50 mm apart.	Place parts a minimum of 2.0 mm apart.	Place parts a minimum of 0.50 mm apart.
Level at build platform	Place supported parts 5.0 mm from the build platform.	Place supported parts 10.0 mm from the build platform.	Place supported parts 5.0 mm from the build platform.
Resolution	100 µm Z resolution (dependent on layer thickness).		



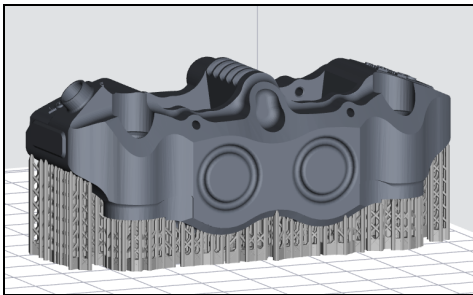
Tip: Parts with large, flat, continuous surfaces may benefit from canting to reduce warpage.

Support Parts Live Build DLP

Some approved applications require supports. Always use the LOCTITE 3D IND405.ini support file:

Support Setting Feature	Pro XL & Envision One Recommended Support Settings	Xtreme 8K Recommended Support Settings
Minimum contact tip thickness	0.80 mm	0.90 mm
Minimum support beam thickness	1.75 mm	1.50 mm
Minimum support beam height	5.0 mm	10.0 mm
Minimum space between supports	1.25 mm	1.40 mm
Minimum support base	1.0 mm	1.50 mm
Clearance from part	1.40 mm	2.0 mm

Support Setting Feature	Pro XL & Envision One Recommended Support Settings	Xtreme 8K Recommended Support Settings
Only from platform	Optional	Yes
Reinforcement spacing	3.0 mm	5.0 mm
Maximum angle	55°	60°
Maximum height	150.0 mm	500.0 mm
Base type	Baseplate	Fence



Supported Part in Live Build DLP



Tip: Place support beams as perpendicular to the supported surface as possible. The more parallel the supports are to part surface, the more difficult support removal and part finishing will be.



Tip: Cure stresses can occur during printing, especially to thinner parts. To minimize print cure stress, orient the part to minimize surface area per layer.

Print Preparation

Mix Material

LOCTITE 3D IND405 separates easily and must be mixed regularly.



Important: Parts printed on the Pro XL/Envision One and the Xtreme 8K have different mixing recommendations. Use the mixing recommendations for the printer in use.

Pro XL and Envision One

1. Mix the sealed material bottle on the bottle roller for 30 minutes.
2. Wait for bubbles to subside before filling the material tray.
3. Before every print, gently mix the material in the material tray for 1 minute with the rubber spatula.

Xtreme 8K

1. Shake material in the material container for 1-2 minutes. Wait for bubbles to subside before filling the material vat.
2. Before every print, mix the material in the material vat for 2-3 minutes at a gentle speed with the silicone mixing blade attachment on a drill.

Fill Material Vat/Material Tray

Do not overfill the material vat/tray. Overfilling can cause the material to overflow at the start of the print job.



Important: Ensure there are no small, cured particles in the material. If found, then the material must be filtered. See [Maintain Materials Pro XL](#), [Maintain Materials Xtreme 8K](#), and [Maintain Materials Envision One](#).

To add more material to the printer, carefully pour material into the material vat/tray between prints. See [Add Material Pro XL](#), [Add Material Xtreme 8K](#), and [Add Material to Domeless Material Tray Envision One](#).



Note: Do not add material to the material vat/tray during a print. Adding material while the print is paused, or during a print, will cause a small shift line in the part.

Print LOCTITE 3D IND405

Before starting a print:

- Ensure the build platform is clean and free of cured material.
- Ensure the material level is correct.
- **Xtreme 8K only:** Check the build platform level.
- **Xtreme 8K only:** Check the recoating blade gap.

To start the print, see the printer's Operations & Maintenance guide:

- [Pro XL Operations & Maintenance Guide](#)
- [Xtreme 8K Operations & Maintenance Guide](#)
- [Envision One Series Operations & Maintenance Guide](#)

Post-Processing

Materials Safety

The **Safety Data Sheet (SDS)** for materials used in the printing process are available from ETEC or directly from suppliers. Read and understand the information provided in these documents prior to attempting to operate the printer or handle any media.

WARNING

Fire hazard: Some materials used for washing may be flammable. Do not wash parts in proximity of any potential ignition source. Washing or drying equipment must be approved for use with flammable solvents. Read SDS and contact your EHS Representative.

Remove Supports, Remove Parts from Build Platform

Allow the material to drip off parts for 15 minutes before post-processing. Then, immediately begin post-processing.



Tip: Time the end of the print in order to post-process parts immediately. Ensure clean 99% IPA is available for part washing.

1. Remove excess resin from parts using compressed air. Parts should be left attached to the build platform for added sturdiness.
2. Remove parts from the build platform with the paint scraper (Pro XL, Envision One)/razor scraper (Xtreme 8K).



Xtreme 8K Tip: To remove parts, place the paint scraper under one corner of the part, angling towards the opposite diagonal corner of the part. Use the rubber mallet to gently tap the back of the paint scraper. Work slowly to avoid chipping/fracturing parts.



Tip: Small parts tend to "pop off" of the build platform, so do not apply significant pressure for part removal.

3. Remove supports from the parts (if applicable):
 - a. Use gentle pressure to press against the portion of the support beams that is closest to the part surface. Separate the support tips from the part.
 - b. Pull the part in the opposite direction of the supports. The supports should separate from the part with minimal difficulty.
 - c. Provide extra care to thin-walled areas or areas with long supported overhangs.



Tip: Cleaning parts printed with LOCTITE 3D IND405 can be difficult. For best results, use compressed air to remove as much resin as possible prior to part washing.

Clean Printed Parts

Clean the parts using one of the following washing units:

- **Small parts:** PWA 2000.
- **Medium and large parts:** Desktop Orbital Shaker Washer.



Important: Do not expose LOCTITE 3D IND405 to alcohol for longer than five minutes. Excess exposure to alcohol may cause adverse effects on the mechanical properties of parts and surface issues.



Tip: Large surface areas, small gaps/holes, and acute corners may be difficult to clean. Use compressed air, soft sponges, and 99% IPA to remove remaining resin after cleaning.

Clean parts with the PWA 2000:

1. Remove excess resin from the parts using compressed air.
2. Wash the parts in the PWA 2000 with 99% IPA for 2.5 minutes on **High**.
3. Remove the parts as soon as the program is done and dry with compressed air for 20 to 40 seconds.
4. Repeat **Steps 2 - 3**.
5. If the surface of the parts is glossy after drying, spray with IPA and remove residue with compressed air. The surface should be matte and smooth.

Clean parts with the Desktop Orbital Shaker Washer:

1. Remove excess resin from the parts using compressed air.



Note: Adjust the washing time and RPM as needed, dependent on part size and solvent volume.

2. Wash the parts in the Orbital Shaker with 99% IPA for 2.5 minutes at 100 RPM.
3. Remove the parts as soon as the program is done and dry with compressed air for 20 to 40 seconds.
4. Repeat **Steps 2 - 3**.
5. If the surface of the parts is glossy after drying, spray with 99% IPA and remove residue with compressed air and a soft sponge (applying light pressure). The surface should be matte and smooth.

Dry Parts

Parts must be completely dry before post curing:

1. Dry the parts with compressed air.
2. Place the parts in a dark room on a clean surface lined with parchment paper.
3. Leave the parts to dry:
 - a. Envision One: 10 minutes.
 - b. Pro XL, Xtreme 8K: 60 minutes.

Post Cure Printed Parts

Post cure parts using one of the following curing options:

- PCA 4000. See [Programs and Features PCA 4000](#).
- **Xtreme 8K only:** UVCA 3000. See [Hardware Operations UVCA 3000](#).



Important: Parts printed in LOCTITE 3D IND405 on the Pro XL, Xtreme 8K and Envision One have different curing instructions. Use the curing instructions that are compatible with the printer in use.

Cure parts with the PCA 4000:

1. Place parts in the curing unit with as much space between parts as possible. Parts should never touch one another while curing.
2. Cure the parts in the PCA 4000 with the following settings:
 - a. Pro XL: 75 minutes at 45° C and 100% power.
 - b. Xtreme 8K: 30 minutes at 20° C and 100% power.
 - c. Envision One: 20 minutes at 20° C and 100% power.
3. When the cycle ends, let the parts cool completely before handling.
4. Flip the parts between cycles for an even cure.
5. Repeat **Steps 2-3**.

Cure Xtreme 8K parts with the UVCA 3000:

1. Place parts in the curing unit with as much space between parts as possible. Parts should never touch one another while curing.
2. Cure the parts in the UVCA 3000 for 120 minutes at 20° C and 100% power.
3. When the cycle ends, let the parts cool completely before handling.
4. Flip the parts between cycles for an even cure.
5. Repeat **Steps 2-3**.



Desktop Metal, Inc.
63 3rd Avenue
Burlington, MA 01803
www.desktopmetal.com

Desktop Health
c/o Desktop Metal, Inc.
63 3rd Avenue
Burlington, MA 01803
health.desktopmetal.com

EnvisionTec US LLC (ETEC)
15041 Commerce Dr. S, Suite 401
Dearborn, MI 48120
etec.desktopmetal.com

EnvisionTec GmbH
Brusseler Str. 51
45968 Gladbeck
Germany

ExOne Operating, LLC
127 Industry Boulevard
North Huntingdon, PA 15642
www.exone.com

ExOne GmbH
Daimlerstrasse 22
86368 Gersthofen
Germany

ExOne KK
161-5 Haneo
Odawara-shi, Kanagawa
Japan 256-0804