

Conformal Coatings

Enhanced protection for ultimate PCB performance

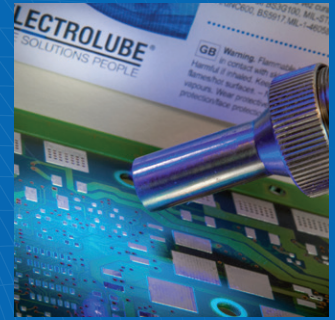


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ELECTROLUBE
THE SOLUTIONS PEOPLE

Conformal Coatings



- UL, MIL-I-46058C and IPC-CC-830 approved
- Solvent removable and solvent resistant coatings
- Acrylic, Silicone, Polyurethane and Hybrid Materials
- UV cure and water-based options available
- UV trace to aid inspection
- Thinners and masking products

Conformal coatings are designed to protect printed circuit boards and related equipment from their environment. These coatings ‘conform’ to the contours of the board allowing for excellent protection and coverage, ultimately extending the working life of the PCB.

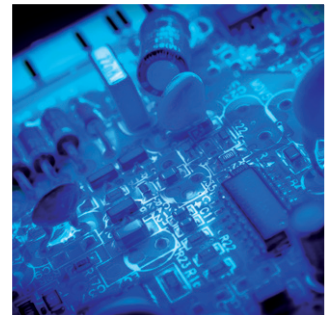
The use of conformal coatings is particularly important in automotive, military, aerospace, marine, lighting, industrial and green energy applications. Due to the rapid expansion of the electronics industry, conformal coatings are also finding their way into the domestic and mobile electronics industries, providing the necessary combination of high performance and reliability within a vast array of electronic devices.

Conformal coatings can be used in a wide range of environments to protect printed circuit boards from moisture, salt spray, chemicals and temperature extremes in order to prevent corrosion, mould growth and electrical failures, for example. The protection provided by conformal coatings allows for higher power and closer track spacing, in turn enabling designers to meet the demands of miniaturisation and reliability.

Electrolube is among the world’s foremost experts in the formulation and application of conformal coatings designed to meet international approvals (including European and American military specifications). The range of products currently available comprises acrylics, silicones, polyurethanes, hybrid chemistries and environmentally friendly options.

Electrolube can offer both transparent and pigmented coatings to improve or camouflage the appearance of printed circuit boards. The range also includes a number of ancillary products to complement the use of our conformal coatings, including thinners and removers, peelable coating masks and thixotropic materials for dam and fill applications.

Introducing the '2K' Range

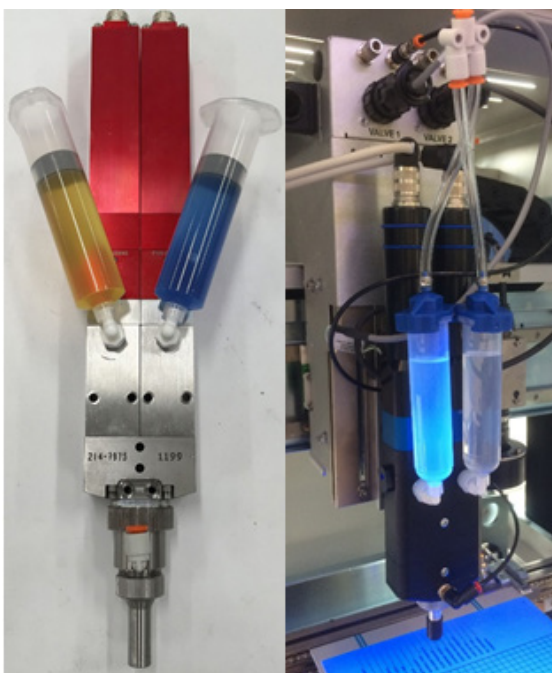


The 2K range of conformal coatings from Electrolube are a unique technology combining the two-part chemistry of encapsulation resins with the ease of application and process of a conformal coating. The new range are solvent-free, fast-curing, high performance conformal coatings designed for application by selective coating. The fundamental chemistry behind Electrolube's new '2K' coating materials is not new, but the 2K, solvent-free selective coating process is a new technological breakthrough, fully enabling the benefits of 2K coating materials to be realised.

The 2K materials provide an excellent, solvent-free alternative to both single part UV and silicone coating materials. Overall, Electrolube 2K materials require less capital investment than traditional UV materials and offer improved performance in harsh environments when compared to silicones.

Electrolube's new 2K850 UV cure coating enables operatives to handle coated boards immediately, with full cure achieved within 24 hours. By contrast, the first generation of UV cure systems require moisture cure times of at least 7-8 days, potentially delaying further stages of the production process.

From rigorous testing, the two part systems demonstrate very impressive performance when compared to other coating types. The fact that they can be applied thickly, without cracking during thermal shock testing, enables a greater degree of component lead coverage to be achieved. This in turn results in improved performance during powered salt-spray testing, mixed flowing gas (MFG) testing and condensation testing; traditionally gruelling test regimes commonly used during automotive qualification campaigns.

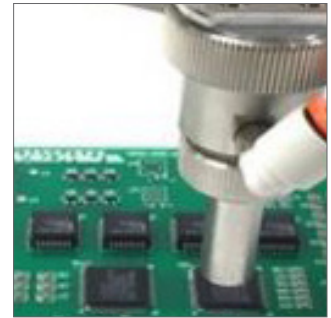


2K coating materials can be applied thinly (50-75 μ m), however they have been designed, formulated and tested to be applied at much greater thicknesses (250-300 μ m), to facilitate superior encapsulation of components and component leads.

With coating applications, controlling the flow rate at a suitably low level whilst also maintaining the correct mix ratios, is the key challenge and has recently been overcome by the use of specially developed, low volume progressive cavity pumps.

The pumps accurately control the flow rates of the individual components of the formulations within $\pm 1\%$, maintaining control of the volumetric mix ratio and ensuring correct curing and properties of the dispensed materials. Additionally, the spray head velocity can be up to three times faster than traditional 100% solids materials spray applications, significantly reducing coating cycle times.

Other Coating Options



Electrolube offer a range of conformal coatings including solvent-based, hybrid chemistries and environmentally friendly products. The most widely used materials are historically solvent-based, the benefits of which include:

- Ease of processing and application
- Simple viscosity adjustment
- Suitability for a range of application methods
- Tailored application and cure

ACRYLIC	HPA, APL, AFA, HFAC
SILICONE	MCS, HCS, 2K750
MODIFIED SILICONE	FSC, FSCP
MODIFIED ALKYD	DCA – SCC3 Range
POLYURETHANE	PUC, URC
WATER-BASED	WBP, WBPS
RUBBER	LTC
UV CURE	UVCL, 2K850
TWO-PART SYSTEMS	2K300, 2K350, 2K500, 2K550, 2K750, 2K850
ULTRA-THIN COATING	FPC

Application & Collaboration

Electrolube selectively partner with key global dispensing equipment manufacturers (including PVA and Nordson Asymtek) to optimise dispensing solutions. This has included close partnership on the testing and development of our unique two-part coating (2K) range.

By working in this way with selective coating machine manufacturers we can ensure that formulations are optimised for application and process using commercially available dispensers.



THERMAL SYSTEMS

MYCRONIC



Selection and Best Practice



In order to achieve the best performance, it is imperative that the most suitable coating and application methods are chosen. The main considerations during this selection period are:

Application Method

Conformal coatings can be applied via spray, dip or brush methods either by manual or automated application. Products are available in bulk, aerosol and small packaging sizes, therefore the correct method and conditions should be assessed for each application. Careful consideration of the advised humidity and temperature conditions for the selected coating should be taken for both application and curing stages.

As well as working with a number of local and international equipment suppliers to apply conformal coatings, Electrolube also offer a range of water and solvent-based cleaning products to ensure all corrosive residues are removed from the printed circuit board prior to conformal coating application. Electrolube therefore offers superior technical support in ensuring the correct application parameters are identified. Please contact us for further information where required.

Operating Environment

The coating must be suitable for use under the required operating conditions. Technical data is provided based on a range of internal and external tests according to international standards. Customers should perform their own testing to ensure that the coating retains all of the required properties throughout the expected lifetime of the product, in its anticipated end use environment. This is due to the differing conditions exhibited as a result of varying PCB materials and designs.

Electrical Requirements

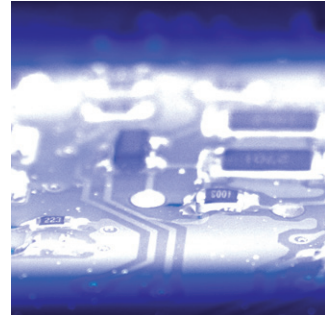
Conformal coatings form a protective, insulating layer. The most common electrical parameter tested is the Surface Insulation Resistance (SIR). This measurement is often taken before and after coating and exposure to harsh conditions, thus ensuring the coating continuously provides the level of insulation required. The coating should also exhibit high dielectric strength; the minimum required can be determined from the inter-track separation and the potential difference between adjacent tracks.

Board Layout

The design of the board should include consideration of the placement of components that should not be coated. Selective spray equipment or the application of a peelable coating mask can be used to help avoid such areas. Alternatively, gel materials can be used to form a 'dam' to contain the coating and avoid capillary effects transferring material to unwanted areas, such as connectors.

Rework and Repair

If the assembly requires repair then consideration must be given to the ease of removal of the coating. Electrolube offer products for the effective removal of conformal coatings, including those that are solvent resistant.



VOCs – The Need for Change

- Volatile solvents used in conformal coatings are classed as VOCs (Volatile Organic Compounds).
- VOCs contribute towards the formulation of ground level ozone.
- Such pollution can have many detrimental effects on the environment, damaging forests and vegetation.
- In addition, some materials classed as VOCs can act as irritants and over exposure can lead to a variety of health problems.

VOC Definitions

EPA

'Volatile Organic Compounds (VOC) means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate, which participates in atmospheric photochemical reactions.'

EU Solvents Emissions Directive

'Any organic compound with a boiling point less than or equal to 250°C at a standard pressure of 101.3 kPa.'

Previously the directive referred to the definition as 'Any organic compound, having at 20°C a vapour pressure of 0.01kPa or more, or having corresponding volatility under the particular conditions of use'.

As stated on the European Commission website, either method is suitable:

'The "boiling point approach" was adopted for Directive 2004/42/CE because during negotiations Member States were generally more in favour of this definition of VOCs than the "vapour pressure approach" definition in Directive 1999/13/EC. The main reason is that the boiling point of a substance is easier to identify (and presumably more data are available) than the vapour pressure at room temperature of the same substance. Nevertheless, the results of the two approaches for any one substance are, to the knowledge of the EU Commission, in most cases identical.'

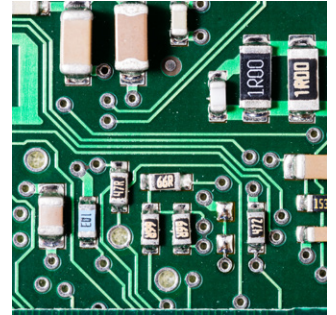
Low VOC Alternatives

Electrolube manufacture conformal coatings with alternative curing technologies, such as the 2K range of two-part coatings, and UVCL which completely eliminate the use of VOCs.

In addition, Electrolube's water-based coatings WBP and WBPS also help to keep VOC levels to an absolute minimum without compromising on performance.

Electrolube are continually developing 'greener' technologies, helping to minimise solvent emissions and their impact on the environment.

Investigation & Methodology



A coating needs to be exposed to a range of environments via appropriate test conditions to establish its performance range and limitations.

The ideal coating should offer a combination of:

- Good electrical properties
- Low moisture permeability
- Good physical characteristics
- Excellent adhesion to all board materials

Basic tests:

- Electrical performance and accelerated humidity testing.

Advanced testing:

- Severe conditions such as salt mist, temperature extremes or rapid environmental changes.

Approvals

The following Electrolube conformal coatings are approved to the standards listed:

- DCA (SCC3) – UL746, Def Stan 59/47
- AFA – IPC-CC-830, UL746
- HPA – MIL-I-46058C, IPC-CC-830
- FSC – IEC 61086, UL746
- UVCL – IPC-CC-830, UL746
- FPC – UL746

BMW Group Standard

2K300, 2K500, UVCL, AFA, LTC and DCA have passed qualification to BMW Group Standard GS95011-5

Electrolube put all of their conformal coatings through the test conditions outlined in these specifications and therefore, many other coatings from the range also meet the requirements of these standards.

Performance Criteria

Environmental Testing



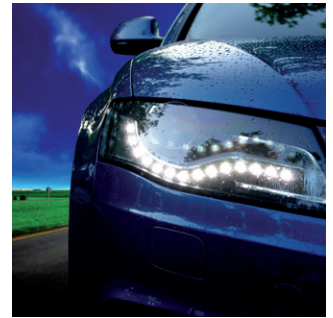
Environmental testing is essential to ensure the required level of protection is achieved. End-use conditions should be replicated or accelerated, however care must be taken to ensure accelerated tests are suitable for comparison with end-use conditions by inducing some failure mechanisms:

- Humidity Exposure and Salt Mist Testing
- Thermal Cycling, Shock and Ageing
- These parameters are either tested individually or combined depending on the requirements

Environmental Cycling

Based on UL746 test methods, the following environmental cycling profile can also be utilised:

- 24 hours immersed in water, followed by
- 24 hours at 105°C, followed by
- 96 hours at 90%RH, 35°C, followed by
- 8 hours at -70°C – end of cycle
- 3 cycles



Humidity Tests

Humidity tests were carried out on comb pattern boards, similar to those in IPC-TM 650 2.6.3.4:

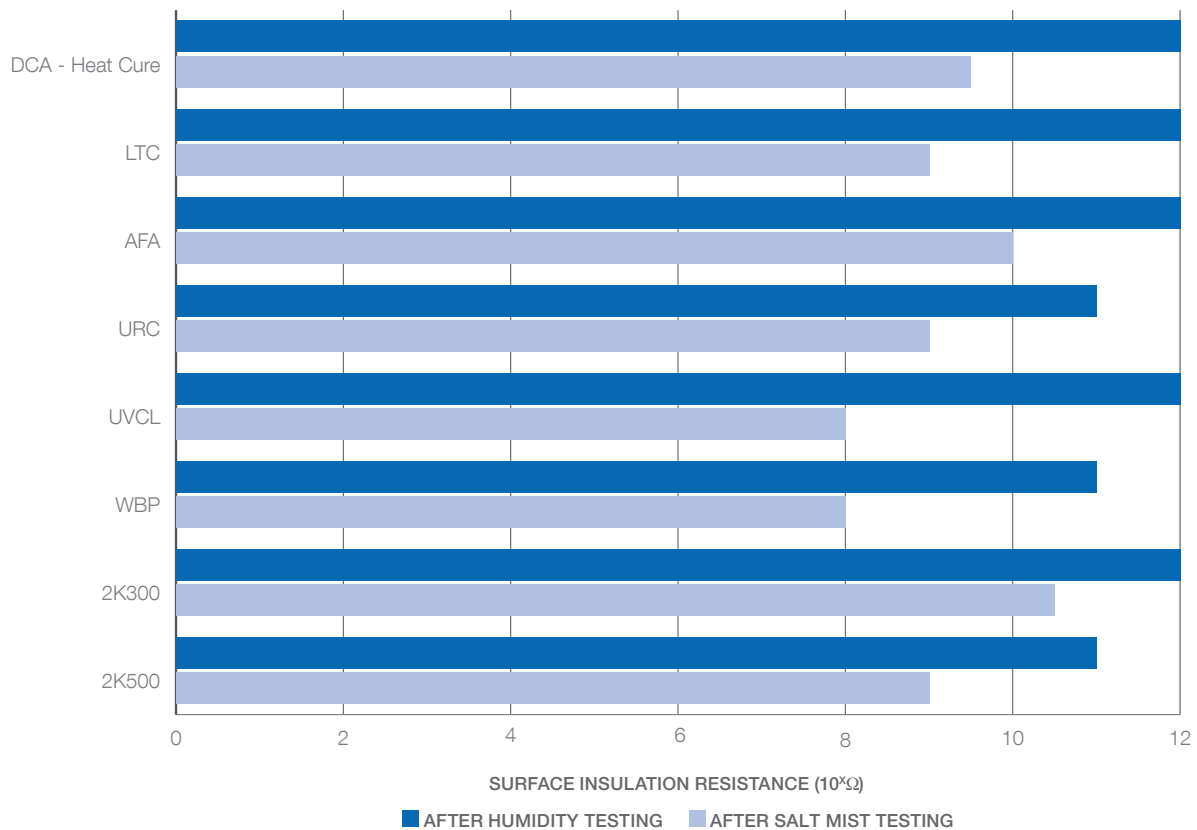
- 85-90% RH, 65°C, 50V DC, 168 hours

Salt Mist Tests

Salt mist tests were carried out in accordance with IEC 60068-2-11:

- 5% salt solution
- 35°C, 168 hours

Environmental Testing

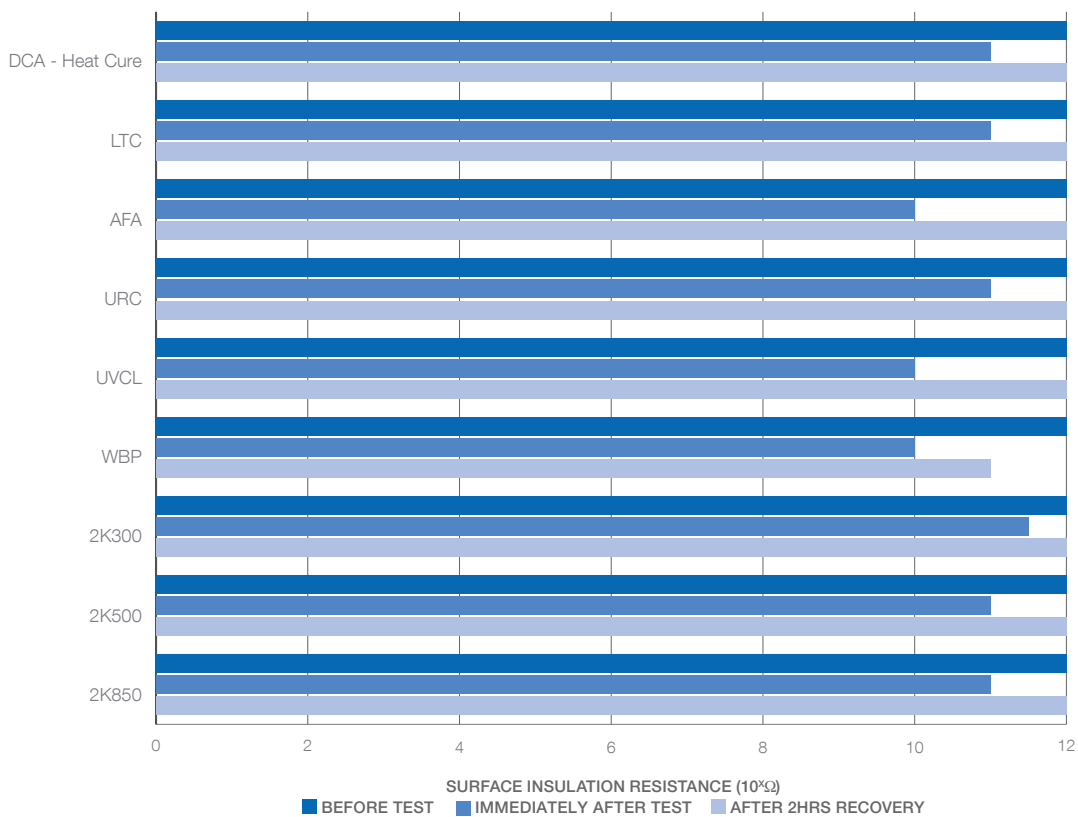




Corrosive Gas Testing

Corrosive gas testing involves exposing PCBs to a mixed gas environment combining hydrogen sulphide and sulphur dioxide – BS EN 60068-2-60, method 1.

Surface insulation resistance (SIR) was used to determine the performance of each coating in this environment:

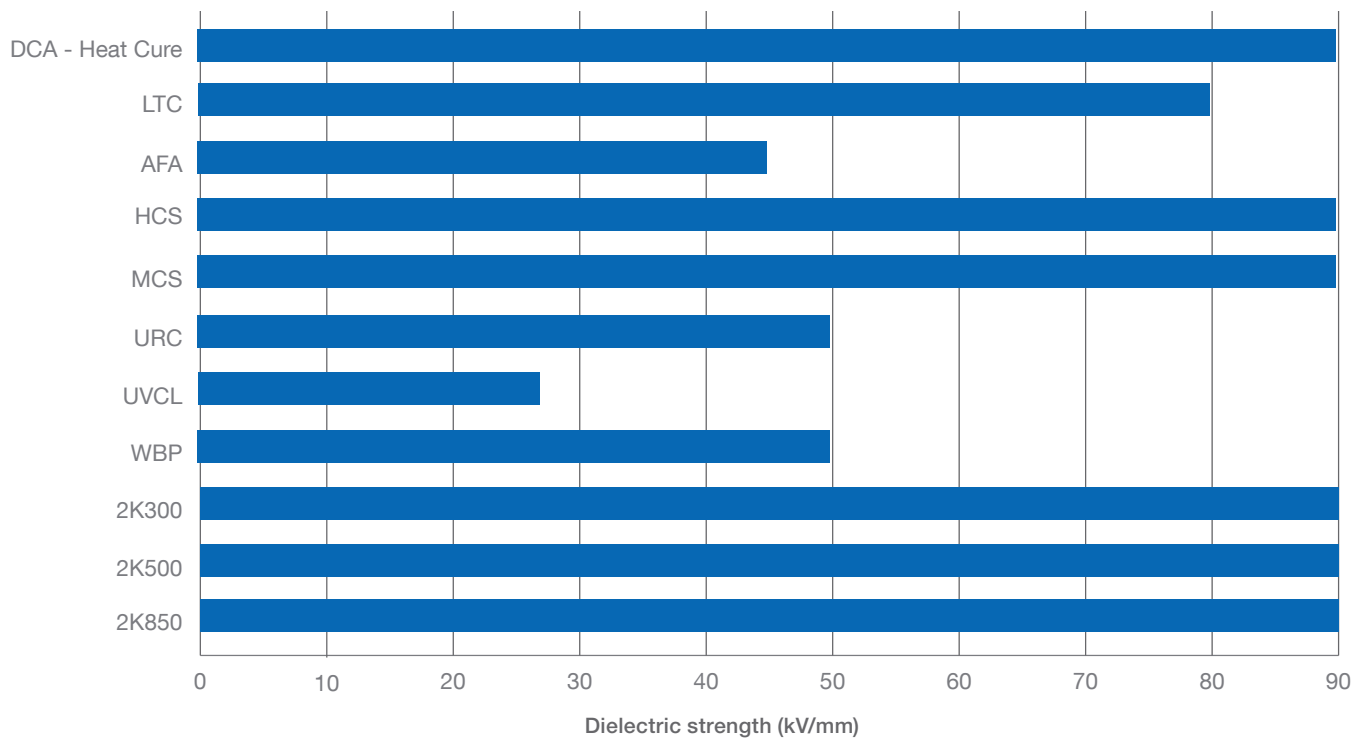
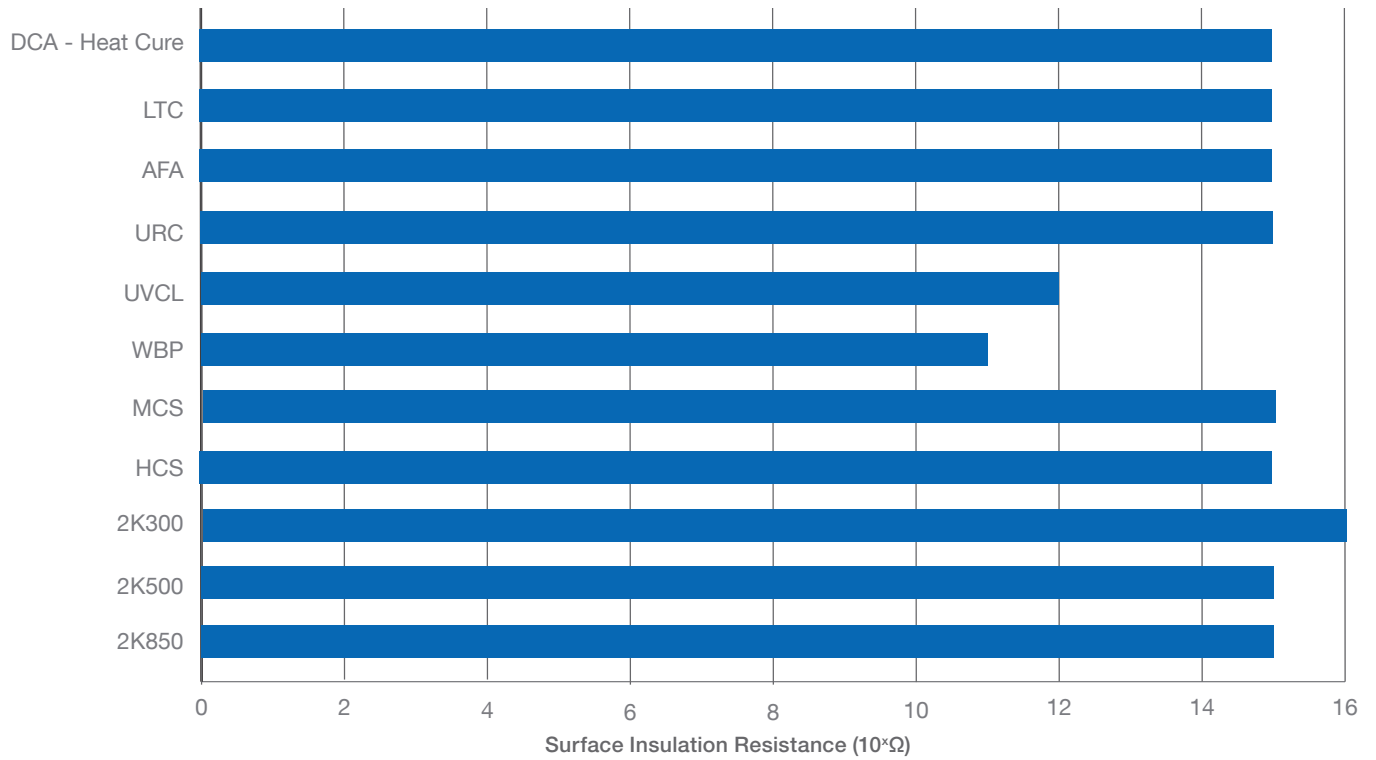


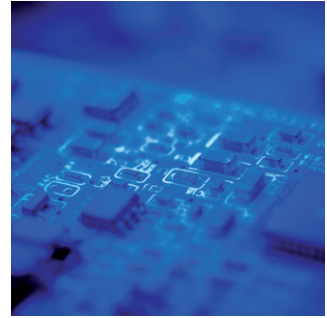
Electrical Testing

Evaluation of electrical properties is essential in all conformal coating applications. Some typical tests include:

- Dielectric Strength
- Dielectric Constant
- Dissipation Factor
- Surface Insulation Resistance
- Comparative Tracking Index (CTI)

Electrical Testing

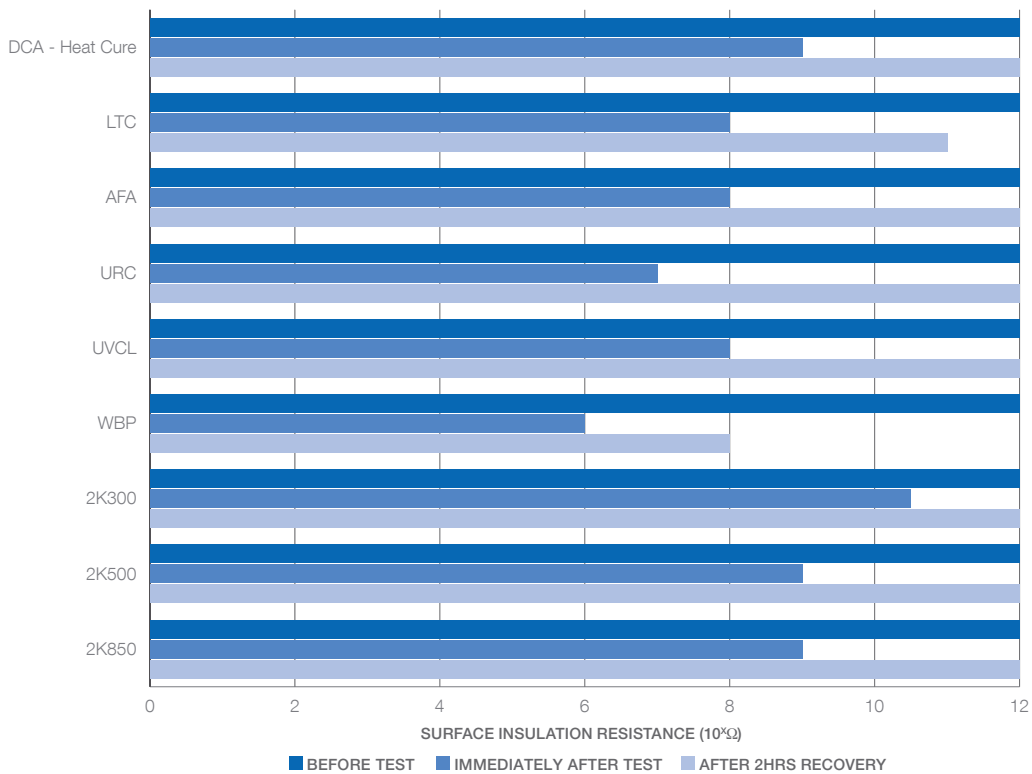




Water Immersion

Immersion in water is an extremely harsh test for a conformal coating to pass. Most coatings will resist immersion for short periods of time however prolonged exposure can highlight issues.

- Coated boards were immersed for 7 days and the SIR results compared.
- For continuous or frequent immersion in water we advise Electrolube Encapsulation Resins



Solvent Resistance

Solvent resistance tests can be carried out in accordance with IEC 61086-2. The performance of the coating will largely depend on the solvents used during the test. Those marked excellent will have a very high level of solvent resistance; Electrolube offer CCRG, a highly efficient coating remover for such products. Those marked 'good' have a reasonable solvent resistance to materials such as IPA but may be easily reworked with specialist products such as Electrolube ULS.

2K Range	EXCELLENT
AFA	GOOD
DCA Heat Cure	EXCELLENT
FSC	GOOD
HFAC	GOOD
LTC	OK/FAIR
PUC	EXCELLENT
MCS	GOOD
HCS	GOOD
URC	GOOD
UVCL	EXCELLENT
WBP	GOOD

Thermal Cycling



A thermal cycling profile was set up as per IEC 60068-2-14:

- -55°C to +125°C, 25 minutes at each temperature
- 12°C/min rate of temperature change
- 20 cycles

Coated tin, copper, aluminium and FR4 panels were subjected to the cycling and then tested for adhesion (BS EN ISO 2409) and flexibility (3mm mandrel – IPC-TM 650 2.4.5.1)

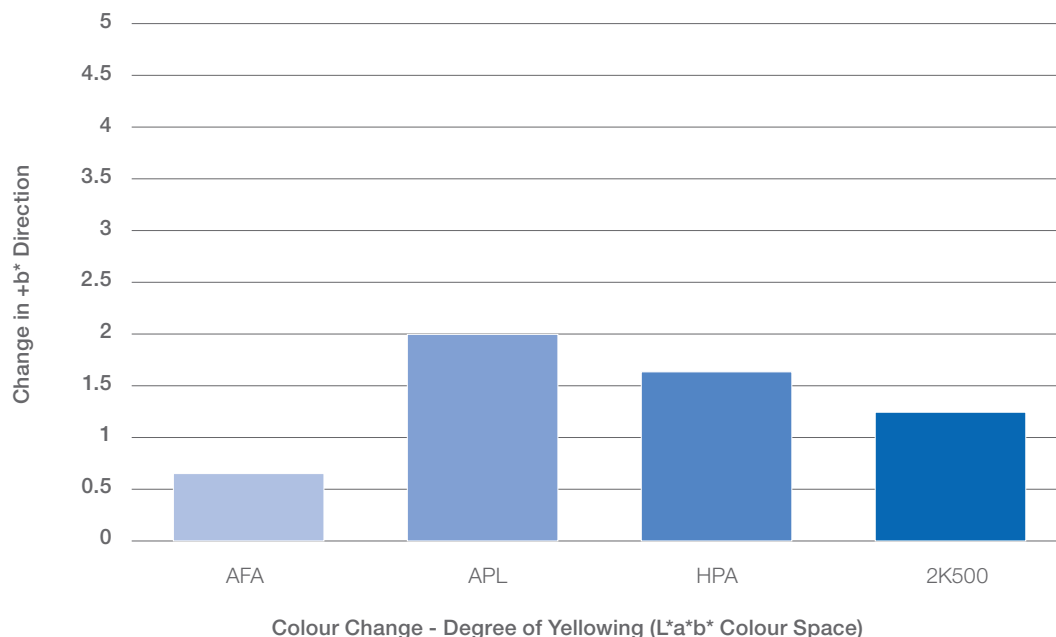
All Electrolube conformal coatings pass this test when applied to the substrates described above.

UV Resistance

Electrolube have carried out weathering resistance tests on a number of available conformal coatings. Tests were in accordance with ISO 4892, Part 3, Cycle 1: 'Plastics Methods of Exposure to Laboratory Light Sources' and carried out in a QUV SE Accelerated Weathering Tester. After 1000 hours exposure, the results indicated that Electrolube acrylic coatings, AFA, APL and HPA have superior resistance to UV light, maintaining their clarity throughout the exposure testing.

Exposure intensities will vary depending on geographical locations and therefore it is important to establish the correct accelerated exposure time for your region. As an example, this test is roughly equivalent to 4 years weathering resistance in a typical Northern European climate.

UV Exposure Testing - 1000 Hours



The Product Range



DCA – SCC3 Conformal Coating

- High specification flexible modified alkyd resin conformal coating
- UL746 approved
- May be ambient cured or heat cured for enhanced performance
- Excellent chemical and solvent resistance when heat cured
- Extremely wide operating temperature range
- Available in opaque black (DCB), opaque red (DCR) and high build (DCRT) versions



MCS – Moisture Cure Silicone Coating

- 100% solids silicone coating
- Very fast touch dry time
- Good coverage; ideal for difficult geometries
- Soft, flexible coating
- Room temperature cure for ease of processing
- Contains a UV trace for ease of inspection



HCS - Heat Cure Silicone Coating

- Low viscosity and solvent-free
- Fast full thermal cure time of 10 mins at 105°C
- Wide operating temperature range (-65 to +200°C)
- Meets UL746 and IPC-CC-830 industry standards



AFA – Aromatic Free Acrylic Coating

- Excellent clarity, ideal for LED applications
- Free of aromatic solvents
- Meets UL746 and IPC-CC-830 industry standards
- Very fast touch-dry time
- May be removed with solvents such as Ultrasolve (ULS)
- UV trace to aid inspection



HFAC – Acrylic Conformal Coating

- High performance coating
- Free of Aromatic + halogenated solvents
- Excellent electrical properties
- Optical clarity for LED applications
- Good adhesion to a wide range of materials



HPA – High Performance Acrylic

- High performance flexible acrylic coating
- Approved to US MIL-I-46058C
- UV trace to aid inspection
- Excellent electrical properties
- Excellent clarity, ideal for LED applications
- May be removed with solvents such as Ultrasolve (ULS)



PUC – Polyurethane Conformal Coating

- Excellent abrasion resistance and mechanical strength
- Excellent adhesion under all climatic conditions
- Excellent resistance to a wide range of chemicals and solvents
- UV trace to aid inspection



APL – Acrylic Protective Lacquer

- Excellent clarity, ideal for LED applications
- Offers excellent adhesion to all substrates
- Good temperature range and dielectric properties
- May be soldered through for rework
- UV trace to aid inspection
- May be removed with solvents such as Ultrasolve (ULS)

*Various sizes are available for most products, including bulk



URC – High Performance Urethane Coating

- Fast touch dry time
- Excellent abrasion resistance and mechanical strength
- Excellent adhesion under challenging climatic conditions
- Contains a UV trace to aid inspection
- High level of flexibility, even at low temperatures
- Good resistance to a wide range of chemicals and solvents



LTC – Aromatic-Free Low Temperature Coating

- Maintains flexibility even at low temperatures
- Fast touch-dry time
- free from aromatic solvents
- Excellent protection in high humidity environments
- Good high temperature and thermal shock performance
- UV trace to aid inspection



UVCL – UV Curable Polyurethane Coating

- VOC-free
- Exceptionally fast curing
- Low viscosity, ready to use for selective spray application
- Long shelf life
- Excellent flexibility, even after thermal cycling
- UV trace to aid inspection



FPC- Fluorinated Polymer Coating

- Non-flammable, ultra-thin coating
- Very low surface energy
- Repels hydrocarbon and silicone oils, synthetic fluids and aqueous solutions
- Low film strength once cured; connectors do not require masking
- Extremely quick touch dry time
- Simple coating procedure
- UL746 Approval



WBP/WBPS – Aquacoat Plus

- Water-based coating, very low VOC content
- Excellent solvent resistance
- Resistance to mould growth
- N-Methyl pyrrolidone, isocyanate and phenol free
- Wide operating temperature range
- UV trace to aid inspection

*Various sizes are available for most products, including bulk

The 2K Range



2K300 – Two-Part Conformal Coating

- Enhanced operating temperature range
- Highly flexible coating, low stress on components
- Hydrophobic; demonstrates excellent salt mist and condensation resistance
- Good solvent resistance
- Excellent coverage, even over difficult geometries
- Two Part System requires 2K300 as Part A and 2KPB01L as Part B.



2K550 – Two-Part Conformal Coating

- Meets UL94 V-0
- Wide operating temperature range
- Good abrasion resistance
- Excellent thermal shock performance
- Excellent coverage, even over difficult geometries
- Fluorescent tracer
- Two Part System requires 2K550 as Part A and 2KPB05L as Part B.



2K500 – Two-Part Conformal Coating

- Wide operating temperature range
- Good abrasion resistance
- Excellent clarity and resistance to discolouration; ideal for protecting LEDs
- Excellent thermal shock performance
- Excellent coverage, even over difficult geometries
- Very good salt-mist resistance
- Two Part System requires 2K500 as Part A and 2KPB05L as Part B.



2K750 – Two-Part Conformal Coating

- Meets UL94 V-0
- Wide operating temperature range of -40 to +220°C
- Fast thermal cure time of 10 mins at 80°C in addition to curing at ambient temperature
- Tough, low stress coating.
- High continuous use temperature of 200°C
- Provides excellent adhesion to most solder resists and metals
- Two Part System requires 2K750 as Part A and 2KPBS05L as Part B.



2K300KIT – Sample Kit

- Unique sampling kit for 2K300
- Aerosol for ease of application
- No need for specialist equipment
- Designed for customer trials of 2K300



2K850 – UV Cure Two-Part Conformal Coating

- Super-fast UV cure
- Consistently reliable chemical cure in shadow areas
- Wide operating temperature range
- Good abrasion resistance
- Excellent thermal shock performance
- Excellent coverage, even over difficult geometries
- Meets UL94 V-0
- Two Part System requires 2K850 as Part A and 2KPB05L as Part B.



2K350 – Two-Part Conformal Coating

- Meets UL94 V-0
- Opaque Blue - ease of inspection
- Highly flexible coating, low stress on components
- Hydrophobic; demonstrates excellent salt mist and condensation resistance
- Good solvent resistance
- Excellent coverage, even over difficult geometries
- Two Part System requires 2K350 as Part A and 2KPB01L as Part B.



2KPB0 – Reaction Agent for 2K Systems

- 2KPB0 is required for all 2K Two Part Systems
- Available in 1 and 5 litres
- Please consult respective 2K TDS for recommended mix ratios.

Associated Products



The Safewash Range

- Water-based cleaning products for use before conformal coating
- Environmentally friendly
- Efficient removal of all flux residues
- Ensures cleanliness to military standards is achieved
- Products available for ultrasonic, spray under immersion and dishwasher application
- Products available for stencil cleaning and uncured adhesive removal



HFS – High Performance Fluorinated Solvent

- Non-flammable solvent
- Fluorinated solvent suitable for a wide range of applications
- Used to dilute fluorinated coatings, such as FPC
- Very fast drying; aids quick processing
- Promotes cost effective and efficient application
- Can be used for electronic cleaning and general degreasing applications



PCM – Peelable Coating Mask

- Flexible latex for masking components
- Manual removal, leaving no residue
- Solvent resistant and does not contaminate conformal coatings
- Dries at room temperature
- High film strength, does not break easily
- Can be accurately applied using automated dispensing machines



PCS – Peelable Coating Mask Synthetic

- Thermal cure
- Ammonia free – no odour
- Manual removal, leaves no residues
- Does not dissolve in solvents or contaminate conformal coatings
- Suitable for use with dip, spray or brush applied coatings
- Can be accurately applied using automated dispensing machines



CCRG – Conformal Coating Removal Gel

- Thixotropic gel specifically formulated to remove Electrolube's solvent resistant coatings
- Allows localised removal of components
- Can be used in conjunction with RRS, Resin Removal Solvent for complete coating removal
- Water rinsable
- Does not contain methylene chloride



ULS – Ultrasolve Cleaning Solvent

- Allows efficient rework of solvent removable conformal coatings
- Excellent degreasing properties
- Fast evaporation
- Compatible with most plastics, rubbers and elastomers
- APL, FSC, HPA, AFA, can be removed
- Available in bulk, aerosol and aerosol brush version



HFFR – Hexane-Free Flux Remover

- N-hexane free
- Efficient removal of all flux residues
- Harmless to most plastics, rubbers and elastomers
- Leaves a perfectly clean, dry surface with no residue
- Fast evaporation
- Available in bulk, aerosol and aerosol brush version



IMC – Industrial Machine Cleaner

- Designed for general cleaning of automated dispensing equipment
- Ideal for cleaning selective spray equipment prior to and following the use of UVCL Conformal Coating
- Non-flammable
- Prevents machine blockages
- Low toxicity
- Very low vapour pressure

*Various sizes are available for most products, including bulk

Single-Part Conformal Coatings

							Low VOC				
	AFA	DCA	HPA	HFAC	LTC	URC	MCS	HCS	UVCL	WBP/WBPS	FPC
	Aromatic Free Acrylic	Modified Alkyd Conformal Coating (SCC3)	High Performance Acrylic	High Performance Acrylic	Low Temperature Coating	High Performance Urethane Coating	Moisture Cure Silicone Coating	Heat Cure Silicone Coating	UV Cure Conformal Coating	Aquacoat Plus/Sprayable	Ultra-Thin Coating
Colours Available	Transparent	Clear/Black/Red	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Viscosity (mPa s @ 20°C) (Bulk)	175	200	300	360	150	240	500	600	250	200/80	2
Flashpoint (°C) (Bulk)	-7	27	-7	12	-4	>90	None	None	>90	None	None
Solids (%) (Bulk)	35	37	35	25	23	43	100	100	100	35	2
Dielectric Strength (kV/mm)	45	90	45	45	80	80	90	90	27	50	90
Insulation Resistance (Ω)	1 x 10 ¹⁵	1 x 10 ¹⁵	1 x 10 ¹⁵	1 x 10 ¹⁵	1 x 10 ¹⁵	1 x 10 ¹⁶	1 x 10 ¹⁵	1 x 10 ¹⁵	7 x 10 ¹²	5 x 10 ¹¹	1 x 10 ¹⁵
Temp. Range (°C)	-65 to +125	-70 to +200	-55 to +130	-65 to +125	-65 to +130	-40 to +140	-65 to +200	-65 to +200	-65 to +135	-60 to +125	-40 to +200**
Touch Dry Time (Mins @ 20°C)	5-10	50-55	10-15	20-30	10-15	15	<10	N/A	*	25-35	1-5
Cure Time (Hours @ 20°C)	24	2 @ 20°C & 2 @ 90°C	24	24	24	24	24	10 mins @ 105°C	*	24	24
Solvent Resistance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Humidity Resistance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Mould Resistance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Thinners	FTH	DCT	UAT	MDT	LTCT	LOT	N/A	N/A	N/A	DI Water	HFS
UV Trace	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Approvals	IPC-CC-830, UL746, (Meets) BMW GS95011-5	UL746	MIL-I-46058C	Meets IPC-CC-830, Meets UL746	(Meets) BMW GS95011-5, IPC-CC-830, IEC61086	Meets IPC-CC-830	Meets IPC-CC-830	Meets IPC-CC-830	IPC-CC-830, UL746, (Meets) BMW GS95011-5		UL746

* Please refer to the technical data sheet for more information on UV Curing Parameters.

** Application and Geometry Dependent.

UVCL, AFA, LTC and DCA have passed qualification to BMW Group Standard GS95011-5

Two-Part Conformal Coatings

	2K300	2K350	2K500	2K550	2K750	2K850
	High Temperature Resistant	Flame Retardant High Temperature Resistant	Optically Clear, Abrasion Resistant	Flame Retardant Abrasion Resistant	Silicone	Unique UV Cure & Chemical Cure
Colours Available	Clear	Blue Opaque	Clear	Clear, slightly white opaque	Clear, slightly white opaque	Red
Viscosity (mPa s @ 20°C) (Bulk)	sprayable*	sprayable*	sprayable*	sprayable*	sprayable*	sprayable*
Flashpoint (°C) (Bulk)	>100	>100	>100	>100	None	>100
Solids (%) (Bulk)	100	100	100	100	100	100
Dielectric Strength (kV/mm)	90	90	90	90	90	90
Insulation Resistance (Ω)	2 x 10 ¹⁶	9 x 10 ¹⁵	5 x 10 ¹⁵	1 x 10 ¹⁵	1 x 10 ¹⁵	1 x 10 ¹⁵
Temp. Range (°C)	-65 to +150	-65 to +130	-40 to +130	-40 to +130	-65 to +200	-40 to +130
Cure Time	10 mins @ 80°C	10 mins @ 80°C	10 mins @ 80°C	10 mins @ 80°C	10 mins @ 80°C	UV
Touch Dry Time (Mins @ 20°C)	240	240	240	240	<120	<120
Solvent Resistance	★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Humidity Resistance	★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Mould Resistance	★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Thinners	2KPB0	2KPB0	2KPB0	2KPB0	2KPB5	2KPB0
UV Trace	Yes	N/A	Yes	Yes	Yes	N/A
UL94 V-0	No	Yes	No	Yes	Yes	Yes
Approvals	Meets BMW GS95011-5 Meets IPC-CC-830					

* The 2K Range has been formulated for optimal application with specific applicators, designed purposively for 2K conformal coatings, by suppliers such as Nordson Asymtek and PVA. Please refer to the technical datasheet or contact us for further information.

2K500 has passed qualification to BMW Group Standard GS95011-5

2K300, 2K350, 2K550 and 2K850 meet the requirements of BMW Group Standard GS95011-5



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