LEARN-IT: Adhesives

Which adhesive should I use?

### Reactive adhesives

Bond through a chemical reaction – often used structurally:

- **Epoxy**
  - Two-part curing
  - Strongest: structural adhesive (for wood and acrylic + high temperature)
  - High temperature resistance (for metal and acrylic)
  - Adhesive/adhesive bond (heat and force)
  - Can be used for dissimilar materials
  - Cures with water on the piece or humidity in the air
  - High viscosity bond
  - Can be used for all substrates
  - Needs high strength between the two pieces

- **Acrylic**
  - Two-part curing
  - High-strength bonding without the surface preparation, in acetone or heat
  - Bonds to a wide variety of materials
  - Can be used for hard and soft plastics
  - Cures with water on the piece or humidity in the air

- **Silicone**
  - Two-part curing
  - High-strength bonding without the surface preparation, in acetone or heat
  - Bonds to a wide variety of materials
  - Can be used for hard and soft plastics
  - Cures with water on the piece or humidity in the air

- **Urethane**
  - Two-part curing
  - High-strength adhesive that can be mixed or pre-made
  - Cures with water on the piece or humidity in the air

- **Cyanosilane** (Super glue)
  - Used on wood, metal, and concrete
  - Cures with water on the piece or humidity in the air

- **Polyurethane**
  - Cures with water on the piece or humidity in the air

### Non-reactive adhesives

Bond through a physical change – often used non-structurally:

- **PVA**
  - Polylactic acid (wood glue and white glue)
  - Cures by the evaporation of its solvent
  - Used on porous materials
  - Wood, paper, cloth, or paper
  - Cures in 6–30 hours

- **Construction adhesive**
  - Cures by the evaporation of its solvent
  - Requires heat and moisture to cure
  - Used on most materials, especially porous surfaces

- **Hot glue**
  - Cures by the evaporation of its solvent
  - Used on most materials, especially porous surfaces
  - Needs 15-30 minutes to cure
  - Needs a clamp

Main types of reactive adhesives

- **Epoxy**
  - Base hardener + catalyst
  - Act as its own adhesive

- **Acrylic**
  - Base + catalyst
  - Needs 2-5 mg of catalyst per kilogram

- **Silicone**
  - Thermoset adhesive
  - Needs 60 sec of catalyst per kilogram

- **Urethane**
  - Two-part adhesive
  - Needs a trigger to start

- **Cyanosilane** (Super glue)
  - Neat mixture of natural or synthetic rubber dispersed in a solvent or water
  - No need for catalysts

Main types of non-reactive adhesives

- **PVA**
  - Polylactic acid (wood glue and white glue)

- **Construction adhesive**
  - Cures by the evaporation of its solvent

- **Hot glue**
  - Cures by the evaporation of its solvent

Pro Tips

- **Check the label before you do anything**
  - To make sure it works on your materials in your environment – each adhesive has different variances.

- **Do you need to use an adhesive?**
  - Would a mechanical fastener like a nail or bolt work better?

- **Work quickly.**
  - Have all your pieces ready to be adhered before you open the adhesive package/bottle.

- **Clean all surfaces**
  - Before you adhere them to ensure the strongest bond.

- **Sand metal**
  - And then wipe them clean! Microscopic rust will weaken the bond.

- **Use in well-ventilated area.**
  - Don’t inhale adhesive fumes.

- **Does your adhesive need to be clamped?**
  - The industry evaluates adhesives based on two things: show strength and peel strength.

---

Learn more about the following topics: [D-Lab](https://www.dlab.com) Adhesives [Creative Commons License](http://creativecommons.org/licenses/by/4.0)