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LOCTITE® Cyanoacrylates – Best Practices

Key product concepts:

- Thermoplastic – One-part, solvent-free.
- Moisture curing, via diffusion of moisture from surfaces, an anionic reaction.
- Exothermal heat is a by-product of polymerization – faster cure is hotter.

Primer: Increases bond strength on polyolefins. See bonding guides for substrates.

Accelerator: Enhances cure speed and can enable surface cure but can cause embrittlement.

Process parameters:

- Bond gap: 0.001 in. minimum, to typically .008 in. maximum for moisture cure.
- Ideal bonding environment humidity 40-60%. Acclimate parts 30 minutes to ensure moisture on the surface. Less critical with surface insensitive chemistries.
- Fixtures in seconds, full cure in 24 hours. Repositioning during fixture time or cure can weaken bond.
- Storage and use:
  - Unopened: Optimal storage 2°C to 8°C, converts to 36°F to 46°F, per Technical Data Sheet.
  - Before use: Let acclimate to room temperature (approximately 1 hour).
  - Upon opening: Mark date on bottle. Discard in 30 days.
  - If opened and returned to refrigerator, discard, due to condensation in bottle.

Best practice tips:

- "Blooming" looks like a white haze. It occurs when cyanoacrylate monomer volatizes and settles around the bond line in the form of minute crystals of cyanoacrylate resin. This is purely an aesthetic problem and does not affect the performance of the adhesive in the bonded joint. Blooming is minimized through adequate ventilation, and rapid curing. Avoid excessive amount of adhesive and squeeze-out. Do not enclose assembly for 24 hours, such as in packaging or stacking parts on trays.
- It is highly recommended that new designs utilize the latest technology, such as surface insensitive, toughened, thermally resistant chemistries to ensure robust processes and performance. Low bloom and flexible are also options.
- Any possible stress cracking is aggravated by uncured adhesive (see design guide to see which plastic types might display cracking).
- Henkel does not recommend downloading CA out of its original package. Henkel does extensive packaging stability testing. Transferal of product into another container could compromise the adhesive and breaks traceability, and thus voids warranty.

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LOCTITE® Epoxies – Best Practices

Key product concepts:

- Thermoset plastic – Typically two-part system (resin and hardener).
  - Cures at room temperature, although one-part pre-mixes which utilize a heat cure cycle are also possible.
  - Worklife: 1 to 120 minutes.

Process parameters:

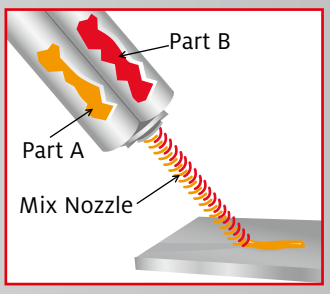
- Bond gap: 0.001 in. minimum, to typically .008 in. maximum.
- Storage and use:
  - Optimal storage 8°C to 21°C, converts to 46°F to 70°F, per Technical Data Sheet. Always refer to the Technical Data Sheet as some products may require refrigeration.

How they work:

- A mix nozzle is crucial to proper mixing. Smaller mixer tip diameter will provide better mixing via an increase in shear. Mix nozzle variables to consider: Diameter, length, aperture size, number of elements.
- The two components mix, and upon mixing, the curing reaction of the epoxy can release heat. The epoxy cures through an exothermic reaction.
- Use:
  - Insert the epoxy cartridge into the dispense equipment.
  - Remove the cartridge cap and dispense a small amount of adhesive into a dish to ensure that both components are flowing evenly and freely.
  - Attach the static mixing nozzle to the end of the cartridge to begin.
  - Purge and dispose of the first portion of epoxy exiting the nozzle.

Best Practice Tips:

- If heat is used to accelerate the cure of the epoxy, the increase in temperature can result in a drop of viscosity and an increased flow of the adhesive.
- Every 10°C increase in temperature doubles the reaction rate (general guideline).
- The mix nozzle will serve as the new cap.



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LOCTITE® Light Cure Cyanoacrylates – Best Practices

Key product concepts:

- Thermoplastic – One-part, solvent free.
- Moisture curing, via diffusion of moisture from surfaces, an anionic reaction.
- Photoinitiator curing, activated by UV/visible light of the appropriate wavelength and intensity.

Process parameters:

- Bond gap: 0.001 in. minimum, to gap specifications (usually .006 in.) maximum for moisture cure.
- Ideal bonding environment humidity 40-60%.
- Fixtures in seconds, full cure in 24 hours (moisture).
- Light cure, cures in 1 to 60 seconds.
- Repositioning during cure weakens bond.
- Storage and use:
  - Unopened: Optimal storage 2°C to 8°C, converts to 36°F to 46°F, per Technical Data Sheet.
  - Before use: Let acclimate to room temperature.
  - Discard/use within 30 days.
  - If opened and returned to refrigerator, discard, due to condensation contamination within the bottle.

How they work:

- Upon exposure to light of the proper intensity and spectral output, the photoinitiator decomposes to initiate polymerization of the adhesive to yield a thermoplastic.
- Cure-through depth by light is listed in the Technical Data Sheet. Cure-through depth and fixture time via moisture are the same as standard moisture cure cyanoacrylates of similar viscosity.
- **Fluorescent:**
  - Excitation: 290 nm wavelength (black light).
  - Emission: 460 nm wavelength.

Best practice tips:

- Any possible stress cracking is aggravated by uncured adhesive (refer to design guide to see which plastic types might display cracking).
- Avoid stray light exposure that may lead to premature curing.
- Henkel does not recommend downloading CA out of its original package. Henkel does extensive packaging stability testing. Transferal of product into another container could compromise the adhesive and breaks traceability, and thus voids warranty.

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LOCTITE® Light Cure Acrylics – Best Practices

Key product concepts:

- Thermoset plastic – One-part, solvent-free acrylic.
  - Uses photoinitiator, activated by UV/visible light of the appropriate wavelength and intensity.

Process parameters:

- Bond gap: 0.001 in. minimum, to typically .008 in. maximum.
- Typical cure times of 1 to 60 seconds.
- Storage and use: Optimal storage 8°C to 21°C, converts to 46°F to 70°F, per Technical Data Sheet. Always refer to the Technical Data Sheet as some products may require refrigeration.

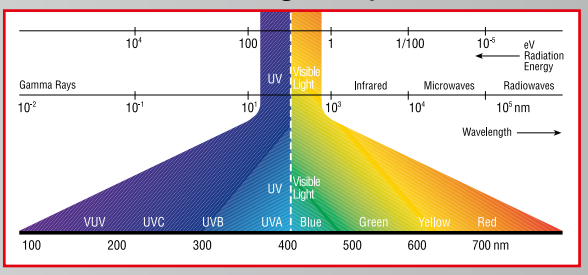
Light Cure Acrylics:

- Light curing acrylic adhesives are composed of a blend of monomers, oligomers and polymers containing the acrylate functionality to which photoinitiator is added.
- Upon exposure to light of the proper **intensity** and **spectral output,** the photoinitiator decomposes to yield free radicals. The free radicals then initiate polymerization of the adhesive through the acrylate groups to yield a thermoset polymer.
- Cure-through depth by light is listed on the Technical Data Sheet.
- Spectral output:
  - 400-436 nm: “Fastest, Deepest Cure” for UV blocking surfaces.
  - 365 nm: “Workhorse” promotes depth of cure.
  - 254 nm: “Tack-Free” promotes surface cure for tack-free fillet.

Best Practice Tips:

- Any possible stress cracking is aggravated by uncured adhesive (see design guide to see which plastic types might display cracking).
- Avoid stray light exposure prior to dispense/assembly that may lead to premature curing.

The Electromagnetic Spectrum



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