RELTEK LLC
adhesives, sealants & coatings for harsh environments

BONDiT™

Coating, Sealant & Adhesive System

Bonds dissimilar materials

An adhesive for engineering plastics including UHMWPE, ETFE, and silicone on metals, glass and ceramics, for adhesion of thermoset, thermoplastics, rubbers and urethanes.

Anticorrosion & chemical attack

A protective coat for most metal, glass and ceramic materials for use against corrosion and anodic/cathodic action, and other chemical attacks.

Encapsulates and seals

Encapsulant for electronic and electrical components. Operational temperatures up to 200°C. High dielectric, low moisture permeation, high chemical resistance.

Harsh environments

Marine,
Industrial,
Downhole oil,
Underwater,
Mining,
Automotive,
Medical.

The BOND-iT™ System

Throughout industry... from automotive to marine to aerospace, from electronics to building construction to sporting goods **BONDiT™** A-X, B-X and C-X system products represent dramatic breakthroughs in the ever-increasing trend in the improvement of bond strengths of organic coatings, adhesives, and sealants to inorganic surfaces and dissimilar / immiscible polymers.

The **BONDiT™** system creates stable bonds between two otherwise nonbonding surfaces. In reinforced and filled plastics, the improved bond between fibrous or particulate, organic component and the organic matrix polymer results in greater composite strength and longer service life.

The **BONDiT™** system products produces markedly improved bonding to siliceous or metallic surfaces, particularly after exposure to a humid environment such as underwater applications.

BONDiT™ system products activate chemical bonding between normally immiscible polymers and normally nonbonding polymers such as non-polar polyethylene and polyurethane elastomers.

BONDiT™ A-X and C-X product bonding capabilities are very powerful and broad in reactivity. Interactions between very diverse material properties may be achieved. For instance, polyolefin may be made to bond to urethane, silicone rubber and non-polar polyethylene, while co-monomers may be bonded to epoxy, UHMW PE and floropolymers.

When combined with **BONDiT™** B-4X products, adhesion may be achieved between all types of metals, glass, ceramics with each other, and with many polymers. For instance, **BONDiT™** A-3, when used with other **BONDiT™** B-4X products, creates moisture resistant bonds able to withstand up to 11.0 pH environment on metal surfaces. That makes **BONDiT™** technology especially effective in corrosion control of metals. **BONDiT™** A-3 is non-conductive and is used in conjunction with **BONDiT™** B-4X products as electronic component encapsulants for harsh environments.

Many different types of reactive groups are present in the **BONDiT™** system products, providing the ability to chemically bond to both the organic polymer and the inorganic surface. Dry strengths of resulting bonds are improved, but the most valuable and pronounced effects show up after exposure to moisture, even immersion in water, to chemical solutions and to high temperatures over extended periods of time.

BONDiT™ products may be applied by wipe, brush, spray, pour, and sheeting. Curing regimes vary by the product. Higher cure temperatures on mineral surfaces inherently produce superior moisture resistant bonds. However, higher cure temperatures are not mandatory. Bonding of immiscible polymers through application of the **BONDiT™** system are typically temperature sensitive. Particular application conditions should be tested to ensure the desired bond characteristics are attained in the application environment. **BONDiT™** products is suitable for industrial and military use.

Application notes

Mineral (metal, ceramic or glass) to polymer bonds inherently are not moisture resistant. Recent studies led to the realization that polymer/metal bonds will hydrolyze in the presence of moisture. Consequential debonding cannot be stopped. High pH environments as a consequence of cathodic/anodic action or corrosion especially aggravate the condition. Thermal shocking and pressure cycling are also found to be major factors in debonding.

Research has developed a better understanding of the mechanism for debonding in harsh environments. The **BONDiT™** systems derived from that research, form reliable metal/ceramic/glass to polymer bonding systems able to withstand long service in continuously exposed hash environments. The various **BONDiT™** components offer capabilities in adhesion between metals (including titanium), glass, ceramics and a wide range of polymers, including such polymers as fluorocarbons, ethylenes (polar and non-polar, cross link and thermoplastic), epoxies, polyamides, polyurethanes, and various elastomers. These highly adaptive material characteristics make **BONDiT™** products especially valuable for adhesion between dissimilar materials, sealing electronic components against harsh environments, and protective coatings of surfaces against corrosion and chemical attack.

BONDiT™ technology is a multi-component system designed with chemical constants that greatly favor bonding in harsh environments. The constants of the individual polymer/mineral bond give it a probability 10^4 greater than other adhesives commonly in use today. In addition, the **BONDiT™** system is designed to "manage" mechanical stresses and provide a balanced transition from rigid metal to high expansion polymers, such as polyurethanes. Accelerated Life Tests demonstrate bond survival rate improvements of 3,000% over other common adhesion systems in use today. In all test cases the bulk adherend failed under adhesion pull tests, before and after accelerated aging, with such overmold materials as polyurethane, neoprene, and LDPE.

Operating temperatures for **BONDiT™** system products range variously -50°C to 204°C (-40°F to 400°F). For instance, the **BONDiT™** A-3/B-4811 as a semi-rigid system can maintain adhesion to metal substrate up to temperatures of 204°C (400°F) in super heated water or steam, and certain oils. This system is applicable in thin or thick coatings, and large cross sections. Cure temperatures vary from ambient to 100°C (to 300°F) depending on required operational characteristics. This system can withstand typical thermoplastic and rubber injection molding operations. This system offers excellent electrical characteristics as a high dielectric sealant.

The **BONDiT™** A-3/HM-502 or HM-505 as a flexible thermoplastic system is especially valuable for excellent chemical resistance, thin coating large surfaces, corrosion protection, adhesion layer between thermoplastics and metals, and electronics encapsulation. Cure temperatures vary from 121°C to 204° (250°F to 400°F) depending on the bonding characteristics required. This system offers superior low moisture permeation and electrical characteristics.

BONDiT™ 401 provides no cure sealing as a flexible elastomeric of very high electrical dielectric. **BONDiT™** C-21 will form cohesive bonds with **BONDiT™** 401.

BONDiT™ A-X, C-X system products provide specialized adhesion characteristics for bonding dissimilar and immiscible polymers. C-6 is particularly useful in applications for bonding thermoplastic and elastomer polyurethanes to epoxies and HM-502.

Product Development

RELTEK is committed to serving the world through technology development and application that promotes health and well being for all cultures. Product development and application research are a continuing process at **RELTEK**. **RELTEK** laboratories will serve you and create a product for you if we don't have it now.

Information

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