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Photoetching for modelers
Creating a bas-relief instrument panel at home

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Despite the flood of photoetched detail parts for aircraft, armor, cars, and ships, you may find a need for parts that aren't available. Just gazing at those aftermarket parts could make you think it's a complicated and expensive manufacturing process only engineers in white coats can comprehend. Not so. Photoetching is a relatively simple process, one that does involve special materials, techniques, patience, and care. Although any technique should not be considered the gospel of photoetching, they work for me and others who have tried them.

What is photoetching? Photoetching is essentially a chemical-milling process—it's used to make electronic "printed" circuit boards. As its name suggests, it is a photographic process, too. The desired designs are photographically imprinted on light-sensitive metal, which is then developed. This developed image protects the metal underneath, while the etching chemical eats away unprotected material. Figure 1 is an overview of the process, and you can follow as you read along.

Original image: The example we'll use is a bas-relief instrument panel for a Revell 1:32 scale P-47 Thunderbolt. Although I wanted raised instrument bezels and rivets, I also wanted holes etched through for the instrument faces that would be added later. To make a bas-relief instrument panel, I needed to create correctly sized images of the face and back sides of the panel. The first step is a set of enlarged ink drawings. Since this process involves a photographically printed positive image with black ink on good-quality vellum, a frothy, translucent drawing paper. You need to visualize the process before starting to draw: In the negative process, everything drawn with black ink is retained on the final part. Some photoetching processes use a positive to create the image, but I prefer the negative process.

One advantage of this system is that you can draw the original larger than the final image, I usually draw my originals eight times larger (8x). This makes it easy to draw fine details. One caution: When you produce the original image, you must remember that the weight (or thickness) of the line you use also decreases as you reduce the drawing to the final size. When I draw the 8x original, I never use a line thinner than this.

Fig. 1

Fig. 2. The large artwork for the front (top) and back of the instrument panel features register marks that will help align the negatives when exposing the brass.

Fig. 3. The instrument faces were also drawn, here, everything black will appear white on the finished panel.

Fig. 4. The group of chemicals on the left is made by OGL Electronics, while the group on the right is made by Unbek Corporation. In the center rear is a bottle of litho chloride etchant. Front and center is a roll of paper, which can be brushed onto areas of the metal that need to be protected from the etchant. All these chemicals can be purchased at an electronics supply store.

Fig. 5. The negative/brass sandwich is clamped between two sheets of glass. Once one side of the brass is exposed, simply flip the set over and expose the other side.

Fig. 6. Etching.

Paul's finished photoetched instrument panel is installed in the cockpit of a 1:32 scale Revell P-47 Thunderbolt.

Step 1 - Etching: The etching process is very simple and straightforward. After the artwork is exposed, you have a positive which is laminated to the brass. The exposed brass is then put on the etching machine, and the chemicals are applied. The chemistry used is a combination of etchant and developer. The etchant is a mixture of salts that attack the brass and create the image. The developer is a solution that stops the etchant and prevents further etching. The resulting negative/brass sandwich is clamped between two sheets of glass. Once one side of the brass is exposed, simply flip the set over and expose the other side.

Step 2 - Cleaning: After the brass has been etched, it is cleaned with a solution of water and detergent. This removes any remaining etchant and developer from the brass. The brass is then rinsed in distilled water and dried with compressed air.

Step 3 - Laminating: The cleaned brass is then laminated to the positive artwork. The positive artwork is placed on the brass, and a sheet of glass is placed on top. A weight is placed on the glass to ensure that the brass and positive artwork are pressed together. The assembly is then placed in an oven to cure the adhesive that holds the positive artwork to the brass.

Step 4 - Trimming: Once the adhesive has cured, the excess brass is trimmed away. This is done by cutting the brass with a utility knife or a band saw. The trimmed brass is then polished to a high shine with a polishing compound.

Step 5 - Assembly: The trimmed brass is then assembled into the final product. This may involve wiring, painting, or other assembly processes.

Photoetching allows you to create highly detailed and realistic parts for your model. It is a technique that anyone can learn with a little patience and practice. With a little creativity, you can create parts that are not available from any of the aftermarket parts companies. So, get started today and see what you can create with photoetching.