

Adhesives and Sealants: Your Secret Maintenance Weapons

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Adhesives and sealants are an essential asset of every maintenance and operation plan, and with technology and products always changing, it's important to stay on top of these trends.

This article originally appeared in the [March 2014 print edition \[1\]](#) of IMPO.



When applied correctly, adhesives and sealants can improve equipment reliability, lower operating costs and save large amounts of time and money. Depending on the type of adhesive or sealant that you select, they can be used for equipment repairs, filling gaps, bonding materials, and locking and sealing threaded fasteners. To ensure that you're using these products correctly, it's important to understand the differences in various adhesives, how long they last and what changes are coming.

The Right Product for the Job

There are six general categories of adhesives, and each was designed with a different purpose in mind. Let's take a look at what each type offers:

Acrylic adhesives cure rapidly at room temperature for a weather resistant bond. They boast tensile, shear and peel strength combined with maximum impact, stress and shock resistance. Acrylic adhesives are the best choice for bonding two dissimilar materials.

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Published on Food Manufacturing (<http://www.foodmanufacturing.com>)

Instant adhesives, or cyanoacrylates, are extremely popular due to their fast cure rate. Consumers can buy these adhesives, commonly called “Super Glue,” almost anywhere, but a high-performance version is most commonly used for industrial uses.

Epoxies are one of the most effective choices for filling large gaps, and are often found in hybrid forms. By adding other chemicals to the basic epoxy resin, developers can impact elasticity, viscosity, heat resistance and more.

Urethanes are repair materials that can be troweled, cast or brush-applied to rebuild or protect critical operating equipment. Their rubber-like properties provide protection from impact, abrasion and corrosion.

Another rubber-like adhesive, *RTV silicone*, has excellent resistance to heat and moisture which makes it especially suited for outdoor applications.

Lastly, *anaerobic adhesives* remain liquid as long as they are exposed to air, and solidify in the absence of air and in the presence of most metals. They are often used as threadlockers and are known for their strength.

Choosing the right product is essential, but is becoming increasingly difficult as the variety of adhesives and sealants expand. According to Peter Leal, ITW Brands Red Head Product Manager, here are some guidelines, specifically for building construction applications:

- **Strength:** Bond strength must be calculated for every specific application.
- **Building Codes:** Adhesives for building construction must comply with local and state building codes. These codes change, so be sure to do your research to ensure compliance.
- **Temperature:** Epoxies generally will not cure at temperatures below 40 degrees F. If you are in a cold environment, acrylics should be used.
- **Moisture:** Outside construction projects, in the event of rain, should use an adhesive designed for use in water filled holes and submerged conditions.
- **Test:** All sealants and adhesives should also be tested to ensure their effectiveness.

How Long Will It Last?

Generally, concrete adhesives are designed to be permanent, and should last indefinitely. Cured adhesives can be visually evaluated by looking for cracks in the adhesive.

“Shelf life varies depending on chemistry, package type and storage conditions,” advises Laurie Gibbons, Business Development Manager at Permabond. “Some companies use a date of manufacture as the start of the shelf life while others use date of shipment.” To be sure about the quality and condition of the sealants in your facility, Gibbons recommends contacting the manufacturer with the product number, lot number, and date of shipment for the most accurate information.

Upcoming Developments

In the past several years, the development of hybrids has been at the forefront of changing adhesive technology. “We are seeing more technology blends,” says Gibbons. “For example, epoxies that are modified to behave more like silicones, or UV curable materials that also act like anaerobic sealants. Combining the desirable features of both types of products into one material provides design solutions to engineers.”

The next wave of changes that manufacturers should watch for in adhesive and sealant protocol — especially with construction applications, says Leal — is the adoption of the international building code becoming stricter across the U.S. “More regions will require that adhesives have an ICC report for cracked concrete and seismic approval,” says Leal. This is an important trend for manufacturers throughout the country, as earthquakes are not limited to California and the West Coast. Recent updates by the U.S. Geologic Survey to the National Seismic Hazard Maps incorporates new data on earthquake rates and associated ground shaking, which include regions in the Central U.S. and South Carolina, for example.

“Also, potential climate change may cause hurricanes to move further up the northern coast and further inland, which will cause these regions to require adoption of building codes for cracked concrete,” Leal says. “Future adhesives will need to be building code approved, stronger and crack resistant.”

Source URL (retrieved on 02/01/2015 - 8:49pm):

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