

# Casting Guide

## 3D jewelry production

*Modern 3D printing opens up new possibilities for the jewelry industry. With our Moiin Wax Cast, we provide you with a material that can support you in your daily work process. Its high wax content and the accuracy of the details in the printing process ensure that you achieve excellent, reproducible casting results quickly and easily.*

*This guide gives you practical tips and advice on how to work optimally with Moiin Wax Cast. From design and 3D printing to casting and burning out.*

*We would like to thank the "Hamburger Goldschmiede" (goldsmiths) very much for their valuable cooperation.*

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## Design

Design of the desired object takes place with the aid of a suitable CAD software. Please note the usual design guidelines. With Moiin Wax Cast you can create, print and cast objects with very fine structures down to a minimum diameter of 0.3 mm. For such filigreed work, it may be necessary to add additional support structures to provide greater stability.

Objects with larger volumes can also be printed and cast using Moiin Wax Cast. For stronger structures from 4-5 mm and larger, it is advisable to convert these into thinner walled objects by hollowing out and using inner lattice structures and drainage holes.

In order to obtain an optimal printing and casting result, pronounced projections, corners and edges should be avoided during construction.



Hollow construction for voluminous objects.



Hollow construction with drainage holes.

# CASTING GUIDE

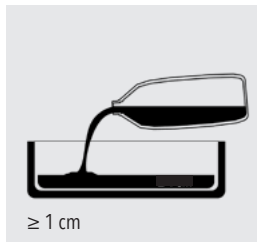
## 3D printing

Once the design has been created in a printer-compatible file (e.g. stl or 3mf), the virtual model can be supplemented with support structures or supports using the printer software.

Casting channels can also be added and printed. In this way, time is saved and the casting channels can also serve as support structures during the printing process.



Before use, Moiin Wax Cast should be shaken for at least a minute. You will then always have a homogeneous product and consistently high quality results in 3D printing as well as during the subsequent casting process.



Fill Moiin Wax Cast into the resin reservoir of your 3D printer. Due to its high wax content, Moiin Wax Cast is slightly thicker than other resins. Therefore, a filling height of at least 1 cm is necessary, so that the resin can flow evenly into larger printed objects.



Follow the instructions of your 3D printer manufacturer. Moiin Wax Cast can be used with SLA, DLP or LCD 3D printers working at 385 or 405 nm wavelengths.

Since exposure time depends on the wavelength and intensity of the installed light source, suitable material parameters and light-curing times may need to be determined and tested.

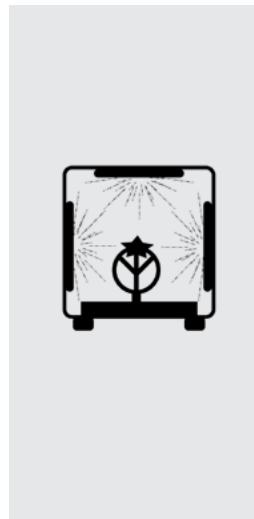


The objects must be carefully cleaned of any non-hardened material after printing. We recommend isopropyl alcohol (IPA) or ethanol (observe the manufacturer's hazard warnings) as solvents. Make sure that all resin residues are completely removed.

**TIP:** For cleaning fine structures you can use a soft brush, a fine brush or an ultrasonic bath (maximum 5 minutes).

Prior to post-curing, the printed samples should be completely dry. If necessary, use compressed air to ensure that the solvent has completely evaporated.

Due to the high wax content of Moiin Wax Cast resins, a slightly whitish surface may appear after cleaning. This is of no consequence for the further casting process.



A thorough post-curing of the printed parts is important to ensure a clean burnout and therefore a perfect casting result. In addition, this increases the stability of the printed objects.

**TIP:** Depending on the volume of the printed object and the type of exposure device, a longer light-curing time may be necessary.

Any UV or flash exposure device operating at a wavelength between 385 and 405 nm can be used for post curing. Such devices include e.g. Otofash (at least 2 x 2000 flashes), Kulzer HiLite power 3D (at least 2 x 180 s), Heraeus Heraflash (at least 2 x 180 s). If you use devices that expose only one side of the object, the printed objects should be turned during the post-curing process.



The fully cured objects can now be prepared for embedding. If you have used support structures that do not serve as casting channels, they should be removed and the residues smoothed. If hollow structures with drainage holes were used in the printed object, they should be closed with wax in order to prevent penetration of the embedding material into the hollow structure.



The cleaned and fully cured parts can now be prepared for embedding and casting.

## Preparation for casting

The objects are attached to the casting tree according to the requirements of the casting technique. In this case, influencing factors such as length and diameter of the casting channels, attachment of the channels on the casting object, placement on the casting tree etc. should be taken into account. Avoid edges and hard transitions.

**TIP:** For the best possible casting results, it may be necessary to work with a feeder/reservoir in casting, to ensure subsequent metal supply in bulkier areas upon solidification of the metal.



Fig.: Feeder/reservoir in casting

For embedding, we recommend an embedding compound that is suitable for synthetic resins, such e.g. Plasticast from Ransom & Randolph, Prestige Optima from Certus or, for high temperatures, Pro-HT Platinum from Gold Star.

**TIP:** The processing instructions of the manufacturer of the embedding material can provide you with important information on storage temperature, mixing ratios and rest periods of the embedding material. Depending on the size of the cuvette, these may vary.

## Burnout

After observing the curing and resting periods of the embedding material, the cuvette should then be placed in the curing oven. For several cuvettes, take care that there is a minimum distance between cuvettes and to the surrounding walls, so that uniform heating of the cuvettes is guaranteed. Preheat the oven according to the recommended burnout schedule (see the Burnout Schedule section).

Depending on the cuvette size, furnace type, furnace filling and volume of the object, it may be necessary to optimize the burnout curve. The Moiin Wax Cast is designed to enable a flexible adjustment process.

**TIP:** During the burn-out process, vapors and gases may form. Therefore, it is advisable to use a burnout furnace with a steam exhaust fan or catalyst.

## Casting

Casting should be carried out according to the usual wax-melting process rules. Bear in mind that, depending on the casting process, the strength of the casted objects, size of the cuvette, etc., there may be different casting conditions.

**TIP:** We recommend casting with a vacuum die casting machine.

After casting, gently chill the casting mold in cold water and carefully remove the remains of the embedding material from the cast object. Compatibility with metals is first and foremost a property specific to the respective embedding materials. If you have any questions, please contact the manufacturer.

## Burn schedule

Our Moiin Wax Cast is ideal for integration into your individual work processes. The burnout schedule shown here is designed for a cuvette size of Ø 50mm x 55mm and the following embedding materials: PlastiCast from Ransom & Randolph, Prestige Optima from Certus.

Depending on variable parameters such as e.g. cuvette size, type of embedding material, furnace type, furnace filling, size of casting objects etc. the burn-out curves should be optimized.

Time in h cumulated	Time in h	Temperature	Explanation
0	0	25 °C	Place muffle in the oven at room temperature
1	1	150 °C	In one hour heat to 150 °C (2.1 °C/min)
3	2	150 °C	Maintain at 150 °C for two hours
5	2	350 °C	In two hours heat to 350 °C (1.7 °C/min)
7	2	350 °C	Maintain at 350 °C for two hours
10	3	730 °C	In three hours heat to 730 °C (2.1 °C/min)
13	3	730 °C	Maintain at 730 °C for two hours
14	1	Casting temperature	In one hour cool to casting temperature
16	2	Casting temperature	Maintain at casting temperature for two hours

## Burn schedule for Moiin Wax Cast

