



Reproduced with permission of
Objet Geometries Inc.

Jewelry Molds Using VLT Rubber Jewelry Prototyping Process

Overview - Rapid Jewelry Prototyping

The recent introduction of Castaldo®'s VLT™ [Very Low Temperature] molding rubber opens the way to a new time-saving process for jewelry prototyping using molding, by Objet Eden™ 3-Dimensional Printing Systems. The new rubber allows users to utilize their PolyJet™ patterns as master models for rapid jewelry prototyping and mold them in as little as one hour. This eliminates the need to go through the time-consuming process of creating a metal master model in the jewelry prototyping process.

Direct casting of resin models made by most rapid prototyping systems do not burn out cleanly. However, using cold-mold compounds that do not damage the pattern and an RP system that supports the specialized material offers the perfect alternative for rapid jewelry prototyping.

Another recently developed alternative method involved making a liquid rubber mold of the model, curing it overnight, injecting the wax, and then casting the wax (another overnight process) to get the master model. Finally, they make a traditional rubber mold, shoot waxes, and start production casting. All together, the process would take more than two days.

Many casters, while still preferring to make a mold of the resin model and shoot waxes are unhappy with the long curing times: quite simply, they want to make their jewelry prototype models as fast as possible.

Jewelry Prototypes - New Methodology

Now this entire process of rapid jewelry prototyping can be done in less than half the time. Rubber can be cured at temperatures ranging from 160°F (71°C) to 180°F (83°C), well below the softening point of most resin materials. At a temperature of 160°F, a standard 3/4-inch mold will be cured and ready for injection in 90 to 120 minutes. At 180°F, that time is further reduced to just 30 to 45 minutes. However, as with traditional casting rubbers, longer curing times mean better molds – the longer the cure, the more likely it is that the rubber will flow into every nook and cranny of the jewelry model to provide detail. In addition, when VLT™ rubber cures, it shrinks just 1.4 percent.

Perhaps one of the greatest benefits of VLT rubber in the jewelry prototyping process is that it makes rapid prototyping more useful for mass production. Specifically for the jewelry industry, enabling

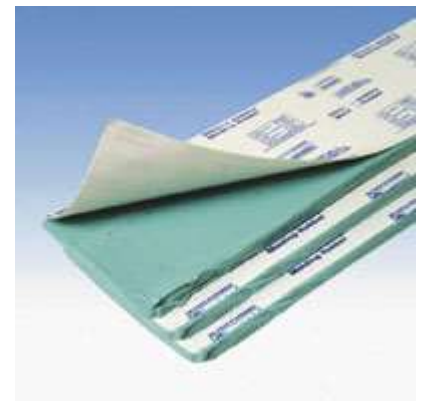


Figure 1: The VLT™ Silicone Molding Rubber.



Figure 2: Placing the Objet model inside the mold.



Figure 3: Finished mold can be complex with even spiral plugs.

PolyJet™ models to be used directly as master models is an important development because it offers significant time savings in a market where time can be a vital competitive edge.

Practical Jewelry Prototyping Processing

On a practical level, it is too expensive and time consuming to run a rapid prototyping machine a thousand times in order to create the high number of castings needed. Now, with VLT rubber and PolyJet, a prototype piece can be directly molded, and the subsequent wax models can be used to make thousands of castings.

VLT rubber also works well with traditional hand-carved waxes. And, VLT rubber is designed specifically for molding – i.e. it acts like any other molding rubber, only at much lower temperatures.

Essentially, the VLT and PolyJet methodology leverages traditional technology, tools, and techniques. This means there is no one needs to learn anything new, buy new equipment, or train people in new techniques. If you are already doing lost-wax casting, the VLT and PolyJet methodology fits right in.

How does Jewelry Prototyping work with VLT?

Castaldo VLT Silicone Molding Rubber can be vulcanized at any of a wide range of time and temperature combinations, depending on the characteristics and requirements of the model material. Below are some suggested combinations for a typical mold that is 3/4" / 19 mm thick

88° C / 190° F for 30 minutes
82° C / 180° F for 45 minutes
76° C / 170° F for 60 minutes
71° C / 160° F for 90 minutes

The only change from established mold making techniques required by Castaldo VLT Silicone Molding Rubber may be the need to coat the plastic model with a release spray before vulcanizing to ensure easy release of the model after vulcanization. Teflon® (PTFE) sprays work very well, as do common household cooking oil sprays made with olive oil or canola oil, such as PAM®. Wax models do not need to be sprayed.

Key advantages of Rapid Jewelry Prototypes & VLT

Tools and technology

The VLT and PolyJet methodology utilizes the simple tools and easy technologies you already have and know how to use.

Easy to work with

VLT Silicone Molding Rubber has the consistency of modeling clay or putty, reducing mold packing time to a few minutes. There is no need to



Figure 4: The resin Release Spray.



Figure 5: Objet Jewelry Models.



Silicone Molding Rubber is soft and pliable, with a consistency like putty or molding clay.



Place the Objet model inside the Silicone Mold.

cut and shape the pieces to fit the mold frame. Merely pull off a piece with your fingers and push it into the mold frame as desired.

Easy to cut

Molds made of VLT™ rubber are firm, yet they “cut like butter”.

Minimal shrinkage

Rubber shrinkage is only 1.4%

Easy, spray-less release of wax injections

Finished molds require no mold release spray. Wax patterns release easily because the rubber already contains anti-stick compounds.

High-shine finish

Molds made of VLT rubber provides waxes with an extremely shiny finish, reducing the polishing work required on your casting.

High tear strength

For a silicone rubber compound, VLT rubber is exceptionally high in tear strength, meaning that molds made from it last for years.

Cheaper and easier than RTVs

Room temperature vulcanizing (RTV) compounds require exact measuring and exact mixing. They have limited working times and require vacuum de-bubbling to provide usable molds.

VLT Rubber Specifications

Sizes:

Regular strips: 18" x 2 7/8 " x ~3/8" (45.7cm x 7.3cm x ~6mm).

Packaged in 5lb (2.27kg) cartons.

Double-wide strips: 18" x 5 3/4" x ~3/8" (45.7cm x 14.5cm x ~6 mm).

Packaged in 10lb (4.5kg) boxes.

Storage:

As with any unvulcanized rubber compound, store away from any source of heat and light. Unvulcanized shelf life is at least one year if properly stored.

Jewelry Prototyping & VLT Processes

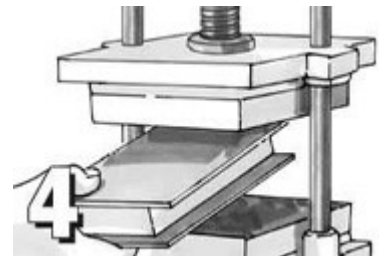
Castaldo VLT Silicone Molding Rubber is compatible with all mold making techniques, including mold cutting and powder and cream separation molds. It is particularly adaptable to the powder and cream separation processes since the parting line is so easily controlled. For patterns strong enough to resist some pressure, merely push the model into rubber to the desired point. If not satisfied with the results, remove the model, smooth the rubber over with your finger or tool and re-insert the model.

Jewelry Prototyping & VLT Processes

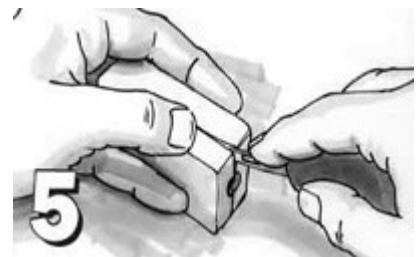
Castaldo VLT Silicone Molding Rubber is compatible with all mold making techniques, including mold cutting and powder and cream separation molds. It is particularly adaptable to the powder and cream separation processes since the parting line is so easily controlled. For patterns strong enough to resist some pressure, merely push the model into rubber to the desired point. If not satisfied with the results, remove the model, smooth the rubber over with your finger or tool and re-insert the model.



Placing and embedding the rubber onto model



Curing Silicone Jewelry Molding Rubber involves no mixing, and at low temperature.



The Silicone Jewelry Molding Rubber Molds are then to be cut and opened by hand.



Parting lines are easily controlled and corrected by hand when used with the powder separation.



Disclaimer

Objet Geometries LTD is not responsible for misuse of our products or their use in conjunction with unsafe or improperly maintained equipment or for uses other than intended as jewelry casting mold making material.

Finished molds can be complex with cores, straight plugs or even spiral plugs.