



# WOOD GLUE GUIDE

This article is to follow up on Clif Munro's Techie Tip on "Glueing Up" (Scuttlebutt November 2020 Vol.1 Issue 11) to help understand different types of glues used in woodworking. An old article found on the internet has been used in writing the report, its source could not be ascertained.

All glues have a finite shelf life. Once it's open, it's only good for about a year. If you notice that the glue starts to smell sour and becomes extremely thick or stringy, it's past its prime and shouldn't be used.

## White Glues And Yellow Glues

The most common furniture making glues are polyvinyl acetate (PVA) adhesives, commonly called white and yellow glues. While white glue (such as Aquadhere) is a good glue that can be used on most porous materials, yellow glue (such as Titebond Red) has been specifically formulated for interior woodworking applications. Yellow glue is usually referred to as aliphatic resin glue.

Neither of these glues work well if a water-resistant bond is required. For that purposes there are water-resistant formulations of yellow glue (such as Titebond Green). These are known as cross-linking PVAs, and they cure through chemical reaction, instead of evaporation.

For general woodworking use, this glue is interchangeable with normal yellow glue except that it can't be cleaned up with water after it cures.

While each white or yellow glue can be used in the workshop, aliphatic resin glue (Titebond Red) is the best choice for the beginner. It's easy to use, requires no mixing, is non-toxic and cleans up with water. It also sands cleanly, without over clogging the sandpaper, and leaves an invisible glue line if the joint is tight (but does leave a yellow stain where the glue is visible). White glue, on the other hand, dries clear.

## Hide Glue

Hide glue is made from animal products and it's extremely useful for projects, like musical instruments, that often require disassembly to make repairs. They are the earliest glues and are still used today.

This glue cures slowly, so it can be a good option for difficult joints or constructions that take a long time to assemble, but it releases its bond with heat and moisture (such as humidity). Whilst this makes it easy to separate pieces without damage, in many instances it defeats its own purpose with furniture as it is unable to withstand exposure to the elements.

## Epoxies

Two-part epoxies are probably the most durable of all adhesives and for situations where extreme water resistance is required, epoxy is the best choice. It is however pretty difficult and messy to use. It sometimes comes in a syringe type dispensed which allows for relatively equal dispensing of the epoxy and the hardener (the 2 components), but sometimes it comes in tubes and measuring the portions can be difficult. It also comes in different setting times, the longer the setting the more secure the adhesion (so 5 minute epoxy is not as secure as 30 minute epoxy).

Epoxy glues are quite toxic, so you need to don gloves and a respirator to protect yourself from chemical exposure making epoxies a bad choice for everyday work. They should be only used in well ventilated locations.

## Polyurethane

Polyurethane glue is supposed to be well suited to just about any gluing job. This glue performs unlike any other. It actually cures by being exposed to moisture, so it's a good choice when moisture resistance is an issue. You even have to dampen wood surfaces before applying this glue. This product changes into a foam like substance as it cures and in the process expands out of the joint. This can make sanding away the glue more difficult.

Because it's such a new glue, it has no long-term successful track record that other glues enjoy, so it how long the adhesion will last is uncertain.

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## **Gluing Techniques**

In preparing a glue joint, it's important to keep a couple of ground rules in mind:

1. while modern glues are amazingly strong, if joints do not fit properly or the glue is not allowed to cure correctly, the bond will almost surely fail.
2. second, less is more. A thin, even layer of glue will form a strong bond between two pieces of wood, but a thick cushion of glue does just the opposite. It weakens the joint. And, usually you won't know if this joint is weak until the piece is done and has been used for a while.

To achieve a successful edge joint, the long mating surfaces must be perfectly tight all along their length. You shouldn't rely on clamps to pull bowed boards together because this places too much stress on the joint and eventually it will fail.

The fit of a mortise-and-tenon joint should also be precise, neither too tight nor too loose. If the parts must be forced together, there will be no room for the glue between the pieces and the joint will be starved. I

f, on the other hand, there is too much play in the joint, the glue layer will be too thick to perform properly when the piece is placed under stress. In a perfect joint, the glue layer is less than the thickness of a sheet of notebook paper.

In order to guarantee that there is sufficient glue in a joint, spread a thin layer on both mating surfaces.

In a mortise-and-tenon joint, this means coating both the mortise and tenon walls with glue. You can use a scrap stick, a small brush or a narrow roller to do this. Just make sure the coverage is complete and even.

In woodworking it is often said that cleanliness is next to godliness, the mating surfaces must also be clean, dry and free of contamination before you spread the glue. Oil, waxes and some chemicals, like silicone, will resist the glue.

Dust and water can cause the joint to fail by preventing good contact between wood surfaces, or diluting the strength of the glue.

All glues have a recommended open time, which defines the amount of time you can safely leave the glue exposed to the air before assembling the joint. For most yellow glues, this is about 10 minutes. But the open time will vary with the temperature and humidity of your workroom.

Hot, dry conditions will cause the glue to set quicker. In complicated assemblies, where many joints must be prepared at once, it's important to factor the open time limit into the process.

Sometimes, you'll have to assemble a project by making smaller subassemblies first.

Also, keep in mind that yellow glue will not perform well in cold conditions. Most manufacturers recommend that both the room and the wood surfaces be at least 13C degrees before applying glue.

Once a joint is assembled, it must be clamped together. Clamps serve two purposes. They pull a joint together tightly and hold it in a fixed position while the glue sets.

You should not apply tremendous force with your clamps because this will drive too much glue from the joint. Just firmly tighten them and set the assembly aside.

If a proper amount of glue has been spread and a proper amount of force used to tighten the clamps, you should see small beads of glue squeezing out of both sides of the joint.

To remove this squeeze-out, allow it to set for about 20 minutes, and then use an old chisel or putty knife to scrape off the excess.

Some people recommend wiping the excess glue off with a damp rag, but this technique should be avoided because it can force glue into the surrounding wood pores—especially with open-grain woods.

Unfortunately, this glue will not be apparent until you apply the finish, when it's too late to do anything easily to fix it.

Finally, all glues must be allowed sufficient time to set and dry before you remove the clamps. Yellow glue should be allowed to set for at least an hour.

A full cure with most glues takes at least 24 hours; so don't disturb the assembly until his time has passed, and in any event make sure that no stress is applied to the joint before a full cure is achieved