



We are all familiar with 'superglue' or cyanoacrylate (CA) to give it its correct title, but what exactly is it and how does it actually work?

Is there a future for cyanoacrylates?

Just how do adhesives work? Put simply, they actually 'wet' the surfaces they are applied to. This may be the only step involved—as with pressure sensitive tapes—or a chemical or physical change may take place within the adhesive itself. Some common mechanisms are:

HotMelt where viscosity is reduced by melting so that hot adhesive wets the surface and subsequent cooling creates a physical bond.

Solvent- or water-based where the adhesive is applied as a liquid and the viscosity increased when solvent or water is lost through drying.

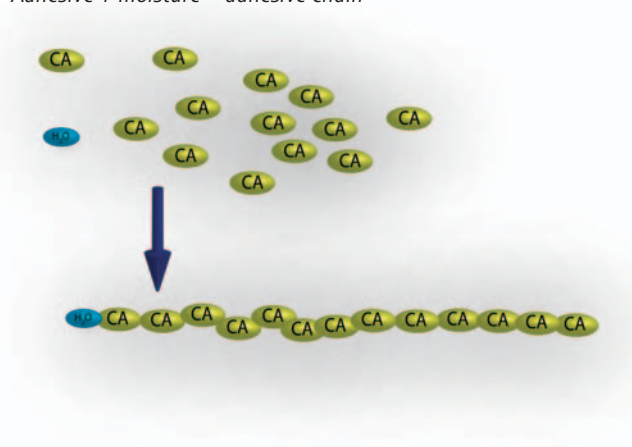
Pressure sensitive as is used for shoe reinforcement tapes and which wets by pressure and can be removed by peeling.

Polymerisation types are applied as liquids or pastes after which a chemical reaction causes an increase in viscosity to form a solid. This can also form a chemical bond with the substrate—and all CAs fall into this group.

How does a CA work?

Simply, by the process called polymerisation. This occurs when a single chemical known as a monomer is converted into a chain by reacting with other monomer units. In a CA, this reaction can be triggered by moisture and is why it was first used in the Vietnam War to close battle-wounds in the field.

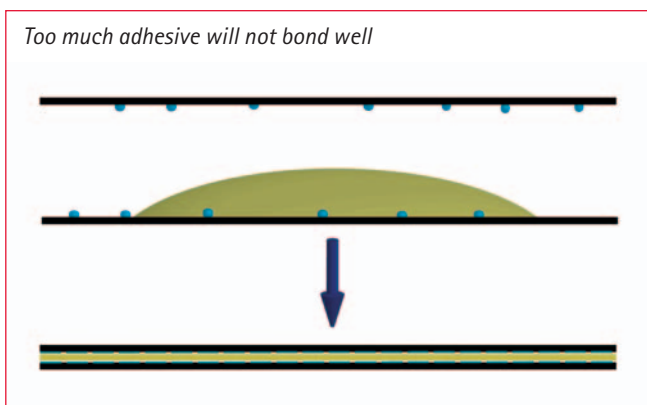
Adhesive + moisture = adhesive chain



A key factor with CA is that the smaller the amount of adhesive applied, the faster and better it bonds. This is why CA comes in small squeezable bottles and tubes, with a fine nozzle applicator. This effect is due to the surface to volume ratio and, in this regard, is rather like paint: if you apply too much paint it takes longer to dry and does not really dry hard.

Similarly, a drop of CA will remain liquid on a surface for a considerable length of time. However, when applied between two substrates and put under pressure to form a thin layer, a

Too much adhesive will not bond well



bond is immediately formed.

All CAs start out with a water-like viscosity and are then modified according to final applications by the addition of an inert polymeric thickener. This can transform it to any viscosity up to that of a gel. It also alters the reaction time so that a basic adhesive that cures in three seconds may take up to ten seconds if made into a gel. The adhesive can therefore be tuned to create a balance between absorption rate and cure time depending on final application. For example, CAs that are water-like in viscosity can wick into a joint already under

contact pressure to form a bond, while gel-like CAs are useful when non-drip properties are required.

Problems for footwear

Unfortunately, CAs tend to be brittle when cured and are clearly not an option for sole attaching or, indeed, any application where flexing is prevalent. In theory, they are nevertheless a serious possibility for sub-assembly operations. Until recently, however, they have not been widely adopted in leather bonding applications for the very simple reason that the acidic surface of leather inhibits polymerisation.

UK adhesive company Chemence specialises in cyanoacrylates for industry and claims its newly developed XF100 is one that overcomes this problem. It has been tested on a range of leathers, where it showed a bonding time of three seconds on both grain and flesh sides. Previous experience indicates that good bonds could be achieved when bonding leather to other materials, such as textiles, plastics, metal and wood, in spite of their variously different properties. Shoemakers will need to make their own evaluations but, in terms of speed on sub-assembly operations, a cyanoacrylate adhesive of this type could prove useful. 

*Details and images
courtesy of Chemence Ltd*

**Need to know about shoemaking?
in LA or NY**

Introduction to Shoemaking Three-day Course - 13th to 15th December

A practical course aimed at giving non-shoemakers a real understanding of how shoes are made. Ideal for buyers, designers, quality control, sales, material and other suppliers, etc. Clients include Gap, Nine West, North Face, Reebok, Skechers, Rockport, New Balance, Macy's, Ferragamo and Timberland.

For detailed brochure or other dates for East and West Coast, contact:-

Noble Footwear
175 Newchurch Road, Rossendale, Lancs.
England BB4 7SU
tel: +441706211181
email: wf4@noblefootwear.com

in USA? call Deborah Nye
tel: 610-6682775



It's simply better
Tru-Fit® Fiberglass Shank System

*Produce your own shanks as needed
Eliminate large shank inventories and obsolescence
Ultra light weight
Non-conductive and excellent insulator
Great memory for excellent shape retention
SAVE—money and time*

American & Schoen
MACHINERY COMPANY
a subsidiary of Schöen & Cie AG

100 Cummings Center, Suite 140A, Beverly, MA 01915, U.S.A.
Tel: (978) 524-0168 Fax: (978) 524-4805
E-mail: info@asm-schoen.com www.asm-schoen.com

Tru-Fit
SHANK MATERIAL