Version 2.0, October 2022

EasyCast 2.0 Material Best Practice

ETEC

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Document Information

Legal Notice

EasyCast 2.0 Material Best Practice Guide: EC2-MBP-00008-Rev01-EN, October 2022

History of Changes

Date	Changes	Version
October-2022	Document creation	1.0
October-2022	Added Materials Safety section	2.0

How to Use This Guide

This document serves as a comprehensive guide to prepare parts, post-process, and finish using EasyCast 2.0 material.

About EasyCast 2.0

Identification

EasyCast 2.0 is a breakthrough material for the high-speed printing of castable jewelry models. EasyCast 2.0 is a photopolymer with the highest wax content available in 3D printing today. It delivers exceptionally crisp features due to the addition of special hardeners, which is similar to ETEC's low- and no-wax materials - from the smallest of pierced filigrees to the sharpest of corners on raised surfaces.

Applicable Printers

This material is tested and approved for the following printers:

- Envision One cDLM
- Micro Plus cDLM
- Vida HD cDLM

Fig. 1 *Envision One cDLM Front View*

Fig. 2 *Micro Plus cDLM Front View*

Fig. 3 *Vida HD cDLM Front View*

Storage Conditions

Store EasyCast 2.0 material at standard room temperature of 21°C - 24°C (70° F - 75°F).

Notice: EasyCast 2.0 material contains wax that hardens in the material tray and bottle when the temperature is lower than the suggested storage temperature.

Getting Started

Primary Supplies

The following supplies are required to print EasyCast 2.0 material:

- Curing Unit: Otoflash, SAP Part # ACC-00-0007
- Washing Unit: PWA 2000, SAP # ACC-22-2000
- Dual Motion Bottle Roller, SAP Part # ACC-26-1000 (110V) and ACC-26-1000 (220V).
- 99% Isopropyl Alcohol.
- Air compressor.
- Cone-shaped paint filter, Starter Kit item.
- Nitrile gloves.
- Paint brush.
- Paint scraper, Starter Kit item.
- Paper towels.
- Plastic funnel.
- Rubber spatula, Starter Kit item.
- Mixing cards.
- Storage container for material, sealable and opaque.

Design Parts for EasyCast 2.0

Jewelry models printed with EasyCast 2.0 material must have a minimum wall thickness of 0.3mm.

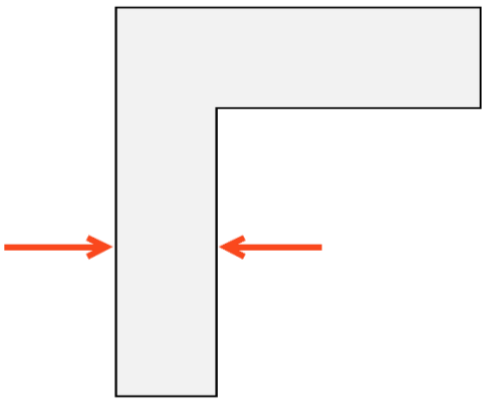

Fig. 4 *Minimum Wall Thickness*

Tip: To improve final casting results, fillet all edges slightly in CAD software. This is especially important for stone holes.

Tip: When working with engraving, make sure the engraving is not deeper than it is wide.

Software

Orient Parts in Envision One RP Software

The Autopilot tool in Envision One RP prepares you 3D model for print. It automatically orients your model, adds supports, if necessary, and sends the file to the printer. Everything that is printed using ETEC printers must pass through this software successfully.

Either the parts are oriented automatically or manually on the build platform, verify the following.

- **Spacing:** Models arranged with a minimum of 1 mm distance.
- **Level at build platform:** Place unsupported models 0 mm from the build platform. Place supported models 4 mm from the build platform.
- **Resolution:** 25-50 µm Z resolution.

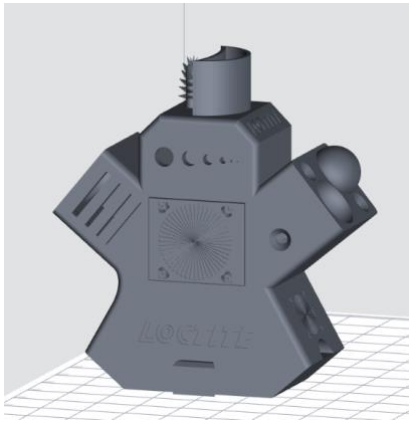

Fig. 5 *Unsupported Part in Envision One RP Software*

Support Parts in Envision One RP Software

All approved applications require supports. Always use the EasyCast2_0.ini support file for building supports.

- **Minimum support base:** 0.5 mm
- **Minimum contact tip:** 0.45 mm
- **Minimum support beam height**: 3.0 mm

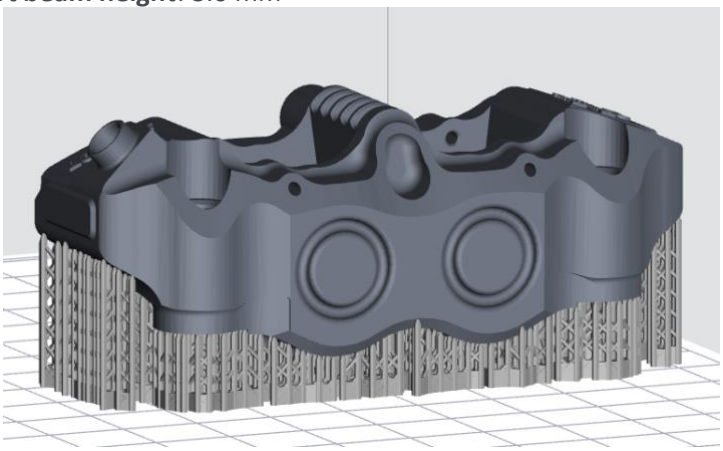

Fig. 6 *Supported Part in Envision One RP Software*

Print Preparation

Mix Material

The EasyCast 2.0 printing material must be mixed in the material bottle prior to use:

1. Place the sealed material bottle on the Dual Motion Bottle Roller for a minimum of 10 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.

If small cured particles are found in the material bottle, then it should be slightly warmed. In case small cured particles are found in the material tray, then the material must be filtered using the plastic funnel, cone-shaped paint filter, and a spare material bottle. *See the **Knowledge Base** for filtering instructions.*

Fill Material Tray

Do not overfill the material tray. Overfilling can cause the material to overflow when the build platform moves down at the start of the print job.

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 model. *See the **Knowledge Base** for instructions adding material.*

Print with EasyCast 2.0 Material

To start the print, follow instructions in the printer's User Manual.

To remove the models from the build platform after the print is complete, follow instructions in the printer's User Manual. *See the **Knowledge Base** for the latest User Manual.*

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

PWA 2000

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

Important: Do not expose EasyCast 2.0 to alcohol for longer than 5 minutes. Excess exposure to alcohol may cause casting issues.

Important: Do not use less than 99% isopropyl alcohol when post processing castable materials. Anything less than 99% will leave residue on the models.

Important: Do not use an ultrasonic cleaner to post-process castable models. Do not expose models to water at any point during post processing. Do not use a debubblizer surfactant that contains alcohol with EnvisionTEC castable materials. This product degrades the material

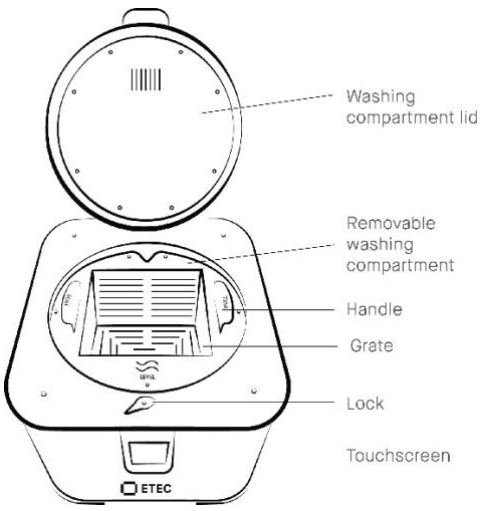

Fig. 7 *PWA 2000 Front View*

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 **Low** washing program. Set the timer to **00:02:30**. Press **Start**.
   → *The PWA 2000 will immediately begin the set washing cycle.*
2. Once the first washing cycle is complete, wait for several minutes and repeat Step 1 once again. Two separate wash cycles is necessary to avoid casting issues when exposing parts to alcohol.
3. Remove the part(s) as soon as the program is complete.
4. Spray the part(s) with the spray bottle filled with 99% IPA.
5. Use compressed air to remove all IPA from the surface of the part(s) as soon as possible.

Important: 99% isopropyl alcohol must be removed from parts using compressed air. Do not let models air dry with alcohol still on the surface.

Dry Parts

Parts must be completely dry before post curing:

1. Place the models on a clean paper towel lined surface.
2. Air dry in ambient room temperature / humidity for 10 minutes.

Post Cure Printed Parts

Important: Follow the post curing instructions for optimal casting results.

Cure the parts using the following method:

- **Otoflash**

See the **Knowledge Base** for instructions setting an Otoflash curing cycle.

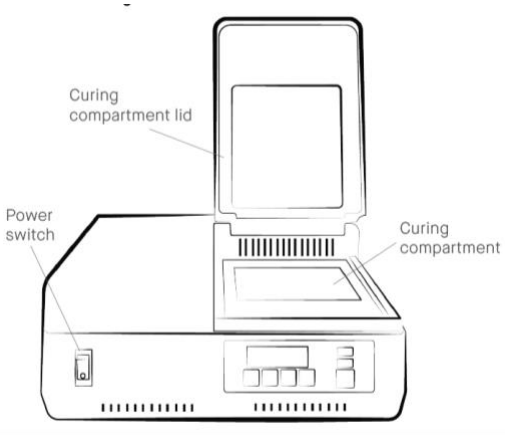

Fig. 8 *Otoflash Front View*

Place models into the curing unit with as much space between models as possible. Models should never touch one another while curing.

Cure parts for 6 cycles for 9000 flashes. Let models cool completely before handling them or starting the next cycle. Flip models between cycles for an even cure.

Notice: ETEC does not support third-party curing units.

Lost Wax Investment Casting

Lost wax casting includes many variables that must be handled precisely in order 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 EasyCast 2.0 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 EasyCast 2.0 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 manufacturers 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.

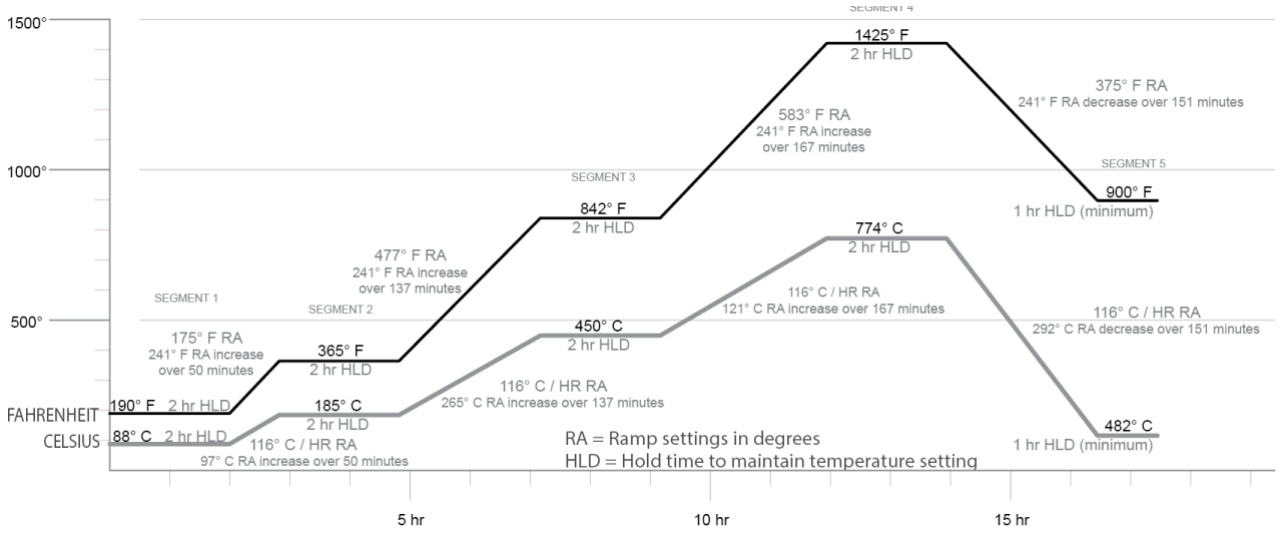

Fig. 9 *EasyCast 2.0 Five Segment Firing Program*

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.

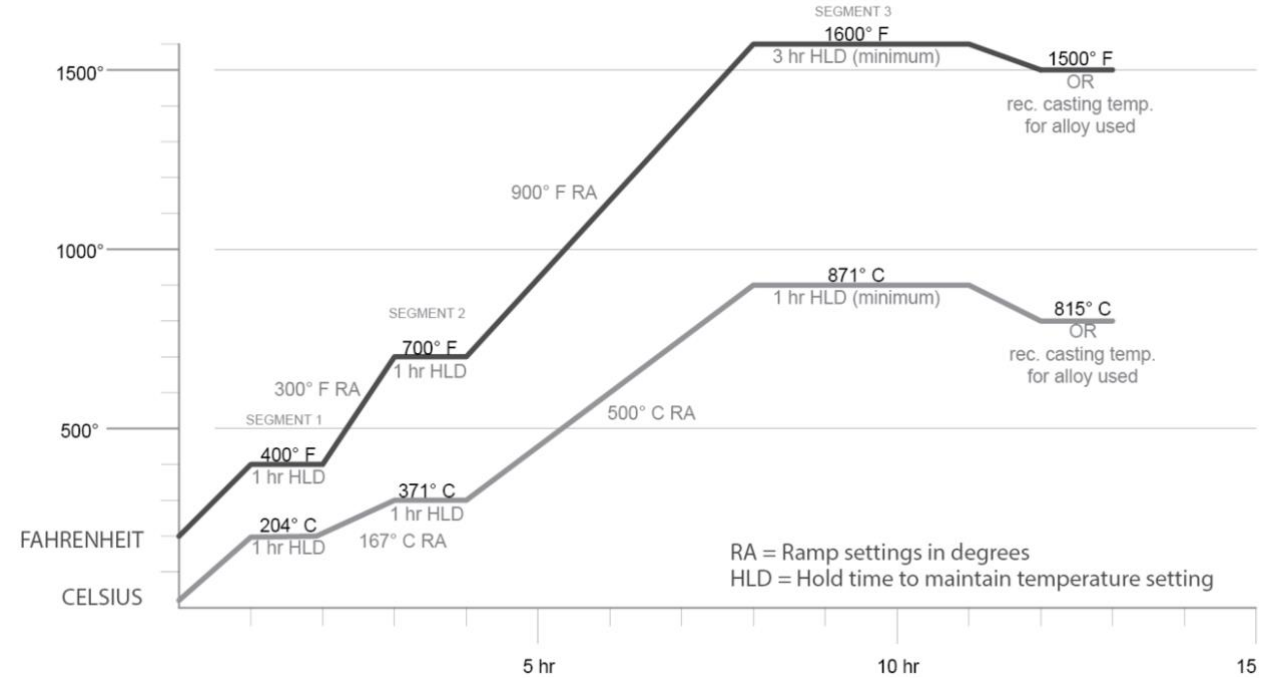

Fig. 10 *EasyCast 2.0 Three Segment Platinum Firing Program*

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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