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Technical Guide
E-SepFree Best Practices

E-SepFree is a wax-based material which is carvable after printing for dental applications. E-SepFree models are for the creation of Hawley retainers without the use of separator. This technical guide details the best practices for preparing models, post-processing, and material handling.

Applicable Printers: Envision One cDLM, Vida Domeless cDLM, P4K printer series, Vida

Primary Supplies

- Storage containers for material - sealable and opaque
- Cone-shaped paint filter
- Rubber spatula (from Starter Kit) or mixing cards
- Bottle roller machine
- Supplies for creation of Hawley retainer (excluding separator)
- Nitrile gloves
- Paper towels
- Plastic funnel
- Paint scraper
- Safety goggles
- PWA 2000 (parts washer) or 1 qt plastic containers and brushes
- 99% isopropyl alcohol (IPA)
- Air compressor

Getting Started

Designing models for E-SepFree
An E-SepFree .stl model is comprised of an arch with a palate. The thinnest section of the palate should be at least 3 millimeters thick.

Do not hollow the .stl models. E-SepFree models must be solid in order to provide structure during the creation of Hawley retainers.

If the printed model appears to be curling during production of the Hawley retainer, then the thickness of the model's .stl file may need to be increased in order to reinforce its structural integrity.

Software

Orienting models in RP software
Orient the models in the RP software with the model's flat base touching the build platform.

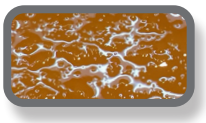
> **Spacing:** *place models a minimum of 10 mm apart*
> **Level at build platform:** *place models 0 mm from the build platform*
> **Supports:** *do not add supports to E-SepFree models*
> **Resolution:** *only print at 100 µm Z resolution*

E-SepFree material has a low viscosity and requires more space between models for the material to flow during a print.

Material Preparation

Storing the material between prints
E-SepFree is a wax-based material, and wax is sensitive to temperature. E-SepFree works best in a space with a minimum ambient temperature of 73° F (23° C).

> ***Cold material** will look cloudy, textured, and uneven, similar to crystalized honey.* In order to prepare material in this state for printing, it must be warmed up.



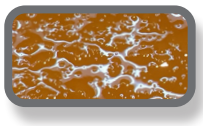
For best results, store E-SepFree bottles on a bottle roller with a warming function. Keep bottles away from direct sunlight and minimize their exposure to extreme temperatures.

Warming the material before a print
Empty the material from the material tray, and use a plastic funnel and cone-shaped paint filter to pour it into a clean opaque storage container with a resealable lid.
See the Resin Handling Technical Guide (DLP printers) or the Domeless Material Tray Best Practices (Domeless cDLM printers) for full instructions on pouring material into a storage bottle.

There are two recommended ways of warming E-SepFree before a print -

> **Bottle roller:** Bottle rollers heat and gently mix, offering two advantages for E-SepFree material. To warm material before a print, place the sealed bottle on a bottle roller for a minimum of one hour. It is recommended to store the material on the bottle roller between prints.
> *Used for warming, storage, and mixing material*
>
> **Sink method:** Plug the sink and then fill it with hot tap water. Place the material bottle in a sealed plastic bag and submerge in the warm water for 20 minutes. After 20 minutes, remove the bottle from the plastic bag. Gently shake the bottle for 10 seconds to mix .
> *Used for warming material*

Cold material -



Warm material -

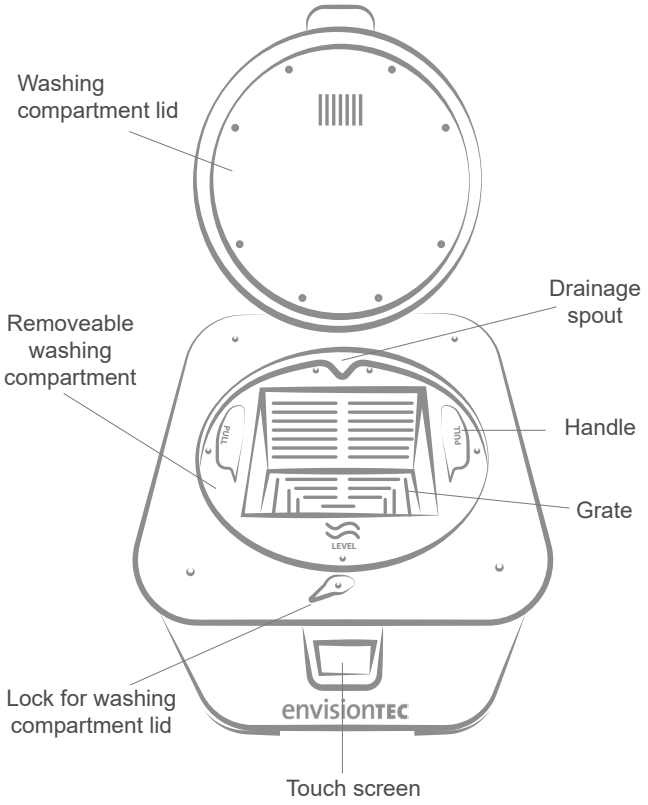
Filling the material tray
The material tray should not be filled more than half way to prevent spilling when the build platform moves down. To add more material to the printer, carefully pour warm material into the material tray between print jobs. Adding material while the print is paused, or during a print, will cause a small shift line in the model.

Printing with E-SepFree 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.

Post-Processing

Cleaning the printed models with the PWA-2000
The PWA-2000 is the recommended parts washer for EnvisionTEC printers. The PWA-2000 has a removeable washing container and three washing programs to speed up the cleaning process. Always wear gloves when handling uncured material and 99% isopropyl alcohol.

Fig. 1 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 **00:01:00**, or 1 minute. Press **Start**
8 ***Remove the model as soon as the washing program is complete***
9 Use compressed air to remove all IPA from the surface of the model as soon as possible

Do not expose E-SepFree material to alcohol for longer than 2 minutes. Excess exposure to alcohol will dry out the model.
See the PWA-2000 Technical Guide for more information.

Post curing models
Cure the models using one of the following methods -

PCA-2000: 00:07:30 / 60° C / 100% power
See the PCA-2000 technical guide for instructions on setting a custom curing program.

OtoFlash: 4 cycles for 6,500 flashes
See the Otoflash User Manual for more information

PCA 100: 4 cycles for 7 minutes
See the PCA 100 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.

During post curing, E-SepFree material releases an oily substance. Do not remove this oil after curing. This is what allows Hawley retainers to be made on E-SepFree models without a separator.

Curing options vary, based on chosen methods. EnvisionTEC only supports EnvisionTEC curing ovens. Any other post curing oven has to be calibrated by the client. It is not the responsibility of EnvisionTEC to support third party curing ovens.

Applications

Manufacturing a Hawley Retainer on an E-SepFree model
Before manufacturing the Hawley retainer on an E-SepFree model, any undercuts should be corrected with wax. The labial wire, metal brackets and expansion screw should be fixed with sticky wax. The retentions must be free of wax. The expansion screw must be placed in a prepared slot in the model. Follow the manufacturers instructions for the expansion screw. No separator is needed on the E-SepFree model.

To manufacture the acrylic base plate for the Hawley retainer, two techniques can be used:

A Salt and pepper technique
Please note the manufacturer's instructions

B Vacuum-forming
Please note the manufacturer's instructions

Remove the Hawley retainer from the E-SepFree model and clean with a steam cleaner. Use common dental equipment for post-processing of the Hawley retainer.

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