

## **Press Release**

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**Manufacturers use solutions from world's biggest adhesives producer**

### **Adhesives from Henkel: A Recipe for Safety and Success in the Food and Packaging Machine Industry**

**More than 177 billion liters of milk, juice and other beverages – even some wines – were sold to customers last year in a simple box, the famous liquid carton. Around 173 billion of these cartons were filled by one of the 8,700 filling machines in use around the world, many of which were built using adhesives and sealants from Henkel.**

Henkel develops solutions for food processing and packaging manufacturers. Starting from the subcomponent manufacturing stage, Henkel offers sustainable and cost-efficient guard manufacturing systems.

For instance, safety and inspection windows can be simultaneously assembled and sealed using fast-cure flexible adhesives that do not require a primer and are free from toxic chemicals. Lighter panels and doors can also be manufactured without compromising their mechanical strength by using new designs that allow more balanced and efficient load transfer. These methods are well known in other industries, for example elevator and even aircraft manufacturing, which benefit from significant production and transportation cost savings.

#### **Innovative processes for food processing and packaging manufacturers**

The use of bonding systems enables manufacturers to incorporate new materials and thereby efficiently combine their attributes. New packaging designs are also possible, with the imagination being the only restriction as regards a new generation of attractive machines.



Fast-cure flexible sealants allow increased output and improved product quality. Their natural adhesion surpasses standard customer requirements, as they are capable of bonding materials such as painted and unpainted steel, stainless steel, cast metal and glass. In addition, Henkel's high-performance sealants comply with food regulations, making them ideal for all food processing sectors. Customers such as manufacturers of liquid cartons benefit from Henkel's state-of-the-art accelerated flexible adhesives and sealants, which reduce manufacturing costs and comply with the most rigorous machinery standards.

Launched recently, Loctite SI 5616 is a flexible adhesive and sealant. This two-component silicone permits fast elastic joints and seals on most materials, including glass, PMMA, stainless steel, carbon steel and painted steel. It is offered in different formats, including a new coaxial 300ml cartridge compatible with most standard manual silicone guns. The product can be easily applied in the same way as any conventional one-component flexible adhesive and sealant; however, its cure rate is much faster and significantly reduces process times.

### **Lighter but more robust automated systems**

Machinery mechanics are increasingly reliant on automated systems. The faster and more reliable the mechanisms, the higher the manufacturing output in automated lines. The most modern assembly and sealing technologies afford new design opportunities for automated systems. Widely used materials such as stainless steel can be bonded using modern engineering adhesives. Compared to welding, structural adhesives that cure at room temperature – the preferred assembly system today – do not modify material properties, nor do they create residual stresses. This leads to more durable, fatigue-resistant joints. Moreover, the bonding manufacturing processes consume less energy, the equipment used is less costly and fewer safety precautions are required in the factory.

Lightweight materials such as plastics and composites can be incorporated and joined with other materials using structural adhesives. Flanged joints in casting parts can be sealed and reinforced using anaerobic liquid gaskets, which enhances their load-transfer capability. These materials prevent fretting corrosion between the mating flanges, thus guaranteeing long-term machinery reliability.

Rollers used in automated line conveyors, paper mills, paper converting and laminating and packaging equipment can be manufactured using efficient assembly systems that operate at room temperature, thereby reducing manufacturing costs and scrap without compromising mechanical performance.

## **Fluid sealing systems**

Henkel offers a comprehensive portfolio of thread sealants and liquid gaskets to solve all fluid sealing challenges. These range from low-pressure fluid-drainage and air-recirculation systems that can be sealed using high-performance yarns, to high-pressure hydraulic, lubricant and pneumatic supply connections, the threads of which require high-performance anaerobic thread sealants.

One of the latest innovations in Henkel's thread sealant family is Loctite 55 yarn. This grade has all the advantages of PTFE tape and hemp but none of their disadvantages. Threaded connections are easily and instantly sealed, allowing part repositioning. One Loctite 55 ergonomic application container allows workers to seal around 50 times the number of threaded connections that would be feasible with one PTFE tape reel – without mixing sticky, dirty grease and hemp. Loctite 55 also complies with food-contact regulations.

## **High-performance anaerobics to solve mechanical challenges**

Manufacturing machinery is continuously evolving in response to new industry demands. Trends such as energy efficiency and the demand for increased production rates and machine availability mean that industrial machinery manufacturers are under huge pressure to build faster equipment without compromising key aspects, for instance reliability and productivity. To fulfill this task, these manufacturers must safeguard all mechanical components by guaranteeing that part dimensions and movements are not compromised in any way under working conditions.

Henkel has been serving metal-working machinery manufacturers since the 1950s, when anaerobic adhesives were discovered and developed into commercial grades by Vernon Krieble, founder of Loctite Corporation. The name Loctite is derived from "lock tight", which refers to the most well-known application of anaerobic adhesives: the complete filling of threaded joints to prevent vibration that in turn leads to loss of clamping force.

## **Heat resistance, compatibility with oily surfaces and low surface sensitivity**

Loctite anaerobics have evolved dramatically since those first early formulas, keeping Henkel at the cutting edge of technology. Properties such as high temperature resistance of around 200°C in many grades, compatibility with oily surfaces and low surface sensitivity, which means that most grades cure even on inactive surfaces such as stainless or passivated metals, have been progressively incorporated into Henkel's range.

Threadlockers are well known by all machinery manufacturers, although their use is still associated with heavily loaded bolts. In terms of cost, threadlockers are as cheap as washers and significantly cheaper than other mechanical solutions such as higher-quality bolts or tab washers. They are also more efficient in ensuring bolt clamping force. Vibration is not only a source of bolt loosening; it also causes temperature changes, pressure loads, part surface settling, etc.

Fretting corrosion is another major problem that can be prevented using anaerobics. Flanges sealed with liquid gaskets not only prevent leakages and the ingress of fluids, but also reinforce joint versus local shear stresses, thereby preventing any micromovement. As transversal forces are prevented, load-transfer capability is actually enhanced without any design modifications and with no need for surface-finishing improvements.

Cylindrical joints can also be resolved using anaerobics. In this case, stress distribution is more even, preventing all typical fatigue-related failures that occur when keyways and other mechanical systems are used. Compared with welding, the metal properties are not modified by high temperatures and no residual stresses are generated. Balancing and turning processes are dramatically minimized, as parts can be aligned while the adhesive is curing. Metal removal during turning is minimal.

### **Machinery industry benefits from anaerobic retainers**

As one example, rollers can now be manufactured using this cheaper and more sustainable system. Customers benefit from anaerobic retainers, which make their transportation rollers more reliable and simpler to manufacture. The bondline evenly transfers the dynamic loads expected during roller operation. Fatigue-related failures are thus prevented.

In addition, rollers of all sizes and functions including conveyors, lamination systems, wrapping and thermoforming rollers, converting equipment and calendaring machines can be manufactured using this system. The same principle can be applied to the bearings and driving gears of such rollers, which are often subject to deterioration. Part slippage is not unusual, but can be easily prevented by simply applying a fluid anaerobic retainer with no need for any design modifications. This is a straightforward measure that makes the mechanism more reliable and avoids costly malfunctions.

Anaerobic retainers are not restricted to heavily loaded parts such as shafts, gears and rollers; bearings and static joints can also be assembled using these adhesives. Bearings that are assembled using anaerobics only are better aligned and exhibit no residual stresses. As a result of these benefits, the life time and durability of these mechanical elements increase dramatically.

### **Instant assembly of small parts**

Not long after anaerobics were introduced, another adhesive technology was added to the Loctite range: cyanoacrylates, or superglues. These adhesives were soon used by machinery manufacturers to bond materials such as plastics and rubbers that are used in door seals, tags and other parts. Today, Henkel cyanoacrylates are unrivalled in terms of performance and manufacturing speed, as the latest developments have increased temperature resistance by 50 percent up to 120°C. The fixture speed is just a few seconds in most working conditions. No other commercial grade is able to equal this.

Temperature resistance is not only noticeable at close to the upper limit of 120°C; these adhesives exhibit higher strength than competitor products even at temperatures of around 50°C and 60°C, where the resistance of most grades falls dramatically. Several food-compliant grades are available in addition to medically approved grades that have been used for decades to manufacture disposable medical devices.

### **Noise and vibration management**

Machinery often generates heavy-duty dynamic forces, heavy vibration and noise. The use of flexible adhesives in the construction of panels reduces noise and vibration transfer. However, only the most state-of-the-art structure-borne sound-deadening coatings can efficiently absorb heavy vibration. These materials can be sprayed on the metal surfaces at room temperature, which reduces manufacturing costs and manual operations.

### **Other subcomponent manufacturing**

Improved machine-construction components are not the only parts that can be manufactured at lower cost. Certain food processing and packaging machinery subcomponents such as cutting blades and stirrers also benefit from Henkel's products. Henkel's surface-treatment solutions reduce subcomponent manufacturing costs because they require less cutting fluid and added bactericide and at the same time offer a longer cutting-tool life. Furthermore, these subcomponents often use adhesive and sealant solutions that are subject to stringent food requirements. These demands can also be met by Henkel grades.

## **Machine installation**

When it comes to machine installation, Henkel can apply the highest standards required by the marine industry to other industrial customers. Faster solutions approved by Germanischer Lloyd are offered to machinery installers and include training, support and applicator homologation capabilities.

## **Machine maintenance**

Henkel's expertise in both OEM and MRO environments is a valuable asset for machinery manufacturers, who can plan proactive maintenance programs for the installed machines and add value that benefits their end customers. Specifying carefully thought-out maintenance procedures is key to guaranteeing machinery availability and preventing costly shutdowns. Henkel's experience in the maintenance sector has greatly assisted a number of OEM customers in incorporating innovative solutions such as sacrificial wear coatings in locations heavily subjected to abrasion.

**Loctite is a registered trademark of Henkel and/or its affiliates in Germany and elsewhere.**

Henkel operates worldwide with leading brands and technologies in three business areas: Laundry & Home Care, Beauty Care and Adhesive Technologies. Founded in 1876, Henkel holds globally leading market positions both in the consumer and industrial businesses with well-known brands such as Persil, Schwarzkopf and Loctite. Henkel employs about 47,000 people and reported sales of 16.4 billion euros and adjusted operating profit of 2.5 billion euros in fiscal 2013. Henkel's preferred shares are listed in the German stock index DAX.

**Photo material is available at <http://www.henkel.com/press>**

Contact	Holger Elfes	Lisa Kretzberg
Phone	+49 211 797-99 33	+49 211 797-56 72
E-mail	holger.elfes@henkel.com	lisa.kretzberg@henkel.com

Henkel AG & Co. KGaA

**The following material is available:**



Henkel adhesives are used in a wide range of food and packaging machines.



Loctite SI 5616 is offered in different packaging, including a new coaxial 300ml cartridge compatible with most standard manual silicone guns.