

Si-COAT® 570™

RTV Silicone High Voltage Insulator Coating

Technical Data Sheet

INTRODUCTION

Si-COAT® 570™ High Voltage Insulator Coating (HVIC) is a room-temperature vulcanizing (RTV) silicone product. Unlike competitive products, it is supplied ready-to-use without the need of additional thinning or excessive mixing/shaking before use. Si-COAT® 570™ HVIC is based on extensive research and development work that lead to the award of a patent. The basis of the Si-COAT® 570™ patent is the optimally-sized alumina trihydrate (ATH) particle and the optimum concentration of the ATH ingredient, discovered by the engineers and chemists at CSL Silicones Inc. The presence of ATH in the formulation of the HVIC is necessary to protect the coating from the damaging effects of tracking under high electrical activity along the surface of the coating. It is essential that the ATH particle be optimally-sized and in an optimum concentration in order to promote long-term hydrophobicity of the coating.

The downside to the presence of ATH is the potential for the filler to settle during storage and transportation. In order to alleviate the problem, competitive coatings rely on a very fine particle size ATH (below 1 micron diameter). However, this fine particle size is far from the optimum size (13 microns) patented by CSL. By virtue of other key ingredients and a unique manufacturing process, the engineers and chemists behind Si-COAT® 570™ have achieved a finished product in which the larger 13 micron ATH particle will not settle. Hence, excessive agitation prior to application is unnecessary, making Si-COAT® 570™ one of the easiest HVICs to use.

Apart from its very long life and ease-of-use qualities, Si-COAT® 570™ was the first to introduce the benefit of strong adhesion to the insulator surface. It is ideally suited for unprimed application to glass, porcelain and polymer (silicone and EPDM) insulators under all voltage conditions from distribution to very high voltage. Over its greater than 15 years of service history, Si-COAT® 570™ has distinguished itself from its competition by virtue of flawless performance without a single failure of any type. That is far more than any competitor can claim of their HVIC.

For ultimate suppression of leakage current and an untarnished service life greater than that of any other HVIC, turn to Si-COAT® 570™ by CSL Silicones Inc.

PRODUCT DESCRIPTION

A single component, RTV, moisture cure, high-build polysiloxane coating providing excellent long-term hydrophobicity, hydrophobicity recovery, electrical characteristics and UV tolerance leading to suppression of leakage current, reduction of pollution related flashover risk and a long service life.

INTENDED USES

Suitable for use on both new insulators and old insulators to be refurbished. Can be used, unprimed, on a variety of insulator substrates including glass, porcelain, HTV silicone, LSR type silicone and EPDM.

Further suitable as a refresh coating over old silicone HVICs provided the old HVIC is properly cleaned and still displays strong adhesion to the insulator surface.

Can be used in a variety of pollution environments including, but not limited to, salt spray, salt fog, industrial (cement dust, fly ash, carbon black, acid emissions, etc.) and desert sand.

Designed for use in AC and DC systems, in substations of all voltage levels and on transmission lines under all voltage conditions ranging from low distribution voltages to very high transmission voltages.

PRODUCT CHARACTERISTICS AND PRACTICAL INFORMATION

Color	Clay Gray. Custom colors may be available dependent on formulation requirements	
Gloss Level	Semi-gloss	
Percent Solids	57% by volume, nominal 70% by weight, nominal	
Theoretical Thickness	15.0 mil ± 4 mil (380 ± 100 microns) dry film thickness (DFT)	
	26.3 ± 7 mil (667 ± 175 microns) wet film thickness (WFT)	
Theoretical Coverage	15.0 mils (380 μ) DFT	
	<i>sq. ft per US gal</i>	61.1
	<i>sq. ft per lb</i>	6.4
	<i>sq. m per liter</i>	1.5
	<i>sq. m per kg</i>	1.3

Allow appropriate loss factor:

Practical Coverage = Theoretical Coverage x [100% - Loss%].
Coverage will vary with the substrate and texture of surface.

Practical Application Thickness Guidance:

380 microns ± 100 microns, in accordance with IEEE Std 1523TM-2002 (IEEE Guide for the Application, Maintenance, and Evaluation of Room Temperature Vulcanizing (RTV) Silicone Rubber Coatings for Outdoor Ceramic Insulators)

Method of Application: Airless spray, brush or dip

Application Temperature Range:

41 to 140°F (5 to 60°C) [ambient]
41 to 266°F (5 to 130°C) [substrate]

Drying Time:

Skin-over Time	20-25 minutes nominal*
Tack-free Time	30-40 minutes nominal*
Cure Through	6 hours nominal*
Full Physical Characteristics	7 days nominal*

*At standard conditions [77°F (25° C) and 50% relative humidity – 10 mils wet film thickness]

REGULATORY DATA

Flash Point	100°F (38°C)
VOC	2.83 lb/US gallon (340 g/liter), nominal
Product Weight	9.6 lb/US gallon (1.15 kg/liter), nominal



PHYSICAL PROPERTIES

(Typical properties - values not to be used as specifications)

Uncured	
Appearance	Thick Paint
Viscosity	1,350 ± 350 cP
Cure System	Neutral, moisture cure
Cured At Standard Conditions* for 7 Days	
Dielectric Strength (ASTM D149)	701.8 V/mil @ 16.1 mil (276.3 kV/cm @ 0.041 cm)
Volume Resistivity (ASTM D257)	1.37 x 10 ¹⁶ Ω.in (3.48 x 10 ¹⁶ Ω.cm)
Surface Resistivity (ASTM D257)	1.36 x 10 ¹⁶ Ω/□
Dissipation Factor (ASTM D150)	at 100 Hz: 0.01 (DFT = 214 microns) at 100 Hz: 0.0292 (DFT = 878 microns) at 100 kHz: 0.00494 (DFT = 878 microns)
Dielectric Constant (ASTM D150)	at 100 Hz: 2.74 at 100 kHz: 2.63
Tracking Wheel Withstand (CEA LWIWG-01)	> 1,000 hrs
Dry Arc Resistance (ASTM D495)	Track: 184 sec Burnout: > 450 sec
Temperature Stability	-40 to 480°F (-40 to 250°C)
Thermal Expansion Coefficient	1.33 x 10 ⁻⁵ in/in.°F (2.4 x 10 ⁻⁵ cm/cm.°C)
Thermal Conductivity	1.70 x 10 ⁻⁵ BTU/hr.ft °F (7.0 x 10 ⁻⁴ Cal/sec.cm.°C)
Loss Tangent at 100 Hz (ASTM D150)	0.0292
Water Repellency Angle (IEC 62073)	<i>Static:</i> 121.3 degrees <i>Advancing:</i> 121.4 degrees <i>Receding:</i> 104.4 degrees
UV & Salt Fog Accelerated Weathering (IEC61109, 5,000 hours)	No degradation
Inclined Plane Tracking & Erosion Test (IEC 60587)	PASS: 1A 4.5; 1B 4.5
Adhesion Testing (IEEE 957)	Water Blast Test: PASS
Adhesion Testing (CEA LWIWG-02)	100 hrs Boiling Water Test: PASS

*At standard conditions 77°F (25°C) and 50% relative humidity

SURFACE PREPARATION & CLEANLINESS*

All surfaces to be coated should be free of dirt, dust, grease, oil, release agents, curing compounds, and other foreign matter including frost, water and microscopic condensed moisture. In addition, prior to applying the coating, all surfaces must be dry. Such precaution will ensure proper adhesion of the Si-COAT® 570™ coating to the insulator surface.

High-pressure water washing is the suggested method for cleaning the insulator surface. The suggested pressure washing parameters are 3,000 psi @ 8 – 10 gallons per minute (210 kg/cm² @ 30 – 40 liters per minute). Insulators contaminated with cementitious material should be cleaned with a dry abrasive cleaner such as crushed corncob or walnut shells mixed with limestone.

For insulators covered in silicone or hydrocarbon grease, remove the bulk of the grease with a dry abrasive cleaner as above, or by hand wiping with a rag. Once the bulk of the grease has been removed, the surface should be wiped clean using an oil-free solvent such as acetone. Isopropyl alcohol is suggested for the final wipe and coating should commence once the insulators are dry. If for whatever reason the Si-COAT application is delayed after cleaning of the insulator, the insulator must be re-cleaned.

COATING APPLICATION

Mixing: Si-COAT® 570™ is supplied as a one-part, ready-to-use coating. It is normal, however, during shipment or extended storage, for carrier solvent to rise to the top of the container. Upon opening of the container, **mix by power agitator until an even consistency of coating is obtained.**

Application: All surfaces should be clean and dry prior to application. The coating should be applied in a manner that prevents runs, sags, drips, spills, etc. and that completely covers surfaces without holidays. The temperature of the surface to be coated should be between 41 and 122°F (5 and 50°C) and environmental temperature should be at least 5°F (3°C) above the dew point prior to and during application.

All areas particularly prone to corrosion such as the caps and pins of insulator discs can also be coated to provide added protection and a uniform monolithic surface.

The entire insulator should be coated with a minimum 15.0 mil (381 micron) to 20.0 mil (508 micron) DFT of Si-COAT® 570™. The maximum advisable DFT of Si-COAT® 570™ is 50 mil (1,270 micron).

Airless Spray: *Recommended* - Tip sizes to range from 17 to 21 thou (432 to 533 micron) with a 6 to 10 inch (15 to 25 cm) fan at 1 ft (30 cm) distance. Pump pressure ratio of 40:1. Total output fluid pressure at spray tip not less than 2,000 psi (141 kg/cm²). Minimum 1/2 inch (1.3 cm) ID, maximum 50 ft (15 m) length spray line. See recommended spray apparatus in Section 9.

Dip: *Suitable* - Constant nitrogen purge should be used over liquid surface in container to avoid formation of skins while dipping. Rotate insulators after dipping to avoid formation of drip marks. Generally, higher DFT is achieved. Thinning may be necessary.

Brush: *Suitable* - Generally, 10 to 15 mil (254 to 381 micron) DFT can be achieved

Thinner: Naphtha or Odorless Mineral Spirits. It is recommended, however, that Si-COAT® 570™ be used at the viscosity supplied. If product is thinned, do not exceed local environmental legislation.

Cleaner: Naphtha or Odorless Mineral Spirits.

Work Stoppages & Restarts: Work stoppages are not recommended with only partial utilization of a container of Si-COAT® 570™. If work must stop after only a portion of a container of Si-COAT® 570™ is used, seal to minimize air and moisture contact with the coating by covering the surface of the coating with a sheet of polyethylene film, then reseal the container to be airtight.

Upon reopening the container to restart work, peel back the polyethylene film. If curing of the coating has occurred, use a utility knife to cut the cured coating away from the wall of the container. Peel away the cured layer of coating to expose fresh coating underneath.

Clean-up: Do not allow material to remain in hoses, gun or spray equipment. Thoroughly flush all equipment with Si-COAT equipment cleaner, naphtha or mineral spirits.

Fully cured coating is environmentally benign (will not harm) and is suitable for landfill disposal. However, always check local environmental regulations before disposal.



RECOMMENDED SPRAY APPARATUS

For Low Productivity	
<i>Spray Pump</i>	<ul style="list-style-type: none"> Use an electric or compressed air-driven 30:1 ratio pump Ensure pump volume output of 1.2 to 3.5 L (0.3 to 1.0 US gal) per minute Pump is to be equipped with a pail suction tube or be suitable for immersion into the coating container
<i>High-Pressure Filter</i>	Use a high-pressure filter located at the outlet side of the spray pump
<i>Hoses</i>	Use a single hose from 7 to 15 meters (25 to 50 ft.) length and 65 mm (0.25 in.) inside diameter for connecting outlet of high-pressure filter to inlet of spray
<i>Airless Spray Guns and Spray Tips</i>	<ul style="list-style-type: none"> Use a single airless spray gun equipped with a filter housing at the gun handle Ensure the gun is designed to accept reversible spray tips Use a 100-micron filter in the gun filter housing Use reversible tips that produce a 10 cm (4 in.) fan width (measured at 30 cm [12 in.] from tip orifice) Use tips with orifices ranging from 280 to 380 microns (0.011 to 0.015 in.)
For Medium Productivity (low productivity equipment with following improvements)	
<i>Spray Pump</i>	<ul style="list-style-type: none"> Ensure pump volume output of minimum 3.5 L (1.0 US gal) per minute Other specifications as per low productivity equipment
<i>High-Pressure Filter</i>	Specifications as per low productivity equipment
<i>Hoses</i>	Use up to 2 hoses from 15 to 30 meters (50 to 100 ft.) length and 65 mm (0.25 in.) inside diameter for connecting outlet of high-pressure filter to inlet of spray gun
<i>Airless Spray Guns and Spray Tips</i>	<ul style="list-style-type: none"> Use up to 2 airless spray guns equipped with a filter housing at the gun handle Other specifications as per low productivity equipment
For High Productivity (medium productivity equipment with following improvements)	
<i>Spray Pump</i>	<ul style="list-style-type: none"> Use ONLY a compressed air-driven spray pump Other specifications as per medium productivity equipment
<i>Transfer Pump</i>	Use a 2:1 ratio air-driven pail transfer pump equipped with an agitator to force feed the coating from the coating container into a low pressure filter
<i>Low-Pressure Filter</i>	<ul style="list-style-type: none"> Use a large external low-pressure bag filter located between the transfer pump and the spray pump Use a 200-micron filter
<i>High-Pressure Filter</i>	Not required
<i>Hoses</i>	Specifications as per medium productivity equipment
<i>Airless Spray Guns & Tips</i>	Specifications as per medium productivity equipment

PRODUCT CHARACTERISTICS

Level of sheen and surface finish is dependent on application method. Avoid using a combination of application methods whenever possible. Best results in terms of gloss and appearance will always be obtained with airless spray.

If over coating Si-COAT® 570™ after weathering or ageing, ensure the coating is fully cleaned to remove all surface contamination such as dust, grease, oil, salt crystals, traffic fumes, etc. before application of a further coat of Si-COAT® 570™.

This product must only be thinned using the recommended thinners. The use of alternate thinners may inhibit the curing mechanism of the coating.

Do not apply to substrate temperatures below 41°F (5°C).

When applying Si-COAT® 570™ in confined spaces ensure adequate ventilation and/or respiratory equipment is available. Consult the Si-COAT® 570™ SDS for further details.

Condensation occurring during or immediately following application may result in a matte finish.

Si-COAT® 570™ has excellent tolerance to airborne chemical exposure. When severe chemical or solvent splashing/pooling is likely to occur, please contact CSL Silicones Inc. for information regarding suitability.

SAFETY PRECAUTIONS

This product is intended for use only by professional applicators in industrial situations in accordance with the advice given in this document, the Safety Data Sheet (SDS) and the container(s), and should not be used without reference to the SDS that CSL Silicones Inc. has provided to its customers.

All work involving the application and use of this product should be performed in compliance with all relevant national, Health, Safety & Environmental standards & regulations.

In the event welding or flame cutting is performed on metal coated with this product, dust and fumes may be emitted that will require the use of appropriate personal protective equipment and adequate local exhaust ventilation.

If in doubt regarding the suitability of use of this product, consult CSL Silicones Inc. for further advice.

PACKAGING*

Size (unit)	Product Volume	Product Weight	Shipping Weight
1 US gal	1.0 US gal (3.8 l)	9.5 lb (4.3 kg)	11.0 lb (5.0 kg)
2.5 US gal	2.5 US gal (9.5 l)	23.6 lb (10.7 kg)	26.5 lb (12.0 kg)
5 US gal	5.0 US gal (18.9 l)	47.1 lb (21.4 kg)	51.5 lb (23.4 kg)
50 US gal	50.0 US gal (189.3 l)	470.6 lb (213.9 kg)	514.8 lb (234.0 kg)

*For availability of other package sizes, please contact CSL Silicones Inc.

STORAGE

Shelf Life: 12 months from date of manufacture in the original unopened container below 90°F (32°C). Subject to re-inspection thereafter. Store in dry, shaded conditions away from sources of heat or ignition.

CSL is ISO 9001:2015 Registered

Disclaimer

The information given in this sheet is not intended to be exhaustive and any person using the product for any purpose other than that specifically recommended in this document without first obtaining written confirmation from CSL Silicones Inc. as to the suitability of the product for the intended purpose does so at his/her own risk. The information contained herein has been prepared in good faith to comply with applicable federal and provincial (state) law(s). However, no warranty of any kind is given or implied and CSL Silicones Inc. will not be responsible for any damages, losses or injuries that may result from the use of any information contained herein. While CSL endeavors to ensure all advice it gives about the product (whether in this document or otherwise) is correct, we have no control over either the quality or condition of the substrate or the many factors affecting the use and application of the product. Therefore, unless CSL specifically agrees in writing to do so, it does not accept any liability whatsoever or howsoever arising for the performance of the product, or for any consequential loss or damage arising out of the use of the product. Any warranty, if given or specific Terms & Conditions of Sale are contained in CSL's Terms & Conditions of Sale, a copy of which can be obtained upon request. The information contained herein is liable to modification from time-to-time in light of experience and CSL's policy of continuous product improvement. It is the user's responsibility to check that this document is current prior to using the product. This document must not be used for specification writing.

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