INDUSTRY SOLUTIONS.

Material Solutions.

CHT

SMART CHEMISTRY WITH CHARACTER.

DRIVING TECHNOLOGY

START THE FUTURE OF ELECTRIC AND HYBRID VEHICLES WITH CHT'S SMART SILICONE SOLUTIONS

DISCOVER THE CHT GROUP'S WORLD OF SILICONES

Since the acquisition in 2017, we have merged the silicone competence and know-how of CHT, ACC, QSi and ICM under the CHT brand, to serve you with the specialty silicones. You can rely on our international teams of highly skilled silicone experts for experience, know-how, technical and personal service that will surpass your expectations. Our expertise extends into all areas of one- and two-part silicone elastomers with a strong focus on application-based solutions.

More than ever, we ensure consistent development of forward-thinking technologies and products. Through smart chemistry we take care of sustainability. This thinking guides our developments in the area of future mobility concepts. Regarding electrification, autonomous driving and connectivity, our experts are working on innovative materials.

We are committed to developing the best solution for your unique applications – challenge us!

MANY POSSIBILITIES

High temperature stability

Chemical resistance

Thermal conductivity

Lightweight

High transparency

Electrical conductivity

6 KEY FACTS ON SILICONES

Silicone elastomers stand for excellent temperature stability, environmental friendliness, very good optical characteristics as well as perfect electrical insulation and isolation properties. Due to their different features and properties, silicone elastomers can be processed and used in numerous mobility applications.

The silicone matrix can be loaded with microscopic particles which depending on their chemical nature ensure the efficient thermal transfer, enhance chemical resistance or improve mechanical properties. The unique combination of the silicone matrix and the fillers depends upon the required thermal conductivity, mechanical constraints, operating environment and production methods.

1

EFFICIENT THERMAL MANAGEMENT

Main e-vehicle components produce heat when in use. To avoid the premature failure and to maintain their performance, the heat excess has to be dissipated away from the core parts. The need for efficient heat transfer has become a key design requirement as components continue to reduce in size and increase in power. Our flowable products are designed to reduce air gaps even in the smallest electronics, otherwise they act as insulators and prevent heat transfer.

2

EFFECTIVE BONDING AND SEALING

Our silicone adhesives are soft and flexible and are an ideal fit for sealing and bonding of different interfaces. They provide enhanced adhesion and are also available as a thermally conductive modification.

3

NO COMPROMISE IN OPTICAL CLARITY FOR LED ENCAPSULANTS

High performance LEDs have a complicated optical system design. The smallest traces of impurities or UV-induced yellowing can affect the optical performance dramatically. CHT silicones developed for LED applications are UV-resistant, optically clear with low outgassing to avoid any impurities on the lens.

4

PROTECTION FROM MOISTURE AND CHEMICALS

Due to the enhanced ability to flow around, under and over the components, covering all the cavities and edges, our encapsulants and potting compounds ensure the best protection from moisture and aggressive or corrosive materials.

5 PROTECTION FROM THERMAL STRESS, VIBRATION AND MECHANICAL SHOCK

Our products maintain excellent adhesion to all component substrates, their mechanical properties and outstanding thermal conductivity are unaffected by changes in operational temperatures. They will protect the components from stress, vibration and mechanical shock under the harshest conditions!

6 ELECTRICALLY CONDUCTIVE MATERIALS

With our unique filler technology we can transform insulating silicones into electrically conductive, lightweight and highly ductable materials. These elastomers can be used wherever electrical current needs to be dissipated, e.g. in small sensors or electronic components.

> WHAT WE REALLY OFFER TO OUR CUSTOMERS IS SILICONE EXPERTISE.
>
> **Levi Cottington,**
> CEO CHT USA

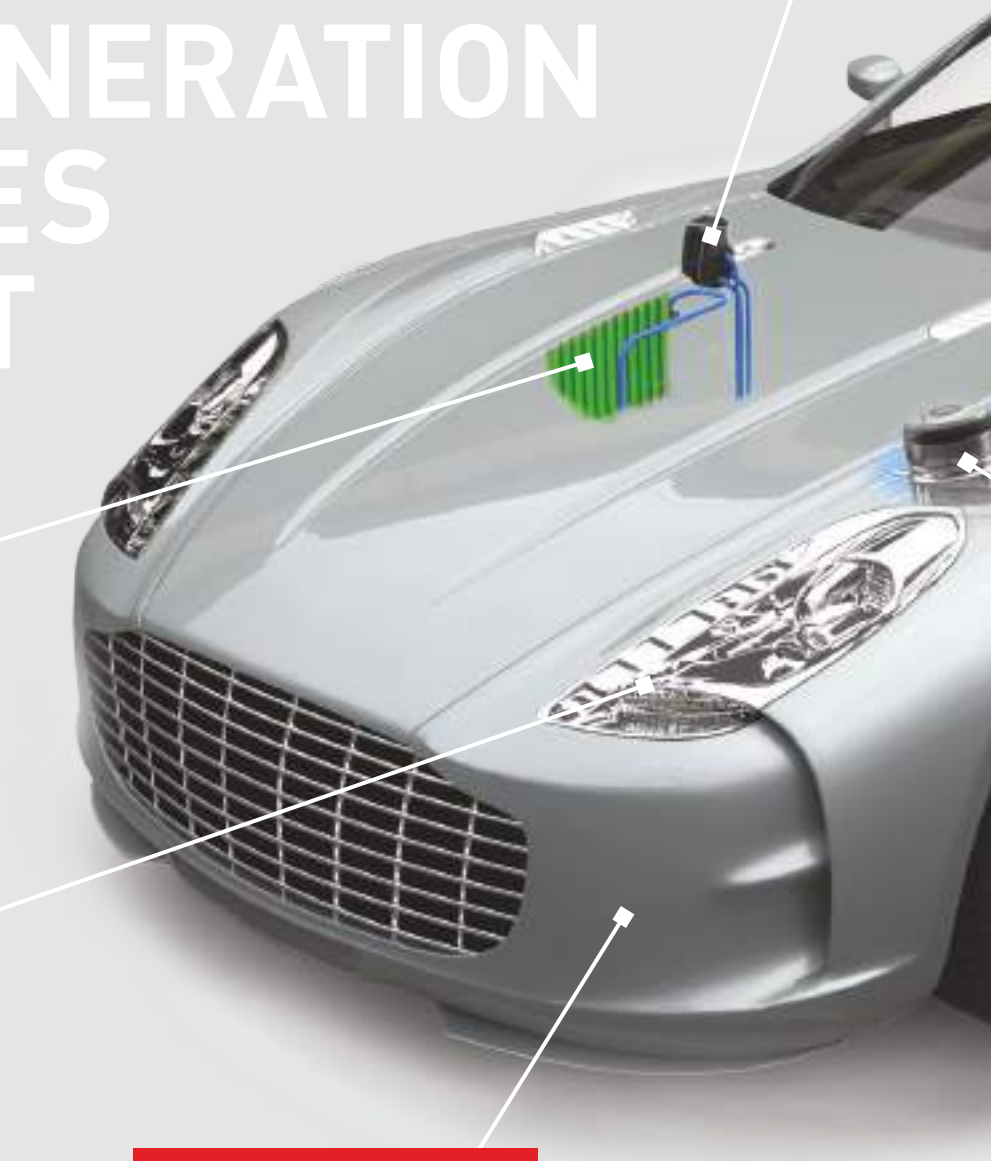
What happens when chemical excellence meets application expertise?
Dr. Ralf Brückmann and Levi Cottington discuss how CHT silicone solutions help the industry solve significant electrification challenges.

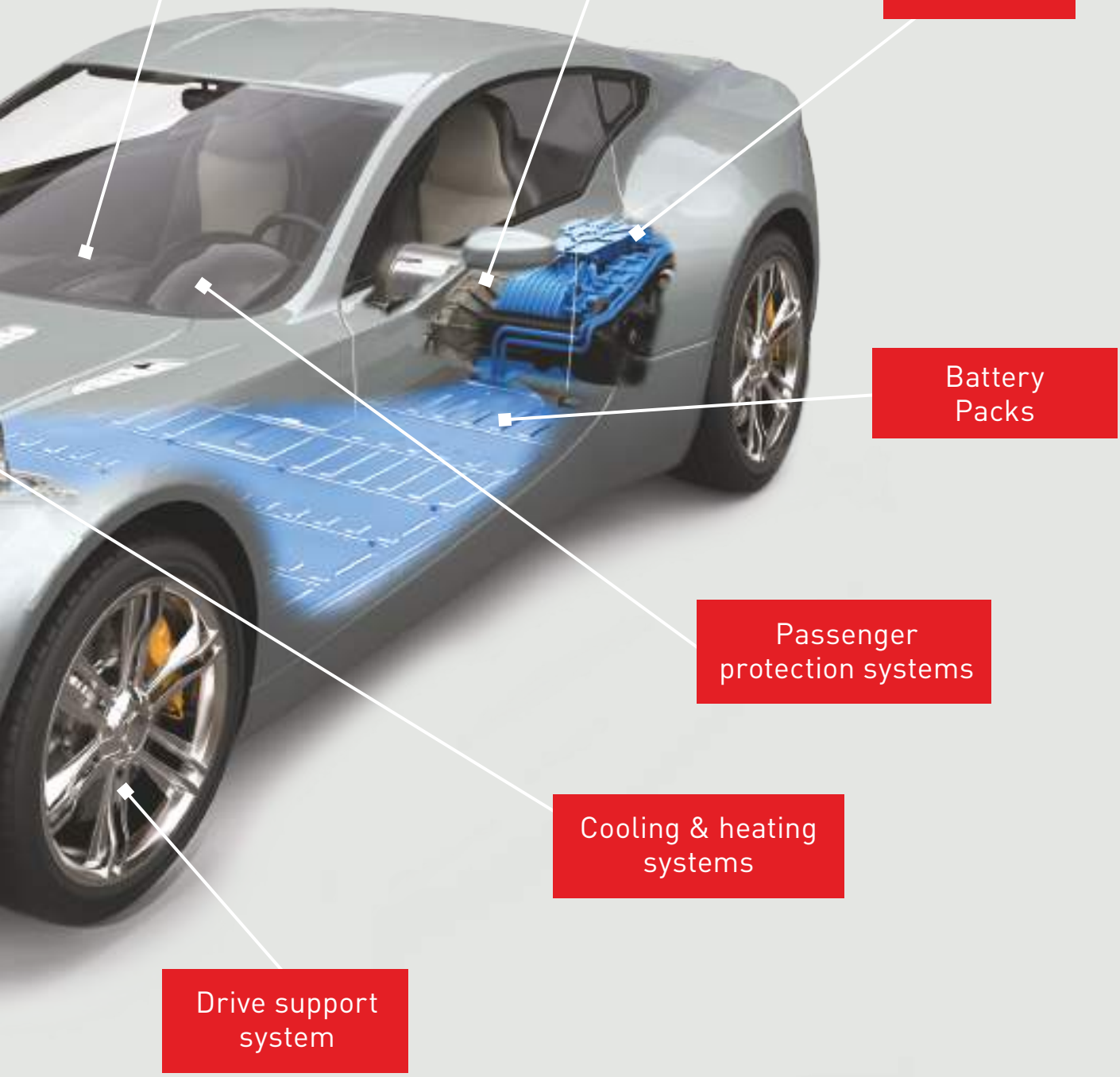
READ INTERVIEW

REAL MULTI-TALENTS

CURRENT APPLICATIONS

SILICONES GIVE NEW GENERATION VEHICLES A BOOST




On-board enternainment
Alternative drives
Engine control unit
Battery Packs
Passenger protection systems
Cooling & heating systems
Drive support system

QSIL 553

VERSATILE SOLUTION FOR ELECTRONIC POTTING APPLICATIONS

QSil 553 is a two-component, addition-cure silicone elastomer system. It has been specially designed for electronic assembly potting applications. The fully cured elastomer offers good protection against shock, vibration and environmental contamination. This product features a low modulus to reduce stress placed on components during thermal expansion and contraction, whilst retaining a wide operating temperature range, a moderate thermal conductivity and a low viscosity.

The versatility of this product offers itself to many applications in the electronics and automotive electronics industries.

Key features and certification:

- Thermally conductive
- UL listed file No. E205830 (UL 94-V0)
- Low modulus
- 1:1 Mix ratio
- Low viscosity

PROPERTY (UNCURED, MIXED)	TEST METHOD	VALUE	UNITS OF MEASUREMENT
Appearance (uncured, mixed)	Not Applicable		Black Viscous Liquid
Max Cure Mins at 25 °C	Not Applicable	24	hours
Max Cure Mins at 100 °C	Not Applicable	7	minutes
Pot Life at 25 °C	Not Applicable	100	minutes
Viscosity	Brookfield	6000	mPa.s

PROPERTY (CURED PRODUCT, AFTER 15 MINUTES AT 150 °C)	TEST METHOD	VALUE	UNITS OF MEASUREMENT
CTE Linear	Not Applicable	217	ppm/°C
CTE Volumetric	Not Applicable	650	ppm/°C
Duro Shore A	ASTM D 2240-95	45	Shore A
Elongation at break	ISO 37	240	%
Min Working Temp	AFS_1540B	-55	°C
Max Working Temp	AFS_1540B	260	°C
Specific Gravity (cured)	BS ISO 2781	1.63	g/cm^3
Tensile Strength	ISO 37	1.72	N/mm^2
Tear Strength	ISO 34-1	7.8	N/mm
Thermal Conductivity	Not Applicable	0.68	W/mK
Dielectric Constant	ASTM D-150	3.08	Not Applicable
Dielectric Strength	ASTM D-149	>18	kV/mm
Dissipation Factor	ASTM D-150	9.00E-03	Not Applicable
Volume Resistivity	ASTM D-257	4.02E+14	Ω.cm

Any questions or suggestions about QSil 553?

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SE3000

UL 94-V0 APPROVED LOW VOC PROTECTION FOR ELECTRONIC COMPONENTS

This is a two-component, addition cure silicone elastomer system specially designed for electronic potting and encapsulation applications. It offers good protection against chemicals, environmental contamination, mechanical shock, vibration and impact damage. It can be employed in areas where low flammability is a prerequisite.

The cured elastomer can be repaired. The component parts have relatively low viscosities and are readily mixed either by hand or machine. The material has the added benefit of low volatile content to minimise the potential interference risk to electrical connections.

Key features and certification:

- Thermally conductive
- Low viscosity
- Low volatility
- UL listed file No. E334038 (UL 94-V0)
- Thermal outgassing compliant to ECSS-Q-ST-70-02C

PROPERTY (UNCURED, MIXED)	TEST METHOD	VALUE	UNITS OF MEASUREMENT
Appearance (uncured, mixed)	Not Applicable		Orange liquid
Max Cure Mins at 25 °C	Not Applicable	4	hours
Max Cure Mins at 100 °C	Not Applicable	6	minutes
Pot Life at 25 °C	Not Applicable	50	minutes
Viscosity	Brookfield	1950	mPa.s

PROPERTY (CURED PRODUCT AFTER 7 DAYS CURE AT 23 °C AND 50 % HUMIDITY)	TEST METHOD	VALUE	UNITS OF MEASUREMENT
CTE Linear	Not Applicable	134	ppm/°C
CTE Volumetric	Not Applicable	402	ppm/°C
Duro Shore A	ASTM D 2240	40	Shore A
Elongation at Break	ISO 37	30	%
Min Working Temp	AFS_1540B	-70	°C
Max Working Temp	AFS_1540B	250	°C
Specific Gravity (cured)	BS ISO 2781	2.2	g/cm^3
Tensile Strength	ISO 37	0.81	N/mm^2
Tear Strength	ISO 34-1	4.56	N/mm
Volatile Content	Not Applicable	<300	ppm
Thermal Conductivity	Not Applicable	1.2	W/mK
Dielectric Constant	ASTM D-150	4.53	Not Applicable
Dielectric Strength	ASTM D-149	14	kV/mm
Dissipation Factor	ASTM D-150	1.07E-02	Not Applicable
Volume Resistivity	ASTM D-257	1.80E+14	Ω.cm

Any questions or suggestions about SE3000?

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SILSO SE 2014

FIRST CHOICE FOR LIGHT WEIGHT POTTING

Lightweight 1:1 addition cure silicone rubber vulcanising at high temperature or overnight at room temperature. The material is suited for coating and protecting cables exposed to water and other environmental elements.

The material can also be used in electronic isolation potting applications and has the added benefit of low weight, especially beneficial to aviation and automotive applications.

Key features and certification:

- Crosslinks at temperatures > 23 °C
- Easy processing
- Crosslinks to a resistant, elastic, rubber without requiring heat
- Very good mechanical properties

PROPERTY (UNCURED, MIXED)	TEST METHOD	VALUE	UNITS OF MEASUREMENT
Appearance (uncured, mixed)	Not Applicable		Viscous green liquid
Specific Gravity (Liquid)	Not Applicable	0.77	g/cm^3
Viscosity (uncured, mixed)	Brookfield	10000	mPa.s
Viscosity (2 hours, mixed)	Brookfield	12800	mPa.s
Viscosity (6 hours, mixed)	Brookfield	28300	mPa.s
Pot Life	Not Applicable	>6	Hours
PROPERTY (VULCANISATE, 177 °C, 17 MIN)	**TEST METHOD**	**VALUE**	**UNITS OF MEASUREMENT**
Hardness, Shore A	ASTM D2240-95	67	Not Applicable
Tensile Strength	BS903 Part A2	2.7	N/mm^2
SG (Cured)	Not Applicable	0.73	g/cm^3
Elongation at Break	BS903 Part A2	54	%
Thermal Conductivity	Not applicable	0.14	W/mK
Volume Resistivity	ASTM D257	1.00E+15	Ω.cm
Dielectric Constant	ASTM D150	2.29	Not Applicable
Dissipation Factor	ASTM D150	1.74E-03	Not Applicable

Any questions or suggestions about SilSo SE 2014?

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AS1420

HEAT CURED SILICONE SEALANT FOR PRIMERLESS BONDING

This is a non-corrosive, neutral cure, one-part, silicone adhesive sealant. It is one in a range of addition cure products which are solvent free. It exhibits primerless adhesion to many substrates when cured at temperatures above 100 °C. It cures to form a very tough, resilient silicone elastomer.

This product will not corrode copper or its alloys and is suitable for use with electronic components.

Key features and certification:

- Fast cure with heat
- Excellent thermal conductivity
- Non-corrosive
- Tough protective rubber
- Self-bonding

PROPERTY (UNCURED, MIXED)	TEST METHOD	VALUE	UNITS OF MEASUREMENT
Appearance (uncured, mixed)	Not Applicable		Grey viscous liquid, flowable
Max cure mins at 100 °C	Not Applicable	30	minutes
Viscosity (Part A)	Brookfield	43000	mPa.s

PROPERTY (CURED PRODUCT, AFTER 1 HOUR AT 150 °C)	TEST METHOD	VALUE	UNITS OF MEASUREMENT
CTE Linear	Not Applicable	187	ppm/°C
CTE Volumetric	Not Applicable	562	ppm/°C
Duro Shore A	ASTM D 2240-95	67	Shore A
Elongation at break	ISO 37	70	%
Linear Shrinkage	Not Applicable	2	%
Max Working Temp	AFS_1540B	260	°C
Min Working Temp	AFS_1540B	-50	°C
Specific Gravity (cured)	BS ISO 2781	2.06	g/cm^3
Tensile Strength	ISO 37	3.1	N/mm^2
Thermal Conductivity	Not Applicable	1.38	W/mK
Dielectric Constant	ASTM D-150	6	Not Applicable
Dielectric Strength	ASTM D-149	22.5	kV/mm
Surface Resistivity	ASTM D-257	1.30E+15	Ω^2
Volume Resistivity	ASTM D-257	7.70E+15	Ω.cm

Any questions or suggestions about AS1420?

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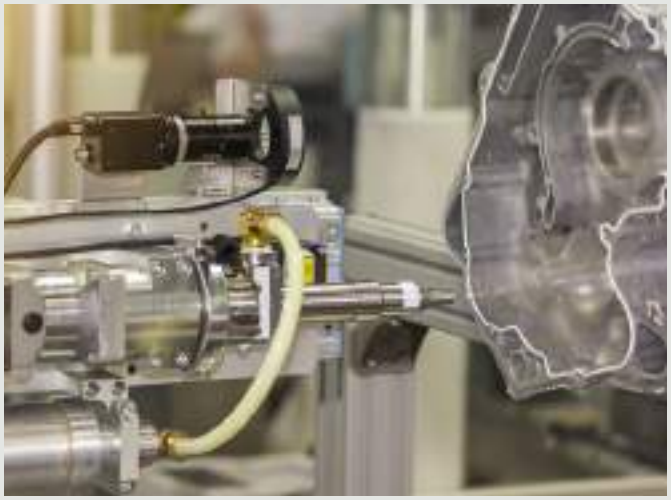

AS1802

ONE-PART, NON-CORROSIVE ADHESIVE FOR THERMAL MANAGEMENT

This is a non-corrosive, neutral cure, one-part, RTV (Room Temperature Vulcanizing) silicone adhesive sealant. It is one in a range of acetone cure products which are solvent free. It exhibits excellent primerless adhesion to many substrates and cures rapidly at room temperature when in contact with atmospheric moisture to form a tough rubber.

This product will not corrode copper or its alloys and is suitable for use with electronic components. AS1802 is also available as black version (UL 94-V0) and with spacers for uniform layer thickness.

Key features and certification:

- Excellent thermal conductivity
- Non-corrosive
- Fast skinning
- Low linear shrinkage
- Self-levelling
- Self-bonding

PROPERTY (UNCURED)	TEST METHOD	VALUE	UNITS OF MEASUREMENT
Appearance (uncured, mixed)	Not Applicable		Grey paste
Max cure mins at 25 °C	Not Applicable	8	hours
Tack Free Time	Not Applicable	4	minutes
Viscosity	Brookfield	350.000	mPa.s

PROPERTY (CURED PRODUCT)	TEST METHOD	VALUE	UNITS OF MEASUREMENT
CTE Linear	Not Applicable	164	ppm/°C
CTE Volumetric	Not Applicable	493	ppm/°C
Duro Shore A	ASTM D 2240	67	Shore A
Elongation at Break	ISO 37	103	%
Min Working Temp	AFS_1540B	-50	°C
Max Working Temp	AFS_1540B	220	°C
Specific Gravity (cured)	BS ISO 2781	2.11	g/cm^3
Tensile Strength	ISO 37	3.9	N/mm^2
Linear Shrinkage	Not Applicable	0.5	%
Thermal Conductivity	Not Applicable	2.3	W/mK
Dielectric Constant @1kHz	ASTM D-150	3.85	Not Applicable
Dielectric Strength	ASTM D-149	20	kV/mm
Dissipation Factor	ASTM D-150	2.00E-03	1kHz
Volume Resistivity	ASTM D-257	1.00E+14	Ω.cm
Lap Shear Aluminium	ASTM D1002	7.15	kg/cm^2
Lap Shear Copper	ASTM D1002	3.60	kg/cm^2
Lap Shear Stainless Steel	ASTM D1002	2.98	kg/cm^2

Any questions or suggestions about AS1802?

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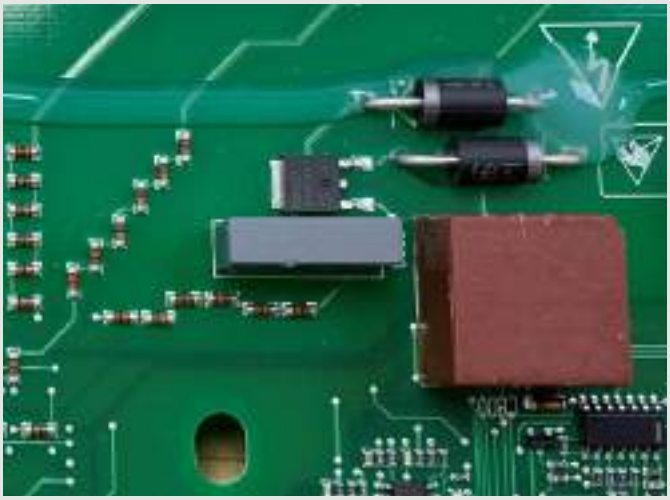
AS1740

HIGH PERFORMANCE RTV ADHESIVE



AS1740 is a one-component alkoxy cure, self-levelling, high performance RTV silicone adhesive. It is a neutral cure silicone sealant specifically designed to meet the physical, chemical and temperature-resistant requirements of MIL-A46146B.

It features exceptional physical properties and is compatible with many sensitive substrates including copper, brass, steel, aluminium and FR4, making this an ideal option for many electronic applications where a high performance is paramount. The alkoxy cure system produces a silicone sealant with excellent adhesion to most common substrates.

Key features and certification:

- Meets the requirements of MIL-A-46146B
- UL certified under file No. E334038 (UL94HB flame rating)
- Excellent adhesion to most substrates
- Contains UV tracer for easy detection

PROPERTY (UNCURED, MIXED)	TEST METHOD	VALUE	UNITS OF MEASUREMENT
Appearance (uncured, mixed)	Not Applicable		Translucent liquid
Max cure mins at 25 °C	Not Applicable	72	hours
Tack Free Time	Not Applicable	8	minutes
Viscosity	Brookfield	40000	mPa.s
PROPERTY (CURED PRODUCT, AFTER 7 DAYS AT 23 °C AND 50 % HUMIDITY)	**TEST METHOD**	**VALUE**	**UNITS OF MEASUREMENT**
CTE Linear	Not Applicable	294	ppm/°C
CTE Volumetric	Not Applicable	883	ppm/°C
Duro Shore A	ASTM D 2240-95	27	Shore A
Elongation at Break	ISO 37	400	%
Min Working Temp	AFS_1540B	-62	°C
Max Working Temp	AFS_1540B	200	°C
Specific Gravity (cured)	BS ISO 2781	1.03	g/cm^3
Tensile Strength	ISO 37	2.5	N/mm^2
Thermal Conductivity	Not Applicable	0.18	W/mK
Dielectric Constant	ASTM D-150	2.6	Not Applicable
Dielectric Strength	ASTM D-149	18	kV/mm
Dissipation Factor	ASTM D-150	3.10E-03	1kHz
Volume Resistivity	ASTM D-257	2.25E+15	Ω.cm
Dissipation Factor	ASTM D-150	1.07E-02	Not Applicable
Volume Resistivity	ASTM D-257	1.80E+14	Ω.cm

Any questions or suggestions about AS1740?

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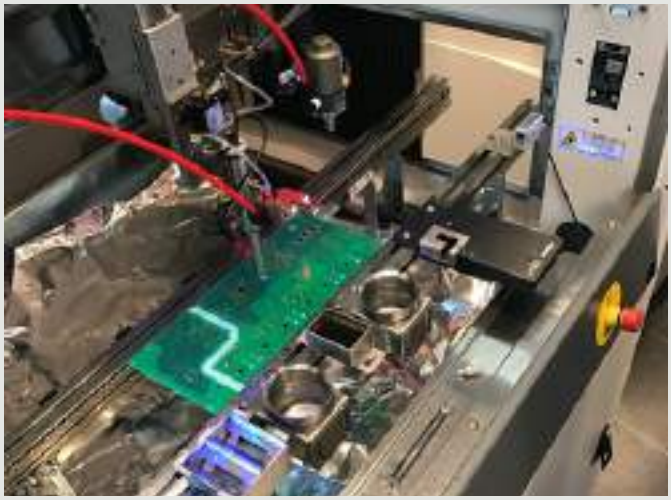

ACC15

LOW VISCOSITY, UV TRACEABLE CONFORMAL COATING

ACC15 is a low viscosity, one-component, condensation curing silicone coating. The uncured product can be applied by pouring, brushing or by use of spraying equipment and readily cures to a tough, transparent rubber.

It can be used to coat printed circuit boards to prevent ingress of water and environmental contaminants.

Key features and certification:

- UL listed file number E493561 (UL 74-6E for printed circuit boards and UL 94-V1 flame rating)
- Room temperature cure or mild heat acceleration at 60°C
- Low viscosity
- Solvent free
- Fluorescent UV aid for production QA checks
- Excellent adhesion to many substrates
- Low odour
- RoHS compliant

PROPERTY	TEST METHOD	VALUE	UNITS OF MEASUREMENT
Appearance (uncured)	Not Applicable		Translucent pale yellow liquid
Viscosity (uncured)	Brookfield	1180	mPa.s
Tack free time	AMB001	12	minutes
Hardness, Shore A	ASTM D 2240-95	18	Not Applicable
Flash Point, Pensky Martin (closed cup)	ASTM D93	150	°C
Solids Content	Not Applicable	100	%
Volumetric coefficient of thermal expansion	Not Applicable	930	ppm/°C
Linear coefficient of thermal expansion	Not Applicable	310	ppm/°C
Volume Resistivity	ASTM D-257	1.88E+15	Ω.cm
Surface Resistivity	ASTM D-257	8.59E+14	Ω.cm
Dielectric Strength	ASTM D-149	18.5	kV/mm

Any questions or suggestions about ACC15?

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QSIL 212

PROTECTION OF LEDs WITH HIGH TRANSMITTANCE

QSil 212 is a low viscosity, high strength, two-component, addition cure silicone elastomer which will cure at room temperature or at elevated temperatures.
It has a low viscosity, which allows ease of flow around complex parts, providing electrical insulation and shock resistance.

The product has a high optical transmittance in the UVC wavelength range of 200 to 280 nm making this the ideal product choice for UVC sterilisation/ disinfection lamps.

Key features and certification:

- Low viscosity
- Low linear shrinkage
- Transparent
- Non-bleed
- High strength
- Great adhesion to many substrates using QSil Primer #7

PROPERTY	TEST METHOD	VALUE	UNITS OF MEASUREMENT
Appearance	Not Applicable		Transparent
Viscosity (uncured)	Not Applicable	10000	mPa.s
Gel Time at 25 °C	Not Applicable	60	minutes
Hardness, Shore A, 10 minutes at 125 °C	Not Applicable	60	Not Applicable
Hardness, Shore A, 3 minutes at 110 °C	Brookfield	50	Not Applicable
Tensile Strength	Not Applicable	8.6	N/mm^2
Elongation at Break	Not Applicable	120	%
Tear B	ASTM D 2240	4.3	N/mm
Volume Resistivity	ISO 37	1.70E+15	Ω.cm
Refractive Index	AFS_1540B	1.41	Not Applicable
Useful Temperature Range	AFS_1540B	-50 to 204	°C
Thermal Conductivity	BS ISO 2781	0.18	W/mK
Refractive Index	ISO 37	1.41	Not Applicable
Max Working Temp	ISO 34-1	204	°C
Min Working Temp	Not Applicable	-50	°C
Volume Resistivity	Not Applicable	1.70E+15	Ω.cm

Any questions or suggestions about QSil 212?

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IT IS VERY IMPORTANT AT CHT, THAT WE HAVE A GLOBAL STRUCTURE. AS A CUSTOMER YOU HAVE ONE CONTACT PARTNER WHO ALWAYS PROVIDES YOU WITH ASSISTANCE AND SOLUTIONS.

Andreas Mumoth,
CHT Sales Director

LEARN MORE ABOUT OUR SilSo APPLICATIONS

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OUR PASSION FOR CUSTOMISED SOLUTIONS

We live and think silicone.

As a strong international team, we are looking forward to being there for you and for all your future specialty silicone demands. We stand for innovation and customisation; thus, we are committed to finding the solution that is best for you and your individual requirements. Silicone chemistry and creative molecule design along with a strong focus on future technologies have always been our passion.

Silicone is our common language.

We are constantly on the road and active for you. No distance is too far for us and no challenge too high. It is our conviction that personal customer contact is the best way to find solutions for your unique requirements. Our technical experts and sales representatives will advise and support you competently and thoroughly, because we see your success as part of our responsibility. Due to our worldwide corporate network, we can offer you helpful information, technical support and the know-how for application wherever you are.

WE COVER EVERYTHING TOGETHER: WE HAVE A TECHNICAL SERVICE THAT IS REALLY SPECIALIZED IN APPLICATION. AND WE HAVE A RESEARCH & DEVELOPMENT DEPARTMENT, THAT REALLY LOVES MAKING MOLECULES AND FINDING SPECIAL SOLUTIONS FOR EACH CUSTOMER.

Dr. Eva Jürgens,
Head of Technical Service

Newest addition to the CHT Silicone Product Range: SilSo BOND 14000 – Are you ready for testing?

SilSo BOND 14000

A one component alkoxy-curing silicone with exceptional fire resistance. It cures to a tough, resilient elastomer and exhibits primerless adhesion to many substrates when cured at room temperature in the presence of atmospheric moisture.

The neutral curing chemistry allows the product to be safely used on sensitive substrates such as copper, copper allows and polycarbonate with no detrimental effects or corrosion of the substrate. SilSo Bond 14000 is ideally suited for use in many applications including a permanent gasket to seal electrical units, a protective glob top of individual electrical components and a supporting coating or wire reenforced ducting for aviation air circulation systems.

Key features:

- Thixotropic, black paste
- Easily dispensed from a 310 ml cartridge
- Will self-extinguish within 10 seconds and will achieve UL94V-0 listing
- Very good overlap shear adhesive strength to aluminium
- Electrical insulator with a high resistance of 1.2 x 10^{15} Ohm*cm
- Will not inhibit the curing platinum catalysed elastomers

WATCH THE FILM

ABOUT ADVANCED CHT SILICONE ELASTOMER SOLUTIONS

If you are interested in testing the material in your area of application or in adapting it to your specific requirements in a close partnership with us, please do not hesitate to contact us.

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GLOBAL CUSTOMERS RELY ON TRUE PARTNERSHIP AND PERFECT WORKFLOW

01 / 2021

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