

# Clay Pattern Styling and Rigid Surface Casting In Today's Composite Industry Class "A" Surfacing Techniques for PRODUCTION MOLDS

## Preparing Clay Surfaces for Polyester F.R.P. Negatives

When making molds with polyester resin, from a clay pattern, a barrier coat must be applied between the clay surface and the polyester or epoxy resin. One method of surface preparation is to apply strippable vinyl onto the surface of the clay model / plug / mule / master / pattern. Follow with several light coats of PVA, which are sprayed onto the surface of the vinyl coated clay model. Each coat of PVA must dry thoroughly before the next coat is sprayed on. After these have dried, mold release wax is applied over the PVA. The wax must be applied with care so that the PVA is not disturbed. Now an epoxy or polyester mold can be taken from the clay model and the mold will have an adequate surface.

The only trouble with incorporating this basic surface preparation system into typical clay modeling is that the industries using polyester resins for mold making prefer a "Class-A" polyester gel coat finish on their pattern of choice. Obviously, negatives made from a model with a "Class-A" finish will be able to produce positive cast parts maintaining the "Class-A" finish.

Today it is possible to achieve a polyester gel coat finish on models constructed with styling clay. To realize this finish the surface of the approved styling clay model is first sprayed with a few coats of an adhesion promoter such as R&M 811 commonly used for automotive parts such as flexible bumpers or as a refinishing product. Following this step, after the adhesion promoter is thoroughly dry, the surface is sprayed with several coats of a water-borne barrier coat such as R&M HP-100. Each coating should be allowed to flash-off only long enough to prevent sagging. The final barrier coat application must be thoroughly dry before proceeding.

There are other products available that can be used to create a barrier coat to seal the clay. Alternate suppliers of Adhesion Promoter or Water Borne primers can be found in the Suppliers section at the end of this article.

The R&M HP-100 is a water-borne primer-sealer and not a solvent-based material. As such, there is no solvent sensitivity to the undercoats or topcoats and there is no reaction to the styling clay. Any substitute sealers should water-borne.

The cured Barrier Coat surface is then sprayed and built up to the desired thickness with Featherfill, Duatex or other polyester sandable primer and sanded as instructed.

Krylon also makes three colors of an all-purpose sandable primer in an aerosol, which can be applied directly on top of the clay. Either way, this barrier seal must not be broken. It is a good idea to apply two different colors of sandable primers so that when sanding is taking place you will have a built in warning system. When you see the second color you will know that you are very close to the clay surface.

A polyester tooling gel is then sprayed over the sanded primed surface or it can actually be sprayed directly on top of the HP-100-barrier coat, reducing the number of steps required. The polyester tooling gel coat is then dry or wet sanded as instructed by the manufacturer. Care must be taken to avoid sanding through the undercoats and disturbing the clay. Always use the largest sanding block possible to avoid sanding holes or low spots into the surface.

## Typical polyester finishing techniques are:

Allow adequate time for post curing. Lightly sand with 600 - 1200 grit sandpaper.

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After sanding, machine buff using appropriate buffing compound. Buff the whole area evenly with extremely light pressure since you do not want to heat, by friction, the prepared surface with the buffing wheel. Continue buffing process until a satisfactory luster is obtained.

Provided the clay model surface was properly developed using steels and slicks and the sanding of the various surface preparation coats was done correctly, there will be no distortions or undulations in the reflective highlights of the surface of the finished model. If low spots are seen polyester fillers can be applied and finished accordingly. The results will render a "Class A" finish.

There are variations on this surface preparation system and there is an additional step, which can be quite valuable. Following the application of the R&M HP-100 Barrier Coat on the clay model, the surface can be laminated with a polyester resin and a very fine fiberglass such as a surfacing veil or surfacing mat (sometimes called angel hair). When this has set up, sand off any high points of this laminate but do not sand through the fiberglass veil. Spray the surface with the Fourseal or other sandable polyester primer. Build up with the polyester tooling gel coat, sand and buff to a high luster. This thin fiberglass shell will protect the clay surface, provide a harder surface for sanding and buffing and assure a crack free polyester gel coat finish.

### **Alternative Method for Priming over Chavant Clay**

The clay model should first be coated with R&M 811 adhesion sealer, or similar product and allowed to completely dry. This will provide a stronger bond between the clay and the first light coat of a Lacquer Base Primer. Allow approximately a 10-minute flash time between the following two coats of additional Primer. When the primer is dry, apply three light coats of a different color primer, again allowing a 10 minute flash time between coats.

Allow the primer coats to dry completely insuring that all possible shrinkage transpires before any sanding or spot filling takes place. After the primer coats are cured, holes, small dents or undulations can be patched with spot filler and allowed to dry.

The dry prepared surface is sanded as instructed by the primer manufacturer. Additional topcoats can be sprayed or filler can be added to obtain the required finish. Thinners may be introduced as recommended by the primer manufacturer.

The surface is then sprayed and built up with polyester tooling gel. The tooling gel coat is dry or wet sanded as instructed. Machine buff the surface area evenly and with very light pressure. Do not heat the surface with the buffing wheel. Continue buffing until a satisfactory high luster is obtained.

### **Third Alternative Method**

Krylon, the spray paint available from many locations, produces a Sandable Primer in three colors. This can be applied directly to the clay surface with reasonably good adhesion. After two coats are applied sand, and topcoat with polyester tooling gel as described above.

It is important to be confident and familiar with the system you have selected. It is highly recommended that a test sample or samples of molds be made off of a test clay model prior to casting an important mold from a valuable clay model.

Many of these topics are covered in Chavant's Educational Video Series, tape number three, "Mold Making and F.R.P. Preparation from Clay Models".

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## Summary of Surfacing Clay for Mold Preparation

The following procedural summaries are to be applied over the steeled, slicked clay surface will help assure a "Class-A" surface. Always test compatibility of specific system components prior to beginning the sealing / mold-making process. The number of coats for any step can be manipulated as required. Normal FRP mold making processes will follow.

### Method #1

- Any universal adhesion promoter (commonly used for Automotive Plastics)
- Any water borne sealer/primer
- Polish as instructed
- Any sandable primer
- Polish as instructed
- Any polyester gel coat
- Polish as instructed
- Appropriate release wax or system

### Method #2

- Gel coat or sandable primer directly onto clay (test compatibility)
- Polish as required
- Appropriate release wax or system

### Method #3

- Krylon Sandable Primer directly on the surface of the clay.
- Apply finishing coats of any material and polish as required
- Appropriate release wax or system