

PVA Type II and Type III Wood Glue: Technical Material Specification

1.0 Material Overview & Common Uses

Polyvinyl acetate (PVA) wood glue is a water-based emulsion adhesive widely used in woodworking and furniture manufacturing. Type II and Type III grades denote increasing water resistance per ASTM D-4236 and ANSI/HPVA HP-1 standards. Type II is suitable for interior applications with occasional moisture exposure, while Type III is rated for exterior and marine-grade bonding where prolonged water immersion may occur.

- Primary applications: furniture assembly, cabinetry, millwork, engineered wood products, and joinery.
- Type II: interior doors, window casings, baseboards, and non-structural furniture.
- Type III: exterior decking, marine plywood, outdoor furniture, and structural laminated beams.
- Commonly used in cold press, hot press, and RF (radio frequency) gluing processes.

2.0 Core Technical Properties & Sizing

- Density: 1.05–1.10 g/cm³ at 25°C.
- Viscosity: 2,000–10,000 cP (Brookfield, spindle #4 at 20 rpm) depending on formulation.
- pH: 4.0–5.5 (acidic emulsion).
- Solids content: 45–55% by weight.
- Open time: 5–15 minutes at 21°C and 50% relative humidity.
- Closed assembly time: 10–30 minutes (longer for Type III due to slower set).
- Minimum film-forming temperature (MFFT): 5°C (Type II), 10°C (Type III).
- Water resistance: Type II passes 3-cycle soak test (24 hr soak + dry); Type III passes 4-cycle boil test (4 hr boil + dry).
- Shear strength (wood-to-wood, maple): > 10 MPa after 7-day cure at 23°C/50% RH.
- Standard packaging: 1 L, 4 L, 18 L pails; 205 L drums; 1,000 L IBC totes.
- Shelf life: 12 months from date of manufacture in unopened containers stored at 5–30°C.

3.0 Processing, Machinability & Application

PVA wood glue is applied by brush, roller, spreader, or extrusion. For optimal bond strength, apply a uniform film at 150–250 g/m² (single spread) or 100–150 g/m² (double spread). Clamping pressure should be 0.7–1.4 MPa for softwoods and 1.0–2.0 MPa for hardwoods. Cure time at 21°C is 30–60 minutes under clamp, with full strength achieved after 24 hours. Type III requires longer clamp time (60–90 minutes) due to slower water evaporation.

- Application temperature range: 10–35°C (Type II), 15–35°C (Type III).
- Do not apply below MFFT; film will crack and bond will fail.
- Use stainless steel or plastic spreader rollers to avoid corrosion from acidic pH.
- Clean tools and spills with warm water before glue dries.
- For RF gluing, adjust generator power to achieve 80–100°C at glue line within 30 seconds.

- Do not mix with solvents, fillers, or other adhesives unless specified by manufacturer.
- Avoid over-clamping; excessive squeeze-out indicates too much glue or pressure.

4.0 Common Defects & Quality Control

- Reject if glue has separated, curdled, or formed a rubbery skin on surface.
- Reject if viscosity is outside specified range (e.g., too thick or watery).
- Reject if pH is below 3.5 or above 6.0 (indicates emulsion instability).
- Reject if freeze-thaw stability fails: no gelation or coagulation after 3 cycles of -10°C to 25°C.
- Reject if bond line shows visible voids, bubbles, or delamination after cure.
- Reject if shear strength is below 8 MPa after 7-day cure per ASTM D-905.
- Reject if water resistance fails: Type II shows delamination after 3-cycle soak; Type III after 4-cycle boil.
- Acceptable squeeze-out: continuous bead 1–3 mm wide after clamping.
- Perform a 24-hour cold soak test on a sample joint: no visible separation or softening.

5.0 Storage, Handling & WHMIS Guidelines

- Store in original sealed containers at 5–30°C. Do not freeze; freezing causes irreversible gelation.
- Keep away from direct sunlight and heat sources above 40°C.
- Shelf life: 12 months from manufacture date. Use FIFO (first-in, first-out) inventory rotation.
- WHMIS classification: Not classified as hazardous under WHMIS 2015 (GHS). However, may cause mild eye or skin irritation.
- Mandatory PPE: Safety glasses with side shields; nitrile gloves if handling large quantities.
- In case of skin contact: wash with soap and water. For eye contact: flush with water for 15 minutes.
- Do not ingest. If swallowed, do not induce vomiting; drink water and seek medical attention.
- Spill management: contain with inert absorbent (sand, vermiculite); dispose as non-hazardous solid waste.
- Ventilation: general room ventilation is sufficient; avoid prolonged inhalation of vapors in confined spaces.
- Dispose of empty containers per local regulations; do not reuse for food or drink.

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