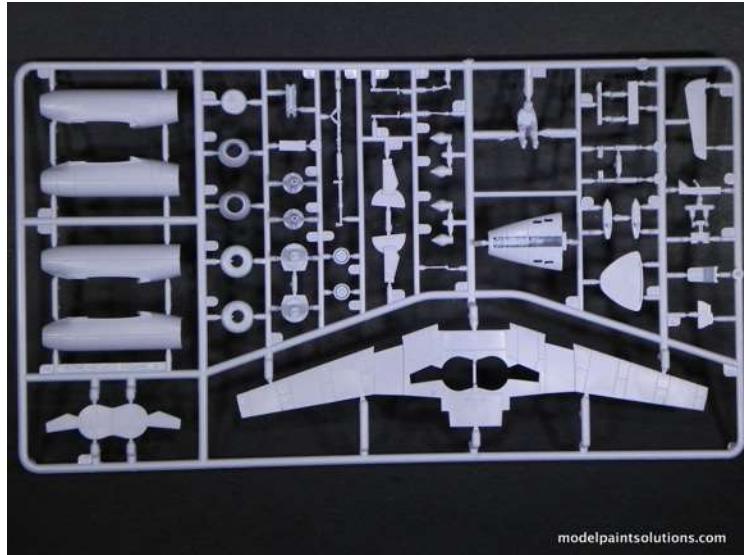


Model Design & Building Merit Badge

Adhesives & Fasteners

## Why Adhesives & Fasteners?



### Why?:

- Most models consist of individual components
- The components require some sort of adhesive to keep together
- Keeps the pieces together as the model is assembled

### Result:

- The correct adhesive (or fastener) will allow you to handle the model without it coming apart
- Can take painting or a decorative coating (like a decal) and not have gaps

## Polyvinyl Acetate (PVA)

- Better known as white glue or carpenters glue or school glue
- Common makers of white glue are Elmers, LePage and Tite Bond



### PVA Glue Uses:

- Good for porous surfaces like paper, wood, cloth
- Will not bond to a non-porous surface such as metal, aluminum foil, plastic, or waxy surfaces (think milk cartons)
- Dissolves in water thus not good in wet environments

### PVA Glue Safety Steps:

- If comes in contact with skin, wash it off
- If comes in contact with eyes, flood the eye with water
- May produce an allergic reaction (rare)

## Cyanoacrylate (CA)

- Better known as super glue
- Comes in either a liquid (kinda runny) or a gel (think goopy)
- Common makers of cyanoacrylate glue are Loctite, Gorilla Glue & Duro



## Cyanoacrylate Glue Uses:

- Good for non-porous surfaces such as metal, glass or ceramics (like dinner plates)
- Can be a range of thicknesses to help with assembly of parts but will not cure in a gap
- Parts need to fit tightly together for this glue to work

## Cyanoacrylate Glue Safety Steps:

- Use in ventilated area
- Do not ingest, saliva will cause the glue to set closing up your throat
- If it gets on your skin, soak in warm water then gently peel off
- Do not let come in contact with eye, may cause eyelid to bond to the eye

## Hot Melt Glue

- Lots of makers of hot melt glue
- Many different types of hot melt glue – non-sticky (like plastic surface) or sticky (like adhesive tape)
- The glue is heated to apply to surface and sets when cools down
- Can be thick or runny when heated



### Hot Melt Glue Uses:

- Can be used for both porous and non-porous surfaces
- Can be used for temporary applications (to hold something in place)
- Can be used for permanent applications (to bond something together forever)

### Hot Melt Glue Safety Steps:

- Use only with parent or teacher supervision
- Use in ventilated area
- Wear protection to prevent heated glue from getting on skin – will cause a burn
- Do not touch the nozzle, it will burn
- Set glue gun on heat resistant surface when not using or when task is finished

## Glue sticks

- Similar to hot melt type glues but contains a chemical which keeps it soft until dried
- Once dried will not stick to anything
- Common makers of glue sticks are 3M, Elmers and Uhu

### Glue stick Uses:

- Best used in craft applications like when bonding pictures to paper or when bonding craft paper together
- Not a strong glue, can come apart easily
- Not easy to remove from a surface

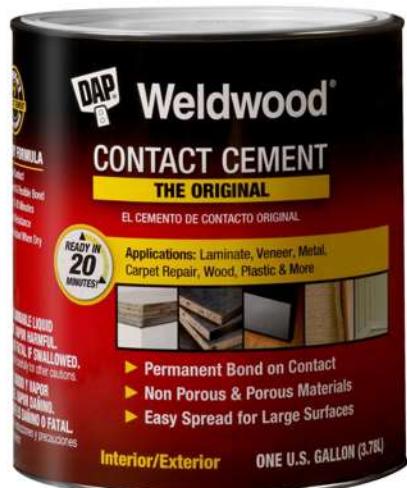


### Contact Adhesive Safety Steps:

- Do not use on skin, hair or your clothes
- Do not put glue stick glue in your mouth
- Do not wipe glue stick on furniture
- Do not wipe glue stick on the floor

## Contact Adhesives

- Also known as contact cement
- Dries by evaporation of a flammable solvent
- Can be brushed on or sprayed on
- For a period of time after it is dry, it will stick to itself – if wait too long will not stick to itself
- Common makers of contact adhesives are 3M, Dap and Bostick



### Contact Adhesive Uses:

- Best used for non-porous surfaces
- Used for permanent applications (to bond something together forever) like Formica countertops
- Use where surfaces fit tightly together
- If want to use on wood, prime the wood surface first

### Contact Adhesive Safety Steps:

- Use in ventilated area – do not breathe in the vapors
- Wear goggles and gloves
- Keep away from heat and flame
- Do not get on skin, in eyes or on clothing

## Epoxy Adhesives

- Epoxy is generally a 2-part and sets when the two parts are mixed together
- Wide variety of thicknesses: can be runny like water or thick like molasses
- Common makers of epoxy are 3M, JB Weld, Gorilla glue and Devcon



## Epoxy Adhesive Uses:

- Best used for porous and non-porous surfaces
- Used for permanent applications
- Has a very strong bond
- Thicker versions are good gap filling glues
- Ceramic and glass surfaces need priming before applying epoxy

## Epoxy Adhesive Safety Steps:

- Use in ventilated area – do not breathe in the vapors
- Wear goggles and gloves
- Keep away from heat and flame
- Do not get on skin, in eyes or on clothing
- Do not ingest
- Be careful where you place the mixing stick
- Mix in a disposable container

## Plastic Model Adhesive

- Commonly called plastic model cement or tube glue
- Consists of a resin dissolved in a solvent like toluene
- Can be thick like a gel or runny like water
- When the solvent evaporates it leaves a thin membrane which sticks to and holds both surfaces together
- Common makers are Testors, Tamiya, Bob Smith, and Roket



## Plastic Model Adhesive Uses:

- Best used for plastic models
- Can dissolve plastic – need to check label of the adhesive before using
- Speed of cure can vary – check label
- Most popular type of adhesive for styrene based plastic models
- May need clamps to hold pieces together while adhesive sets
- May cause clear parts to become cloudy or craze

## Plastic Model Adhesive Safety Steps:

- Use in ventilated area – do not breathe in the vapors
- Wear goggles and gloves
- Keep away from heat and flame
- Do not get on skin, in eyes or on clothing
- Do not ingest

## Other Methods to Hold Things Together



- Cellophane tape, also called sticky tape
- Masking tape



- duct tape, also called cloth tape

## Other Methods to Hold Things Together



- Nails



- bolts



- screws



- staples