

Mold Making

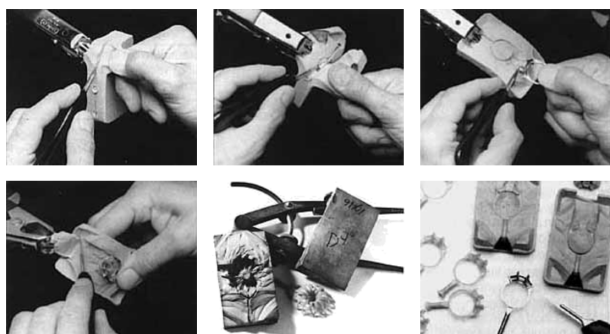
Guide to Solving Common Mold Making Problems

Instructional Datasheet

Mold Cutting

A cold mold is somewhat harder to cut than a warm one.

Change knife blades frequently. Blades will cut more easily if dipped occasionally in a solution of water and liquid household detergent. Dull blades are hard to cut with and are a common cause of accidents.



Care and Storage of Finished Molds

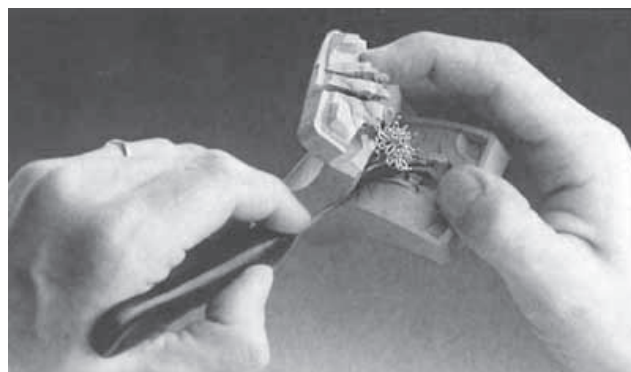
Molds made from Castaldo Jewelry Molding Rubber can last for decades, preserving the care and expense invested in them, if they are treated in much the same manner as the unvulcanized rubber itself. Keep them away from heat, which can cause the molds to become brittle. Sunlight may darken the mold and age it prematurely. Cold will stiffen the mold, but only until normal temperatures are regained. Clean finished molds with the mildest means available. A suggested progression would be: water; soap and water; soap, water and ammonia; isopropyl alcohol and then finally industrial cleaners such as acetone, toluene, tri-chloro-ethylene and methyl-ethyl-ketone.



Normally a mold release agent is not needed, although some workers prefer to use talcum powder or a silicone or Teflon® spray. If talcum powder is used, avoid a buildup of powder in the mold cavity, cleaning it if necessary with an air gun or a soap and water solution.

General

Castaldo Jewelry Molding Rubber has been the industry standard for more than 40 years and continues to be the best jewelry molding rubber available for lost wax casting.



Castaldo White Label®, the less expensive of our two grades, has a high concentration of pure natural gum rubber, which makes it soft and pliable, qualities that the experienced mold-cutter values in his efforts to produce high-quality molds in the shortest reasonable time.

Castaldo White Label contains more pure natural gum rubber, making it even softer and more pliable. Experienced mold-cutters know that this compound's superior qualities can save them substantially on labor costs when used for difficult molds containing undercuts, where a stiffer mold would break delicate wax patterns or would make their production impossible altogether.

Both compounds are unique in consistently allowing one to cut with the knife, not ahead of it, a small but important detail that allows the mold maker complete control.

The care and labor invested in a Castaldo rubber mold can last for decades. The mold will retain its characteristic "memory" and flexibility long after other mold rubbers have become crumbly and stiff.

Important Notice

All Castaldo Jewelry Manufacturing Products are intended for professional use only and only by persons familiar with jewelry casting techniques.

We are 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.

Castaldo Jewelry Manufacturing Products are warranted to be free from defects in material and workmanship.

THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES NOT EXPRESSLY SET FORTH HEREIN, WHETHER EXPRESSED OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

The seller shall not be liable for incidental or consequential losses, damages or expenses, directly or indirectly arising from the sale, handling or use of the goods, or from any other cause relating thereto, and Seller's liability thereunder in any case is expressly limited to the replacement *(in the form originally shipped) of goods not complying with this agreement or, at Seller's election, to the repayment of, or crediting Buyer with, an amount equal to the purchase price of such goods, whether such claims are for breach of warranty or negligence. Any claim by Buyer with reference to the goods sold hereunder for any cause shall be deemed waived by the buyer unless submitted to Seller in writing within (30) days from the date Buyers discovered, or should have discovered, any claimed breach.

Mold Frame Packing, Etc.

The polished cloth backing supplied with Castaldo Jewelry Molding Rubber may be left on the top and bottom pieces packed in a molding frame, either to insure cleanliness or to provide a surface for writing on. Some workers use the cloth to sketch out the model inside as an aid to mold cutting and identification. The cloth will peel off easily after vulcanization. It will not melt or burn at recommended temperatures.

The blue plastic liner supplied on some forms of Castaldo Jewelry Molding Rubber must, however, be removed completely before vulcanization.

To insure the proper flow of rubber into the model, it is suggested that you pack one additional thickness of rubber in each frame. Thus a 3/4 inch (19 mm) mold frame, which would otherwise take six thicknesses of rubber, should be packed with seven. Sizeable cavities in models should be packed with scraps of rubber; taking care to use tweezers or other tools rather than bare fingers.

Attempt to place the jewelry model in the center of the mold with as many thicknesses of rubber above the model as below it.

Overpacking of the model frame or excessive pressure can often result in extremely dense, hard and difficult to cut molds. Sometimes these molds have an excessively springy quality as well.



This mold shows obvious signs of not having been packed fully enough. Separate layers of rubber are easily visible, as are air bubbles.

Three signs that a mold has been under-packed are:

1. The appearance of separate layers of rubber along with edges of the finished mold.
2. A sponge rubber-like appearance caused by thousands of tiny air bubbles; and
3. Large pits or depressions in the top and bottom surfaces of the mold. Two of these conditions are illustrated in the accompanying photograph.

Pre-heat the vulcanizer until it reaches the proper temperature and then place the loaded mold frame between the vulcanizer plates. Let it rest there for a few moments, but not longer than 3 minutes. Tighten the vulcanizer press slowly, avoiding extreme pressure. Do not tighten beyond what can be done by hand as delicate models can be bent by the resulting internal pressure.

Expect to see some rubber flow out of the mold frame as vulcanizing progresses. If this does not occur, the mold frame is probably underpacked and subsequent frames should be packed more fully.

After the first few minutes of vulcanization, some workers prefer to "bump" the molds - releasing pressure for a moment no later than the first 3 or 4 minutes to let out accumulated air pockets and then retightening the vulcanizer press. Check the tightness of the vulcanizer occasionally during the first 10 minutes of vulcanization and tighten as necessary.

Slow cooling of the mold after vulcanization has ended is suggested, but if speed is necessary, the mold can be plunged directly into cold water without ill effects.

Precautions

- Uncured mold rubber will retain its properties for up to one year if stored away from direct sunlight at temperatures below 70°F (21°C). Longer shelf life may be obtained by refrigeration at no less than 32°F (0°C). Accidental vulcanization through exposure to heat or through excessive aging will make the rubber useless for mold making.
- AVOID storing unvulcanized mold rubber near heat sources such as radiators, furnaces, in hot attics or in direct sunlight. Date all boxes of mold rubber when received and rotate your stock as the rubber vulcanizes slightly day by day throughout its expected shelf life and is at its peak when new.
- Nonetheless even rubber a year old can make satisfactory molds, depending on storage conditions and other factors.
- Mold rubber may become stiff and hard for weeks or even months due to exposure to extreme cold. Allow the rubber to return to room temperature slowly or warm slightly (100°F/38°C) for 1 hour. No permanent damage will result from exposure to low temperatures.
- Do not clean the rubber with cotton swabs or cotton balls as the fibers may be left embedded in the mold.
- Take care to remove loose threads when pulling off the polish cloth backing supplied with the rubber. They may become embedded in the mold.
- Try not to touch the rubber with bare hands, as even normal skin oils may cause separation problems. Use tools, tweezers, pliers, etc. as much as possible to pack mold frames. If it is necessary to handle the rubber by hand, attempt to touch only the edges.
- Take care not to pack a mold frame with rubber laid out in different directions - that is, try to observe the natural "grain" of the rubber, avoiding the possibility of molds that are stiff or springy.
- In general and aside from other considerations, thin molds are best made from Castaldo White Label®. Similarly, thicker molds benefit from the added flexibility of Castaldo Gold Label®.

Check your vulcanizer temperature regularly with a reliable thermometer. Measure the top and bottom plates separately using a block of scrap wood, first between the top plate and the mold, and then between the bottom plate and the mold. Sudden thermostat failures are common and are the main cause of mold making problems!

Preparation of Models and Molds

The model to be embedded in Castaldo Jewelry Molding Rubber must be perfectly clean and dry for production of the best possible molds. Cleaning in a solution of water; mild detergent and ammonia is recommended, as is ultrasonic cleaning. Some workers prefer as a matter of routine to electroplate their models with rhodium to assure utmost cleanliness and perfection.

Models made of brass should not be used unless they are first plated with some other metal, as brass may sometimes bond to compounds in the rubber. Later separation is extremely difficult.

Keep Castaldo Jewelry Molding Rubber as clean as possible. It should not normally be necessary to clean the unvulcanized rubber; and if small quantities become soiled for any reason it is normally both advisable and prudent to discard the piece and begin anew.

However, if cleaning is absolutely necessary, use industrial cleaning agents such as acetone, toluene, tri-chloro-ethylene and methyl-ethyl-ketone.

You may find a white powder coating one side of Castaldo Jewelry Molding. This powder is part of the compound and need not be cleaned off - it will merge with the compound during vulcanization.

Similarly, the ink used to label Castaldo Jewelry Molding Rubber need not be cleaned off if it has left an impression on the rubber itself - it is harmless to molds and models alike.

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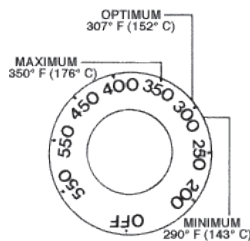
Problem	Cause	Solution
Finished mold tacky & soft	Insufficient vulcanization time and/or temperature.	Check vulcanizer with accurate thermometer & observe recommended time and temperature.
Finished mold hard & springy--won't lie flat.	Excessive pressure. Excessive vulcanization time and/or temperature.	Reduce pressure, check temperature with accurate thermometer; observe recommended time and temperature
Partial de-lamination of mold into separate layers.	Contamination with hand oils, silicone spray, talc, etc.	Discard and ensure future cleanliness.
Air bubbles throughout and/or large depressions in top and bottom surfaces.	Mold frame underpacked.	Pack mold frame more fully.
White powder on unvulcanized rubber.	Normal	Disregard--do not attempt to clean off.
Rubber hard and won't vulcanize.	Full or partial vulcanization through accidental exposure to heat and/or aging.	Discard and ensure proper storage techniques.
Rubber hard and stiff.	Rubber frozen through long exposure to cold.	Warm slowly at approx 100°F (38°C).

Problem	Cause	Solution
Excessive shrinkage.	Too high vulcanization temperature.	Check setting with accurate thermometer and observe recommended temperature and time. Also: reduce temperature to 290°F (143°C) and double time.
Rubber does not flow into all cavities.	Mold not packed properly.	Pack cavities with scraps of rubber.
Rubber does not flow into all cavities.	Vulcanizing temperature too high.	Check vulcanizer with accurate thermometer & observe recommended time and temperature.

Vulcanization

Each experienced mold maker has his or her own technique for vulcanization molds, and if a technique produces good results, there is no reason to change it. The following suggestions, however, may prove useful:

Optimum results are achieved at a vulcanization temperature of 307°F (152°C). Calculate vulcanization time as follows: 7.5 minutes for every thickness (1/8 inch or 3.2 mm) of mold rubber; with a minimum time of 30 minutes and a maximum time of 75 minutes.



Thus a 3/4 inch mold (19 mm) consisting of six thicknesses should be vulcanized for 45 minutes (6 x 7.5). A half inch mold (13 mm) should be vulcanized for 30 minutes (4 x 7.5).

Castaldo Jewelry Molding Rubber will normally flow into and around the most intricate and detailed parts of a jewelry model. In the unlikely event that difficulty is experienced, however, it is advisable to reduce vulcanization temperature to 290°F (143°C) and double the recommended vulcanization time. This will allow a longer period for the rubber to flow in semi-liquid form. Poor flow is also a symptom of too high vulcanizing temperatures. Do not rely on thermostat dials but check your vulcanizer with a reliable thermometer instead.

Recommended Vulcanization Times

Mold Thickness		# of pieces of rubber	307°F (152°C)
1/2 inch	13 mm	4	30 minutes <--Minimum
5/8 inch	16 mm	5	37 minutes
3/4 inch	19 mm	6	45 minutes
1 inch	25 mm	8	60 minutes
1 1/4 inch	32 mm	10	75 minutes
1 1/2 inch	38mm	12	75 minutes <--Maximum