



EPI adhesives (**Emulsion Polymer Isocyanate**) are a type of high-performance adhesive commonly used in the woodworking industry and other applications that require strong, durable bonds with good resistance to various environmental factors.

Key Characteristics:

- **Two-component system:** EPI adhesives are typically a two-part system. They consist of a water-based emulsion (the base) and an isocyanate hardener (the crosslinker). These two components are mixed shortly before use.
- **Composition:** The emulsion can be based on different polymers, often acrylic or vinyl acetate. The isocyanate compound acts as a crosslinking agent, reacting with the emulsion to form a highly durable bond.
- **Superior performance:** Compared to traditional PVAc (polyvinyl acetate) adhesives, EPI adhesives offer significant advantages, particularly in:
 - **Water and moisture resistance:** Excellent resistance to water, condensed water, and high humidity. Suitable for exterior applications, furniture in humid areas, windows, and doors. They often meet durability classifications such as D4 (EN 204/205) and C4 (EN 12765).
 - **Heat resistance:** EPI adhesives are known for their high strength, outstanding water resistance (including resistance to boiling water in some formulations), and good heat resistance.
 - **Strength:** They form very strong bonds, often exceeding the strength of the wood itself. They also show good creep resistance, meaning the bond is less likely to deform under prolonged load.
 - **Versatility:** Capable of bonding a wide range of woods—including softwoods, hardwoods, and even wood with higher moisture content or thermally treated wood, which can be challenging for other adhesives. Some formulations can also bond wood to other materials such as metal or plastics.
- **Curing Characteristics:**
 - EPI adhesives often cure at room temperature (“cold cure”).
 - They are fast-setting, contributing to increased productivity.
 - They can also be cured with heat or radio frequency (RF) to further accelerate curing.
 - The curing process involves both film formation of the emulsion and complex chemical reactions between the isocyanate and various functional groups present.
- **Environmental Considerations:** Many EPI adhesive formulations are water-based, solvent-free, and low in VOCs (volatile organic compounds). They are often designed to be formaldehyde-free, addressing environmental and health concerns.
- **Appearance:** The bond line produced by EPI adhesives is typically light-colored or transparent when dried.



Common Applications:

EPI adhesives are widely used in demanding woodworking applications, such as:

- Engineered wood products:
 - Glulam beams (glued laminated timber)
 - Solid wood panels
 - Parquet flooring (multi-layer)
 - Plywood
 - Structural wood components:
 - Glulam construction
 - Bonding of difficult woods (e.g., hardwoods)
 - Wood-to-metal bonding
- Windows and doors: Thanks to their excellent water and heat resistance.
- Furniture: Especially furniture intended for humid environments or outdoor use.
- Cabinet doors: Their fast setting time and high solids content can improve production efficiency.
- Continuous lamination lines: For bonding aluminum sheets to wood-based boards.

Summary:

EPI adhesives are a preferred choice for applications requiring strong, durable, and environmentally friendly bonds, especially in the woodworking industry where high resistance to moisture, heat, and mechanical stress is critical.