CASTING PLASTIC

USING MULTI-PART FLEXIBLE MOLDS AND POLYURETHANE RESIN TO CREATE ONE OF A KIND HOT ROD COMPONENTS

BY MATT SPROUSE

As a major focal point of a vehicle's interior, a shift knob undoubtedly makes a statement of ownership and represents the owner's tastes. Whether it is a modern billet aluminum piece, a traditional tiki head, or a menacing figure, it serves as not only a piece of artwork, but also as a connection between the driver and the drivetrain. Picking the perfect shift knob is an exercise in personal expression and should not be overlooked.

While seeking out the appropriate shift knob for one of our *Street Thunder* project cars, we came across a number of options in the aftermarket, ranging from limited run plastic knobs to well machined aluminum handles, all of which would've been suitable for our application. However, because we would rather build something than buy it (if we're capable), we thought we would design and create our own knob and share what we learned with our fellow NSMC Members.

What we discovered is a simple and effective way to reproduce complex parts in polyurethane (plastic) by creating a multi-part mold out of flexible RTV silicone. To create the mold, we simply masked off half of the skull that we created and poured our first section. After creating half of the mold, we repeated the process to form the other side and then jumped right into pouring the final casting.

Most of the chemicals we used can be purchased at your local hobby shop or ordered online from an art supply store. While we created a custom skull shift knob, you can cast and mold most anything you can think of. So, use your imagination to create something unique for your street machine, whether it is a shift knob, badging, radio control knobs, or even taillight lenses.

Follow along over the next few pages to learn how to cast with plastic using a multi-mold process at home in your garage.

01

Here we have assembled a group of found objects with our sculpted skull. Whether you're at your local hardware store or a home decor store, keep your eye out for interesting shapes, which will add a little something to your ride.

02

We decided to do a one-off piece for our shift knob. Using a microcrystalline wax (commonly used in the bronze sculpting process) we produced a traditional skull design.

03

To get started on repopping our object, we built a box to house our skull, leaving a 1/2-inch of space between it and the walls.

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To isolate one half of our object, we submerged it into non-hardening clay. This allowed us to pour the first portion of the mold.

FLEXIBLE MOLDING MATERIALS

The wonderful thing about using flexible molding material is its ability to easily release from a molded object. To help illustrate the differences, lets consider a sphere. With a hard molding material such as plaster, if you were to have one of your mold halves encompass more than 180 degrees of the sphere, you wouldn't be able to release the object from the mold. With a flexible molding material, the mold will easily release, which is the most notable advantage of using these types. While it may take four or five mold sections to cast a complex object, it will take a maximum of two when using a flexible material.

There are two main types for flexible molding materials, silicone RTV and urethane RTV. RTV stands for room temperature vulcanizing, which means the chemicals cure at room temperature without the need for an external heat source. They are all safe to use indoors and are virtually odorless. But, each have advantages and disadvantages that must be taken into consideration when choosing which material to use for your project.

Urethane RTV

If you need a rigid and highly durable molding compound, urethane RTV is the correct compound for your project. It requires a 1:1 ratio catalyst and has a very low viscosity, which reduces the amount of air bubbles during pouring. Because urethane will stick to everything, a mold release should be used on all parts. It is great for multi-part molds, but lacks the flexibility of silicone RTV. It's the most economical of the two, but doesn't have the flexibility silicone does.

Silicone RTV

This option is the most expensive of the two, but offers the best of both words. It's a very durable compound with a lot of flexibility, therefore it can tackle deep undercuts that most molding compounds would have a difficult time releasing from. It features a 10:1 mixing ratio and comes with multiple hardeners for quick set times. Silicone won't stick to your part, but if you're creating multiple mold sections you will need a mold release to keep it from fusing to other sections. Silicone RTV was our pick for this project because its pros greatly outweigh its cons, and due to its tendency to capture more detail than other molding chemicals.

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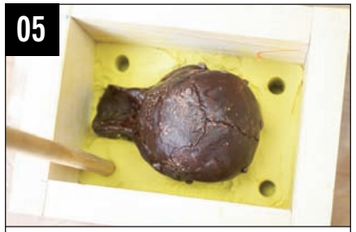

To allow a perfect match between the mold halves we made keyways in the mold by making depressions in the clay.

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With urethane RTV molding material, using mold release is a must. A light misting with silicone RTV will ensure easy release.

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Silicone RTV is a two-part compound. The silicone itself (white) and a hardener (blue) are mixed in a 10:1 ratio.

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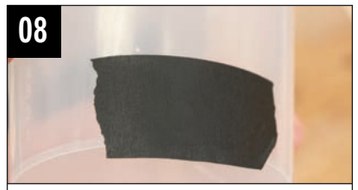

To reduce air bubbles in our molding material, we cut a small whole in our separate mixing cup and covered it with tape. This allows air pockets to pop in the mold pouring process. If air bubbles set next to our original object, they will cause imperfections in our final casting.

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We used the two-cup mixing method. After mixing in one cup, we transfered it to another to move the material stuck to the sides of the first cup to the inside of the new cup.

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We set the cup with the covered hole on the edge of a table, removed the tape, and let it drizzle into the lowest point of our casting box. This is called the "bombs away method." As the material falls, the air bubbles are stretched causing them to break.

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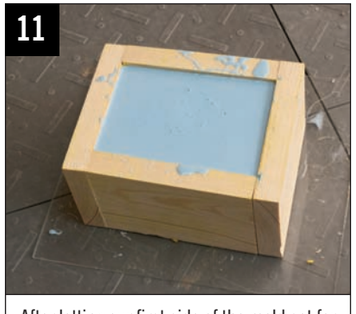

After letting our first side of the mold set for 16 hours to cure, we flipped our box over and removed our clay from the original.

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As you can see, the depressions in the clay formed the male end of the keyway and our original part is secured snuggly in the first mold half.

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If an object is completely encapsulated by the silicone, you will need to add a pour spout and an air vent at the highest point of the object. We used wooden dowels.

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Before repeating steps 7-10 to create the second half of the mold, we applied a generous amount of mold release to ensure the two halves would not fuse together.

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After the appropriate cure time, we separated the two halves and removed our wax skull. Upon close inspection, you can see that silicone picks up remarkable detail.

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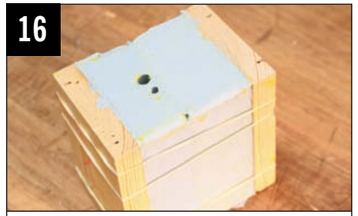

Before casting, we placed the two mold halves together, lining them up with the keyways, and held them together with rubber bands. Sometimes molds will distort from the rubber bands so we backed them with wood to give it more structure.

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For our final casting, we used a polyurethane compound, which like our silicone RTV is a two-part resin. We used a clear resin, which allowed us to add dyes and pearl flakes.

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We poured our dyed resin into the pour spout slowly, allowing all the gases to escape out of the air vent. We continued pouring until resin came out of the vent.

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After the appropriate cure time (usually between two to ten hours depending on thickness), we had an exact replica of our original sculpted skull.

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Because silicone RTV is so durable, we were able to do multiple pourings and get the same detail out of it. You can usually get about 20 castings out of a mold before the detail begins to diminish.

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Here is another example of the casting process. We took an antique doorknob that would be at home in any traditional rod and casted it in multiple colors.

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To finish off our new skull shifter, we painted it with a self-etching paint, gave it a little patina with a water-based paint, added a final clear coat, and topped it off with shell casings from a .357 Magnum and a 20-gauge for eyes. Then we tapped the bottom with the appropriate threads and hung it in its new home.

WEB EXTRA

While shopping around for ideas for moldable objects at an antique store in Iowa, we found this WWII mortar shell and felt it would make the ultimate ratrod shift knob. Our plans are to adapt the threads on the bottom of the mortar to the common 3/8-inch threads and make a polyurethane cap for it with a shift pattern embedded in it. To watch the process, visit the Club website at streetmachineclub.com and navigate to the "From *Street Thunder*" tab to see the final product.