

HUMISEAL

- SENSORS
- HARSH ENVIRONMENTS
- PERFORMANCE
- ACCURACY
- MOTION CONTROLLER
- RELIABILITY
- SAFETY
- LONGEVITY
- GAS DETECTION
- CONTROL GEAR
- PLC

ERJO
STEVELCTESSE
UARURQUH MOFWALEL
ISSOSCIPIT BNRIOSSMTI
FKHUMISEALQ SNTSTYUMRXE
ASXINERHLBORE DOLRSEMAANAEA
I VELITSE NOGOUMQL GI
WEC REO NORPL ILDO MIT
ESOGGR NFRMALCSPTIEG G NEHOL
TAENHCN Y PSRMVOLU EMDYABOP
OBNATAE T DIW EBCYFIAS ACHRKVP
QUKSPSA AE BI ONVENTOCEV RISATAS
FUEOHUR ZON OE T STENACUS RRHRSLT
BSTNRIYZ LXOD DAS ROCSUTVG UETAKEM
PNTISMT LOPEM NTIURTOT MNEMLJM
UNDEOMI SISEEN RSIAVOL PVATCOA
U L UELARDA UTCERS IIOATQB
ND I ISTENFT ITYOLC TRTIMAC
QUIINEB OLUPTAOE EQUAX IOOLPOL
MODICOA QUARURRU ELTN UNERLRE
GCORPIR SSOSCIPM PSM CMUTOL
IAADWLA CPEQFRYA LUM OEECIHA
ASSAEOT TRELBOREN CM NNANALB
DIDIRCNV ITSEDQUC NU TLAMTIUN
OZEDSAGI FCOPTDZEMNUI ROLORSIT
POTDCOEF LCARTIH OTIONALO
INSEDTSVOTP VOLUPTCFYSB
ATACVITIEDIWDIEBCYLIKSPACHE
AQTAEATILLOENVEETORETIR
EMIQIUYLNTSISRENATYSN
MODZLDSUFESROCSIT
NQUELAUDANTIU
USERR

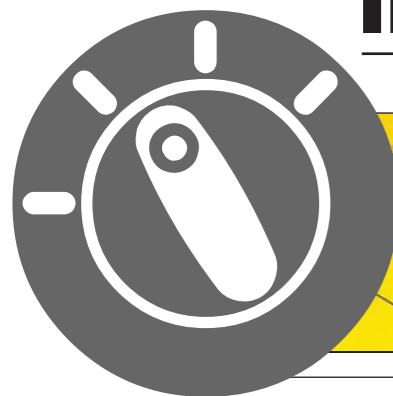
PRODUCT GUIDE

What's inside the machine?



Appliance & Industrial Control

HumiSeal®



Industrial Controls Electronics

HumiSeal®

Market Sectors

HumiSeal conformal coatings are being deployed in an increasing number of applications, across a wider range of market sectors.

This increased demand for conformal coatings is often coupled with elevated expectations in diverse areas such as performance, ease of application, sustainability, quality,

functionality, and environmental properties. All of these expectations require special attention in order to ensure that our products meet expected standards. Each market sector has a distinct set of requirements in terms of standards, operating environments, as well as other factors.



With recent changes in OEM requirements related to CSR (Corporate Social Responsibility), ISO 14001 commitments and the need to drive out cost, both within their own factories and throughout their supply chains, and the continuous need to “do more with less”, HumiSeal has a wide range of environmentally compliant, low-outgassing, fast curing, high throughput, solvent-free materials, in addition to a wide range of traditional solvent-borne chemistries.

HumiSeal® is the only supplier specialized in conformal coating manufacture.

With a rich history of innovation for more than 50 years, our product offerings and technical support is second to none.

With the widest range of high performance conformal coatings, from every major type of protective chemistry, including acrylic, urethane and silicone, you can be certain that HumiSeal has a high-performance solution for your specific application.

With increasingly sophisticated automation, being required to work longer, harder and with reduced downtime, in new and emerging markets, industrial control assemblies continue to be placed in ever more demanding applications and end-use environments, where the risk of degradation in performance, due to extraneous factors such as humidity, salt-spray, noxious gases and other sources of corrosion continues to increase rapidly.

These electronic assemblies and industrial computers continue to become an increasingly sophisticated and important aspect of both the functionality and reliability of modern industrial drives,



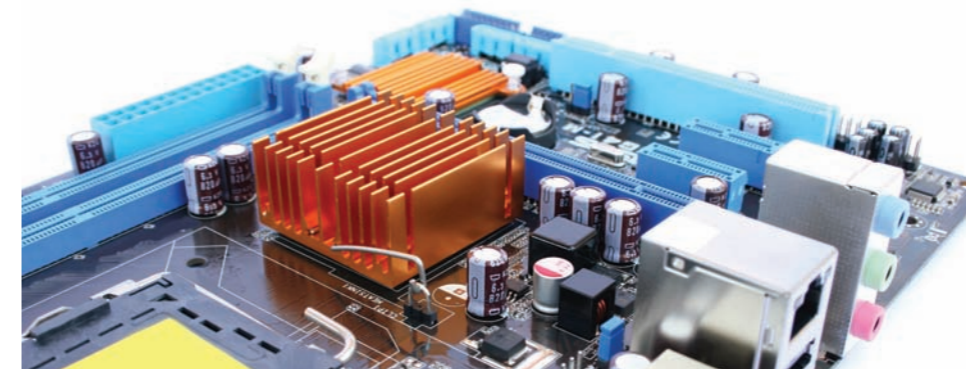
automation systems, (uninterruptible) power supply units, air-conditioning backup generator systems, sensors and measurement systems, HVAC (Heating, Ventilation and Air Conditioning) systems and any other device that is controlled by, or relies upon electronic assemblies as part of its functionality.

The costs of failure (both direct fiscal from recalls and longer-term to brand equity) and the competitive need to provide longer warranties and greater levels of reliability, drive the need to increase the ‘mean time Between failures’ (MTBF) to the maximum possible duration.

With increasingly sophisticated automation, being required to work longer, harder and with reduced downtime, in new and emerging markets, industrial control assemblies continue to be placed in ever more demanding applications and end-use environments, where the risk of degradation in performance, due to extraneous factors such as humidity, salt-spray, noxious gases and other sources of corrosion continues to increase rapidly.

With the increasing adoption of silver, both as a solderability finish and as part of a typical SAC (Tin, Silver Copper) alloy (required by WEEE Initiative), and it’s known susceptibility to creep corrosion and other electrochemically driven corrosion processes, this can result in large warranty claims, especially in the more polluted emerging markets, as well as most major cities and of course, industrial processes that produce such noxious gases that can drive these corrosion failures.

SELECTION HumiSeal® offers the industry’s widest range of high performance coatings, drawn from the widest range of chemistries and they can be applied by any of the common application methodologies This will enable you to select the product that best meets your project needs, production throughput, floor space, and capital equipment requirements. Whether you are upgrading an existing product, transferring a production process from another facility, or are working on a new product introduction - Whatever your requirements, HumiSeal has the solution.



Whatever your requirements, HumiSeal has the solution.

In addition, with more than 50 years’ experience, and a wealth of clients that produce similar products, have similar end-use environments or have overcome similar challenges, HumiSeal is well placed to offer valuable advice that can help save time and reduce the effort to achieve an optimal solution.

TOTAL SOLUTION HumiSeal’s central philosophy is that a conformal coating is not simply a material, it is part of a process, and all of HumiSeal’s materials are backed by an unparalleled level of process knowledge and applications experience, to ensure that whatever your process requirements, a perfectly tailored total process solution is available thus ensuring the results that you demand.

TOTAL CONSISTENCY The overall consistency of your process is largely governed by the consistency of the process inputs, of which your conformal coating material is one. HumiSeal goes to very great lengths to ensure the consistency of batch-to-batch material characteristics. Take advantage of one of our pre-blended materials, to virtually eliminate any potential for on-site mixing or measuring mistakes and you can be assured of an industry beating level of consistent material inputs, taking you one step closer to your SPC or 6 Key Performance Indicators (KPIs).

TOTAL SUPPORT With even the best process solution, occasionally things change. Should this happen to your line, you can rest assured, wherever your factory is located, that HumiSeal’s team of Global Application Experts are on call to ensure that you resolve the situation to your complete satisfaction in the shortest time-frame possible and get your process running at optimum efficiency once again.

HumiSeal®

Appliance & Industrial Control Product Range



Electronics are increasingly used to control the motors and drives of appliance and industrial control products and are often subjected to hostile environments such as heat, humidity, chemical splash, noxious gases and salt spray. A conformal coating is a light weight, low cost method of ensuring reliability.

HumiSeal® acrylic conformal coatings are specified in these sectors, especially where humidity and condensation are prevalent:

- Fast drying by solvent evaporation
- Excellent resistance to moisture
- Ease of application by all application methods
- Superb flexibility over wide temperature range
- Easiest coatings to repair and rework

HumiSeal polyurethane conformal coatings also offer the opposite features and are widely specified in more demanding environments where solvent resistance is required:

HumiSeal's silicone conformal coatings provide a proven technology, offering:

- Low odor
- High temperature resistance (200°C)
- Non hazardous
- Excellent flexibility
- Heat activated or room-temperature RTV cure
- Very good dielectric properties
- Medium to fast cure speeds

HumiSeal's UV40 range of materials is the latest breakthrough in UV curable technology, offering:

- Rapid cure speeds
- Superb flexibility over wide temperature range
- Low VOC emissions
- Extreme thermal endurance
- Easy application
- Unrivaled chemical resistance
- Reliable secondary cure mechanism



HumiSeal can supply materials pre-blended to your exact viscosity requirements, to eliminate on-site mixing and prevent batch-to-batch differences in material behaviour.

| | ACRYLICS | | | UV CURABLES | | URETHANES | | | SILICONES | | | |
|--|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| | 1B31 | 1B73 | 1R32A-2 | UV40 | UV40-250 | 1A20 | 1A27LU | 1A33 | 1C49 | 1C49LV | 1C51 | 1C55 |
| QUALIFICATIONS | | | | | | | | | | | | |
| MIL-I-46058C | Yes | Yes | No | Yes | No | Yes | No | Yes | Yes | Yes | Yes | No |
| IPC CC-830B | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No |
| UL746E | No | Yes | No | Yes | No | Yes | Yes | Yes | Yes | Yes | Yes | No |
| UL94 | No | V0 | V0 | V0 | V0 | V0 | V0 | V0 | V-1 | V1 | V-0 | No |
| Available as an Aerosol | Yes | Yes | No | No | No | No | No | Yes | No | No | No | No |
| Solids Contents (%w/w) | 35 | 29.5 | 32 | 100 | 100 | 50 | 50 | 44 | 100 | 100 | 100 | 100 |
| Viscosity (MAX)/cPs | 215 | 270 | 250 | 800 | 300 | 130 | 1900 | 230 | 10500 | 800 | 690 | 300 |
| LIQUID PROPERTIES | | | | | | | | | | | | |
| Flash Point °C (°F) | 1 (33) | 1 (33) | 1 (33) | 85 (185) | 80 (176) | 28 (82) | 26 (80) | 1 (33) | 102 (215) | 102 (215) | 121 (249) | 121 (249) |
| VOC (grammes/litre) | 592 | 654 | 600 | 0 | 0 | 511 | 480 | 521 | 0 | 0 | 0 | 0 |
| Drying Time | | | | | | | | | | | | |
| Tack-free/mins | 10 | 30 | 10 | 0.5 | 0.5 | 60 | 25 | 15 | 180 | 60 | 15 mins @ 110°C | 15 mins @ 110°C |
| Dry | 24 Hrs | 24 Hrs | 24 Hrs | N/A | N/A | 24 Hrs | 20 Hrs | 24 Hrs | 24 Hrs | 24 Hrs | 15 mins @ 110°C | 15 mins @ 110°C |
| Optimum Properties | 1 Week | 1 Week | 1 Week | 72 Hrs | 72 Hrs | 1 Week | 30 hrs | 1 Month | 1 Week | 1 Week | 15 mins @ 110°C | 15 mins @ 110°C |
| Pot Life at Room Temperature (RT) | 12 Months | 12 Months | 12 Months | N/A | N/A | N/A | 12 Months | 12 Months | N/A | N/A | 1 Month | > 30 days |
| Shelf Life at RT | 24 Months | 24 Months | 24 Months | 12 Months | 12 Months | 6 Months | 24 Months | 24 Months | 6 Months | 6 Months | 12 Months | 12 Months |
| Coverage m ² /litre (25 microns thickness) | 14 | 12 | 13 | 40 | 32 | 20 | 20 | 18 | 40 | 40 | 40 | 40 |
| PHYSICAL PROPERTIES | | | | | | | | | | | | |
| Continuous Use Operating Range °C (°F) | -65 (-85) + 125 (+257) | -65 (-85) + 125 (+257) | -65 (-85) + 125 (+257) | -65 (-85) + 150 (+302) | -65 (-85) + 150 (+302) | -65 (-85) + 125 (+257) | -65 (-85) + 125 (+257) | -65 (-85) + 125 (+257) | -65 (-85) + 200 (+392) | -65 (-85) + 200 (+392) | -65 (-85) + 200 (+392) | -65 (-85) + 200 (+392) |
| Thermal Shock °C (°F) | -65 (-85) + 125 (+257) | -65 (-85) + 125 (+257) | -65 (-85) + 125 (+257) | -65 (-85) + 150 (+302) | -65 (-85) + 150 (+302) | -65 (-85) + 125 (+257) | -65 (-85) + 125 (+257) | -65 (-85) + 125 (+257) | -65 (-85) + 200 (+392) | -65 (-85) + 200 (+392) | -65 (-85) + 200 (+392) | -65 (-85) + 200 (+392) |
| Glass Transition Temperature (Tg) °C | 14 | 42 | 14 | 45 | 26 | 71 | 28 | 26 | <-65°C | <-65°C | <-65°C | <-65°C |
| CTE (x 10 ⁻⁶ / °C) | | | | | | | | | | | | |
| Below Tg | 170 | 193 | 170 | 85 | 112 | 70 | 120 | 119 | N/A | N/A | N/A | N/A |
| Above Tg | 340 | 338 | 340 | 197 | 283 | 183 | 229 | 225 | 367 | 323 | 340 | 154 |
| ELECTRICAL PROPERTIES | | | | | | | | | | | | |
| Dielectric Constant (1MHz @ 25°C) | 2.5 | 2.6 | 2.5 | 2.5 | 2.41 | 3.5 | 3.6 | 3.6 | 2.5 | 2.5 | 2.7 | 2.4 |
| Dissipation Factor (1MHz @ 25°C) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.03 | 0.02 | 0.03 | 0.01 | 0.01 | 0.01 | 0.01 |
| Dielectric Withstand Voltage V (1 minute) | >1500 | >1500 | >1500 | >7500 | >1500 | >1500 | >1500 | >1500 | >1500 | >1500 | >1500 | >1500 |
| Insulation Resistance Per MIL-I-46058C (ohms) | 8.0 x 10 ¹⁴ | 5.5 x 10 ¹⁴ | 8.0 x 10 ¹⁴ | 8.0 x 10 ¹⁴ | 8.0 x 10 ¹⁴ | 3.0 x 10 ¹⁴ | 2.0 x 10 ¹⁴ | 2.0 x 10 ¹⁴ | 5.0 x 10 ¹⁴ | 5.0 x 10 ¹⁴ | 5.0 x 10 ¹⁴ | 5.0 x 10 ¹⁴ |
| Moisture Insulation Resistance Per MIL-I-46058C (ohms) | 6.0 x 10 ¹⁰ | 7.0 x 10 ¹⁰ | 6.0 x 10 ¹⁰ | 6.0 x 10 ¹⁰ | 4.7 x 10 ¹⁰ | 4.8 x 10 ¹⁰ | 1.2 x 10 ¹⁰ | 1.6 x 10 ¹⁰ | 1.0 x 10 ¹⁰ | 1.0 x 10 ¹⁰ | 1.0 x 10 ¹⁰ | 1.0 x 10 ¹⁰ |
| Resistance to chemicals and solvents | Poor | Poor | Poor | Excellent | Excellent | Very Good | Very Good | Very Good | Moderate | Moderate | Moderate | Moderate |
| Recommended Thinner (Dip & Brush/Spray) | 503/521 | 73 | 503/521 | N/A | N/A | 503/521 | 503/521 | 503/521 | N/A | N/A | N/A | N/A |
| Recommended Stripper | 1080/1080A | 1080/1080A | 1080/1080A | Thermal/Mechanical | Thermal/Mechanical | 1072 | 1063/1072 | 1063 | 1090/Mechanical | 1090/Mechanical | 1090/Mechanical | 1090/Mechanical |

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What's inside the machine?

HUMISEAL®, THE WORLD'S LEADING FORMULATOR OF
PROTECTIVE COATINGS FOR ELECTRONIC CIRCUITS



Military & Aerospace
Electronics



Industrial Controls
Electronics



Renewable Energy
Electronics



Automotive
Electronics



Consumer
Electronics



White Goods
Electronics



We make a *material* difference