Cyanoacrylate (CA) Glue and Accelerator – Technical Material Specification

1.0 Material Overview & Common Uses

Cyanoacrylate (CA) glue is a fast-setting, single-component adhesive that polymerizes rapidly in the presence of moisture, forming a strong, rigid bond on non-porous substrates. The accelerator is a solvent-based aerosol or liquid that contains a catalyst (typically an amine or a metal salt) to speed up cure time, especially in deep gaps or on acidic surfaces. Common industrial applications include bonding plastics, rubber, metals, ceramics, and wood in assembly, prototyping, and repair operations. Typical uses include fixturing jigs, bonding gaskets, securing fasteners, and assembling electronic components. CA glue is available in viscosities ranging from water-thin (low viscosity) to gel (high viscosity) for gap-filling applications.

2.0 Core Technical Properties & Sizing

- Viscosity range: 2–2000 cP (water-thin to gel grades).
- Density: 1.05–1.10 g/cm³ at 25°C.
- Flash point: >80°C (closed cup) for glue; accelerator flash point typically 20–40°C (highly flammable).
- Cure time: 5–60 seconds (fixture) with accelerator; 10–300 seconds without accelerator depending on humidity and substrate.
- Full cure strength: 80–100% of ultimate bond strength achieved in 24 hours.
- Tensile shear strength (steel-to-steel): 10–25 MPa (depending on grade and surface prep).
- Operating temperature range: -55°C to +120°C (continuous); short-term peaks to 150°C.
- Standard packaging: 20 g, 50 g, 500 g bottles; accelerator in 100 mL, 400 mL aerosol cans.
- Shelf life: 12 months from date of manufacture (unopened, stored at 2–8°C).

3.0 Processing, Machinability & Application

CA glue is applied directly from the bottle or via dispensing needle for precision. The accelerator is sprayed or brushed onto one surface before assembly, or applied after joining to speed cure. Surfaces must be clean, dry, and free of oil, grease, and mold release. For low-surface-energy plastics (polyethylene, polypropylene), a primer or surface treatment (corona, flame) is required. Bond line thickness should be kept below 0.25 mm for maximum strength; gap-filling grades can tolerate up to 0.5 mm. Accelerator should be used sparingly to avoid brittleness or blooming (white residue).

- Apply glue in a thin, even layer; avoid pooling.
- For porous substrates (wood, leather), apply accelerator first to prevent wicking.
- Use a low-viscosity grade for capillary action into tight joints.
- Use a gel grade for vertical surfaces or gap filling.
- Accelerator spray distance: 15–20 cm to avoid solvent washout.
- Cure time can be controlled by accelerator concentration; use a fine mist for fast cure, heavy spray for instant fixture.
- Do not use accelerator on polycarbonate or acrylic; it may cause crazing or cracking.
- Post-cure: Allow 24 hours at 20–25°C for maximum bond strength.

4.0 Common Defects & Quality Control

- Reject if glue has thickened, gelled, or shows visible crystallization (indicates moisture contamination or expired shelf life).
- Reject if accelerator propellant is leaking or can is dented beyond 2 mm depth.
- Reject if bond line shows white blooming (excess accelerator or moisture) that reduces aesthetic quality.
- Reject if bond fails within 24 hours under light finger pressure (indicates surface contamination or wrong viscosity).
- Reject if glue bottle nozzle is clogged or cap is cracked (compromises seal and shelf life).
- Acceptable bond strength: minimum 80% of manufacturer's stated value on test coupons (steel-to-steel, per ASTM D1002).
- Acceptable cure time: within ±20% of stated fixture time at 23°C and 50% RH.
- Visual inspection: glue must be clear to slightly yellow; accelerator must be clear liquid or aerosol without sediment.

5.0 Storage, Handling & WHMIS Guidelines

- Store CA glue in a refrigerator at 2–8°C to extend shelf life; allow to warm to room temperature before opening to prevent condensation.
- Store accelerator in a cool, dry place below 30°C, away from heat, sparks, and open flames (WHMIS Class 2.1 flammable gas/aerosol).
- Keep containers tightly sealed when not in use; moisture in air will cure glue in the bottle.
- Use FIFO (first-in, first-out) rotation; label each container with receipt date.
- WHMIS hazard classification for CA glue: Class D-2B (toxic), Class B-3 (combustible liquid).
- WHMIS hazard classification for accelerator: Class A (compressed gas), Class B-2 (flammable aerosol), Class D-2B (toxic).
- Mandatory PPE: safety glasses, nitrile gloves (CA glue bonds skin rapidly; use acetone for removal), and chemical-resistant apron.
- Ventilation: Use in well-ventilated area or with local exhaust to avoid inhalation of vapors (accelerator contains flammable solvents).
- Spill procedure: For glue, apply water or a commercial debonder to cure; for accelerator, absorb with inert material and dispose as flammable waste.
- First aid: If glue bonds skin, soak in warm soapy water and gently peel; do not force. If in eyes, flush with water for 15 minutes and seek medical attention.