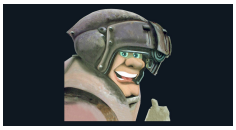
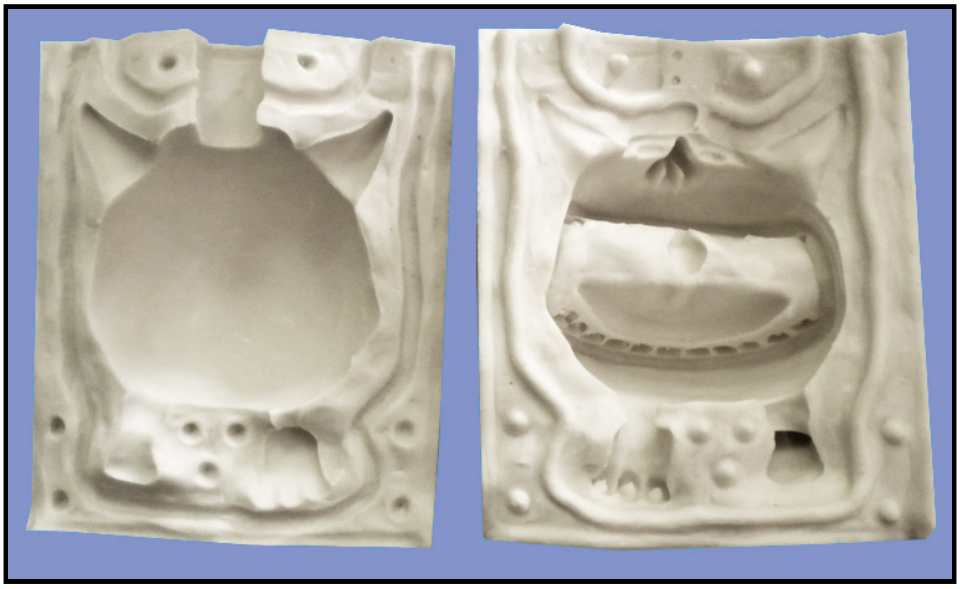


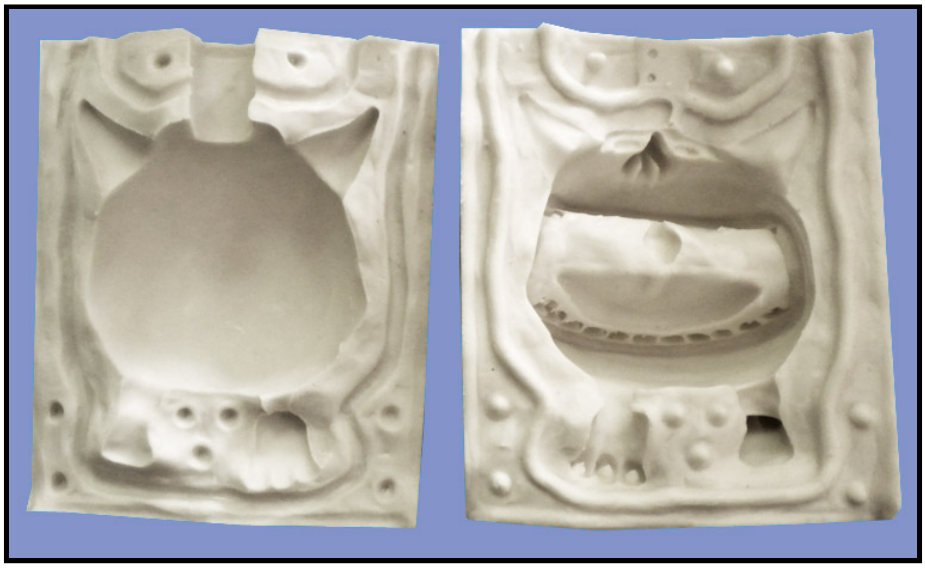
Making a flexible silicone elastomer mold

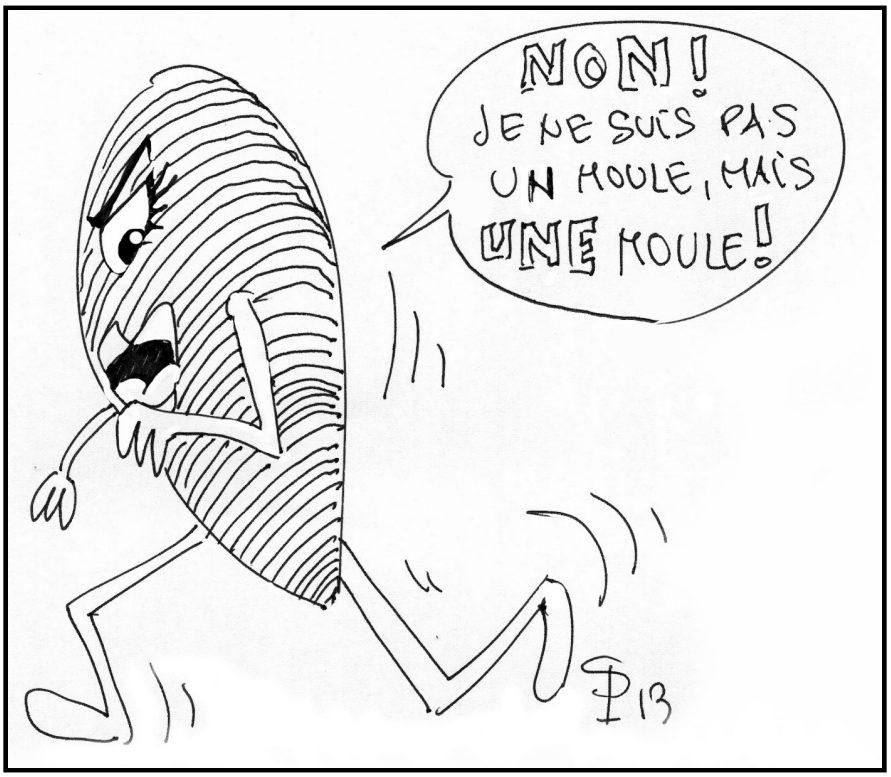
09/03/2013



Contents

Préambule : Le but de ce tutoriel n'est pas de vous faire un cours complet et exhaustif sur les tenants et aboutissants du moulage d'art. Sachez bien que c'est un métier à part entière et parmi les plus nobles qu'il existe encore. La base des techniques est très c...





Preamble:

The purpose of this tutorial is not to provide you with a complete and comprehensive course on the ins and outs of artistic casting. Please be aware that this is a craft in its own right—and one of the most noble that still exists. The fundamentals of the techniques are explained very clearly in Pascal Rosier’s excellent book, *Le moulage*...

Our goal will be to highlight all the main pitfalls encountered by beginners in amateur art casting...

Personally, I’d advise you to start small with simple latex molds and plaster casts, then gradually move on to elastomers and resins. Many specialty shops these days will give you sound advice. We’re no longer in the situation we were in twenty years ago, when you’d be offered paid workshops featuring demonstrations of high-performance products—only to be sold unsuitable and extremely expensive products afterward—all with the aim of discouraging you and ensuring that “the secrets of the gods remain on Mount Olympus”… Certain so-called “pros” will recognize themselves; the Internet revolution and the culture of sharing have finally swept all that away…

You need to think things through carefully before you begin:

-1- How many prints will I make?

-2- What material will I use for casting?

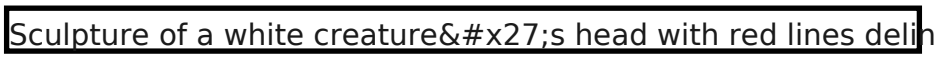
-3- What is my budget?

For our demonstration, we'll use the Giant Squig master model created in a previous tutorial. This subject is perfectly suited for an introduction to casting. It has a large surface area—which has the drawback of requiring a large amount of molding material (resin)—as well as details that are both very fine (ears) and simple, and also undercuts (gums). Therefore, we cannot make the mold out of a rigid material (plaster, resin, etc.). Furthermore, since we want to make multiple resin casts (polyurethane or polyester, depending on your preferences and the materials you have on hand), a durable yet flexible material is essential; we'll therefore be working with silicone elastomer...

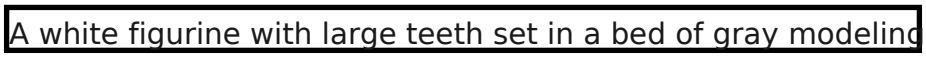
Note: It is possible to make a latex mold with reinforcements and a cap, but that would require a significant amount of time and expertise, which is not the purpose of this tutorial. Polyurethane elastomer is also an option, but its cost puts it beyond the scope of this tutorial as well...

Sculpture of a creature's head with its mouth open; a red line marking the fut

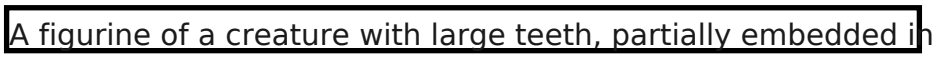
To create your mold, you'll need to start by "thinking through" your design. In other words, where will you place the parting line separating the two halves of the mold? It makes practical sense to choose a parting line that follows a path with as few details as possible. This is important both to ensure the mold is airtight and to make it easier to remove this future parting line from the castings later on. If you place your parting line along intricate details, you'll face hours of tedious deburring...

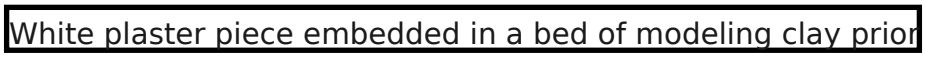


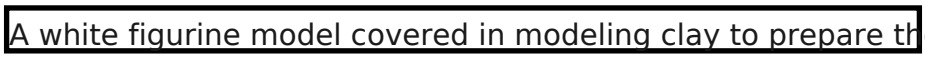
Finally, be very careful not to position your parting line in a way that would "trap" (green cross on the mold) part of the model inside the mold...



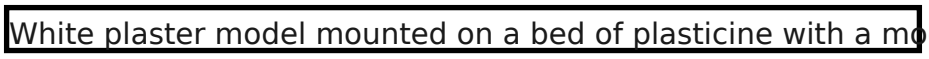
Avec de la plastiline souple vous asseyez votre modèle...

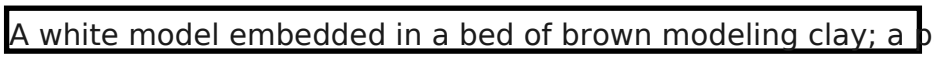






...et montez des épaisseurs de plastiline jusqu'à vous rapprocher du plan de joint souhaité...





ETAPE IMPORTANTE : Le plan de joint...

Using an appropriate tool, create your joint line. It must be exactly at a 90° angle to your workpiece...

Cross-sectional diagram showing the blue model partially embedded in the gray mol

Diagram showing a poor connection between the formwork and the structural memb

Explanatory diagram labeled "OK" showing a part with a rounded profile

Ce schéma vous explique ce qu'il ne faut pas faire. Il ne faut surtout pas le lisser en arrondi (erreur fréquente de débutant) car certes cela est plus facile mais un côté du moule présenterait un plan de joint très fin, donc peu résistant, donc vite corrodé et détruit par « l'agressivité » chimique des matériaux de moulage...

A white figurine of a smiling creature encased in a mold made of modeling clay

A figurine of a white monster with a large mouth embedded in a slab of modeling cla

A white plaster cast of a creature with large teeth, made from a silicone mold

Lissez et finissez le reste de votre galette de plastiline proprement...

Hand placing metal markers on a model surrounded by modeling clay

A white plaster cast of a grimacing creature set in its flexible silicone mold

ETAPE IMPORTANTE : Le centrage des deux faces du moule. C'est une étape cruciale. A l'aide d'un outil arrondi (ici un simple trombone) vous réalisez tout d'abord une gorge de centrage tout autour de votre modèle (si possible)...

A plaster cast of a smiling creature made from a flexible silicone mold

Plaster cast of a grimacing figurine removed from a flexible silicone mold

...elle permettra d'assurer un plan de joint précis. Ensuite vous réaliserez des centreurs (ici le bout d'un pinceau), ils auront pour but de guider la fermeture du moule...

White figurine of a smiling monster removed from its silicone mold

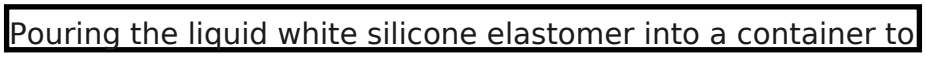
A white creature figurine placed in a beige silicone mold inside a cardboard box

Monter un cadre autour de votre moule, en matériau non poreux (carton lisse, médium recouvert de papier aluminium, novolam etc.) Calculez le volume d'élastomère à couler pour réaliser votre première face, trop peu et votre modèle ne sera pas assez recouvert, trop grande quantité et vous gaspillerez de la matière en épaisseur superflue. En général un minimum de 5mm aux endroits les plus fins est recommandé jusqu'à 8mm ou 10mm. *A savoir que si vous comptez faire beaucoup de tirages il faudra une épaisseur appropriée. De même si le volume de votre sujet est important la réaction chimique sera importante : plus il y a de matière et plus la réaction est vive et plus il y a montée en température et plus il y aura corrosion du moule = il faut une épaisseur adéquate d'élastomère.*

HOW TO CHOOSE THE RIGHT ELASTOMER? As explained above, you'll be using a silicone elastomer for art casting. It will be tear-resistant, provide high-fidelity detail reproduction, and be compatible with composite casting materials. Once you've determined this, you'll still be offered several varieties, particularly in terms of "Shore" hardness. In simple terms, the higher the "Shore" hardness, the stiffer your elastomer will be (though no less tear-resistant), and therefore your mold will stand on its own without needing a form or frame to support it!

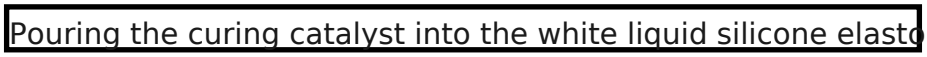
Casting

Supplies for silicone molding: scale, jar of RTV 70, acetone, paintbrush, and spoon



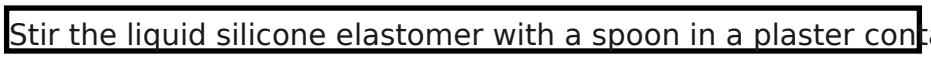
Pouring the liquid white silicone elastomer into a container to prepare the mixture

Coulage de la première face. Vous aurez pris soin au préalable de stocker vos matériaux et outillages divers à température ambiante d’atelier (entre 15 et 20°C) et hors de toute humidité excessive. Préparez tout votre matériel...



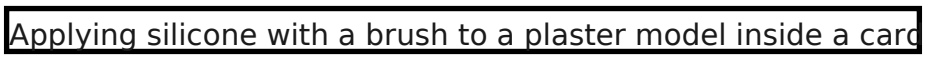
Pouring the curing catalyst into the white liquid silicone elastomer in a container

Mix the white silicone elastomer with a spoon in a small container

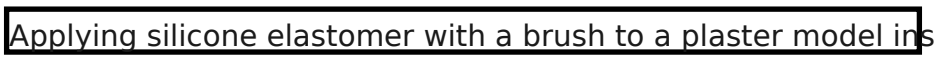


Stir the liquid silicone elastomer with a spoon in a plaster container

Lisez bien la notice d’utilisation de votre produit, en particulier le « Pot Life » ou temps de vie en pot. C'est-à-dire combien de temps est utilisable le mélange une fois le catalyseur incorporé avant gélification. Préparez la quantité d’élastomère prévue, incorporez le catalyseur. Notez l’heure. Mélangez soigneusement, le catalyseur va faire des fils couleur gris dans l’élastomère, mélangez jusqu’à ce que votre mélange soit parfaitement homogène. Raclez et mélangez bien aussi les bords et le fond de la gamelle. Regardez bien l’horloge...



Applying silicone with a brush to a plaster model inside a cardboard mold



Applying silicone elastomer with a brush to a plaster model inside a mold

Imprégnez soigneusement les détails de votre modèle avec un pinceau souple. Surveillez toujours l’horloge...

Imprints of the parts in the white silicone mold cast in a cardboard box

Cardboard mold containing a master part ready for pouring silicone elastomer

Coulez le reste du mélange en un mince filet à partir du point le plus bas du coffrage. Ainsi l'élastomère va monter progressivement et recouvrir un à un tous les détails. Laissez polymériser selon la fiche technique (en général entre 24 h et 36h)...

A plaster model encased in modeling clay within a casting mold

Hands removing the modeling clay from the mold to take the piece out before applyi

Hand removing modeling clay from the mold around the piece, with a spatula nearby

Une fois votre première face durcie, vous pouvez retourner votre travail et commencez à retirer la plastiline. ATTENTION : faire ce travail avec délicatesse et en maintenant toujours fermement votre modèle contre la première face. Si vous ne faites cela et déchaussez votre modèle de la première face du moule il existera un risque que lors de la coulée de la deuxième face que de l'élastomère migre entre le modèle et la première face...

White silicone half-mold in a cardboard box with the imprint of a figurine

White silicone mold in a mold box with the imprint of a figurine and positioning pins

A plaster model coated with petroleum jelly in a cardboard mold next to a pot

Nettoyez correctement tous les restes de plastiline. Montez un cadre. Mettez en place la carotte de coulée. Assurez-vous que votre cadre est bien serré et étanche...

Using a brush, apply a thin, even layer of petroleum jelly to the first side of the mold, taking care not to let it spill over onto the model (otherwise, detail will be lost)...

Imprint of a figurine in a white silicone mold inside a formwork

White silicone mold in a cardboard mold box with a foam block and aluminum tape

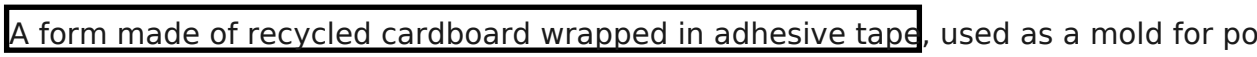
White silicone impression cast in a casting mold for flexible molds

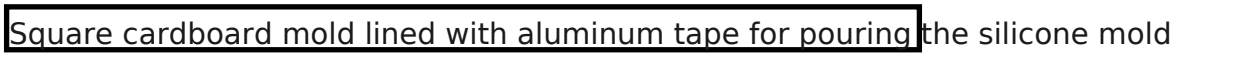
ASTUCE PRATIQUE : Pour éviter de gaspiller outre mesure votre élastomère, vous pouvez mettre en place des cales (ici simples morceaux de polystyrène extrudé) de taille appropriée aux endroits opportuns. Elles empêcheront l'élastomère d'y aller.

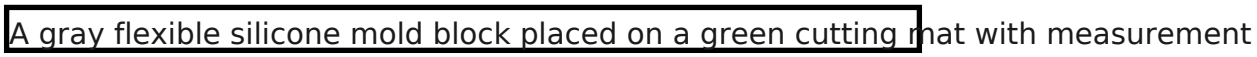
Pour the second side of your mold in the same way as the first side.

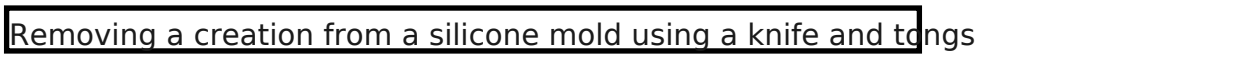
Let it cure for about two or three weeks (generally) at room temperature so that the mold can complete its shrinkage.

Demolding

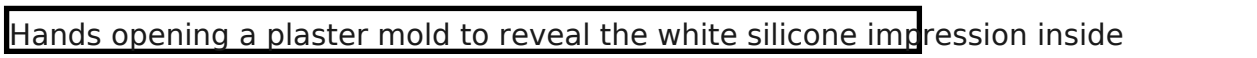

A form made of recycled cardboard wrapped in adhesive tape, used as a mold for po

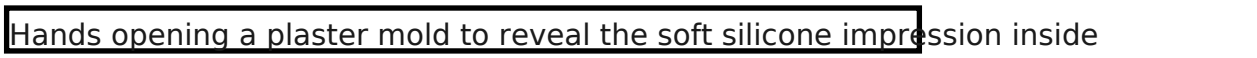

Square cardboard mold lined with aluminum tape for pouring the silicone mold


A gray flexible silicone mold block placed on a green cutting mat with measurement

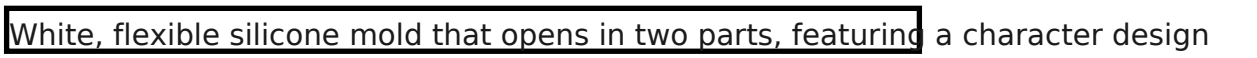

Removing a creation from a silicone mold using a knife and tongs

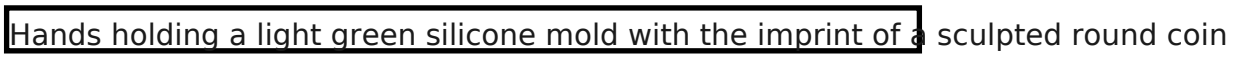
Démontez le coffrage, puis coupez proprement tous les angles de votre moule. Ils forment tous une sorte d’angle en pointe qui fausserait le serrage de votre moule ultérieurement, surtout si vous y rajoutez un coffrage selon comment vous avez raisonné (dureté Shore de l’élastomère et forme générale)...


Hands opening a plaster mold to reveal the white silicone impression inside

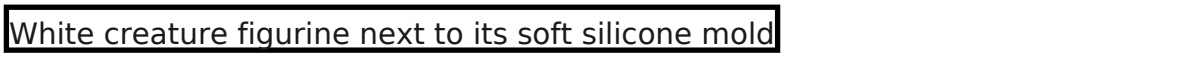

Hands opening a plaster mold to reveal the soft silicone impression inside

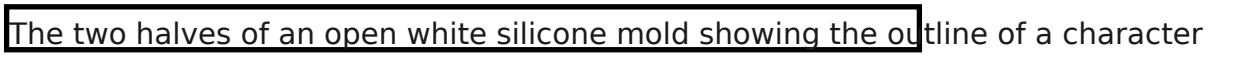
Séparez vos deux faces et sortez votre modèle du moule...


White, flexible silicone mold that opens in two parts, featuring a character design


Hands holding a light green silicone mold with the imprint of a sculpted round coin

...Progressez doucement par torsion et tensions...


White creature figurine next to its soft silicone mold


The two halves of an open white silicone mold showing the outline of a character


A white, flexible silicone mold, open to reveal wooden pieces held between the finge


Silicone mold and thin-walled molded parts attached to their sprue cluster

...utilisez des outils en bois arrondis pour aider si besoin.

MOLDING

You're almost at the end of the process—here comes the long-awaited moment of the first casting!

Depending on the shape of your part, its complexity, and other factors, you will have opted for ingot casting, casting with degassing, investment casting, etc. Please refer to the book by Pascal Rosier.

-For this project, the "Giant Squig," I decided to use the lost-wax casting method.

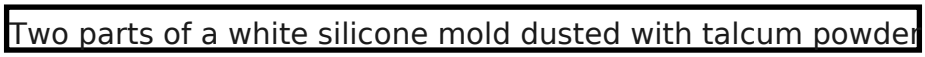
-In other words, pour only a small amount of the mixture (about one-fifth in this case) into the mold and slowly rotate the mold in all directions. The resin will gradually coat all surfaces and fill in all the details.

-Before the resin hardens, place the mold upside down over a bowl; the excess resin will drain out.

- Once the resin has fully cured, repeat the process once or twice.

-Finally, pour in the necessary amount of resin to completely fill your mold, up to and including the sprue...

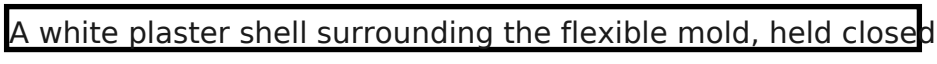
Two halves of an open white flexible silicone mold showing the impression of a figuri



Two parts of a white silicone mold dusted with talcum powder using a brush

Préparation et protection du moule. Le talc constituera un bon agent de démoulage et de protection de votre moule.

NOTE: You can significantly extend the life of your molds by using a specialized silicone spray. Another option is to spray on rust-proof paint from a can. The downside is that you have to wait for it to dry completely before using the mold. The layer of paint will form a very effective protective film; you can almost double the number of casts using this method...



A white plaster shell surrounding the flexible mold, held closed by rubber bands

A white plaster mold held closed by rubber bands against a dark background

White silicone elastomer mold block held in place by rubber bands

A B

Serrage du moule. C’est un point important de la réussite de vos moulages. Pas assez serré (A), le moule fuira. Trop serré (B), le matériau de moulage n’ira pas partout et/ou le moule fuira et de plus la ligne de moulage sera décalée. Le moule doit être serré correctement...

At this point, please refresh your memory by rereading our tutorial on the hazards of casting materials. We won’t hide the fact that the ideal situation is to cast *outdoors* only during the mid-season (between March and May, and between September and October)!

Transparent vacuum chamber with pump and pressure gauge for degassing silicone

Silicone molding supplies: cans, scale, cups, gloves, and wooden molds on a workbe

Préparation de l’ergonomie du plan de travail.

Most resin-based casting materials (such as polyurethane) suitable for casting small parts, figurines, models, and figurines have a fairly short working time, so it’s important to organize your workspace accordingly—and depending on whether you’re right-handed or left-handed...

In this photo, the countertop is set up for a left-handed person:

-1- Let's take a look at the resin

-2- So you can weigh it, measure it out, and mix it

-3-4- You can pour it into the molds

(-4- Once poured into the molds, some of them can be degassed immediately in the vacuum chamber right next to them. We’re taking advantage of the resin we bought for the squig to cast other parts we made earlier...

So the squig is cast upside down...

Let it harden sufficiently before removing it from the molds. A common mistake is to remove the part based on the amount of hardened resin left in the bowl, when in fact the resin in the molds is not yet hard...This is because the quantities in the molds are much smaller (especially for small parts), so the chemical reaction is less intense and slower...

You can remove it from the mold, inspect it, and compare it to the master model.

If it is deemed satisfactory, keep it and always place it back in the mold when storing it so that the mold does not lose its shape...


SPMAQUETTES.COM