

~~All About Glue~~

Well, OK. How about...

"A Quick Guide to Woodshop Glue"

Have you ever wondered if the glue you're using is really the best choice for the job? Will your cabinet, turning, carving or maybe a piece of furniture last as long as it should? Will the joints hold up to the trauma of moving from house to house?

We've all had that fleeting thought, right in the middle of squeezing a bottle, that maybe there's a brand new - or even a very old - option that might work better than the glue we're using. There are several basic glues that are suitable for most woodworking, and a few specialty ones for exceptional circumstances. Among the most familiar are [hide glue](#) and [white glue](#), (polyvinyl acetate); stock [yellow glue](#) (aliphatic resin); and the very popular [water resistant yellow glue](#). For projects which will be exposed to the weather, there's the relatively new family of [polyurethane glues](#), and the ever-popular [epoxies](#) which are most familiar to boat builders. Carvers have a soft spot for [instant \(cyanoacrylate\) glue](#), which is invaluable for small repairs. There are [contact cements](#) for plastic laminates and some veneers, and that handyman's perennial favorite, [hot melt glue](#) which is dispensed from a gun. There are also a few dedicated use adhesives like rubber cement and 3M's Super 77 spray adhesive which are quite useful in the woodshop, but we don't really have space to cover all the options here.

If you're one of those people who likes to read the last chapter of a mystery first, there's a [summary](#) of which glue to use when at the bottom of this page.

Hide Glue

There are two ways to serve up hide glue - hot and cold. These are traditional adhesives which have lost a lot of ground to newer, simpler options. Some professional woodworkers still swear by them, however, especially those in the restoration business. Hot hide glue has an unlimited open time (the amount of time you have to move and rearrange the parts), when heat is applied. Cold (also known as liquid) hide glue has a relatively short open time - about half an hour - but the bond is reversible when one applies water and heat.

Hide glues are made from a cow (and sometimes horse) by-product called collagen, which includes the hide, some bone and other tissues. It dates back to the Egyptians and restoration experts like it for several reasons. One doesn't have to clean all the old hide glue out of a joint before adding more during a repair. And by injecting a little warm water into a joint, it can become quite receptive to new glue.



Photo courtesy of Spurlock Specialty Tools

One major disadvantage of hide glue over the years is that it can dry out in times of low humidity, and become brittle. It also turns into crystals if it comes in contact with alcohol, so leave your beer in the kitchen. Seriously, the biggest problem with alcohol is paint stripper: if you use a stripper, or have some furniture dipped in a stripper tank, odds are you'll have to re-glue the piece.

Hyde glue is, however, an excellent choice for "hammer veneering" - a process that uses the glue's open time to full advantage. And it can become somewhat waterproof if one adds a small amount of aluminum sulfate to the glue. It can even be made to flex, as in a canvas-backed tambour desk door, by adding glycerin.

Hide glues come in various gram strengths - usually 135 to 250g. The higher the number, the more viscous (essentially, thick) the glue is. The glue needs to be mixed with water and heated to around 150 degrees to be usable. You can buy it premixed with chemicals in it that deliver a longer open time and shelf life.

Hide glue accepts stain and wood dyes, which really helps when you're finishing a project.

While hide glue is not overly complicated, there definitely is a learning curve. For more information, visit some furniture restoration sites and seek out experts who have a lot of experience. Most catalog and retail sources know very little about the options, strengths and uses. A couple of the best sources are [Bjorn Industries](http://www.bjorn.net) (<http://www.bjorn.net>), and [Spurlock Specialty Tools](http://www.spurlocktools.com/id57.htm) (<http://www.spurlocktools.com/id57.htm>).

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White Glue

For decades, this has been a great option for hobbyists. Polyvinyl acetate, or PVA glue gives you a few more minutes of open time than (aliphatic resin) yellow glues, and a short (about one hour) clamping time, which makes it very easy to use. It cleans up with a damp rag, dries clear (although it doesn't like stain), and lasts for years on the shelf as long as the bottle is sealed. It is still one of the most viable options and creates a very good bond. It isn't waterproof, doesn't like to be frozen (it's water-based), won't fill gaps (unless you add sawdust) and is nontoxic once it cures. One word of caution: white glue doesn't always sand well because the sandpaper creates heat which makes the glue soft.

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Yellow Glue

Yellow aliphatic resin glue sets up a bit quicker than white glue - you don't have quite as long to get everything just right - but it also has a shorter clamping time. This is a little more expensive than basic white glue (but it's still very reasonable), and it's also a little more moisture resistant. It forms an excellent bond and is ideal for most woodworking, turning and carving assemblies. Yellow glue cleans up with water and is a hair thicker too, so it can sometimes fill small gaps. A harder resin combats the sanding problem, but yellow glue is a little more sticky than white glue during assembly: parts are a bit harder to reposition. It also retains a little elasticity, so it may not be the best choice when gluing up laminations that will remain under stress, such as arches and curves.

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Water Resistant Yellow Glue (Crosslinked PVAs)



As a cabinetmaker and furniture builder, this has been the favorite in my shop since it came on the market. It's a hair more expensive than white and yellow glues, but knowing that it won't fail in a moist environment is a comforting thought. A lot of my cabinetry has ended up in basements in the Midwest where the summers are quite humid and there are frequent basement-flooding downpours. The downside to this glue is that the open time is a bit restrictive, which can be an issue when assembling large finger-jointed or dovetailed drawers. It is visible when it dries, so you can scrape or sand the excess before applying stain. And some manufacturers offer a brown version which shows up more and matches some hardwoods (notably walnut).

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Polyurethane Glue

I built a Spanish cedar picnic table several years ago when Gorilla Glue first became available to woodworkers. It had several bent laminations, which are some of the toughest glue joints around because the wood has a memory and always wants to straighten out. The table has endured through years of Wisconsin and Wyoming weather - lots of snow, ice, rain, sun and wind - and there are no signs of glue failure whatsoever. The trick with polyurethane glues is to dampen the two surfaces, and then make sure your clamps are tight. During the first few minutes after it has been applied, it expands and foams up if it's not under pressure. Wash off the excess while it's still liquid if you can: it's a pain to scrape after it dries. The glue also stains skin, so gloves are in order.

The folks at Gorilla Glue describe their product as "an incredibly versatile, 100-percent waterproof adhesive that can bond wood, stone, metal, ceramics, solid surface material, foam board and more. A little Gorilla Glue goes a long way - it takes just one ounce of Gorilla Glue to cover one square foot, providing three to four times the coverage of other glue."



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Epoxy

If you need to make a waterproof bond in a few minutes which will last for a long, long time, epoxy is the answer. Two-part packages like the one shown at left let you squeeze out equal parts of resin and hardener: mix them together and apply. Epoxy doesn't shrink, is exceptional in applications which involve laminations, and can be submersed in water - which is why boat builders love it. If you have a large area to cover, the squeeze tubes can get quite expensive. You might want to [visit the Gougeon site](http://www.westsystem.com) (<http://www.westsystem.com>) and learn about West Systems.



Note that your hardware store will have several options when it comes to squeezeable epoxies. The biggest differences between them are their set time and their application - some bond metal or plastic, while others work best with wood, glass or other materials. There are epoxies specifically designed for oily wood like teak and rosewood, but squeeze-out can be a problem. Once hardened, epoxy is almost impossible to remove cleanly. But you can add a little sawdust while it's still soft, to help disguise it. You can even add stain to many epoxies while mixing them: try it somewhere unimportant rather than experimenting on an actual project. Don't clamp too hard with epoxy: it needs a sizeable gap to work. And work in a vented space with gloves on: most epoxies are toxic until they cure.

Some manufacturers offer additives that can slow or speed the cure time, or help control the amount of sag. Others suggest playing with the hardener to resin ratios, to achieve a harder glue or a more flexible final result.

The open time varies, too. While most epoxies set in minutes or even seconds, some give you as much as an hour or more to assemble parts. You may have to do that most unmanly thing and ... read the labels.

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Instant Glue

The name of the original brand has come to describe the entire industry. Most people know all instant or cyanoacrylate glues as... "Super Glue". This is a wonderful quick fix for small parts, like when the tip of that last leaf on the fleur-de-lis you're carving splits along the grain and falls off. Instant glue is a great crack filler, too, as turners can tell you: it fills the void and helps stop a crack from growing. It also loves to stick to skin! The biggest advantage is that it sets up in a few seconds and you can go back to work on the part after a quick coffee break. Instant glue makes a waterproof bond.

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Contact Cement

There is nothing on the shelf that works better than contact cement for applying plastic laminates like Formica (TM). An equal coating is applied to the bottom of the laminate and the top of the substrate, using a brush, a roller, or even an old credit card. When the cement dries, you place a number of dowel rods or sticks on the substrate (to keep the laminate and substrate apart), and line up the laminate. As soon as the two parts meet, they are stuck for life. There's no adjustment, or forgiveness. Pull out the sticks one by one and roll the two parts together. Original formulations of contact cement emit a lot of fumes and are flammable. The newer water-based varieties are much safer to work with and, while some cabinet shop owners complain that the bond isn't quite as good, our shop experience has been very, very positive. We've never had the water-based variety fail and we've been using it since it came on the market. Contact cement doesn't give and stretch like some adhesives, so it's not always the best choice for veneering. A modified urea-formaldehyde which doesn't have a water base or water additive is perhaps the best solution here.

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Hot Melt Glue

Designed to be a quick-setting, temporary adhesive, hot melt glue is a wonderful shop aid. It can be used to hold parts in place while other, longer-lasting adhesives set up. It is unsurpassable as a temporary fix for one-time-use jigs and templates. The very quick (approximately 15-seconds) set time lets you keep on working, but this is not a permanent adhesive. When exposed to heat, it will fail. The residue can be removed with mineral spirits.

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Summary: Which glue to use...

Hide Glue	Restoration projects, veneering, jobs that require a long open time.
White Glue	Most standard casework, furniture, dovetail and finger joints that need more open time.
Yellow Glue	Same as white glue, with a shorter open time and clamping time.
Water Resistant Yellow Glue	Any wood project that will see occasional humidity (on a covered porch, in a basement etc.)
Polyurethane Glue	Outdoor furniture.
Epoxy	Boats and items that are sometimes submersed. Plus five-minute fixes that will last.

<u>Instant Glue</u>	Small repairs, as in carving details that split with the grain by mistake.
<u>Contact Cement</u>	Applying plastic laminate. Some veneering jobs.
<u>Hot melt Glue</u>	A great extra pair of hands to hold things together while other glue dries.