ILLUMINATING CHEMISTRY

How to craft custom taillight bezels and cast custom lenses

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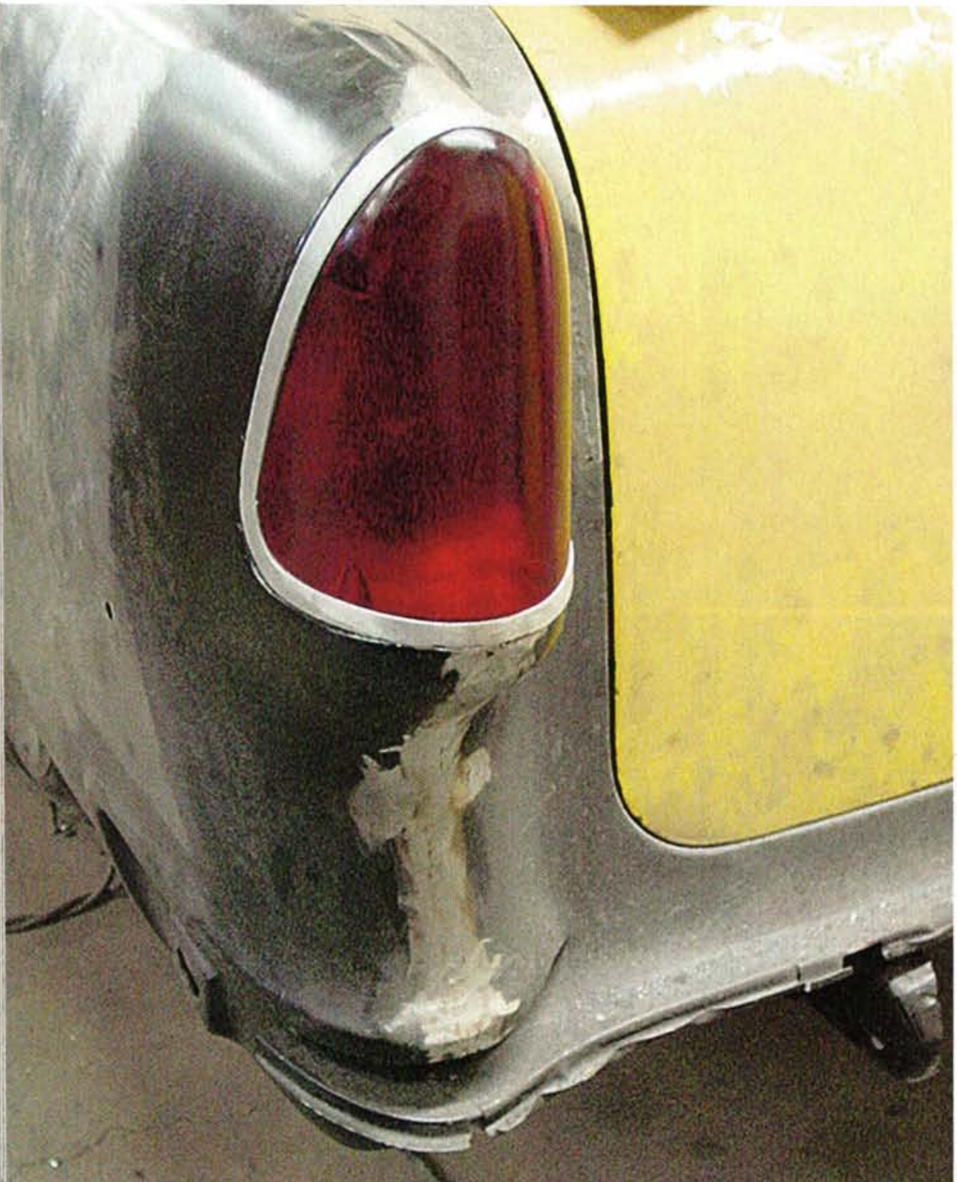

It's still a '55 Chevy taillight—just smoother and more refined. Read on to see how we crafted custom taillight bezels and cast lenses of our own design.

Is there anything more custom than making your own car parts from scratch? We don't think so, especially in this day and age when bolt-on parts reign supreme. Our increasing desire for instant gratification seems to make it increasingly difficult to find people who have the patience, skill, and creativity to craft one-off components.

Fortunately, here at *Custom Rodder* we have creative readers who sometimes share their car-crafting secrets with us. Recently, Brian McCutcheon of Indianapolis sent us sample photos of some custom taillights and bezels he helped build for Harold Riley's '55 Chevy while working at Trick Works in Telford, Pennsylvania. Not only was the information cool, the photos were top rate too. We didn't hesitate in asking Brian to send a full set of pics and some captions to share with you.

Peruse the following pages and you'll soon discover this was no simple Saturday afternoon job. Still, we thought the process was intriguing, and we're certain the *Custom Rodder* audience can figure out how to use similar methods for creating any number of lenses or bezels for their own projects. Brian says many of the products used, such as the modeling clay and plaster, are available at art and craft stores. The more specialized materials, like the sulfur-free clay, rubber, casting urethane, release agents, and pigments, may take a little more searching; Brian got his at Polytek, a Pennsylvania company that offers online and telephone ordering for any of you who are ambitious enough to try something like this at home.

***1.** We used the original taillight bezel to make a poster board template for the new one. The marker line represents the desired thickness of the new bezel. **2.** Once the desired shape was finalized, we transferred the template to 1/8-inch aluminum and cut out four pieces on the bandsaw. The cut was made slightly larger than the pattern, and the pieces sanded down to the correct profile. Again, we used the original bezel as a guide for bending the new pieces to shape. **3.** We made small 90-degree tabs from 18-gauge steel and tack welded them on to fit the new parts on the car. The tabs were attached correctly gapped for the new parts, and set to allow for the additional material thickness expected in final body prep and paint. **4.** We used simple C-clamps to hold the new bezel pieces to the tabs, and then TIG-welded the two bezel pieces together. We could then cut off the temporary tabs. **5.** Again, poster board was used to template the back of the bezel. The pattern was transferred to aluminum sheet, cut out slightly large, and bent to the proper shape using a slip roller. The piece was constantly checked for fit on the car as it was being formed. **6.** When proper fit of the bezel back and rim was established, the parts were attached to the car with Cleco clamps and tacked together with a TIG welder. **7.** The next step was to model the new lens shape. We retrieved the templates to get a starting point for cutting out a foam armature for the clay. We cut one piece from 1-inch blue foam to fit to our satisfaction, and then used that piece to cut three more, which were laminated together using contact adhesive.*


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__8.__ This resulting foam block was cut, filed, and sanded to fit the inside of the bezel. __9.__ With the bezel secured in the car, we fit the foam block to the bezel, wrapped it in plastic (to keep foam pills out of our clay), and blocked in the modeling clay. __10.__ We then sculpted the clay to create our lens shape. __11.__ To prepare for the plaster mold-making process, we masked off the car with plastic and added a clay shim to define the perimeter of our mold. We set the shim back onto the bezel so the prototype cast would be oversized, allowing us to trim it back to assure a good edge and even thickness. __12.__ A poster board template was made to create 1/4-inch plywood bracing for the mold. It was cut large enough to allow for a 1/2-inch mold thickness of plaster against the model. Making the brace with a square bottom will allow the mold to sit upright on a table surface while we cast a prototype lens. __13.__ The materials needed: plastic buckets, fiberglass (or burlap), and plaster. We cut the fiberglass matte into strips for easy handling, and mixed the plaster following the instructions. __14.__ The first coat is a splash coat, applied by flinging on plaster immediately upon mixing while it still has the consistency of thick latex paint. You don't want to touch or disturb the clay surface. This coating will be glossy or wet upon initial application; wait for it to cure to a satin surface before applying two more coats of plaster with the fiberglass or burlap. Just be careful not to print through to the clay while applying.

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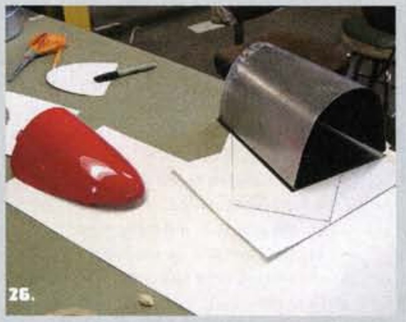
***15.** When there were three layers of plaster on the model (about 1/2-inch thickness), we attached the plywood braces with plaster and fiberglass. **16.** The plaster mold was allowed to dry after being removed. Once dry, we sealed the mold surface with a couple coats of shellac. When it dried we applied and buffed three coats of Butcher's wax. **17.** Final prep for casting the prototype was a layer of PVA mold sealer/release. **18.** We made a paper template of the mold's interior shape and used it as a guide to precut our fiberglass matte. Tip: Use a rolling fabric cutter to cut fiberglass sheet. **19.** Wearing proper safety equipment, we mixed the fiberglass resin according to the instructions and laminated four layers of fabric and resin to achieve a thickness between 1/8- and 3/16-inch. Note that the mold is sitting upright thanks to the flat-bottom braces. **20.** After the prototype cast was removed from the plaster mold, the edges were trimmed to fit the bezel, which had been welded up during the prototype casting process. **21.** We applied masking tape to the bezel and skimmed the prototype with body filler. We did the same on the inside of the prototype after removing it from the bezel, and then sanded it all smooth. **22.** We made bullet resin tabs for fastening the lens to the bezel and glued them to the prototype. **23.** Here is our prototype lens fit into its bezel, compared to the original lens and bezel. **24.** We coated all prototype surfaces with high-build primer, and wet sanded it to prep for paint.*



25. *This is the painted prototype in the car. The paint allowed us to create a polished, sealed model. When casting optically clear urethanes, your mold surface has to be polished; any imperfections in the mold will appear as fog in a cast urethane part and will require sanding and polishing. The better the prototype and mold, the less work there will be.* **26.** *In order to achieve an optically clear cast, both the mold and the plastic must be cured in a vacuum or under pressure. Pressure casting is far less costly unless you already have a vacuum chamber. All you need is a compressor and a pressure pot—which many shops already have. Due to the size limitations of our pressure pot, we made a mold box out of 18-gauge sheet steel.* **27.** *Next we modeled our shim for separating the mold out of sulfur-free modeling clay. It's important to know your products—during testing, even a sealed clay with sulfur would inhibit our rubber from curing. It is worth your time to know and test your products before committing to the final casting. Look carefully and you can see the mold keys modeled into the surface of the clay that will align the mold when finished.* **28.** *The rubber product we used is Polytek 71-20, a platinum-cured RTV silicon. It does not require a mold release when casting clear urethane plastic. In many cases using a mold release will inhibit surface curing of the final cast.* **29.** *The rubber was mixed following the directions carefully (using a gram scale) and the first half of the mold was cast and left under pressure (60 lbs) overnight. The mold box was disassembled and the clay shim carefully removed without disturbing the prototype in the rubber. It is critical that the model is not removed from the mold at this point to assure accurate reproduction of the piece once the mold is complete. A mixture of petroleum jelly and mineral spirits was made and applied to the SHIM AREA ONLY so the mold would separate when finished. The sharp eye can see that extra keys have been cut from the rubber. We thought the mold lacked the required keys to align properly, so we made adjustments at this point.* **30.** *Here's the pressure pot in action. We mixed the second batch of rubber and cast the second part of our two-part mold. You need to cast the rubber under a pressure equal to or exceeding the pressure at which you will cast the plastic.* **31.** *Here is the mold separated and ready for plastic. Vents and pour spouts were cut from the rubber post cure. Be sure to keep the mold clean; we washed ours with mild detergent and water and let it dry before reassembly. We used Polytek 1410 Clear Casting Resin, a two-part liquid urethane, for our final cast, and colored it with Poly Tint. To assure consistency, we mixed the Poly Tint (after testing small amounts of plastic for color) into the entire quantity of the B-side of the plastic component. Then, following instructions, we mixed our plastic, poured it into our mold, and let it cure under 60 lbs of pressure. We initially tried post-curing the lens (still in the mold) at 170 degrees, but saw spotting on our casts from the silicon leaching out of our mold rubber. We ultimately used the part X additive to accelerate curing and eliminate the need for post curing.* **32.** *This is the part just out of our mold. Once the cast hardened, we polished it with the recommended plastic polish.* **33.** *Here is the new lens in the aluminum bezel. We eventually built an LED system and diffuser to illuminate our new lenses, and made hinge mechanism for the driver-side bezel to access the relocated fuel filler.*

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