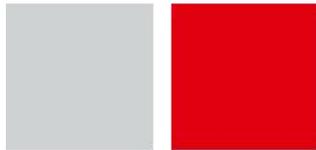


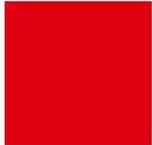
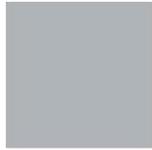
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Pushing the Limits with Instant Adhesives

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Abstract

Modern instant adhesives can often help to make industrial manufacturing processes faster, safer and more economical. They also open up completely new design opportunities for series production. But in order to get perfect results, the right choice of product is critical. To make sure that all the benefits of this bonding technology can be fully exploited, Henkel's Loctite® brand offers a broad range of instant adhesives tailored to meet the specific needs of the manufacturing industries.

Adhesive bonding is one of the most important techniques employed to join materials in modern manufacturing processes today. When properly selected and applied, adhesives can be used to achieve lasting bonds between virtually all materials in any combination. Users can choose from a variety of bonding technologies to find the best solution for their application and requirements. Instant adhesives are playing an increasingly important role in industrial manufacturing where they offer many advantages over traditional material joining techniques like ultrasonic and solvent welding or mechanical fastening methods such as clipping or bolting.

Fast, versatile and effective

Instant adhesives, also known as cyanoacrylates, are ideal for bonding small and medium-sized parts to achieve a close fit in series manufacturing. The products are applied in dots or beads to one of the parts to be joined, either directly from the ergonomically designed, easy-to-use bottle or using manual or automatic dispensing devices. For best results, the surfaces of the parts must be clean and free of grease. Plastic parts can normally be processed without any additional surface preparation, as long as they are not heavily soiled. As soon as the parts have been joined, the cyanoacrylate cures within seconds by reacting with the moisture on the surfaces of the parts. This results in rapid assembly operations as the bondline develops sufficient strength to allow further processing after only 5 to 20 seconds.

In addition to speeding up processes, cyanoacrylates also adhere to a very broad spectrum of different materials. They can be used to bond similar or dissimilar combinations of plastic, rubber, metal, textile, wood or paper materials – without problems and without damaging the materials either chemically or thermally. This performance capability makes cyanoacrylates especially well suited for bonding sensitive materials such as plastics, rubber or latex to one another or to metals. Another point in favor of adhesive bonding is that it achieves full-surface joining rather than joining only at isolated, highly stressed contact points as is usual with conventional techniques. Stress peaks can therefore be avoided.

Because they are so versatile, as well as enabling fast, easy and economical processing, cyanoacrylates can now be found in many different industrial applications. Examples include bonding rubber feet to ABS housings, attaching clips and switches to mobile electronic devices, and forming flexible gaskets on steel. Moreover, this bonding technology can often replace mechanical constructions such as the frames used for mechanical fixing of heat-sensitive materials like foam. This results in simpler and more esthetic structures that can be built faster while at the same reducing manufacturing costs by saving on materials.

Multipurpose and specialized products

Cyanoacrylates are generally characterized by their ability to create high-strength bonds with very good aging resistance, even in the smallest gaps. Even small amounts of adhesive are sufficient to create high-performance bondlines whose strength is often higher than that of the materials they join.

But choosing the right product is essential to get the best results. Loctite therefore offers users a broad range of industry-proven cyanoacrylates. While multipurpose products already deliver very good results for bonding a variety of different material combinations, the specialty products have additional specifically engineered characteristics which considerably extend the spectrum of possible applications. Powerful solutions are available even for difficult-to-bond plastics such as PP, PE, POM, PTFE or silicones.

Each of the different product categories has been optimized as appropriate for the applications involved. For example, the elastomer-modified cyanoacrylates from Loctite offer good impact and shock resistance and are therefore used to bond loudspeaker parts (fig. 1), the housings for rechargeable batteries in power drills, or similar applications. Flexible products, on the other hand, can reliably withstand repeated twisting or bending of the bonded materials and are therefore suitable for bonding the plastic sheaths on the metal temples of flexible-frame sunglasses or for attaching rubber profiles to refrigerator doors made of painted metal (fig. 2). For transparent parts requiring very good optical performance, light-curing cyanoacrylates will be the best choice. These adhesives cure within seconds when exposed to UV or visible light. And they remain clear and transparent after curing (fig.3).

Gap-filling bonds

The scope of applications in industrial manufacturing processes has been distinctly broadened by the recent addition of the first gap-filling cyanoacrylate, Loctite 3090. Since conventional cyanoacrylates mostly have very low viscosity, they were only used to join close-fitting parts. This was a drawback that severely restricted their range of uses. With Loctite 3090, Henkel has vastly broadened the application range of instant adhesives, offering an unmatched capability to fill gaps up to 5 mm wide (fig. 4). The new instant adhesive is suitable for almost all materials, including metals, most plastics, rubber and ceramics. Even porous substrates such as wood, paper and cork can be reliably bonded with it.

Users also benefit from the significantly improved handling: The transparent cyanoacrylate is a high-viscosity gel, which allows easier application to difficult vertical surfaces – without dripping. Another new feature is the convenient 2-chamber syringe packaging enabling precise and clean application. Unlike one-component systems, Loctite 3090 does not depend on the moisture on the surfaces to cure, but has an additional activator. The two components are dispensed into an integrated static mixer, which ensures that curing is triggered within the defined timeframe, regardless of moisture or temperature, and that the components are always mixed in the right ratio. The adhesive has a working time of 90 to 180 seconds after application. The bond is then strong enough for use or downstream processing of the joined parts.



Fig. 1: Toughened instant adhesives, used here to assemble loudspeaker parts, show high resistance to shear and impact forces.



Fig. 2: For parts subjected to repeated flexing there are specially designed flexible cyanoacrylate adhesives, which can be used to attach rubber profiles to refrigerator doors or for similar applications.



Fig. 3: Light-curing adhesives make a visible difference – ideal for bonding clear and transparent materials for a perfect visual appearance.



Fig. 4: Offering an unmatched capability to fill gaps up to 5 mm wide, Loctite 3090 has vastly broadened the application range of instant adhesives.

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