

INFORMATION SHEET

STRUCTURAL CONNECTIONS



ADHESIVES

PERFORMANCE/DESIGN DATA

THERMOSETTING ADHESIVES

Thermosetting adhesives are cured by heat and will not break down when heated. They are the most common structural adhesive and include:

- formaldehyde-based adhesives
- epoxy resins
- casein adhesives.

Synthetic phenols include:

- phenol formaldehyde
- resorcinol formaldehyde
- copolymer-resorcinol phenol formaldehyde.

Natural phenols include:

- tannin formaldehyde
- copolymer-resorcinol tannin formaldehyde
- resorcinol tannin phenol formaldehyde.

Synthetic and natural phenols:

- can be exposed to the weather
- need to be protected from the sun (UV) and rain
- have poor quality gap-filling properties, so components must be clamped securely when being glued
- are used for the manufacture of glulam beams, plywood and durable finger jointing
- are dark in colour – usually a distinctive dark, glue line is visible.

Amnioplastic adhesives:

- include melamine formaldehyde, copolymer melamine urea formaldehyde, urea formaldehyde, extended urea formaldehyde are suitable for interior environments where the moisture content and temperature is reasonable
- have poor gap-filling properties so components require secure clamping during gluing
- tend to be used for non-structural applications such as panelling.

Epoxy resin:

- has excellent gap-filling properties, so surfaces do not necessarily need to be in direct contact with each other
- is typically used in interior environments such as for epoxy steel dowel joints has excellent strength properties, but under high temperatures, such as during a fire, will soften and lose strength.

Casein adhesives:

- have good gap-filling properties lose strength as the thickness of application increases
- are used for interior applications
- are durable when protected and fully ventilated
- are unsuitable for use in tropical environments.

THERMOPLASTIC ADHESIVES

Thermoplastic adhesives will soften when heated and creep under long-term loads. They can break down when subjected to moisture.

Polyvinyl acetate (PVA):

- includes normal PVA and highly cross-linked PVA (highly cross-linked PVA is more durable than normal PVA)
- has high strength but low resistance to creep, elevated temperatures and moisture
- is used for furniture manufacture.

Elastomer based adhesives:

- include elastomeric construction adhesives, contact adhesives and rubber latex
- are prone to perishing and creep so require the used of mechanical fasteners
- are used for fixing flooring to floor joists to eliminate floor squeak
- have good gap-filling qualities.

Contact adhesives:

- have low strength
- are used for bonding formica to wood surfaces.

Rubber latex:

- is an excellent gap filler
- is used for bonding floor coverings.
- Polyvinyl chloride (PVC):
- is used for bonding PVC sheets to plywood or particleboard.

Animal glue:

- is now rarely used, but was common in furniture manufacture.

Isocyanate (polyurethane):

- has excellent adhesion and good water-resistance properties
- expands while setting, so will fill minor gaps
- the expanded glue contains air bubbles, so will not fill gaps as thoroughly as glues such as epoxy resins.

Hot melts:

- are solvent free
- are rapid at bonding but have low bond strength.