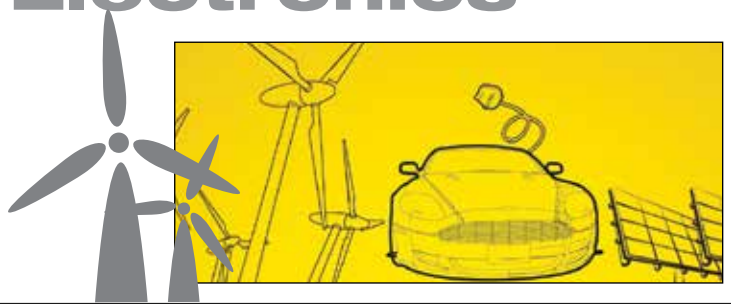
PRODUCT GUIDE
What's inside the machine?

HUMISEAL
RENEWABLE ENERGY
WIND
TURBINE
SOLAR CELL
WAVE
PHOTOVOLTAIC
HYDROELECTRIC
GREEN SOLUTION

Renewable Energy Electronics

HumiSeal®

Renewable Energy Electronics



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 expensive field failures, especially in the harsh marine, coastal and other remote rural installation sites.

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.

Whether you are an environmentalist, an economist or simply a pragmatist at heart, there can be no arguing that it makes the utmost sense to utilize naturally occurring resources whenever possible – this has been the story of the evolution of man. Even the historical use of fossil fuels and nuclear reactions to derive the majority of our energy demands, could be said to be making use of natural resources.

Whether you believe in global warming and the "Greenhouse Gas" theory or not, the reality is that the use of fossil fuels has a finite lifetime and politicians in many countries have taken the responsible approach and committed to reduce emissions of carbon dioxide by 60% in the next 40 years or so. Fossil fuels are projected to become scarce in similar time frames, and so the attention has focused to the pragmatic task of harnessing nature's resources once again, in the form of wind, wave, tide, photovoltaic, geothermal, biomass and fuel cell technology to obtain the majority of our electrical supplies.

The obvious advantage of these sources of energy are that they have been largely unused and being the result of natural processes, clean and sustainable. The main drawbacks to these forms of renewable energy are the enormous costs of installing the required infrastructure, at a sufficient scale to be cost-effective due to the relatively low energy density of these sources, and of course the long payback times on these investments. Given the emergent nature of many of these technologies, achieving cost parity with other forms of power generation will be a key step forwards.

These assemblies will continue to be placed in ever more remote and demanding applications and end-use environments, where the risk of degradation in performance, due to extraneous factors such as high humidity, salt-spray, corrosive gases, rain ingress and other drivers of corrosion will continue 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 renewable energy generation systems.

The costs of failure 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.

Selection of the correct conformal coating is becoming an important methodology, tested, specified and requested by Original Equipment Manufacturers (OEMs) and used by EMS suppliers to prevent corrosion and degradation of assemblies in use, thus maximizing reliability and minimizing warranty claims due to extraneous corrosion.

With the requirement to use lead-free assemblies renewable energy electronics as a fledgling segment, has much work to do to ensure sufficient levels of reliability can be designed or engineered into their systems.

Whatever your requirements, HumiSeal has the solution.

		1H20 WATER BASED		UV CURE				SILICONES								ACRYLICS	
		1H20UR5/D	1H20UR5/S	UV40	UV40-250	UV50 LV	UV500	1C48	1C49	1C49LV	1C49LVF	1C49HVF	1C51 / 1C53	1C55	1C63	1B31LOC	1B73LOC
QUALIFICATIONS	MIL-I-46058C	No	No	Yes	No	No	No	No	Yes	Yes	No	No	Yes	No	No	Yes	Yes
	IPC CC-830B	Yes	Yes	Yes	Yes	No	No	Pending	Yes	Yes	No	No	Yes	No	No	Yes	Yes
	UL746E	No	No	Yes	Yes	Pending	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes
	UL94	No	No	V0	V0	Pending	V0	No	V1	V0	V0	V0	V0	No	V1	No	V0
LIQUID PROPERTIES	Available as an Aerosol	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
	Solids Contents (%w/w)	32	34	95	95	95	98	100	95	90	50	98	98	99	100	25	26
	Viscosity (MAX)/cPs	605	200	800	350	120	375	400	10500	800	800	40000	780	300	5000	475	475
	Flash Point °C (°F)	>100	>100	80 (176)	70 (158)	> 97 (206)	> 99 (210)	150(302)	102 (215)	48 (118)	35 (95)	N/A	121 (250)	121 (250)	220 (392)	22 (72)	6 (43)
	VOC (grammes/litre)	65	65	35	35	0	0	0	0	0	0	0	0	0	<50	91	92
	Drying Time Tack-free/mins	60	60	0.5	0.5	0.5	0.5	5	180	60	10	20			0.5, 60	25	25
	Dry	1 hour @ RT and 6 hrs @ 80ºC	1 hour @ RT and 6 hrs @ 80ºC	N/A	N/A	N/A	N/A	24 hrs	24 hrs	24 hrs	24 hrs	24 hrs	15 mins	15 mins	24 hrs	24 hrs	24 hrs
	Optimum Properties	1 week	1 week	72 hrs	72 hrs	1 week	1 week	1 week	1 week	1 week	1 week	1 week	15 mins	15 mins	1 week	1 week	1 week
	Shelf Life at RT	18	18	12	6	12	6	12	12	12	12	12	12	12	6	24	24
	Coverage m^2/litre (25 microns thinkness)	14	12	40	40	40	40	40	40	40	40	40	40	40	40	14	12
PHYSICAL PROPERTIES	Continuous Use Operating Range °C	-65 to 125	-65 to 125	-65 to 125	-65 to 125	-65 to 125	-65 to 125	-65 to 200	-65 to 200	-65 to 200	-65 to 200	-65 to 200	-65 to 200	-65 to 200	-65 to 200	-65 to 125	-65 to 125
	Thermal Shock °C	-65 to 125	-65 to 125	-65 to 125	-65 to 125	-65 to 125	-65 to 125	-65 to 200	-65 to 200	-65 to 200	-65 to 200	-65 to 200	-65 to 200	-65 to 200	-65 to 200	-65 to 125	-65 to 125
	Glass Transition Temperature (Tg) °C	43	43	45	26	-1	-43	<-65	<-65	<-65	<-65	<-65	<-65	N/A	<-90	14	42
	CTE (x 10^6/ °C) Below Tg	213	213	85	112	122	137	0								170	193
	Above Tg	349	349	197	283	264	311	145	367	323	382	390	296	525	0	340	338
	Dielectric Constant (1MHz @ 25°C)	2.5	2.5	2.5	2.41	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.5	2.5	2.6
ELECTRICAL PROPERTIES	Dissipation Factor (1MHz @ 25°C)	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Dielectric Withstand Voltage V (1 minute)	>1500	>1500	>1500	>1500	>1500	>1500	>1500	>1500	>1500	>1500	> 1500	>1500	>1500	> 1500	>1500	>1500
	Insulation Resistance Per MIL-I-46058C (Ω)	2.3×10^{13}	2.3×10^{13}	8.0×10^{14}	8.0×10^{14}	4.4×10^{12}	4.5×10^{11}	5.0×10^{13}	5.0×10^{14}	5.0×10^{14}	3.9×10^{12}	3.9×10^{12}	5.0×10^{14}	5.0×10^{14}	1.1×10^{12}	8.0×10^{14}	5.5×10^{14}
	Moisture Insulation Resistance Per MIL-I-46058C (Ω)	8.2×10^{10}	8.2×10^{10}	4.7×10^{10}	4.7×10^{10}	3.7×10^{9}	1.6×10^{10}	45.2×10^{10}	1.0×10^{10}	1.0×10^{10}	8.4×10^{10}	8.4×10^{10}	1.0×10^{10}	1.0×10^{10}	1.1×10^{10}	6.0×10^{10}	7.0×10^{10}
	Resistance to chemicals and solvents	Very Good	Very Good	Excellent	Excellent	Excellent	Good	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Poor	Poor
	Recommended Thinner (Dip & Brush/Spray)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	701	701
	Recommended Stripper	1063, 1072	1063, 1072	1100*, Mech	1100*, Mech	1100	1072, Mech	1090, Mech	1090, Mech	1090, Mech	1090, Mech	1090, Mech	1090, Mech	1090, Mech	1090, Mech	1080 (EU)	1080 (EU)

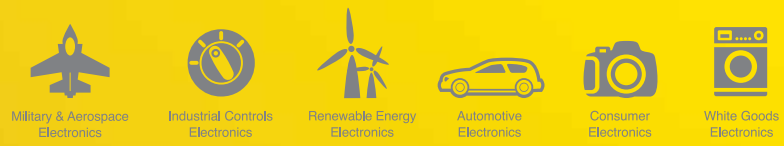
HumiSeal • 295 University Avenue • Westwood • MA 02090 • USA
Tel: **+1 781 332 0734** • Fax: **+1 781 332 0703**

HumiSeal Europe • 505 Eskdale Road • Winnersh • Wokingham • Berkshire • RG41 5TU • United Kingdom
Tel: **+44 (0)1189 442 333** • Fax **+44 (0)1189 335 799**

www.humiseal.com

What's inside the machine?

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



CHASE Electronic Coatings
We make a material difference