

This is a summary of glue strength tests. Tests were done with 2.5 inch pieces of soft maple. These pieces were all 0.25 inches thick by 0.75 inches wide and were glued together end grain to end grain. Light to moderate pressure was applied with a clamp on a flat surface. After 24 hours or more the glued pieces were suspended between two supports, with 4.5 inches of wood over the gap. A pail with a bail was hung over the glue joint and weight was added until the joint failed. Then a sensitive scale was used to measure how much weight was required to break the joint. Two glues were tested twice to check repeatability of the test.

This study was done in partial fulfillment of the requirements for the Ph.G. (Doctorate in Glueology) at WhatsamattaU.

<u>GLUE</u>	<u>POUNDS</u>
Titebond 3	23.5
Titebond 3 plus sanding dust (1:1)	23.5
Satellite City original CA	23.1
Z-Poxy (5 minute)	22.75
System 3 Epoxy	21.8
Gorilla glue polyurethane	21.75
System 3 Epoxy + silica filler	21.5
Titebond 2	21.5
Elmer's White glue	20.25
Titebond original	19.7
Old Brown hide glue (liquid)	17.75
Mohawk hide glue (from granules)	15.25
Gorilla White glue	14.2 and 13.7
G-5 (5 minute) epoxy	9.75 and 9.5
System 3 Epoxy with phenolic microballoons	8.3
Hot melt glue (low-temp)	8.25
Satellite City Gap CA	failed immediately

I was surprised by some of these results. Titebond 3 was stronger than epoxy and so was Satellite City CA and Z-Poxy. I have always heard that 5 minute epoxies are weaker than slow setting epoxies. Gorilla poly U glue was as strong as epoxy. Why all the complaints about Gorilla glue? You should complain about the sloppiness of people who apply it badly. I use gorilla glue and if I can see a bit of it in the glue line, a wipe with asphaltum varnish in naphtha colors it nicely. I was also surprised at how strong Elmer's white glue is. Elmer's is also very flexible if the wood moves a lot. When I was young and foolish I cut 3 inch squares of air dried hickory (3/4 inch thick) and glued them up with alternating grain patterns to make a small table top. They shrunk 1/8 inch across the grain, but did not break the glue bond - and that was end grain to long grain. The next thing I want to test is some of the glues mixed with soft maple dust. I use that if the wood surface I am gluing is a bit rough. The silica filler I use is West System 406 Colloidal Silica. This stuff, mixed with System 3 epoxy can do some really cool repairs. It gets very hard. I replaced a piece of the red plastic on my Swiss army knife and it has held for years.

If you want a substitute for a weld on metal, you can wrap the metal with stranded copper wire and cover it with the Silica-epoxy and it is very strong.

I originally set this test up thinking that end grain gluing would be a direct test of glue strength, without the interference of wood strength. However, that is not the case. When I looked at the broken surface with a jeweler's loupe, the surface looked like blades of grass. The glue had penetrated the surface and adhered to the sides of the long fibers. When the glue line failed, the long fibers were pulled out. My guess is that this test is a test of glue penetration, as well as glue strength.

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