

envisionTEC

Technical Guide

Vida cDLM: Start Guide

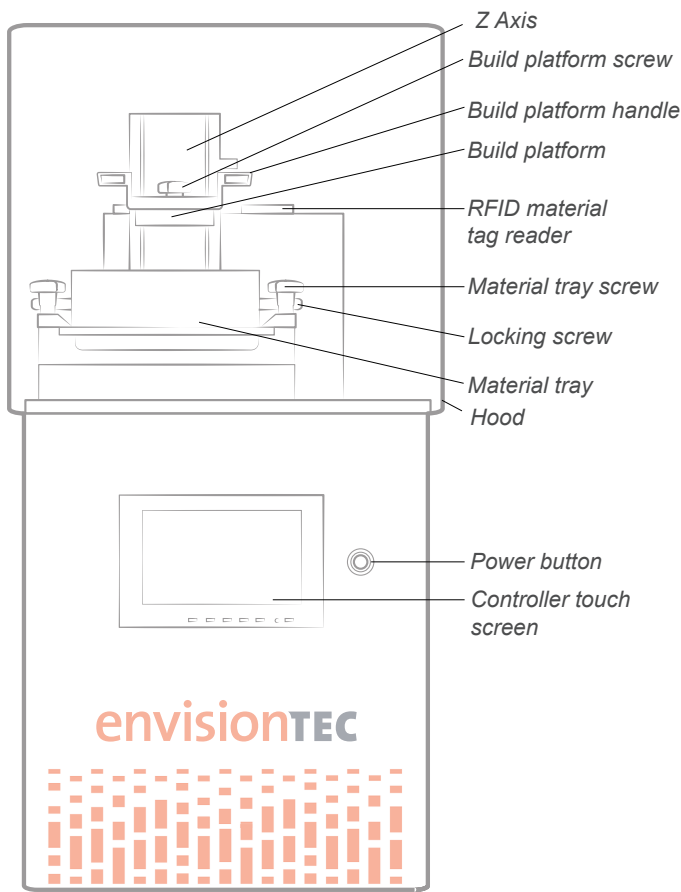
This guide depicts the installation and general maintenance of the Vida cDLM. The Vida Continuous Digital Light Manufacturing (cDLM) printer offers an expedited printing process by incorporating a pressurized oxygen system. The printer can build models at unprecedented speeds while delivering a high level of detail.

Primary Supplies, Non-Immediate Supplies

- | | |
|--|--|
| ☐ Absorbent paper towels | ☐ Bottle roller machine |
| ☐ Air compressor | ☐ Digital calipers |
| ☐ Cone-shaped paint filters | ☐ Magnification loupe |
| ☐ Ethernet cable: CAT 6 | ☐ Phillips screw driver |
| ☐ Garbage can | ☐ Stylus |
| ☐ Makeup or quality paint brush | ☐ UV protecting goggles |
| ☐ Nitrile gloves | ☐ White lithium grease |
| ☐ Storage containers for material-sealable and opaque | ☐ Battery backup |
| ☐ USB drive | |
| ☐ 99% isopropyl alcohol (IPA) | |
| ☐ PWA 2000 (parts washer) | |
| or post-processing containers, 1 qt | |

Refer to the **DLP: Shopping List Technical Guide** for a more detailed list of supplies and their uses. This technical guide is available to download by contacting EnvisionTEC support, or an authorized distributor.

Fig. 1 VIDA CDLM FRONT VIEW



Printer Delivery

The Vida cDLM will arrive in a wooden crate along with a series of accessories boxes. The crate and boxes will all be on top of a pallet. They will need to be delivered to the final site using a fork lift or a pallet jack. Alternatively, the crate and accessories boxes can be removed from the pallet and gently placed on a dolly.

Crate: Vida cDLM, material tray, starter kit, USB drive

Additional Box: Oxygen concentrator

Optional Boxes: PCA 2000 (post-curing chamber), PWA 2000 (parts washer), and battery backup if purchased

Creating a Workspace

Printing Zone

The printer requires space to properly operate, receive maintenance, and dissipate heat -

A minimum of **12 inches** behind the Vida cDLM

A minimum of **24 inches** on the left and right sides of the printer

A minimum of **48 inches** above the table-top

The oxygen concentrator needs floor space near the printer for operation and heat dissipation. Air intakes are located on the upper back and bottom of the concentrator.

Locate the oxygen concentrator so that there is at least **12 inches** of space between the concentrator and any walls, curtains or other obstructions

Processing Zone

This space is located in a separate space from the printing zone. The PWA 2000 (parts washer) and the 99% IPA, cleaning tools, and air system will be in this space. If the PWA 2000 was not purchased, two or more containers for the 99% IPA can be used instead.

Refer to the **Vida cDLM: Site Preparation Technical Guide** for more detailed information. This technical guide is available to download by contacting EnvisionTEC support, or an authorized distributor.

Material Tray

The material tray speeds up the printing process by adding a thin layer of oxygen. This oxygen reduces separation forces, resulting in prints that are three times faster than standard DLP technology. **The material tray is a consumable.**

Cleaning

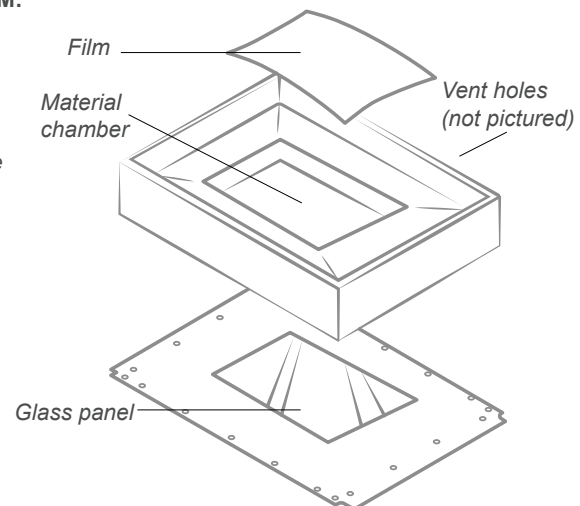
The material chamber, *Fig. 2*, can only be wiped clean with a dry, clean paper towel. Cloudiness on the film is expected and will not change the quality of prints. Reinstall the material tray as soon as possible after cleaning. Leaving the material tray exposed to light can damage the material tray.

Refer to the **cDLM:**

Material Tray Best Practices

Technical Guide for more information. The guide is available to download by contacting EnvisionTEC support, or an authorized distributor.

Fig. 2 MATERIAL TRAY EXPLODED VIEW



Printer Installation

The Vida cDLM printer should be carefully removed from its crate and placed onto a sturdy work surface.

1 Install the Oxygen Concentrator

The Vida cDLM uses a pressurized oxygen system. This system must be properly installed in order to use the printer. Place the concentrator on the floor near the printer. Leave at least **12 inches** of space between the concentrator and any walls, curtains or other obstructions to allow for proper circulation. The concentrator is fitted with casters to allow for easy positioning.

2 Priming the Concentrator

Connect the power cable to the back of the oxygen concentrator and then power it on via the front power switch, *Fig. 4*. Leave the concentrator powered on for **30 minutes to prime before connecting the oxygen delivery tube**, *Fig. 4*.

3 The Material Tray

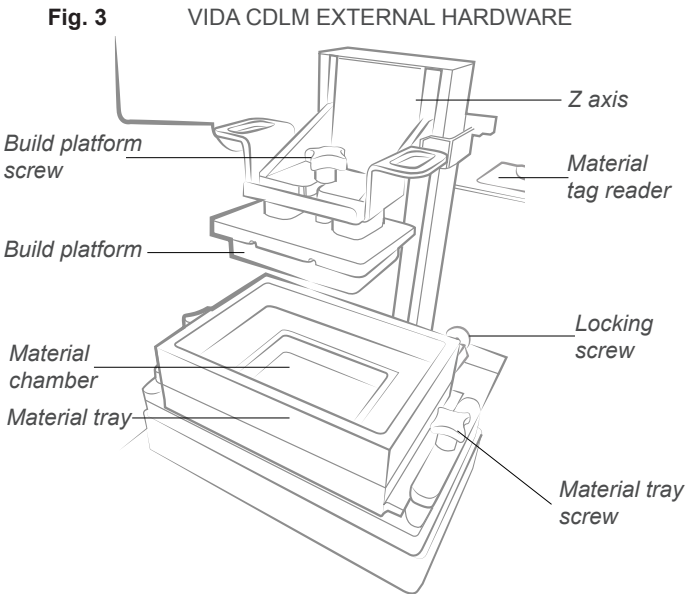
The material tray holds the material used to create models. It is important to not touch the film at the base of the material chamber, *Fig. 2*. To install the material tray -

- 1 Open the hood
- 2 Release the left and right material tray screws, *Fig. 3*
- 3 Slide the material tray into the printer, vent holes first, until it is fully seated
- 4 Tighten the left and right locking screws, *Fig. 3*
- 5 Tighten the left and right material tray screws, *Fig. 3*

Do not add material at this time.

4 Insert the Build Platform into the Printer

Ensure the build platform is fully seated at the top of the Z Axis, *Fig. 3*. Tighten the build platform into position using the build platform screw, *Fig. 3*.



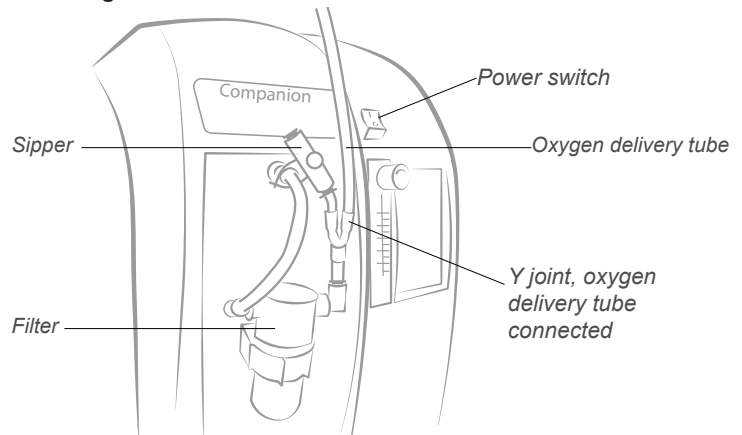
5 Installing the Oxygen Delivery Tube

The oxygen delivery tube connects from the front of the oxygen concentrator, *Fig. 4*, to the back of the printer, *Fig. 5*.

Firmly insert the tube into the plastic release ring at the back of the printer, *Fig. 5*. The other end of the tube should be firmly connected to the Y joint at the front of the oxygen concentrator, *Fig. 4*.

The oxygen delivery tube can be removed by pressing the plastic release ring at the back of the printer and pulling the tube out near the insertion point, *Fig. 5*.

Fig. 4 OXYGEN CONCENTRATOR

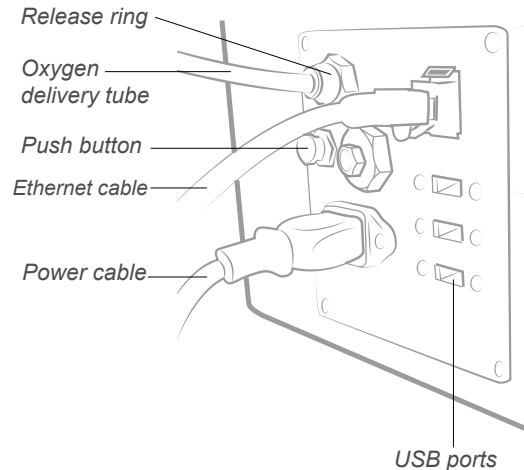


6 Starting the Printer

Plug the power cable into the back of the printer, *Fig. 5*, and then into a power source such as a battery backup or wall outlet.

Press and hold the power button on the front of the Vida cDLM **for roughly five seconds**, or until the blue halo around the button illuminates, *Fig. 1*. This light will remain on as long as the printer is powered on.

Fig. 5 VIDA CDLM REAR VIEW



7 Add Material

Each type of material EnvisionTEC offers has specific instructions for use. Be sure to properly prepare your specific material before each use.

Slowly pour material into the material tray until the material fills the inner material chamber, *Fig. 3*. Do not fill the material tray past this point. Adding material past this point may cause the material to overflow when the print starts. If needed, let the material sit in the tray for 20 minutes to allow any air bubbles to disperse. Close the hood to protect the material from light exposure.

Model Processing Software

All files to be printed must pass through a specific model processing software before transferring to the Vida cDLM printer. The **Perfactory RP Software Suite** allows users to prepare models for the Vida cDLM printer. Once the models are loaded, oriented, and supported in Perfactory RP, they may be transferred to the Vida cDLM printer as a folder containing a series of images and files. This information is used by the printer to build three dimensional models.

Perfactory RP Software

The Perfactory RP software is used to:

- 1 Orient three dimensional models on the build platform
- 2 Create automated support structures
- 3 Generate a print job
 - ☐ **Operating System:** Windows 7 64-bit or Windows 10 64-bit
 - ☐ **RAM:** ≥ 8 GB RAM
 - ☐ **Hard Drive:** 400 MB of free space
 - ☐ **CPU:** Multi-Core Processor e.g. Core i5, ≥ 3 GHz, ≥ 6 MB Cache
 - ☐ **Graphics:** Dedicated 3D graphics card with ≥ 1 GB memory and OpenGL 2.0 support
 - ☐ **Network:** Gigabit Ethernet

8 Download Perfactory RP Software

The software can be found on the USB drive that ships with every Vida cDLM. Follow the prompts to download the software. The software automatically launches when the installation completes.

Refer to the **Perfactory RP Software Suite Quick Start Guide** for instructions in setting up a print job for the Vida cDLM. This guide is located on the USB that ships with every Vida cDLM printer. The guide can also be obtained by contacting EnvisionTEC customer support or an authorized distributor.

9 Transferring the print job folder to the printer

There are two methods to transfer a print job folder from the operating computer to the Vida cDLM printer -

- 1 Transfer the print job folder using a **USB drive**. See **Step 10** for instructions
- 2 Transfer the print job folder using a **network connection**. Contact EnvisionTEC technical support or an authorized distributor to obtain the **Vida Networking Guide**. Once a network connection has been established, see **Step 11** for instructions

10 USB method - transferring the print job to the printer

- 1 Save the print job folder on the computer using Perfactory RP
- 2 Insert a USB drive into the computer
- 3 Copy and paste the print job folder to the USB drive
- 4 Safely remove the USB drive from the computer
- 5 Insert the USB drive into the USB port at the back of the printer, Fig. 5

11 Check the Material in the Tray

Add material to the material tray if this was not done already. See **Step 7**.

12 Installing the Material Tag

The RFID material tag arrives attached to every bottle of material. It must be removed from the bottle and inserted into the RFID material tag reader on the right side of the Z axis, Fig. 3. When the material tag is properly inserted, the reader will respond with a green light. The material tag must remain in the material tag reader for the duration of the print.

There must be a material tag inserted before starting a print or the software will display an error message.

13 Use the Touch Screen to Start the Print

Return to the **Main** tab on the Vida cDLM's touch screen and then press **Connect** -



Select **Load Job** -

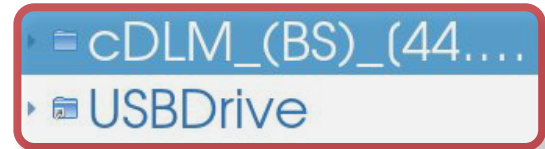


If using a USB drive to transfer the job, then select triangle next to **USBDrive** to open the folder content -



Select the job folder from the list.

If using the network to transfer the job, then select the job folder -



Press **Open** to load the print job -

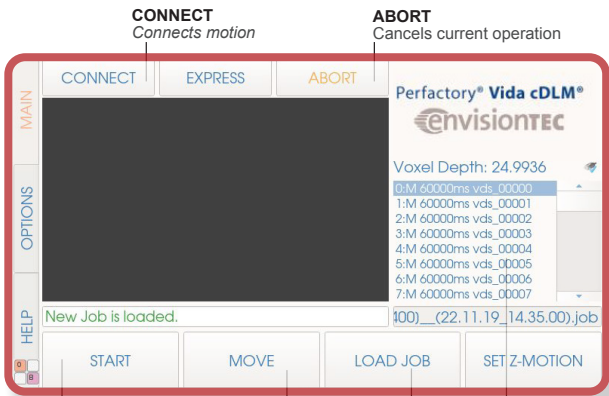


and then press **Start** to begin the print -



Control Software Tree

Fig. 6 CONTROL SOFTWARE MAIN TAB



START
Begins loaded
Print Job

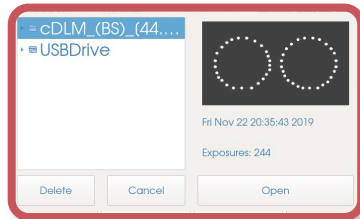
List of images
in the Print Job
folder

Fig. 6B MOVE SETTINGS



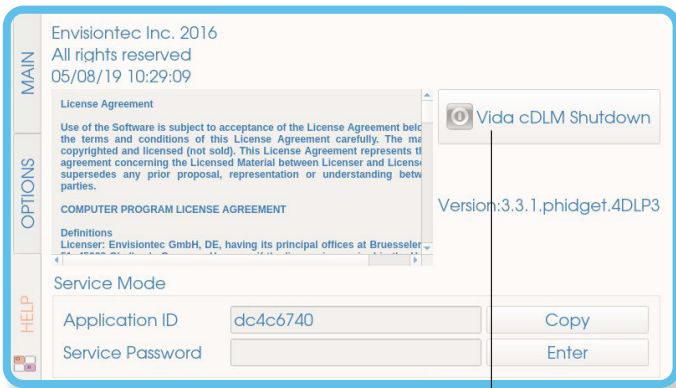
MOVE
Opens options to change the position of the build
platform

Fig. 6C LOAD JOB



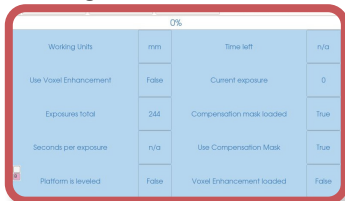
LOAD JOB
List of available Print Jobs on the printer
platform

Fig. 9 CONTROL SOFTWARE HELP TAB



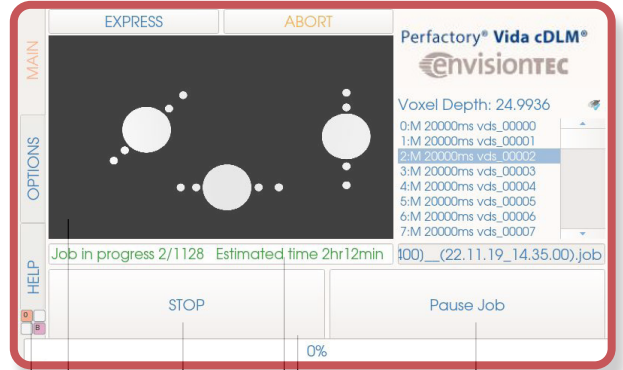
Power
Turns the printer off

Fig. 10 BLUE SCREEN



Blue Screen
This screen can be accessed and removed
by tapping the completion bar (shown here at
the top of the screen). See Fig. 7 for location
of the completion bar outside of the blue
screen.

Fig. 7 CONTROL SOFTWARE PRINT IN PROGRESS



**Preview
Window**
Shows the
current image
being
projected

STOP
Cancels the
Print
Job after
completing
the current
layer

**completion bar
(Using percentages)**
Status Bar
Shows what machine
is doing or has
completed

Pause Job
After current layer
completes, build
platform raises
from the PSA
until Print Job
is canceled or
resumed

Keyboard
Opens the on-screen keyboard
(To close, hold down the enter
key and drag finger to the
minimize button.)

Fig. 8 CONTROL SOFTWARE OPTIONS TAB

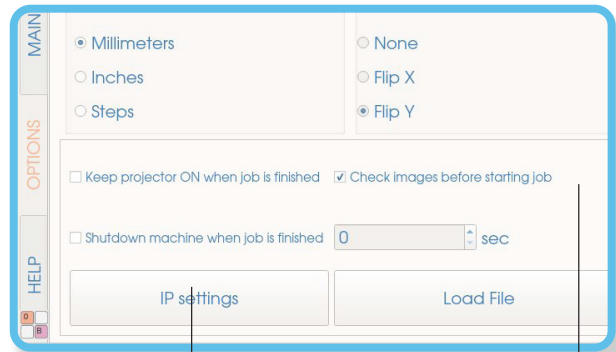
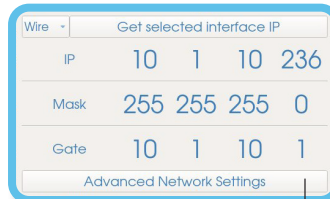


Fig. 8B IP SETTINGS



IP settings
The IP address for the printer

Fig. 8C INFO SETTINGS

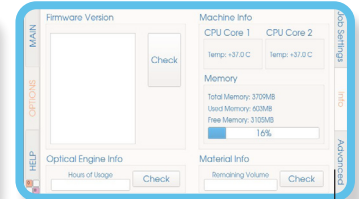
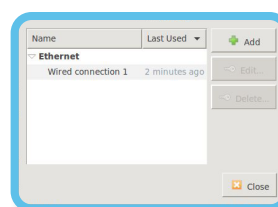
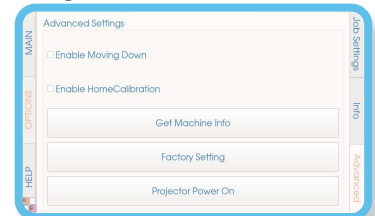


Fig. 8D ADVANCED NETWORK



Establishing a Network Connection
Configure a network connection for the printer

Fig. 8E ADVANCED SETTINGS



Print Processing

Preparations

Details about personal protective equipment (PPE) and handling details for specific materials can be found within:

Safety Data Sheet documents

Instructions for Use (IFU) documents

Material Best Practices Technical Guides

Refer to these sources before continuing. They will guide you through the appropriate safety procedures.

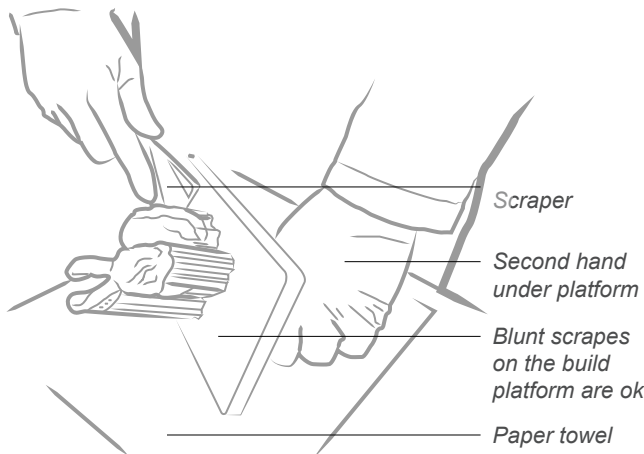
14 Tool and Space Arrangements

- 1 Prepare a few sheets of paper towel in the processing zone. Lay them down into two piles slightly larger than the size of your build platform. The first pile is for the build platform to sit on. The second pile is for the models once they're removed from the build platform
- 2 Fill the containers in the processing zone with 99% IPA
- 3 Raise the hood

15 Remove the Build Platform from the Printer

Place one hand on the build platform handle and then loosen the build platform screw with your dominant hand, *Fig. 1*. This will release the build platform. To remove the build platform, hold the build platform handle and slide the build platform towards you. Use your second hand to lightly cradle the bottom of the build platform with the paper towel to catch potential material drips. **Close the hood on the printer to protect the material and material tray from exposure to light.**

Fig. 5 DETACHING MODELS FROM THE BUILD PLATFORM



16 Detaching the Models

Place the build platform on its side in the processing zone. Watch the material so it does not leak into the top of the build platform assembly and into the build platform screw cavity.

Use the scraper from the starter kit to gently pry models from the build platform. Angle your tool roughly 30 degrees from the platform and move the blade while applying a light amount of pressure, *Fig. 5*. If the model doesn't begin to separate, move to a different area, working your way around the model until it safely dislodges from the build platform. Place each model on a paper towel to keep the area clean. Note that the models appear to be glossy. This is because uncured material is covering the surfaces of each printed model.

17 Resetting the Printer

Once the models have been removed, use the scraper to remove any remnants of the print job from the surface of the build platform. Wipe the entire platform clean using a dry paper towel.

Return the build platform to the printer - see **Step 4**. Close the hood to protect the material and material tray from exposure to light. The Vida cDLM can now begin printing the next loaded print job.

18 Cleaning the Models with the PWA 2000

If a parts washer was purchased, refer to the user manual for instructions. Each material will have its own recommended cleaning time in the PWA 2000.

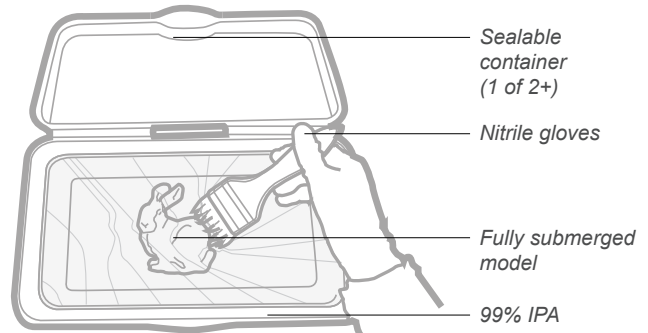
This technical guide is available to download by contacting EnvisionTEC support, or an authorized distributor.

19 Cleaning the Models with Containers of 99% IPA

To clean the models without the PWA 2000, bring the models to the containers of 99% IPA. The first container the models will be placed in is referred to as the "dirty bath" because this solution will become muddy fairly quickly. The second bath is the "clean bath." Each bath needs to be filled with enough 99% Isopropyl alcohol to fully submerge the models.

Fig. 6

CLEANING PRINTED MODELS



Submerge the models in the first bath of 99% IPA for no longer than 60 seconds. Use a brush while the model is submerged to help clean out smaller features of uncured material. Models may also be swished or gently stirred.

Remove the models and spray with compressed air until completely dry. Examine each model for variations in the surface quality. Glossy sections will need to be focused on during the second rinse cycle.

Place models into the second, or clean, bath of 99% Isopropyl alcohol. Repeat the process by submerging models for 60 seconds, then blowing each model dry. Repeat this step as needed until each model has a uniform matte finish. Dry models quickly with compressed air as extended time exposed to IPA can cause micro cracks.

The **99% Isopropyl alcohol needs to be replaced** when the bottom of the container is no longer visible in the dirty container. Use the clean bath as the new dirty bath and fill the emptied container with new 99% Isopropyl alcohol. Rotating containers helps to conserve supplies.

Castable materials should not be exposed to 99% isopropyl alcohol for longer than 2 minutes. Longer exposure increases the risk for porosity in castings. See the *Lost Wax Casting Technical Guide* for more information.

20 Curing the Models

Place the models in their recommended curing apparatus. Follow the recommended program for each material / apparatus combination. Curing times may vary depending on wall thickness and geometry of each model. Check the Material Best Practice guides for more information about the recommended cure time based on your material. More or less time may be required to achieve desired results. Properly cured models should not feel tacky to the touch.

Plug the curing apparatus into a surge protector or battery backup to help protect from electrical fluctuation.

EnvisionTEC only supports EnvisionTEC curing ovens. Any other post curing oven must be calibrated individually. It is not the responsibility of EnvisionTEC to support third party curing ovens.

21 Finishing

Finishing involves using sandpaper and other tools to smooth the supported surfaces of model.

Supported areas can be carefully sanded using a fine Dremel bit followed by sandpaper. Sand beginning with 400 grit sand paper. Going beyond 400 grit sand paper is recommended where the utmost clarity is desired. Buff with fine pumice and finish with plastic polish if needed.

Extended Care

Basic maintenance can help to extend the life of your printer. Many of these tasks are quick to complete and should be added to the operator's weekly activity list.

Hard Drive Space

The Vida cDLM is capable of storing a limited amount of print jobs. To clean out the hard drive, open the printer's Job Folder and delete unneeded print jobs. It is recommended to complete this process at least once every two calendar weeks.

Maintaining the Material

If the Vida cDLM will be inactive for more than three days, the material should be removed from the material tray. Pour the material through a cone-shaped paint filter into an opaque, resealable, container. Strain material every time it is removed from the printer in order to remove impurities and cured bits of material.

The material tray should be cleaned with a dry paper towel. Store the material tray in the printer while empty and clean. The photosensitive properties of the material require it to be protected from light sources to keep the material and tray in prime condition through their shelf life.

Resources

Learn from the Pros

The E-team is an online portal where printer owners and operators can browse through an array of content to find answers to common questions, learn tips, and connect with others using the same technology. The forum includes videos and technical guides. Use this resource as a first response if there is something you'd like to know about your printer.

eTeam

You can open conversation threads and look at anything from a question about a new printing application or material, to more basic questions, like "how often do I need to replace the material tray for my desktop printer?" If you're a seasoned operator, you can join a conversation and help others. Membership is complimentary with the purchase of your Envision One cDLM.

envisiontec.com/etteam

Reordering Consumables

Consumables such as material trays and material can be ordered on the Contact Us page of the EnvisionTEC website. If your printer was purchased through a reseller or distributor, contact them directly for additional supplies.

<https://envisiontec.com/contact-us/>



Support Tickets

Got a tough question or something doesn't look quite right? EnvisionTEC has international teams to assist you. Visit the website below and complete the form to open a support ticket. Certified technicians are available to assist with technical support, questions about relocating your printer, and more. See your warranty for more details.

<https://envisiontec.com/support/>



Webinars

Want to keep up to date with what's going on with the newest technology developments? Sign up for free webinars hosted by specialists to learn more about our software, materials, best practices, new technology, etc. Each webinar ends with an open question and answer segment, so you can bring your notes and ask questions. Space is limited!

<https://envisiontec.com/training/>



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