

envisionTEC

Technical Guide

Surgical Guides

Workflow in E-Guide

E-Guide is intended for the printing dental surgical drill guides. These guides are used by dentists or oral surgeons prior to the surgical procedure in order to facilitate exact drilling and exact placement of the dental implants in the patient's jawbone. This technical guide details the workflow for preparing surgical guide models for printing in E-Guide material, post-processing, and finishing.

Applicable Printers: D4K Pro, Envision One cDLM, Micro Plus series, P4K series, P4 LED series, P4 series, Vida Domeless cDLM, Vida series

Primary Supplies

- 99% isopropyl alcohol (IPA)
- Air compressor
- Cone-shaped paint filter (from Starter Kit)
- Convection oven capable of 37° C
- Nitrile gloves
- Otofash curing unit
Order from EnvisionTEC - SAP # ACC-00-0007
- Paint scraper (from Starter Kit)
- PWA 2000 parts washer
Order from EnvisionTEC - SAP # ACC-22-2000
- Paper towels
- Plastic funnel
- Rubber spatula (from Starter Kit) or mixing cards
- Spray bottle with 99% IPA
- Snips, X-Acto knife, or similar tool
- Storage container for material - sealable and opaque
- Standard dental polishing tools

Getting Started

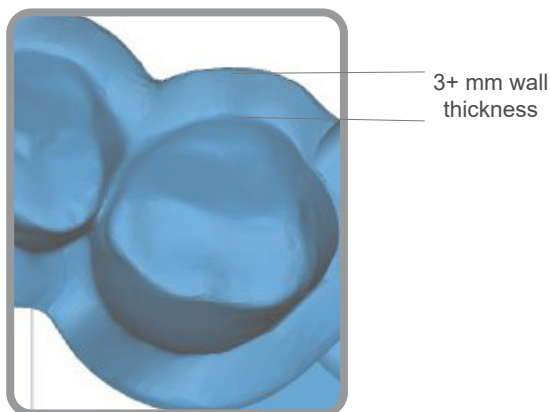
1 Capturing patient data

EnvisionTEC printers are compatible with the universal .STL file format and are thus compatible with almost all dental CAD and surgical design software as well as digital design services. Surgical guides may be designed in-house or outsourced to a design partner.

2 Designing models for E-Guide

Surgical guides printed in E-Guide must have a **minimum wall thickness of 3 mm and maximum wall thickness of 10 mm.**

Fig. 1 SURGICAL GUIDE WALL THICKNESS



After the final post cure the models may show slight color changes. This does not reduce the quality of the application of surgical drill guides.

Software

3 Orienting models in RP software

Orient models in Envision One RP or Perfactory RP software (printer dependant) with the intaglio surface facing up, away from the build platform.

Spacing: place models a minimum of 2.5 mm apart

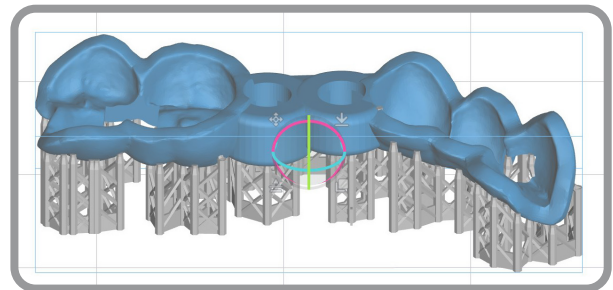
Level at build platform: place models 4 mm from the build platform

Resolution: only print at 100 μ m Z resolution

4 Supporting models in RP software

Surgical guides require supports to print. Always add supports to the outside (non-fitting) surface of surgical guide models.

Fig. 2 SUPPORTED SURGICAL GUIDE



Once models are properly oriented in the RP software, supports can be added automatically. It is recommended to use the preset support configuration for the specific material used.

Print Preparation

5 Filling the material tray

The material tray should not be filled past the material fill line to prevent overflow when the build platform moves down. To add more material to the printer, carefully pour material into the material tray between print jobs. Adding material while the print is paused, or during a print, will cause a small shift line in the model. See *the Start Guide for more information.*

6 Printing with E-Guide material

Mix material in the material tray gently with the rubber spatula from the Starter Kit (Envision One) or a mixing card (DLP) before each print. Make sure there are no small cured particles in the material. If found, than the material must be filtered using the plastic funnel, cone-shaped paint filter, and a spare material bottle. See *the Maintenance Guide for more information.*

Post-Processing

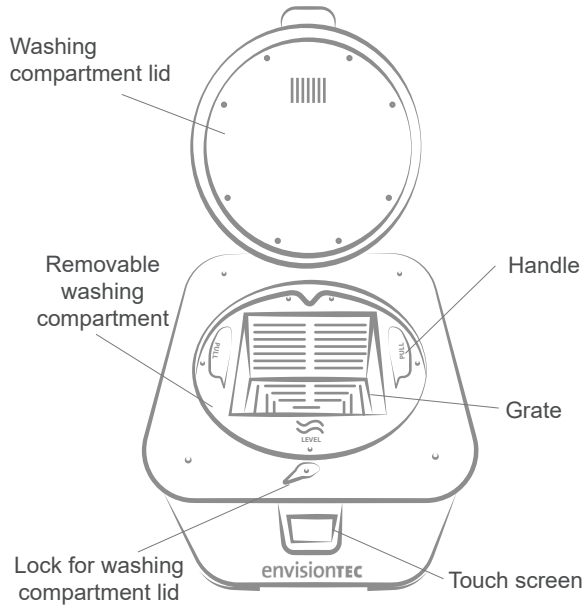
7 Cleaning the printed models

After the print job is complete and the models have been removed from the build platform, the models must be cleaned, dried, the supports removed, and the models post cured. This process is referred to as "Post-Processing." Always wear gloves when handling uncured material and 99% isopropyl alcohol.

Do not use an ultrasonic to clean models printed in E-Guide material.

The PWA-2000 is the recommended parts washer for EnvisionTEC printers. The PWA-2000 has a removable washing container and three washing programs to speed up the cleaning process. Always wear gloves when handling uncured material and 99% IPA.

Fig. 3 PWA 2000 FRONT VIEW



- 1 Open the washing compartment lid
- 2 Lift the handle to raise the interior grate to the highest position
- 3 Pour the 99% IPA into the washing compartment to just below the grate while it is in the lifted position. This ensures you will not have to reach into the alcohol when retrieving models after washing
- 4 Place the model on the grate and gently lower the handle to submerge the model in IPA
- 5 Close the washing compartment lid and lock in place
- 6 Plug in the power cable to turn on the PWA-2000
- 7 Using the touch screen, select the **High** washing program. Use the **Minus** button to set the timer to **00:03:00**, or 3 minutes. Press **Start**
- 8 **Remove the model as soon as the washing program is complete**
- 9 Spray the models with the spray bottle filled with 99% IPA
- 10 Use compressed air to remove all IPA from the surface of the model as soon as possible

Do not expose E-Guide models to alcohol for longer than 7 minutes. Excess exposure to alcohol will dry out the model.

8 Drying the models

Drying models in a convection oven helps to reduce some of the negative effects of over exposure to alcohol -

- 1 Preheat the convection oven to 37° C / 98.6° F
- 2 Place the models in the convection oven for 30 minutes

9 Removing supports

Carefully remove supports with a X-Acto knife, snips, or a similar tool. The supported surface will be polished after post-curing.

10 Post curing the models

The Otofash curing unit will give the surgical guides the required mechanical properties. Cure the models using the following method -

- OtoFlash:** 2 cycles for 1,000 flashes, flip models between cycles
- See the *Otofash User Manual* for more information

Place models into the curing machine with as much space between models as possible. Models should never touch one another while curing. Let models cool completely before handling them or starting the next cycle. Flip models between cycles for an even cure. *EnvisionTEC only supports EnvisionTEC curing ovens. It is not the responsibility of EnvisionTEC to support third party curing ovens.*

Finishing

11 Polishing surgical guides

Surgical guides can be polished using the following method -

- 1 Grind support bumps using a fine burr and rotary tool
- 2 Polish on a lathe using a cloth wheel and pumice
- 3 Polish on a lathe using a cloth wheel and a polishing wax
- 4 Use a steam jet to clean off excess wax after polishing

12 Sterilizing surgical guides

Optional: E-Guide surgical drill guides can be disinfected before use with the following disinfectants:

- Cidex OPA or a 70% Ethanol-solution - *Follow the manufacturer's instructions*

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Fig. 4 OTOFLASH FRONT VIEW

