How to seal a painted 3D print

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Abstract. Let the paint dry (72 hours to two weeks for Liquitex acrylics), then brush or spray two or three thin clear coats. Keep to each maker's recoat time.

Keywords: pla, petg

Table 1. What to seal painted 3D prints with

Clear coat and example	Base	Dry to touch	Recoat	Ready for use	Sheens	Plastic and outdoors
Water-based wood finish, brushed: Minwax Polycrylic Protective Finish	Water	Under 15 minutes	After at least 2 hours, sanded with 220 grit; three coats recommended	Light handling after 3 hours, normal use after 24 hours	Ultra Flat, Matte, Satin, Semi-Gloss, Gloss	Plastic and paint not named; interior only
Artist acrylic varnish, brushed: Liquitex Professional Gloss Varnish	Water (100% acrylic polymer)	Not stated	At least 24 hours; up to three thin coats	Not stated	Gloss; Liquitex also sells High Gloss, Satin and Matte, and they can be mixed	Not stated
Water-based spray: Krylon Low Odor Clear Finish	Water (clear latex enamel)	15 minutes	Not listed	Handle after 3 hours	Matte, Gloss	Plastic listed; interior and exterior
Solvent spray: Krylon COLORmaxx Acrylic Crystal Clear	Solvent (acetone and n-butyl acetate)	20 minutes	Not listed	Handle after 1 hour	Gloss, Satin, Flat	Plastic listed; interior and exterior

1 How do you seal a painted 3D print?

Let the paint dry for as long as its maker says (72 hours to two weeks for Liquitex acrylics), then brush on a water-based varnish or spray a clear coat in two or three thin layers. Keep to the clear coat's recoat window between layers and try it on a scrap print first.

1.1 What to seal painted 3D prints with

Figures come from each maker's own product pages. Minwax's touch-dry time is from its data sheet, measured at 77 °F and 50% relative humidity. The COLORmaxx solvents are from its safety data sheet. Where a recoat time is not listed, follow the can label.

For a print that gets handled, note Golden Artist Colors' limit on its own artist varnishes: they are not meant for furniture, floors or other surfaces that need high physical toughness, and Golden points to polyurethane for those. A game piece gripped every day is closer to that use than a shelf model.

If the part must hold water, that is a different job: see spray coatings for waterproofing a print and sealing a print with epoxy.

1.2 How long should paint dry before you seal it?

- **Brushed acrylic paint:** Liquitex says the paint must be fully dry, 72 hours to two weeks depending on thickness. Golden gives thick, impasto paint a week or two.
- **Spray paint:** go by that can's recoat window. Rust-Oleum's Painter's Touch 2X Ultra Cover data sheet says to apply a second coat or clear coat within 1 hour or after 48 hours, and that on plastic the paint reaches maximum adhesion and durability in 5 to 7 days.

1.3 How to seal acrylic paint on a 3D print

1. **Wait out the paint's dry time** from the list above.
2. **Work in a clean, ventilated spot in the makers' range.** Krylon wants 55 to 75 °F (13 to 24 °C) and humidity below 60%. Golden wants 65 to 75 °F (18 to 24 °C) and 50 to 75% relative humidity.
3. **Try the clear on a scrap print painted the same way.** Liquitex calls its varnish permanent and asks for a patch test. Minwax names neither paint nor plastic for Polycrylic, so the scrap matters most there.
4. **Apply two or three thin coats,** as Golden advises, rather than one thick one. Brush in long, even strokes and do not go back over coated areas: Liquitex says that can cloud the film. Spray in light passes.

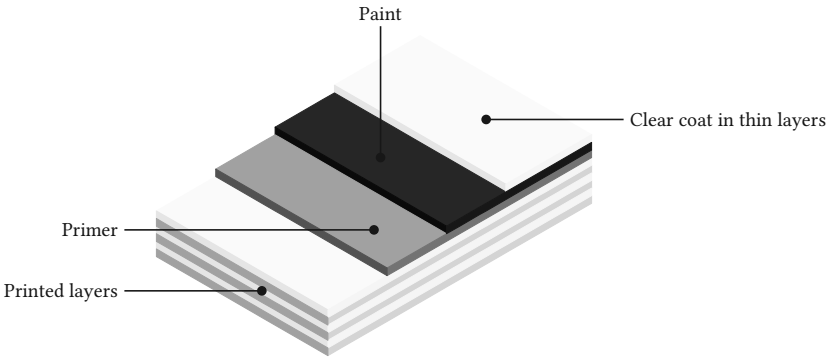


Figure 1. The clear coat is the top of the stack, over paint, primer and the printed layers, and each joint between them has to hold.

5. **Recoat on the maker's clock** from the table, or the can label where the table says not listed. Sand Polycrylic lightly with 220-grit paper between coats, as Minwax directs.
6. **Let it cure before use.** Minwax allows 24 hours before normal use; Golden says to let varnish cure several days before packing. Do not speed this up with a heat gun or a warm box on PLA (polylactic acid): the Prusa Knowledge Base says PLA gets soft and deforms above 60 °C (140 °F).

1.4 Matte, satin or gloss?

Pick by the look; every product line in the table comes in more than one sheen. Golden ties protection to the number of coats, since a thicker film gives more protection from ultraviolet light; neither Golden nor Liquitex says one sheen protects better. For a matte or satin finish, Golden builds the coats in gloss and finishes with one or two satin or matte coats at most, because a thick film of the low-sheen varnishes turns cloudy.

1.5 Why thin coats and the waiting times matter

A clear coat is the top of a stack: printed plastic, primer if you used one, paint, then clear. Each joint can fail on its own. ASTM D3359, the standard tape test for coating adhesion, notes that in a multicoat system adhesion can fail between coats rather than at the surface underneath.

Thickness is the other failure point. Golden says a thick coat takes longer to cure, stays soft for some time and can drip or dry cloudy. Minwax and Liquitex both ask for thin coats too.

1.6 How to check it on your own print

1. **After the ready-for-use time, press a fingernail into a hidden spot.** It should not feel tacky or leave a mark. If it does, give it longer.
2. **Run a tape check on the scrap print.** Cut a small cross through the coats, press tape over it and pull it off. ASTM D3359 rates adhesion with this kind of tape-over-cuts test; it is written for coatings on metal, so on a print read it as pass or fail. Flakes on the tape show which joint let go.
3. **Look at the finish under a light at an angle.** Golden and Liquitex name two causes of haze: a coat that went on too thick, and brushing back over a coated area.
4. **For a part that lives outdoors, leave a few drops of water on the cured scrap, then wipe.** If the surface softens or changes, use a different clear. Minwax rates Polycrylic for interior use only; both Krylon sprays are rated for exterior use.
5. **If the clear wrinkled or lifted the paint,** try another clear on a fresh scrap, such as one with the other base: water instead of solvent, or the reverse.

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