

LOCTITE® SI 5604™

Known as LOCTITE® 5604™
September 2014

PRODUCT DESCRIPTION

LOCTITE® SI 5604™ provides the following product characteristics:

Technology	Silicone
Chemical Type	Alkoxy silicone
Appearance - Part A	Black paste ^{LMS}
Appearance - Part B	White paste ^{LMS}
Components	Two component - requires mixing
Mix Ratio, by volume - Part A: Part B	4 : 1
Viscosity	Thixotropic
Cure	Room temperature cure and Atmospheric moisture
Application	Bonding and Sealing

LOCTITE® SI 5604™ is a fast, high strength, two component (4:1 ratio) neutral cure silicone designed for bonding applications. It exhibits high adhesion to most substrates making it suitable for structural bracket and clip bonding.

UL Classification

Classified by Underwriters Laboratories Inc.® E309695

- The adhesive systems have been tested in accordance with UL746C, "Polymeric Materials for use in Electrical Equipment Evaluations" with regard to the effect of environmental conditions, for the surfaces and temperatures indicated in the individual recognitions. Adequate adhesive bond strength must be determined for the particular application on the end product.

Note: This is a regional approval. Please contact your local Technical Service Center for more information and clarification

TYPICAL PROPERTIES OF UNCURED MATERIAL

Part A:

Specific Gravity @ 25 °C	1.2 to 1.4 ^{LMS}
Flash Point - See SDS	
Viscosity, Cone & Plate, mPa·s (cP): Spindle CP20-2 Deg @ 20 s ⁻¹	40,000 to 90,000 ^{LMS}

Part B:

Specific Gravity @ 25 °C	1.6 to 1.8 ^{LMS}
Flash Point - See SDS	
Viscosity, Cone & Plate, mPa·s (cP): Spindle CP20-2 Deg @ 20 s ⁻¹	20,000 to 70,000

Mixed:

Flash Point - See SDS

TYPICAL CURING PERFORMANCE

The mix of part A and part B initiates the reaction. There is a secondary cure with atmospheric moisture that promotes full cure over 7 days.

Skin Over Time

Skin over time is the time the surface of the adhesive forms a skin upon exposure to atmospheric moisture at 25 ± 2 °C, 50 ± 5% RH.

Skin Over Time, minutes ≤25^{LMS}

Fixture Time

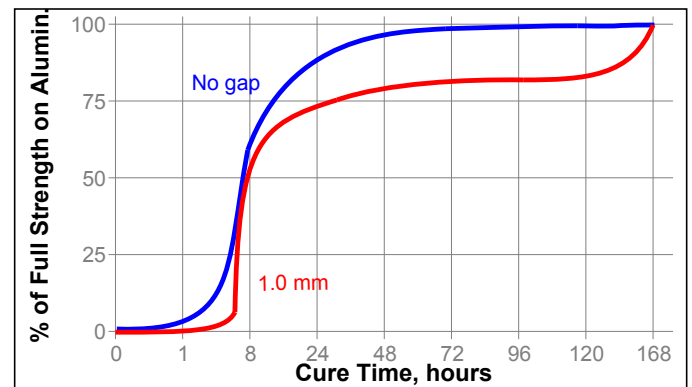
Fixture time is defined as the time to develop a shear strength of 0.1 N/mm².

Fixture Time, ISO 4587, minutes:

Steel @ 25 °C	5 to 10
Aluminium Alclad @ 25 °C	5 to 10

Cure Speed vs. Time

The graph below shows the shear strength developed over time at 22 °C / 50 % RH on aluminum (Alclad) and tested according to ISO 4587.



TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 24 hours @ 25 °C

Physical Properties:

Shore Hardness, ISO 868, Shore A	30 to 50 ^{LMS}
Elongation at break, %	≥120 ^{LMS}
Tensile Strength	N/mm ² ≥1 ^{LMS} (psi) (≥145)

Shear Strength:

Lap Shear Strength, ISO 4587:	
Aluminum (Alclad)	N/mm ² ≥1 ^{LMS} (psi) (145)

Cured for 7 days @ 22 °C / 50% RH

Physical Properties:

Shore Hardness, ISO 868, Shore A	42
Elongation, at break, ISO 527-3, %	205
Tensile Strength, ISO 527-3	N/mm ² 2.1 (psi) (305)
Young's Modulus, ISO 527-3	N/mm ² 1.2 (psi) (180)
Tear Strength, ISO 34-1, Die C	N/mm 9.5 (lb./in.) (54)
Water Absorption, ISO 62, %:	
24 hours in water @ 22 °C:	
Increased weight	0.4
Soluble matter loss	0.08
Glass Transition Temperature, ISO 11359-2, °C	-52
Coefficient of Thermal Expansion, ISO 11359-2, K ⁻¹	2.5×10 ⁻⁴
Volume Shrinkage, ISO 1675 %	0.63
Linear Shrinkage, ISO 1675 %	0.21

Electrical Properties:

Dielectric Constant / Dissipation Factor, IEC 60250:	
1 kHz	4.075 / 0.0126
1 MHz	4.02 / 0.0047
Volume Resistivity, IEC 60093, ohm-cm	5.1×10 ¹⁴
Surface Resistivity, IEC 60093, ohms	720×10 ¹²
Dielectric Breakdown Strength, IEC 60243-1, kV/mm	20

TYPICAL PERFORMANCE OF CURED MATERIAL

Cured for 7 days @ 22 °C / 50% RH, 0 gap

Adhesive Properties

180° Peel Strength, ISO 8510-2 N/mm (lb/in):	
Aluminum (Alclad)	N/mm 4 (lb/in) (23)
Impact Strength, ISO 9653, J:	
Aluminum (Alclad)	3.8

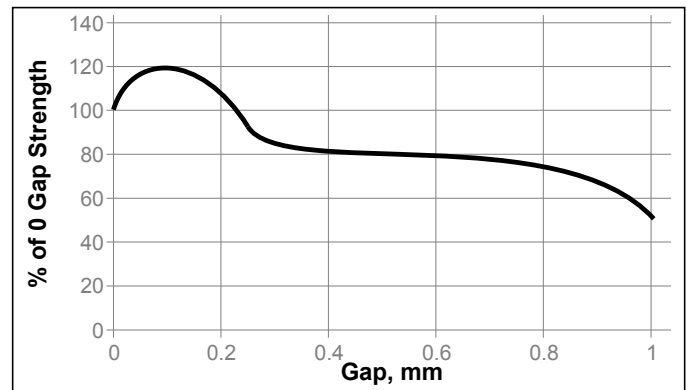
Shear Strength:

Lap Shear Strength, ISO 4587:

Aluminum (Alclad)	N/mm ² ≥1.0 ^{LMS} (psi) (≥145)
Polycarbonate	N/mm ² 2 (psi) (290)
Polycarbonate to ABS	N/mm ² 1.4 (psi) (195)
Polycarbonate to PVC	N/mm ² 0.7 (psi) (95)
Polycarbonate to Nylon	N/mm ² 1.7 (psi) (245)
Polycarbonate to Steel	N/mm ² 1.7 (psi) (250)

Shear Strength vs. Gap Thickness

Cured for 7 days @ 22 °C / 50% RH



TYPICAL ENVIRONMENTAL RESISTANCE

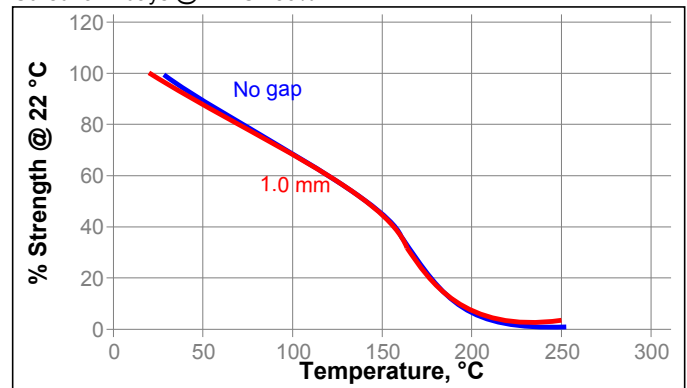
Lap Shear Strength, ISO 4587:

Alclad

Hot Strength

Tested at temperature

Cured for 7 days @ 22 °C / 50% RH



Heat Aging

Aged at temperature indicated and tested @ 22 °C

Aged @ 150 °C for 1,000 hours:	
Change in Tensile Strength, %	12
Change in Elongation, %	-37
Aged @ 175 °C for 1,000 hours:	
Change in Tensile Strength, %	29
Change in Elongation, %	-43
Aged @ 200 °C for 1,000 hours:	
Change in Tensile Strength, %	-22
Change in Elongation, %	-95

Chemical/Solvent Resistance

Cured for 5 days @ 22 °C, on Alclad with 1.0 mm gap, aged under conditions indicated and tested @ 22°C

Environment	°C	% of initial strength	
		500 h	1000 h
Water	25	86	66
Isopropanol	25	62	65
2% Ammonia/Water	25	83	69
Motor oil (10W30)	25	99	109
Water/glycol 50/50	25	97	88

GENERAL INFORMATION

This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or other strong oxidizing materials.

For safe handling information on this product, consult the Safety Data Sheet (SDS).

Directions for use:

- For best performance the mating surface should be clean and free of grease.
- Best results are achieved utilizing 10.7mm square, 24 element mix nozzle.
- After dispense, mate parts immediately to ensure maximum bond strength.
- Dual Cartridges:** To use simply insert the cartridge into the application gun and start the plunger into the cylinders using light pressure on the trigger. Next, remove the cartridge cap and dispense the first 3-5cm of mixed adhesive to be sure both part A and part B are flowing. Attach the mix nozzle to the end of the cartridge and begin dispensing onto part. **Bulk Containers:** Utilize volumetric dispense system to ensure proper mix ratio and utilize mix nozzle to obtain adequate mixing.
- Bonds should be held fixed or clamped until adhesive has fixtured.

Loctite Material Specification^{LMS}

LMS dated October 10, 2009 (Part A) and LMS dated November 27, 2007 (Part B). Test reports for each batch are available for the indicated properties. LMS test reports include selected QC test parameters considered appropriate to specifications for customer use. Additionally, comprehensive controls are in place to assure product quality and consistency. Special customer specification requirements may be coordinated through Henkel Loctite Quality.

Storage

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

Optimal Storage: 8 °C to 21 °C. Storage below 8 °C or greater than 28 °C can adversely affect product properties. Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

Conversions

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$
 $\text{kV/mm} \times 25.4 = \text{V/mil}$
 $\text{mm} / 25.4 = \text{inches}$
 $\mu\text{m} / 25.4 = \text{mil}$
 $\text{N} \times 0.225 = \text{lb}$
 $\text{N/mm} \times 5.71 = \text{lb/in}$
 $\text{N/mm}^2 \times 145 = \text{psi}$
 $\text{MPa} \times 145 = \text{psi}$
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$
 $\text{mPa}\cdot\text{s} = \text{cP}$

Note:

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

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Reference 0.1