



**RELTEK** LLC

*adhesives, sealants & coatings for harsh environments*

# **BONDIT™ HM-502**

## **Coating, Sealant & Adhesive System**

### **Anticorrosion and chemical attack**

A protective coat for most metal, glass and ceramic materials for use against corrosion and other chemical attacks. Useful against fungi growth.

### **Bonds dissimilar materials**

A hotmelt tie coating on metals, glass and ceramics, for adhesion of thermoset, thermoplastics, rubbers and urethanes. Superior at adhesion of dissimilar and immiscible polymers, UHMWPE, ETFE, PEI, urethanes, polyimids, EPDM, neoprene and many others.

### **Encapsulates and seals**

Operational temperatures up to 70°C. High dielectric, low permeation, tough and flexible. Excellent for sealing highly sensitive electronics from harsh environments.

### **Harsh environments**

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





**BONDIT™** HM-502

## **Description**

**BONDIT™** HM-502 is a thermoplastic in a water-based emulsion. This product, used in conjunction with **BONDIT™** A-3 or A-43, affords excellent corrosion protection for metal surfaces, especially in moisture laden environments. **BONDIT™** A-3/HM-502 to metal is particularly effective against moisture, salt water, acids, alkalis, solvents, detergents, oils, and dust. Very low permeation and high dielectric qualities together with wide ranging adhesion characteristics make it particularly valuable in sealing sensitive electronic components and assemblies.

An important feature of this system is the unique bonding capabilities. When used with **BONDIT™** A-X and C-X products unusually immiscible polymers may be cohesively bonded: polyolefin to urethane and UHMW PE to epoxy, and Tefzel to urethane for examples. The benefits of UHMW PE may be combined with the benefits of urethane. Similarly, polymers normally considered non-bonding, or difficult to bond for survival in harsh environments may be adhesively or cohesively bonded: PEI to PEI, PEEK to PEEK, UHMW PE or crosslinked PE to non-polar LDPE.

**BONDIT™** HM-502, when used with **BONDIT™** A-43, may be cohesively bonded to Tefzel wire insulation for waterproof termination in electrical connectors exposed to moisture.

The connector may be further sealed with **BONDIT™** B-482 as the connector backfill, which bonds to the **BONDIT™** HM-502. Typical connector to cable overmold boot materials will then bond to **BONDIT™** B-482, such as with urethanes, high temperature and pressure elastomeric molding, and thermoplastics molding.

With excellent dielectric and extremely low permeation properties **BONDIT™** HM-502 may be used as an electrical encapsulant. Electronic components may be sealed from moisture, such that low voltage leakage currents may be held to the nano-amperes range in components fully submerged in the ocean environment.

## BONDIT™ HM-502

### Typical Properties

<b>Property</b>	<b>Value</b>
Color (dependent on cure)	Clear
Density, ASTM D-792	0.955 g/cc
Viscosity	850 cps
Ultimate tensile, ASTM D-638	900 psi
Elongation, ASTM D-638 2%	350%
Secant Modulus, ASTM D-790	3200 psi
Crystalline melting point	75°C (167 °F)
Thermal shock	No effect
Insulation resistance	500 v/mil
Hardness, Shore D ASTM D-2240	42
Reverse impact, approx.	24 ft-lb
Low temperature brittle ASTM D-746	-23°C
Moisture absorption 100% RH @ 40°C	400 ppm
Water transmission, 38°C ASTM E-96	<2.3 gm mil / 100 in <sup>2</sup> 24 hr Atm.
Gas transmission O <sub>2</sub> , 23°C ASTM D1434	350 cm <sup>3</sup> mil / 100 in <sup>2</sup> 24 hr Atm.
Fungi resistance	No growth
Environmental stress crack resistance <sup>1</sup>	>200 hrs

### Chemical Resistance

<b>Material</b>	<b>Days Immersion</b>	<b>% Weight Gain (approx.)</b>
Perchloroethylene	1 / 7	145 / 145
Isopropanol	1 / 7	48 / 67
Toluene	1 / 7	67 / 67
1% NaOH	1 / 7	14 / 28
2B Ehanol	1 / 7	20 / 32
Gasoline	1 / 7	28 / 36
Methyl Ethyl Ketone	1 / 7	18 / 26
Acetone	1 / 7	4 / 12
5% acetic acid	1 / 7	1 / 4
Vegetable oil	1 / 7	2 / 2

### Material Adhesion

Metals - virtually all types, Polyethylene - virtually all types, EPDM (ethylene-propylene-diene monomer rubber), PEEK (Polyether ether ketone), PEI (polyether imide - GE Ultem), PTFE (polytetrafluoroethylene), EVA (ethylene vinyl acetate), Ionomers (e.g. Surlyn), Nylon (6 and 66), Polyurethane, Glass, Fiberglass, Ceramic, Leather, Paper, Fabric

<sup>1</sup> Modified test: 75 mil thick molded plaques, notched and 90° bend, suspended in detergent Igepal 10% solution. Results are 15 times better than ionomer (e.g. Surlyn) and 80 times better than LDPE 722.



**BONDIT™** HM-502

## **Application Notes**

The product can be poured, sprayed or brushed. HM-502 in liquid form is a water-based immersion. It is also available in solid form as a thermoplastic. Pigments may be added for coloration.

A wide range of curing regimes may be employed. Examples include 160°C (320°F) for 3 minutes, followed by 230°C (446°F) for 5 minutes for thick films. Typical low temperature cure for thermoplastics or piezoelectric ceramics is a thin film at 121°C (250°F) for 15 minutes. At room temperature a thin film of **BONDIT™** HM-502 will setup in 30-60 minutes. Low temperature cure of thicker films (> 0.01") is not recommended.

Uniquely, for non-conducting parts, initial cure may be accelerated with a microwave oven, followed by a heat cycle.

Films of .0005"-.003" may be rapidly cured when sprayed or rolled onto hot 290°C (554°F) surfaces.

Heavy coatings of 0.060" may be obtained using long cycles of oven cure at 160°C (320°F). In general, excellent results are obtained with 100°C (212°F) for 30 minutes for applications.

The cured coating has an unlimited shelf life. It may be reheated and to the tack point and bonded to the substrate. The bonded assembly may be disassembled in the same manner and reassembled multiple times.

## **Storage & Availability**

The usable shelf life of unopened containers of **BONDIT™** HM-502 is six months, and should be stored in cooler temperature, but always above freezing. When not in use, containers should be kept tightly closed.

**BONDIT™** HM-502 is an off-the-shelf product, available in as a solid or liquid in bulk containers or custom packaging.