

# CYANOACRYLATES

## How to Dispense Cyanoacrylates

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The advantages of using cyanoacrylate (CA) adhesives in bonding materials are well recognized, “super glues” having been in use for almost 50 years. The high bond strength of CAs and the rapid cure rate of the material without the need for heat, light, or catalysts have led to their widespread use in industry.

Cyanoacrylates, on the other hand, are not exactly “super” in every respect. For example, superior bonds are achieved with thinner, as opposed to thicker, layers of the material; more does not produce better results than less. Achieving a thin and even coating across a surface area is not always easy to achieve with consistency and precision. CAs can also be expensive, especially where rejects and waste occur due to problems in dispensing. Then, there is the need to avoid contact with the skin, as fingers can end up sticking together.

Undoubtedly, the most significant challenge in dispensing CAs, however, is the premature curing that can occur in the presence of moisture and air, leading to clogging and increased difficulty in dispensing the material.

Cyanoacrylates are one-part acrylic resins that can vary from a low viscosity fluid to high viscosity gel, depending on the formulation. For years, cyanoacrylates were dispensed from a tube or squeeze bottle, and they still are, particularly for non-porous consumer use (mending ceramics, gluing plastic models, etc.) For industrial products, manufacturers are turning to dispensers that reduce waste and provide improved control over the amount dispensed. Yet, despite claims to the contrary, today’s traditional dispensing systems offer far-from-ideal solutions.

Take pinch tubes, for example, in which the amount being dispensed depends on cutting off, or “pinching,” the flow of adhesive. This type requires a certain range of viscosity. Too low a viscosity, lack of control, and even drip, can occur; while for the higher viscosity gels, resistance to flow of the material can be a problem. Then, too, the pinch tube assembly must be discarded after use.



Dispensing of cyanoacrylates using the Fishman LDS9000 (handheld model shown)

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Pneumatic dispensers also have limitations, due to curing of the adhesive where air comes into contact with the adhesive, such as between the piston and the inner wall of the syringe. Over a short period of time, premature hardening causes difficulty in moving the piston downward in the syringe, necessitating an increase in air pressure. Even pneumatic dispensers, in which a column of air is created on purpose between the piston and the top surface of the adhesive, can be a less-than-satisfactory solution. Not only must the supplied air be filtered, clean, and free of oil and moisture, the syringe itself cannot be more than half full.

What about diaphragm valves? Touted for improved control over the amount dispensed, this type of valve employs a flexible diaphragm that separates the “wetted” (adhesive) section of the dispenser from the supplied air. The problem is, with this type, theory differs from reality, and despite the separation, the adhesive begins to get more viscous in the wetted portion, and clogging can occur. As a result, frequent and thorough cleaning of the dispenser is required. In a production environment, either output suffers, or replacement of the valve is necessary.

## **The ideal system for dispensing CAs requires certain conditions:**

1. It must minimize exposure of the adhesive to air.
2. The adhesive must be prevented from adhering to the internal parts of the dispenser.
3. Enough force must be provided to move the adhesive through the dispenser and out of the dispensing tip, and the force must be consistently applied for precise and repeatable dot and bead volumes.
4. For optimum uptime, cleaning of the mechanism should not be necessary.
5. Material waste, rejects, and contact with the skin must be kept to an absolute minimum.

Of the various types of dispensing systems on the market, only one meets all of the above conditions. Fishman Corporation's AirFree™ LDS9000 CA dispensing system minimizes the effects of changes in temperature, moisture, and viscosity for significantly improved fluid control. Find out how at [www.fishmancorp.com/ca](http://www.fishmancorp.com/ca).

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