Version 1.0, October 2022

EPIC Material Best Practice

ETEC

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Document Information

Legal Notice

EPIC Material Best Practice: EPIC-MBP-00007-Rev01-EN, October 2022

History of Changes

Date	Changes	Version
Oct-2022	Document creation	1.0

How to Use This Guide

This document serves as a comprehensive guide to prepare parts, post-process, and finish using EPIC material.

About EPIC

Identification

EPIC has been developed for direct investment casting of products for the jewelry market. It offers excellent burn out properties and builds with the highest quality and crisp detail. Parts made using Epic evaporate at moderate burn-out temperatures without reacting with your investment and offer an extremely low thermal expansion. This material is optimally suitable for producing precious metal castings.

Applicable Printers

This material is tested and approved for the following printers:

- Micro, Micro cDLM, Micro Plus HD, Micro Plus ADV
- Vida, Vida HD, Vida HD cDLM
- P3, P4, P4 LED, P4K

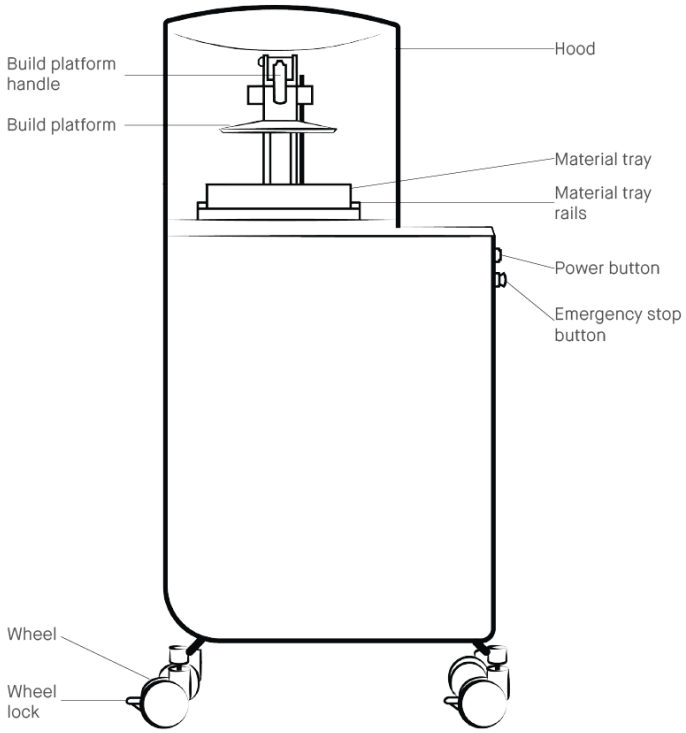

Fig. 1 *P4K Front View*

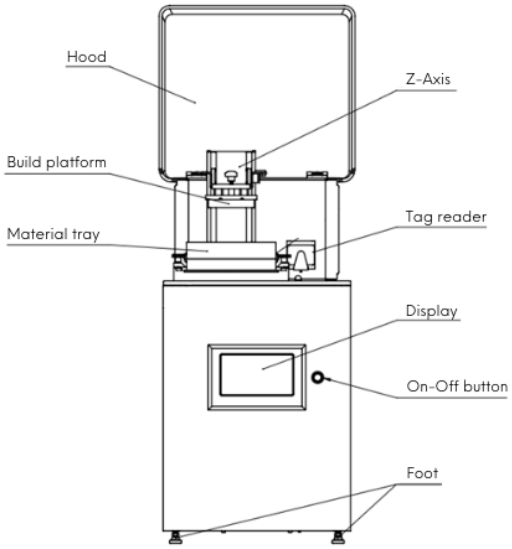

Fig. 2 *Vida cDLM Front View*

Getting Started

Primary Supplies

The following supplies are required to print EPIC material:

- Curing unit: Otoflash, *SAP Part # ACC-00-0007.*
- Washing unit: PWA 2000, *SAP # ACC-22-2000*.
- 99% Isopropyl Alcohol.
- Air compressor.
- Cone-shaped paint filter.
- Nitrile gloves.
- Paint brush.
- Paper towels.
- Paint scraper.
- Plastic funnel.
- Rubber spatula.
- Mixing cards.
- Storage containers for material - sealable and opaque.

Important: Store the EPIC material at standard room temperature of 21° C (70° F) to 24° C (75° F).

Design Parts for EPIC

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

Minimum Wall Thickness

Parts printed in EPIC must have a minimum wall thickness of 0.30 mm.

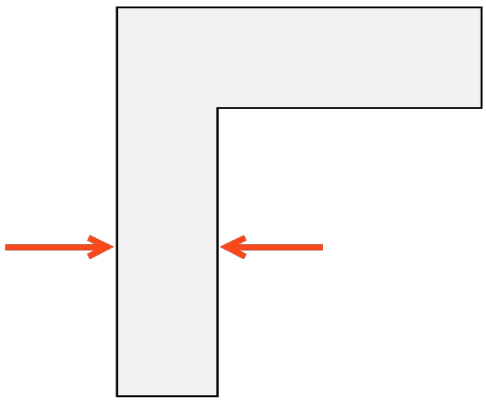

Fig. 3 *Minimum Wall Thickness*

Software

Orient Parts in Envision One RP Software

Envision One RP automatically orients your model, adds supports, if necessary, 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.

- **Spacing:** Place parts a minimum of 1 mm apart.
- **Level at build platform:** Place unsupported parts directly on the build platform. Place supported parts 4 mm from the build platform.
- **Resolution:** 25-50µm Z Resolution (dependent on layer thickness).

Fig. 4 *Unsupported Part in Envision One RP Software*

Support Parts in Envision One RP Software

Some approved applications require supports. Always use the EPIC.ini support file:

- **Minimum support base:** 0.50 mm
- **Minimum contact tip:** 0.45 mm
- **Minimum support beam height**: 4.0 mm

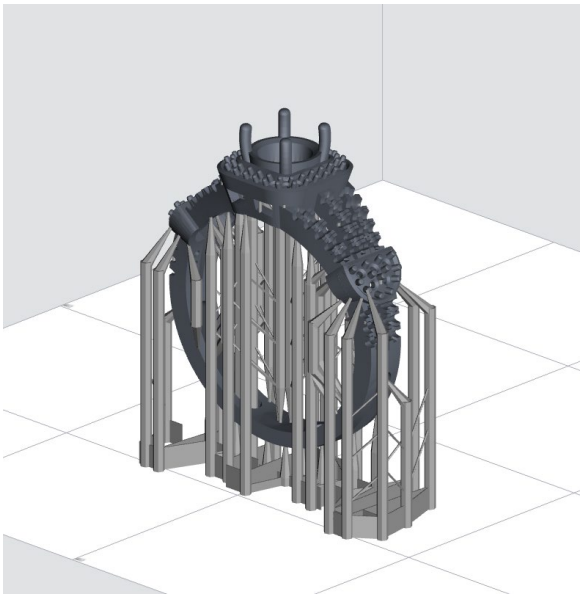

Fig. 5 *Supported Part in Envision One RP Software*

Print Preparation

Fill Material Tray

Do not overfill the material 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 tray. If found, filter the material.

EPIC material must be mixed prior to use on the printer:

1. Place the sealed material bottle on the Dual Motion Bottle Roller for a minimum of 30 minutes.
2. Wait for bubbles to subside before filling the material tray.
3. Mix material in the material tray gently with the rubber spatula from the Starter Kit before each print. The material should be a uniform color.

To add more material to the printer, carefully pour material into the material tray between prints. Adding material while the print is paused, or during a print, will cause a small shift line in the part.

Print with EPIC Material

Before starting a print:

1. Ensure the build platform is clean and free of cured material.
2. Ensure the material tray is free of cured material.

To start the print, follow instructions in the printer's Operations and Maintenance Guide. To remove the parts from the build platform after the print is complete, follow instructions in the printer's Operations and Maintenance Guide. *See the* Knowledge Base *for the latest Operations and Maintenance Guide.*

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

Post-Processing

Materials Safety

Safety data sheets (SDS) for materials used in the printing process are available either 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 EHS Representative.

Clean Printed Parts

Allow the material to drip off parts for 15 minutes before cleaning. Then, immediately clean parts.

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

The PWA 2000 is the recommended parts washer for small and medium parts. Always wear gloves when handling uncured material and alcohol.

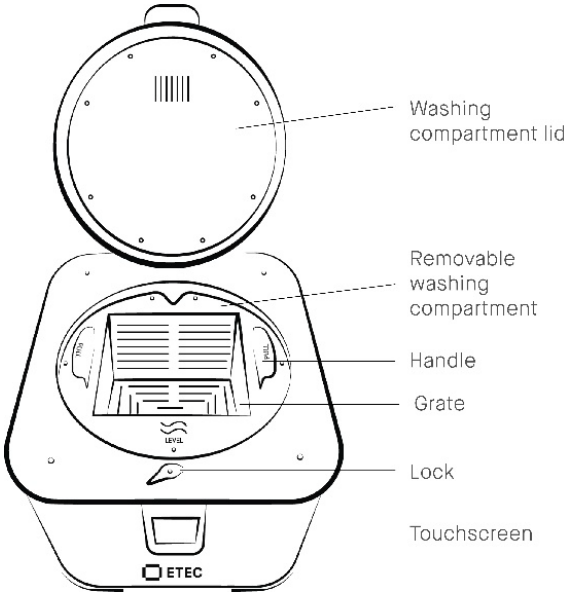

Fig. 6 *PWA 2000 Front View*

Important: Do not expose EPIC to alcohol for longer than 5 minutes. Excess exposure to alcohol may cause dry out parts and lead to casting issues.

Getting Started

1. Open the washing compartment lid.
2. Lift the handle to raise the interior grate to the highest position.
3. Pour 99% IPA into the washing compartment to just below the raised grate.
4. Place the part on the grate and gently lower the handle to submerge the part in 99% IPA.
5. Close the washing compartment lid and lock in place.
6. Plug in the power cable to turn on the PWA 2000.

Wash Cycle

1. Using the touchscreen, select the **High** washing program. Set the timer to **00:02:30, or 2.5 minutes**. Press **Start**.
   → *The PWA 2000 will immediately begin the set washing cycle.*
2. Remove the part(s) as soon as the program is complete.
3. Spray the part(s) with the spray bottle filled with 99% IPA.
4. Use compressed air to remove all IPA from the surface of the part(s) as soon as possible.
5. Repeat Steps 1 – 4 of the Wash Cycle.
6. If resin remains, spray the part(s) with the spray bottle and then dry with compressed air.
7. Repeat Step 6 of the Wash Cycle until the part(s) is completely clean.

Tip: Parts with large surface areas can be difficult to clean. Use soft brushes and 99% IPA to remove remaining resin after cleaning.

Dry Parts

Parts must be completely dry before post curing:

1. Place the parts on a clean paper towel lined surface.
2. Air dry in ambient room temperature and ambient humidity for 10 min.

Post Cure Printed Parts

Important: Place parts into the curing unit with as much space between parts as possible. Parts should never touch one another while curing.

Important: Flip parts between cycles for an even cure. Let parts cool completely before handling them or starting the next cycle.

Cure the parts using the following information:

Curing Unit	Time (flashes)	Notes
Otoflash G171	4 x 6500 Flashes	Flip the parts between cycles

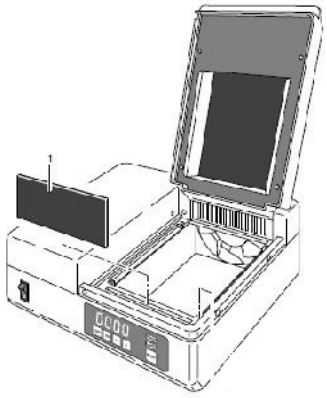

Fig. 7 *Otoflash G171*

Lost Wax Investment Casting

Lost wax casting includes many variables that must be handled precisely to achieve consistent results.

Casting Trees

When constructing casting trees, increase the connection between sprues by 10-30% of the sprue diameter.

Taper sprues to help with metal flow during casting. Round, smooth, and thick transitions will increase the speed of the molten metal throughout the sprue system.

When considering sprue placement on the models, treat EPIC models just as you would your hand carved wax models.

Some models may require more sprues to vent the material during casting. Add more sprues to large or thick pieces.

Adhere wax sprues to EPIC models:

1. Sand the model roughly at the connection point.
2. Use beeswax or super glue to adhere the wax sprue to the model. Beeswax must be very hot to create the best possible connection.

For best results, make sure the vent point is large enough to allow for the flow of material out of the flask. Use a thicker base when working with polymers verses wax for the burn out.

Investment

When casting platinum, R&R Plasticast PT investment is recommended. For all other metals, we recommend R&R Plasticast investment.

Notice: Follow the manufacturer's instructions for investing procedures. Give the flask a maximum of four hours to bench set.

Firing

Gas kilns are recommended for all ETEC castable materials. Casting results may vary based on the specific kiln and/or ambient factors.

Ventilation is a key factor when processing investments in a kiln. The airflow fuels the machine and can optimize a burn out. Propping flasks from the bottom with pieces of fire brick or a steel bolt will introduce more airflow around the flasks and give the burn out an even heat treatment.

Burnout Firing Program

This firing program is for casting with a 3.5-inch flask diameter, 800 feet above sea level. If casting with a flask larger than 3.5 inches, add one hour of hold time to the burn out for each inch.

Notice: Modifications to the burnout procedures may be necessary due to a variety of factors, such as size of flask, humidity level, and type of kiln used.

EPIC is an all polymer-based material. It requires a specific burn out program to achieve a clean pattern divestment. The gradual ramp from SEGMENT 1 to SEGMENT 6 provides a clean transition from an invested pattern to a low-ash burn out.

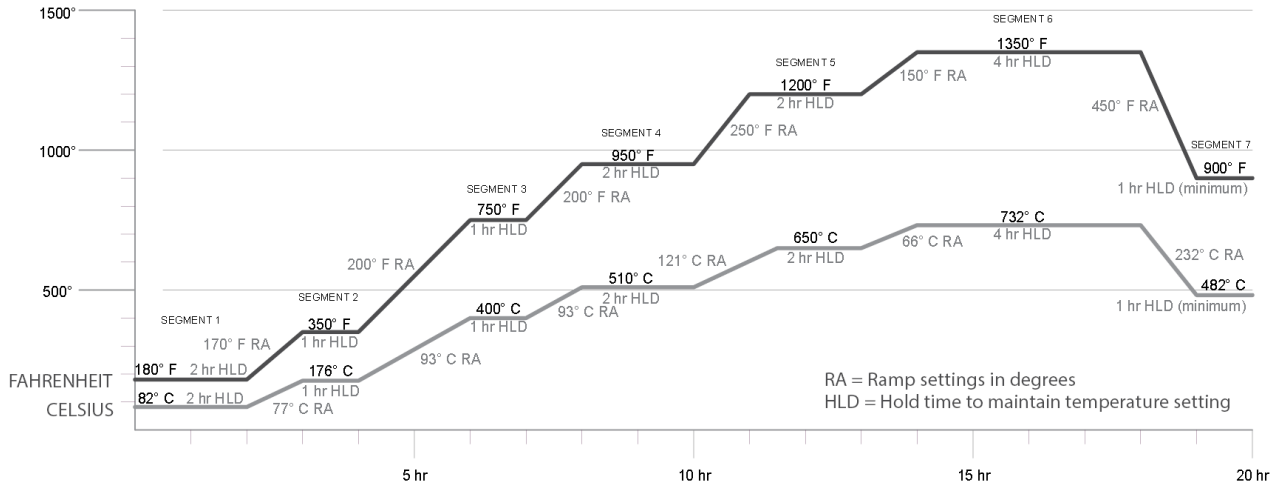

Fig. 8 *EPIC Seven Segment Firing Program*

In SEGMENT 1, the 2 hour hold at 190° F / 88° C may be increased to 4 hours for great casting results. SEGMENT 5 may be held up to 12 hours depending on the ambient casting factors as well as the discretion of the caster based on the specific parameters of the burn out. One hour is the minimum hold time.

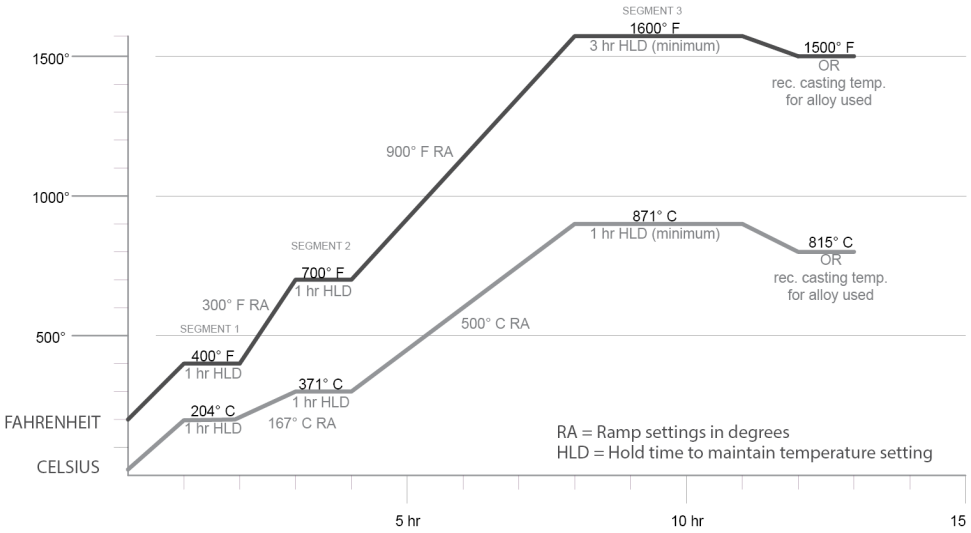

Fig. 9 *EPIC Three Segment Platinum Firing Program*

Platinum requires higher temperatures to cast. When casting platinum, R&R Plasticast PT investment must be used.
SEGMENT 3 can be extended and tailored to best suit the ambient casting factors, and the size of the flask used.

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