Technical Data Sheet

LOCTITE® SI 5091™

Known as LOCTITE® 5091
April 2017

PRODUCT DESCRIPTION

LOCTITE® SI 5091™ provides the following product characteristics:

Technology	Silicone
Chemical Type	Acetoxy silicone
Appearance (uncured)	Translucent liquid[LMS]
Components	One component - requires no mixing
Cure	Ultraviolet (UV) light
Secondary Cure	Moisture for shadowed areas
Application	Potting, Coating or Sealing
Self-leveling	Uniform cavity fill
Flexibility	Highly flexible. Enhances load bearing & shock absorbing characteristics of the bond area.
Strength	Medium

LOCTITE® SI 5091™ is used for potting, coating and sealing of various automotive, electronic, military and industrial components.

UL Classification

Classified by Underwriters Laboratories Inc.® E257711 - Plastics & Components. Please visit the UL website for additional information. **Note:** This is a regional approval. Please contact your local Technical Service Center for more information and clarification

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.01
Solids/Non-Volatile Content, %	>95
Flash Point - See SDS	
Viscosity, Brookfield - RVT, 25 °C, mPa·s (cP):	
Spindle 3, speed 10 rpm	4,000 to 6,000[LMS]

TYPICAL CURING PERFORMANCE

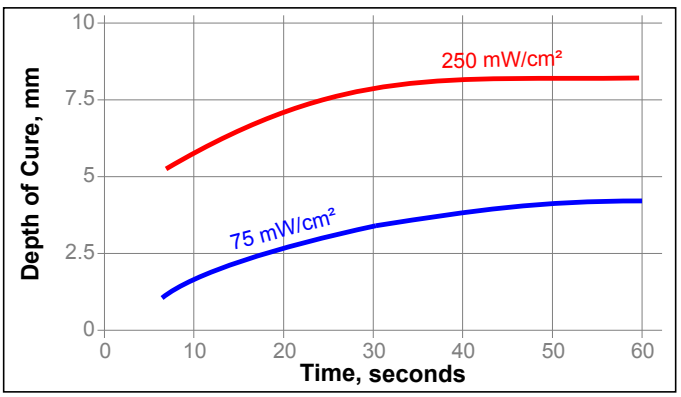
Normal processing conditions will include exposure to sufficient UV light irradiance to effectively cure the material. Surface and/or atmospheric moisture will promote the cure of material in shadowed regions. Although functional strength is developed almost instantly due to the UV curing nature of LOCTITE® SI 5091™, increased cure properties are developed during 72 hours at ambient conditions.

Surface Cure

Tack Free Time, seconds:	
Cured @ 75 mW/cm² ,	≤20[LMS]
Skin Over Time, minutes:	
Moisture cure only	≤15[LMS]

Depth of Cure

Shadowed areas rely on surface and/or atmospheric moisture to effect cure. Depth of cure is limited to approximately 6 millimeters and will take at least 24 hours to develop. Rapid depth of cure can be attained with focused UV light. The graph(s) below show the depth of cure obtained up to 60 seconds at two different levels of UV irradiance.



TYPICAL PROPERTIES OF CURED MATERIAL

Cured @ 40 mW/cm² , for 60 seconds per side plus 7 days @ 22 °C / 50% RH

Physical Properties:

Coefficient of Thermal Expansion, ISO 11359-2, K^{-1}		2.82×10^{-4}
Water Absorption, ISO 62, %:		
24 hours in water @ 22 °C		0
Shrinkage, %		0.2
Tear Strength, ISO 34-1 , Die B	N/mm (lb./in.)	0.7 (4)
Water Vapor Trans. Rate, ASTM E96, g/(h·m²)		0.458
Compression Set, ASTM D 395, Method B, %:		
Aged @ 22 °C for 70 hours		5
Aged @ 75 °C for 70 hours		30
Aged @ 100 °C for 70 hours		52

Electrical Properties:

Dielectric Constant / Dissipation Factor, IEC 60250:	
100 Hz	2.87 / 0.003
100 kHz	2.88 / 0.0027
Volume Resistivity, IEC 60093, Ω·cm	3.3×10^{13}
Dielectric Breakdown Strength, IEC 60243-1, kV/mm	18

Cured @ 75 mW/cm² , measured @ 365 nm, for 60 seconds per side plus 3 days @ 22 °C / 50±5% RH

Shore Hardness, ISO 868, Durometer A		31 to 37[LMS]
Elongation, ISO 37, %		≥75[LMS]
Tensile Strength, ISO 37	N/mm² (psi)	≥0.6[LMS] (≥87)

Cured @ 75 mW/cm² , for 60 seconds per side

UV Depth of Cure, mm	≥3.7[LMS]

TYPICAL PERFORMANCE OF CURED MATERIAL

Cured @ 40 mW/cm² , for 60 seconds, plus 7 days post UV Cure @ 22 °C / 50% RH

Lap Shear Strength, ISO 4587:

Aluminum to Glass	N/mm² (psi)	0.01 to 0.1 (1 to 15)
Steel to Glass	N/mm² (psi)	0.1 to 0.4 (15 to 60)
Glass to Glass	N/mm² (psi)	0.1 to 0.6 (15 to 85)

180° Peel Strength, ISO 8510-2:

Aluminum	N/mm (lb/in)	<0.01 (<0.05)
Steel	N/mm (lb/in)	<0.01 (<0.05)

TYPICAL ENVIRONMENTAL RESISTANCE

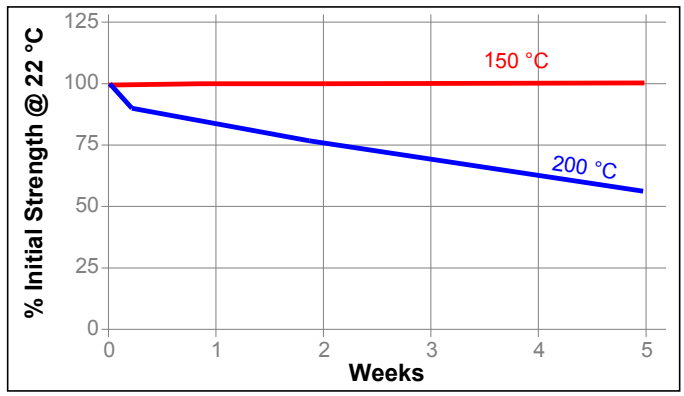
2 mm thick samples cured @ 40 mW/cm² , for 60 seconds per side

Physical Properties:

Tensile Strength, ISO 37

Heat Aging

Aged at temperature indicated and tested @ 22 °C



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:

1. For best performance bond surfaces should be clean and free from grease.
2. The product is designed to be initially cured with UV light at a minimum irradiance of 30 mW/cm2 for approximately 20 seconds, increased exposure may be required for curing deeper sections.
3. Functional strength is achieved almost instantly.
4. Full performance properties will develop over 72 hours.
5. Moisture curing begins immediately after the product is exposed to the atmosphere, therefore parts to be assembled should be mated within a few minutes after the product is dispensed.
6. Excess material can be easily wiped away with non-polar solvents.

Loctite Material Specification[LMS]

LMS dated February 3, 1997. 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 Quality.

Storage

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

Optimal Storage: Storage temperature is dependent upon package size. Consult product label or Henkel Certificate of Analysis for packaged storage conditions. 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

(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
µm / 25.4 = mil
N x 0.225 = lb
N/mm x 5.71 = lb/in
N/mm² x 145 = psi
MPa x 145 = psi
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·s = 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 1.7

Revision Number: 005.0

Issue date: 04/03/2014

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: **LOCTITE SI 5091 known as LOCTITE NUVA-SIL 5091**
Product type: Silicone
Restriction of Use: None identified
Company address:
Henkel Corporation
One Henkel Way
Rocky Hill, Connecticut 06067

IDH number: 135257
Item number: 17412
Region: United States
Contact information:
Telephone: 860.571.5100
MEDICAL EMERGENCY Phone: Poison Control Center
1-877-671-4608 (toll free) or 1-303-592-1711
TRANSPORT EMERGENCY Phone: CHEMTREC
1-800-424-9300 (toll free) or 1-703-527-3887
Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING: CAUSES SKIN IRRITATION.
MAY CAUSE AN ALLERGIC SKIN REACTION.
CAUSES SERIOUS EYE IRRITATION.

HAZARD CLASS	HAZARD CATEGORY
SKIN IRRITATION	2
EYE IRRITATION	2A
SKIN SENSITIZATION	1

PICTOGRAM(S)

Precautionary Statements

Prevention: Avoid breathing vapors, mist, or spray. Wash thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Wear eye and face protection. Wear protective gloves.

Response: IF ON SKIN: Wash with plenty of soap and water. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If skin irritation or rash occurs: Get medical attention. If eye irritation persists: Get medical attention. Take off contaminated clothing.

Storage: Not prescribed

Disposal: Dispose of contents and/or container according to Federal, State/Provincial and local governmental regulations.

Classification complies with OSHA Hazard Communication Standard (29 CFR 1910.1200) and is consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Component(s)	CAS Number	Percentage*
Silicone Resin	Proprietary	5 - 10
Silica, amorphous, treated	68909-20-6	1 - 5
Silane Derivative	Proprietary	1 - 5
Photoinitiator	Proprietary	1 - 5
Substituted silane	Proprietary	1 - 5

* Exact percentage is a trade secret. Concentration range is provided to assist users in providing appropriate protections.

4. FIRST AID MEASURES

Inhalation: Move to fresh air. If symptoms persist, seek medical advice.

Skin contact: Wipe off paste with paper towel or cloth. Wash with soap and water. If skin irritation persists, call a physician.

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If eye irritation persists, consult a specialist.

Ingestion: DO NOT induce vomiting unless directed to do so by medical personnel. If symptoms develop and persist, get medical attention.

Symptoms: See Section 11.

5. FIRE FIGHTING MEASURES

Extinguishing media: Foam, dry chemical or carbon dioxide.

Special firefighting procedures: None

Unusual fire or explosion hazards: None

Hazardous combustion products: Oxides of carbon. Oxides of silicon. Formaldehyde. Acetic acid. Silica mist.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Do not allow material to contaminate ground water system.

Clean-up methods: Scrape up as much material as possible. Spilled material will solidify. Store in a partly filled, closed container until disposal. Maintain good ventilation for large spills.

7. HANDLING AND STORAGE

Handling: Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. Do not wear contact lenses.

Storage: Store in a dry area below 90° F.

For information on product shelf life contact Henkel Customer Service at (800) 243-4874.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous Component(s)	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Silicone Resin	None	None	None	None
Silica, amorphous, treated	10 mg/m3 TWA Inhalable dust.	6 mg/m3 TWA	None	None
Silane Derivative	None	None	None	None
Photoinitiator	None	None	None	None
Substituted silane	None	None	None	None

Engineering controls: Provide adequate local exhaust ventilation to maintain worker exposure below exposure limits.

Respiratory protection: Use NIOSH approved respirator if there is potential to exceed exposure limit(s).

Eye/face protection: Safety goggles or safety glasses with side shields.

Skin protection: Use chemical resistant, impermeable clothing including gloves and either an apron or body suit to prevent skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Viscous, Liquid
Color: Opaque
Odor: Acetic acid
Odor threshold: Not available.
pH: Not applicable
Vapor pressure: < 10 mm hg (21.1 °C (70°F))
Boiling point/range: Not applicable
Melting point/ range: Not applicable
Specific gravity: 1.1
Vapor density: Heavier than air.
Flash point: > 93.3 °C (> 199.94 °F)
Flammable/Explosive limits - lower: Not applicable
Flammable/Explosive limits - upper: Not applicable
Autoignition temperature: Not available.
Evaporation rate: Not available.
Solubility in water: Polymerises in presence of water.
Partition coefficient (n-octanol/water): Not available.
VOC content: 2.22 %; 24.42 g/l ASTM D5403 Process volatiles
1.56 %; 17.16 g/l (potential)
3.78 %; 41.58 g/l (total)
Viscosity: Not available.
Decomposition temperature: Not available.

10. STABILITY AND REACTIVITY

Stability: Stable

Hazardous reactions: Will not occur.

Hazardous decomposition products: Oxides of carbon. Oxides of silicon. Formaldehyde. Acetic acid is liberated slowly upon contact with moisture.

Incompatible materials: Acids. Bases. Oxidizing agents. Heat, sunlight, or UV light.

Reactivity: Not available.

Conditions to avoid: Product is sensitive to light and moisture.

11. TOXICOLOGICAL INFORMATION

Relevant routes of exposure: Skin, Inhalation, Eyes, Ingestion

Potential Health Effects/Symptoms

Inhalation: Acetic acid produced during cure may irritate eyes, nose and throat. When heated to temperatures exceeding 300° F (150° C) in the presence of air, silicones may form formaldehyde vapors. Formaldehyde is a potential cancer hazard and a known skin and respiratory sensitizer. Vapors irritate the eyes, nose and throat. Safe handling conditions may be maintained by keeping formaldehyde vapor concentrations below the OSHA permissible limit.

Skin contact: Causes skin irritation. May cause allergic skin reaction.

Eye contact: Causes serious eye irritation.

Ingestion: Not expected to be harmful by ingestion.

Hazardous Component(s)	LD50s and LC50s	Immediate and Delayed Health Effects
Silicone Resin	None	Irritant
Silica, amorphous, treated	None	No Target Organs
Silane Derivative	None	Irritant, Allergen
Photoinitiator	None	Irritant
Substituted silane	None	Irritant, Allergen

Hazardous Component(s)	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Silicone Resin	No	No	No
Silica, amorphous, treated	No	No	No
Silane Derivative	No	No	No
Photoinitiator	No	No	No
Substituted silane	No	No	No

12. ECOLOGICAL INFORMATION

Ecological information: Not available.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Follow all local, state, federal and provincial regulations for disposal.

Hazardous waste number: Not a RCRA hazardous waste.

14. TRANSPORT INFORMATION

The transport information provided in this section only applies to the material/formulation itself, and is not specific to any package/configuration.

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

International Air Transportation (ICAO/IATA)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

Water Transportation (IMO/IMDG)

Proper shipping name:	Not regulated
Hazard class or division:	None
Identification number:	None
Packing group:	None

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status:	All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12 (b) Export Notification:	None above reporting de minimis
CERCLA/SARA Section 302 EHS:	None above reporting de minimis
CERCLA/SARA Section 311/312:	Immediate Health
CERCLA/SARA Section 313:	None above reporting de minimis
California Proposition 65:	No California Proposition 65 listed chemicals are known to be present.

Canada Regulatory Information

CEPA DSL/NDSL Status:	All components are listed on or are exempt from listing on the Canadian Domestic Substances List.

16. OTHER INFORMATION

This safety data sheet contains changes from the previous version in sections: New Safety Data Sheet format.

Prepared by: Catherine Bimler, Regulatory Affairs Specialist

Issue date: 04/03/2014

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