



Apply an initial coat of thin CA using a folded shop towel.

Finishing with Cyanoacrylate

Don McIvor

Widely used as a handy adhesive, cyanoacrylate (CA) also has a place in woodturners' shops as a clear and durable finish. CA is a fast-setting, strong adhesive with industrial, household, and medical applications. It may be best known as Super Glue, the trade name of one of the more widely available products. CA is an acrylic resin that is applied to a surface as a monomer, a relatively small but highly reactive molecule. Exposed to moisture in the air, the monomers quickly combine to form a single complex polymer, binding together themselves and the surfaces with which they are in contact.

Applied to the exterior of a piece of wood, CA builds a surface film that is clear, hard, and waterproof. Multiple applications will develop a finish with great depth that can be manipulated to a uniform, high-gloss surface.

As with all finishes, there are trade-offs to consider. CA finish works best on a smooth surface. A few voids can be filled prior to finishing, but burl figure with many voids or an object that has been textured will be better served by a different finish. The resulting finish looks like—and is—wood encased in plastic; some folks just do not like the appearance. CA is expensive and its quick-setting behavior also makes it difficult to apply over large surfaces. These two factors limit its usefulness to smaller projects, and it has become particularly popular as a finish among pen makers. As with other film finishes, if the finish becomes worn or damaged, the aesthetic is lost and the finish is difficult to repair. Working with CA presents some unique hazards that warrant special handling (see also *AW*, Vol 26, no 4).

Achieving a good finish with CA is a little tricky, but with a practice the technique is easily mastered. As with a lot of turning tasks, there is more than one approach and each method has its defenders. The following steps will get you past the finish line with a winning project.

Applying CA finish

1. Turn the project to completion and prepare for the finish by sanding the object. Small turned objects invite close scrutiny, so it is important to take care of the details in turning and sanding. The CA's high-gloss finish will highlight poor tool work and sanding scratches. I like to sand first with the lathe running (500 rpm) and sand with the grain with the lathe stopped before proceeding to the next grit. Because the CA film will build to become the tactile surface, it is not necessary to sand the wood to a glass-smooth finish; working through 400 or 600 grit is sufficient. Remove sanding dust with a clean shop towel.
2. Next, cover the turning with a coat of thin CA glue. I do this with the lathe running (about 500 rpm). I fold a small piece of shop towel until it is about 1" (25mm) wide and about four layers thick and hold one end of this applicator under and contacting the rotating work. I then apply a few drops of thin CA to the top of the piece, quickly moving the applicator along the work to help spread the CA (*Opposite page*). This needs to be done smoothly and in a matter of a few seconds, removing the applicator before the CA starts to cure and grab the material. I aim for a uniformly "wet" surface and avoid the temptation to overwork the finish (*Photo 1*). If the CA is not flowing smoothly, it is better to correct the problem with a subsequent application rather than scrambling for perfection as the CA is flash-curing.

Applying an aerosol accelerator is optional at this point; the thin CA cures quickly. An accelerator speeds curing to the point where the process is almost instantaneous, a feature that becomes more useful in the next step.

3. I have used multiple applications of thin CA to finish a turning and it will work. But there are advantages to switching to a thicker, slower-curing CA formulation for subsequent applications. Insta-Bond CA Pen Finish and Stick Fast CA Wood Finish are two examples.

I abandon the shop towel in favor of a plastic bag or heavy-duty plastic wrap to cover my finger as an applicator. With the lathe running (500 rpm), I hold the applicator to the bottom of the blank and apply a narrow bead of the thicker CA to the rotating piece (*Photo 2*). I spread the finish over the turning, aiming again for a uniform distribution. The application includes traversing the work piece once or twice to spread an even coat. Again, overworking the surface will encourage streaks in the hardened surface. It is easier to control the quality of the surface by applying several thin coats (of the thicker viscosity CA) than trying to pile on fewer thick applications.

The finish will cure instantly with a shot of accelerator (*Photo 3*). No need to coat all surfaces of the turning with accelerator, as the process initiated by the aerosol in one area of the turning creates a chemical chain reaction that quickly affects the entire finish surface.

The temptation to sand out imperfections after each coat is strong, but sanding between coats creates more problems than it solves.

4. I repeat Step 3 until I have applied three to five coats.
5. Once the last coat of CA has cured, I return to sanding. The objective is to *finish the finish*. Sanding too aggressively can cut through to raw wood, which could require removing all of the finish and starting over. I start sanding with 320-grit abrasive, then move through 400 and 600 grit. The goal with this initial sanding sequence is to remove any unevenness in the surface, including spirals and ridges (*Photo 4*).

Plastic readily clogs abrasive sheets. Those little plastic nibs ball up in the abrasive surface and create drag, which encourages them to melt and create streaks in the finish. Again, a light touch pays off, along with frequent inspection and possibly cleaning or changing the abrasive. A better solution is Abranet

Sanding Screen, which has abrasives incorporated into an open-weave material. It is easy to clean, resists loading, and works beautifully for this application, as well as for sanding green wood.

6. After the 600-grit sanding, I switch to MicroMesh Polishing Sheets. These sheets (more like stamps!) are sold in a set of nine color-coded pads corresponding to grits from 1,500 through 12,000. I like to use a few drops of thinned tung oil as a lubricant to reduce loading and heat build-up (*Photo 5*), wiping off each sheet and the turning before proceeding to the next grit. Although nine sheets seem daunting, each is applied for only a few seconds; the process proceeds quickly.
7. I inspect the turning carefully after sanding. It should now look like it is encased under glass (*Photo 6*). If I find any scratches or uneven spots, I will re-sand. This is a rare occurrence, but experience informs judgment on how far back in the sanding chain to go.
8. There are a couple of ways to proceed at this point. I like to move to my buffing wheels, using Tripoli, white diamond, and finally carnauba wax to complete the finish. Another option is a final application on the lathe of a plastic polishing ▶



1 The objective is to apply the CA quickly in a single traverse. CA adheres poorly to metal, so a little contact with the bushings is not a problem.



2 Subsequent applications are with CA that is slower-curing, and a thicker consistency than the first coat, using a plastic-bag-covered finger as an applicator.



3 A blast of aerosol accelerator readies the turning for the next coat of CA. Use plenty of ventilation.

compound. A drop or two of liquid plastic polish is applied to a cloth and then to the spinning blank before a final buffing with another clean cloth.

Variations on a theme

Some turners like to initiate the CA finishing process with a coat of



4 Finish the finish with Abranet. The high spots show up as opaque streaks. Aim for a uniformly opaque surface, which is then polished with increasingly finer abrasives.



5 Sand with a MicroMesh Polishing Sheet and a few drops of oil for lubrication.



6 The red eucalyptus burl razor is well suited to a CA finish, as it will easily resist frequent exposure to soap and water.

cellulose or acrylic sanding sealer. This is quick and easy, but I have not discerned any great benefit by adding this step. Another practice is adding boiled linseed oil (BLO) to the sequence. Turners who use this approach add a light coat of BLO to the turned piece to enhance grain before proceeding with the CA. Another variation includes applying the CA in combination with BLO, dampening the shop towel with a few drops of BLO, followed by a few drops of CA, and then holding the applicator against the rotating piece. I am leery of this approach as I am not sure if combining oil with the CA compromises the long-term integrity of the finish. I invite you to experiment and reach your own conclusion.

Tropical hardwoods can be finished with CA, but their natural oil content presents challenges. I have had a CA finish fail spectacularly when combined with BLO and applied to teak; the overabundance of oil prevented the CA from adhering to the wood. Now my approach to tropical hardwoods is to wipe the surface of the wood with a solvent such as mineral spirits or limonene to remove excess oil and then follow-up with CA. The wood can look a bit bleached after the solvent, but the thin CA restores its character.

Handling considerations

CA emits noxious fumes as it cures. These fumes are a vaporized form of the CA monomer and irritate eyes, nose, and throat. Minimize exposure by working in a well-ventilated area, wearing eye protection, and possibly an organic vapor respirator if adequate air flow is not available. A small percentage of the population develops sensitivity to exposure, leading to flu-like symptoms or skin irritation. On even rarer occasions, fumes can trigger asthma.

The chemical reaction that allows CA to cure rapidly is exothermic—it

gives off heat. When CA contacts natural materials such as cotton or wool, the reaction can generate enough heat to cause a burn and even ignite fabric. Shop towels used to apply CA also get surprisingly hot. Wearing disposable synthetic gloves when handling CA is a sensible precaution. For eye protection, wear goggles or safety glasses.

Among the list of surfaces CA readily bonds is skin. Because CA has lower surface tension than water, it also has a habit of spreading rapidly and undetectably, until suddenly fingers are fused or stuck to the lathe. Acetone can soften cured CA and commercial debonders are available.

With its capacity for rapidly bonding with free moisture, CA has a relatively short shelf life, which can be extended by keeping unopened containers in the refrigerator. Although manufacturers do not recommend the practice, I have found that refrigeration works on opened containers, as long as I make the effort to tightly cap the container. As CA ages, it begins to thicken and cure more slowly. CA can be thinned from another container of the same original viscosity, but be sure to stick with the same brand as manufacturers have different and sometimes incompatible formulations.

There are two indisputable maxims when working with CA. Never glue yourself to anything heavier than you can lift, and always work with a can of debonder within reach! ■

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