

Safety Data Sheet (SDS)

www.chipquik.com

To comply with European CLP Regulation 1272/2008 and US 29CFR 1910.1200 OSHA's Hazard Communication Standard

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Chip Quik Lead Free Solder Paste Series: SMD291SNL, SMD4300SNL, SMDLTLFP
SYNONYMS: Paste, Solder Cream
PART NUMBERS: SMD291SNL, SMD291SNL10, SMD291SNL10T4, SMD291SNL10T5, SMD291SNL50T3, SMD291SNL250T3, SMD291SNL250T4, SMD291SNL250T5, SMD291SNL500T3, SMD291SNL500T5, SMD291SNL15T4, SMD291SNL60T4, SMD4300SNL10, SMD4300SNL10T4, SMD4300SNL10T5, SMD4300SNL250T3, SMD4300SNL250T4, SMD4300SNL250T5, SMDLTLFP, SMDLTLFP10, SMDLTLFP10T4, SMDLTLFP10T5, SMDLTLFP50T3, SMDLTLFP250T3, SMDLTLFP250T4, SMDLTLFP250T5, SMDLTLFP500T3, SMDLTLFP15T4, SMDLTLFP60T4, SMDTCLF, SMD291SNL500T3C, SMD291SNL500T4C, SMD291SNL500T5C, SMD4300SNL500T3C, SMD4300SNL500T4C, SMD4300SNL500T5C, SMDLTLFP500T3C, SMDLTLFP500T4C, SMDLTLFP500T5C, TS391SNL, TS391SNL10, TS391SNL250, TS391SNL500C

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REVISION DATE: 2016/1/22
REVISION NUMBER: 2.3
REVISED BY: Chip Quik Product Safety

PRODUCT USE: Soldering components for bonding semiconductor chips and packages to circuit boards. This product is for industrial use only.

2. HAZARD IDENTIFICATION

Classified in accordance with European CLP Regulation 1272/2008

| | |
|-----------------|---|
| Acute Tox. | 4 |
| Skins Sens. | 1 |
| Aquatic Acute | 1 |
| Aquatic Chronic | 1 |

CHEMICAL NAME: NA
CHEMICAL FAMILY: Mixture
CHEMICAL FORMULA: Proprietary

ROUTES OF ENTRY: Inhalation, Ingestion, Skin/Eye Contact

TARGET ORGANS: NA

GHS/CLP:



Signal Word: Warning

GHS/CLP LABEL ELEMENTS:

| | |
|---------------------|--|
| Hazard statement(s) | |
| H302 | Harmful if swallowed. |
| H315 | Causes skin irritation. |
| H317 | May cause an allergic skin reaction. |
| H319 | Causes serious eye irritation. |
| H332 | Harmful if inhaled. |
| H334 | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| H335 | May cause respiratory irritation. |

| | |
|----------------------------|---|
| Precautionary statement(s) | |
| P102 | Keep out of reach of children. |
| P201 | Obtain special instructions before use. |
| P202 | Do not handle until all safety precautions have been read and understood. |
| P233 | Keep container tightly closed. |
| P260 | Do not breathe dust/fume/gas/mist/vapor/spray. |

| | |
|--------------------------|---|
| P262 | Do not get in eyes, on skin, or on clothing. |
| P264 | Wash hands thoroughly after handling. |
| P270 | Do not eat, drink, or smoke when using this product. |
| P271 | Use in a well-ventilated area. |
| P272 | Contaminated work clothing should not be allowed out of the workplace. |
| P273 | Avoid release to the environment. |
| P280 | Wear protective gloves/protective clothing/eye protection/face protection. |
| P284 | In case of inadequate ventilation wear respiratory protection. |
| P301/P330/P331/P310 | IF SWALLOWED: Rinse mouth. DO NOT induce vomiting. Immediately call a POISON CENTER/Doctor. |
| P303/P361/P352/P333/P313 | IF ON SKIN (or hair): Take off immediately all contaminated clothing. Wash with soap & water. Get medical advice/attention if skin irritation or rash occurs or if you feel unwell. |
| P304/P340/312 | IF INHALED: Remove victim to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell. |
| P305/P351/338/P310 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call POISON CENTER/Doctor. |
| P308/P313 | IF EXPOSED OR CONCERNED: Get medical advice/attention. |
| P342/P311 | IF EXPERIENCING RESPIRATORY SYMPTOMS: Call POISON CENTER/Doctor. |
| P362 | Take off contaminated clothing and wash it before reuse. |
| P391 | Collect spillage. |
| P402/P404 | Store in a dry place. Store in a closed container. |
| P405 | Store locked up. |
| P501 | Dispose of contents/container in accordance with local/regional/national/international regulations. |

POTENTIAL HEALTH EFFECTS (CHRONIC and OVEREXPOSURE)

Tin: Dust or fumes may cause irritation of the skin mucous membranes and may result in a benign Pneumoconiosis (Stannosis).

Silver: May cause discoloration of eyes and skin (Argyria).

Bismuth: May cause foul breath, a blue-black line on the gums, and Stomatitis.

Antimony: May cause gastrointestinal upset, sleeplessness, irritability, and muscular pain.

Indium: May cause weight loss, pulmonary edema, blood damage and degenerative changes in liver and kidneys.

MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE: Diseases of the blood-forming organs, kidneys, nervous and possibly reproductive systems. Occupational Asthma.

SECTION 2 NOTES:

Chip Quik Inc. does not recommend, manufacture, market, or endorse any of its products for human consumption.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Classified in accordance with European CLP Regulation 1272/2008

| Hazardous Ingredients ⁽¹⁾ | C.A.S. Number | Weight Percent | OSHA PEL mg/m ³ | ACGIH TLV TWA mg/m ³ | LD 50 Ingested g/Kg | LD 50 Inhaled g/m ³ |
|--|---------------|---|-------------------------------|------------------------------------|------------------------|-----------------------------------|
| Modified Rosins (Rosin) ⁽²⁾ | 8050-09-7 | <45 | NE | NE | NE | NE |
| Pine Oil Derivatives (Terpineol) | 8000-41-7 | <5 | NE | NE | NE | NE |
| Mixed Carboxylic Acids (Maleic Acid) ⁽²⁾ | 110-16-7 | <4 | NE | NE | NE | NE |
| Tin | 7440-31-5 | Product contains one or more of these metallic elements in varying percentages | 2.00 | 2.00 | NE | NE |
| Silver | 7440-22-4 | | 0.01 | 0.10 | NE | NE |
| Bismuth | 7440-69-9 | | NE | NE | NE | NE |
| Antimony | 7440-36-0 | | 0.50 | 0.50 | 7.0 Rat | NE |
| Indium | 7440-74-6 | | NE | 0.10 | NE | NE |
| Copper | 7440-50-8 | | 1.00 | 1.00 | NE | NE |

| Non-Hazardous Ingredients | C.A.S. Number | Weight Percent | OSHA PEL mg/m ³ | ACGIH TLV TWA mg/m ³ | LD 50 Ingested g/Kg | LD 50 Inhaled g/m ³ |
|---------------------------|---------------|----------------|-------------------------------|------------------------------------|------------------------|-----------------------------------|
| Surfactants | NA | <4 | NE | NE | NE | NE |
| Rheological Modifier | NA | <5 | NE | NE | NE | NE |

SECTION 3 NOTES:

(1) Per 29 CFR 1910 the mixture has not been tested as a whole. All hazardous components, which comprise 1% of the mixture (0.1% carcinogenic), are listed. Percentages of individual components are not listed as this information is considered a trade secret.

(2) The identity of the specific chemical(s) is being withheld as a trade secret per 29 CFR 1910.1200. The hazardous properties of these ingredients are disclosed in this SDS.

4. FIRST-AID MEASURES

Signs and symptoms of exposure: Inhalation-Nose and throat irritation, headache, dizziness, difficulty breathing, coughing. Ingestion-nausea, vomiting, cramps. Skin-redness, burning, rash, dryness. Eye-redness, burning, tearing, blurred vision.

Emergency first aid procedures:

EYES: Flush with plenty of water, contact a physician. If contact lenses can be removed easily, flush eyes without contact lenses.

SKIN: Wash affected area with plenty of warm, soapy water. If irritation persists, seek medical attention.

INGESTION: Call a physician or Poison Control Center immediately. Do not induce vomiting. Drink large amounts of water. Never give anything by mouth to an unconscious person

INHALATION: Remove to fresh air. Support respiration if required. If not breathing, seek immediate medical attention.

5. FIREFIGHTING MEASURES

EXTINGUISHING MEDIA: Dry chemical, foam

SPECIAL FIRE FIGHTING PROCEDURES: Do not use water. Use NIOSH-approved self-contained Breathing Apparatus and full protective clothing if involved in a fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: May release Toxic metal and oxide fumes. High concentrations of dust may present explosion hazard. Water trapped below molten metal may explode thus spattering molten metal.

SECTION 5 NOTES:

Molten solder alloys consisting of Antimony, Bismuth, Copper, Indium, Silver, and/or Tin do not produce significant quantities of fumes below 900° F.

6. ACCIDENTAL RELEASE MEASURES

PRECAUTIONS AND EQUIPMENT: Material is extremely thick and will not flow out.

ACCIDENTAL RELEASE MEASURES: If material spills or leaks use a spatula to collect and place it in a plastic or glass jar. Remove traces of residue using cloth rags or paper towels moistened with Isopropyl Alcohol. Exposure to spilled material may be irritating. Follow on-site personal protective equipment recommendations.

ENVIRONMENTAL PRECAUTIONS: Avoid release to the environment. Collect spillage.

SECTION 6 NOTES:

See Sections 2, 4, and 7 for additional information.

7. HANDLING AND STORAGE

HANDLING/STORAGE: Keep containers tightly closed when not in use. Use care to avoid spills. Avoid inhalation of fumes or dust. Avoid contact with eyes, skin, and clothing. Store in a closed corrosive resistant container, with corrosive resistant liner, in cool dry place. Wear appropriate personal protective equipment when working with or handling. Always wash hands thoroughly after handling this product. Dispose of following Federal, State/Provincial, and Local regulations.

OTHER PRECAUTIONS: Empty containers may retain product residues in vapor, liquid, and/or solid form. All labeled hazard precautions should be observed.

WORK HYGIENIC PRACTICES: Cosmetics/Food/Drink/Tobacco should not be consumed or used in work areas. Always wash hands after handling material and before applying or using cosmetics/food/drink/tobacco.

SECTION 7 NOTES:

For industrial use only.

Keep out of reach of children.

Not for internal consumption.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Limit Values:

Rosin flux fumes (as total resin acids)

MEL: 0.05 mg/m³ 8h TWA.

MEL: 0.15 mg/m³ 15 min.

Extraction is necessary to remove fumes evolved during reflow.

Also see section 3.

ENGINEERING CONTROLS: Use only with production equipment designed for use with solder paste.

VENTILATION: Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLVs.

RESPIRATORY PROTECTION: A (US: NIOSH; EU: EN 140:1998, EN 14387:2004 A) approved air-purifying respirator with fume/organic chemical cartridge should be worn when airborne concentrations may be exceeded. General and local exhaust ventilation is the preferred means of protection.

EYE PROTECTION: Use with appropriate eye protection: Goggles or face shield (EU: EN 166-S 3 9).

SKIN PROTECTION: Protective gloves should be worn when the possibility of skin contact exists (EU: EN 374-1:2003).

PROTECTIVE CLOTHING OR EQUIPMENT: Work clothes should be worn and laundered in accordance with current Lead (Pb) standards (US: OSHA).

WORK HYGIENIC PRACTICES: Cosmetics/Food/Drink/Tobacco should not be consumed or used in areas where solder products may be used. Always wash hands after handling soldering products and before applying or using cosmetics/food/drink/tobacco.

OTHER: Maintain eye wash stations in work areas. Avoid the use of contact lenses in high fume areas. Clean protective equipment regularly. Clean up spills immediately.

9. PHYSICAL AND CHEMICAL PROPERTIES

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|---|------------|
| APPEARANCE: | Grey paste |
| ODOR: | Odorless |
| ODOR THRESHOLD: | NE |
| pH as SUPPLIED: | NA |
| MELTING POINT: | Varies |
| FREEZING POINT: | Varies |
| INITIAL BOILING POINT: | Varies |
| BOILING RANGE: | NA |
| FLASH POINT: | NA |
| EVAPORATION RATE: | NA |
| FLAMMABILITY (solid): | NE |
| UPPER/LOWER FLAMMABILITY: | NE |
| UPPER/LOWER EXPLOSIVE LIMITS: | NE |
| VAPOR PRESSURE (mmHg): | NA |
| VAPOR DENSITY (AIR = 1): | NA |
| RELATIVE DENSITY: | NE |
| SOLUBILITY IN WATER: | Insoluble |
| PARTITION COEFFICIENT (n-octanol/water): | NE |
| AUTOIGNITION TEMPERATURE: | NE |
| DECOMPOSITION TEMPERATURE: | NE |
| VISCOSITY: | NA |

SECTION 9 NOTES:

Other physical and chemical properties depend on alloy composition.

10. STABILITY AND REACTIVITY

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|---|--|
| STABILITY: | Stable |
| CONDITIONS TO AVOID (STABILITY): | NE |
| INCOMPATIBILITY (MATERIAL TO AVOID): | Oxidizing materials, acids, hydrogen peroxide, bases |
| HAZARDOUS DECOMPOSITION/BY-PRODUCTS: | Harmful organic fumes and toxic oxide fumes may form at elevated temperatures. |
| POSSIBILITY OF HAZARDOUS REACTIONS: | NE |

11. TOXICOLOGICAL INFORMATION

INHALATION:

This product does not present a risk at ambient temperatures. The flux fumes evolved during soldering will irritate the nose, throat and lungs. Repeated or prolonged exposure to flux fumes may cause an allergic affect which may lead to occupational asthma.

SKIN:

Contact with flux fumes and flux residues may cause irritation and sensitization.

EYES:

Flux fumes may cause irritation.

Health Hazards (acute and chronic): Contact with dust and fumes may cause skin, eye and respiratory irritation. Ingestion and/or inhalation of material or fumes may result in flu like symptoms, insomnia, muscle weakness, nausea and abdominal pain. Gross inhalation or ingestion may be toxic and can result in death. Symptoms of toxicity may take hours or days to manifest. Chronic exposures, inhalation and ingestion, may result in kidney, red blood cell, reproductive and nervous system effects. Health effects may be cumulative over many exposures. Studies show that health risks vary by individual. Minimize exposure as a precaution. See OSHA 29CFR 1910.1025(subpart Z) for more information.

ACUTE TOXICITY:

| Product/Ingredient Name | Result | Species | Dose | Exposure |
|-------------------------|-----------------|---------|-----------------------|---|
| Rosin | LD50 Oral | Rat | 7600 mg/kg | - |
| Terpineol | LD50 Oral | Rat | 2000 mg/kg | - |
| | LD50 Inhalation | Rat | 4.76 mg/l | 4 hours |
| | LD50 Dermal | Rat | 2000 mg/kg | - |
| Maleic acid | LD50 Oral | Rat | 708 mg/kg | Remarks: Behavioral: Convulsions or effect on seizure threshold. |
| | LD50 Inhalation | Rat | 720 mg/m ³ | Behavioral: Muscle weakness. Gastrointestinal: Ulceration or bleeding from stomach. |
| | LD 50 Dermal | Rabbit | 1560 mg//kg | 1 hour Remarks: Behavioral: Tremor |
| Antimony | LD50 Ingested | Rat | 7000 mg/kg | - |
| Silver | LD50 Oral | Mouse | 100 mg/kg | - |

| | |
|---|----|
| SKIN CORRISSION/IRRITATION: | NE |
| SERIOUS EYE DAMAGE/IRRITATION: | NA |
| RESPIRATORY OR SKIN SENSITIZATION: | NE |
| GERM CELL MUTAGENICITY: | NA |
| CARCINOGENICITY: | |

| | | | |
|----------|---------------------|---------|--------------------------|
| OSHA: NA | ACGIH: Lead (Pb)-A3 | NTP: NA | IARC: Lead (PB)-Group 2B |
|----------|---------------------|---------|--------------------------|

REPRODUCTIVE TOXICITY: NA

STOT-SINGLE EXPOSURE:

| Product/Ingredient Name | Category | Route of exposure | Target organs |
|-------------------------|------------|-------------------|------------------------------|
| Maleic acid | Category 3 | Not applicable | Respiratory tract irritation |

STOT-REPEATED EXPOSURE: NA

ASPIRATION HAZARD: NA

SECTION 11 NOTES:

This product has not been tested as a whole to determine its hazards. Synergistic or additive effects of the above chemicals are unknown, as are the effects of exposure to these chemicals in addition to others present in the work place. See Section 2 for additional health hazards.

12. ECOLOGICAL INFORMATION

TOXICITY:

| Product/Ingredient Name | Result | Species | Exposure |
|-----------------------------------|--|--|----------|
| Silver | Acute EC50 1.4 µg/l Marine water | Algae - Chroomonas sp. | 4 days |
| | Acute EC50 0.24 µg/l Fresh water | Daphnia - Daphnia magna | 48 hours |
| | Acute LC50 11 µg/l Fresh water | Crustaceans - Ceriodaphnia reticulata | 48 hours |
| | Acute LC50 2.13 µg/l Fresh water | Fish - Pimephales promelas | 96 hours |
| Rosin | Chronic NOEC 5 mg/l Marine water | Algae - Glenodinium halli | 72 hours |
| | Acute LC50 60.3 mg/l Fresh water | Brachydanio rerio (zebra fish) | 96 hours |
| Terpineol | Acute LC50 62.80 mg/l Fresh water | Danio rerio (zebra fish) | 96 hours |
| | Acute LC50 68 mg/l Marine water | Algae - Pseudokirchneriella subcapitata (green algae) | 72 hours |
| Maleic acid | Acute EC50 316200 µg/l Fresh water | Daphnia - Daphnia magna - Larvae | 48 hours |
| | Acute LC50 5000 µg/l Fresh water | Fish - Pimephales promelas | 96 hours |
| Copper | Acute EC50 1100 µg/l Fresh water | Aquatic plants - Lemna minor | 4 days |
| | Acute EC50 2.1 µg/l Fresh water | Daphnia - Daphnia longispina - Juvenile (Fledgling, Hatchling, Weanling) | 48 hours |
| | Acute IC50 13 µg/l Fresh water | Algae - Pseudokirchneriella subcapitata - Exponential growth phase | 72 hours |
| | Acute IC50 5.4 mg/l Marine water | Aquatic plants - Plantae - Exponential growth phase | 72 hours |
| | Acute LC50 0.072 µg/l Marine water | Crustaceans - Amphipoda - Adult | 48 hours |
| | Acute LC50 7.56 µg/l Marine water | Fish - Periophthalmus waltoni - Adult | 96 hours |
| | Chronic NOEC 2.5 µg/l Marine water | Algae - Nitzschia closterium - Exponential growth phase | 72 hours |
| | Chronic NOEC 7 mg/l Fresh water | Aquatic plants - Ceratophyllum demersum | 3 days |
| | Chronic NOEC 0.02 mg/l Fresh water | Crustaceans - Cambarus bartonii - Mature | 21 days |
| | Chronic NOEC 2 µg/l Fresh water | Daphnia - Daphnia magna | 21 days |
| Chronic NOEC 0.8 µg/l Fresh water | Fish - Oreochromis niloticus - Juvenile (Fledgling, Hatchling, Weanling) | 6 weeks | |

PERSISTENCE AND DEGRADABILITY: NE

BIOACCUMULATIVE POTENTIAL:

| Product/Ingredient Name | LogP _{ow} | BCF | Potential |
|-------------------------|--------------------|-----|-----------|
| Silver | - | 70 | Low |
| Rosin | 1.9 to 7.7 | - | High |
| Terpineol | | | NE |
| Maleic acid | -1.3 | - | Low |

MOBILITY IN SOIL: NE

RESULT OF PBT and vPvB ASSESSMENT: Not applicable

OTHER ADVERSE EFFECTS: NE

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Scrap and waste should be recycled or stored in a dry, sealed container for later disposal. Disposal must be in accordance with Federal, State/Provincial, and Local Regulations.

OTHER PRECAUTIONS: Avoid skin & eye contact, inhalation & ingestion of fumes and material. Wash contaminated clothing before reuse. Keep away from children.

14. TRANSPORT INFORMATION

Transport in accordance with applicable regulations and requirements.

| | |
|---------------------------------|----------------|
| UN Number: | Not available |
| UN Proper Shipping Name: | Not available |
| Packaging Group: | Not applicable |
| Environmental Hazards: | None |

| | |
|---|---------------|
| TRANSPORT HAZARD CLASSES: | |
| US DOT Hazardous Material Classification: | Non-Hazardous |
| Water Transportation: | Non-Hazardous |
| IATA Hazardous Material Classification: | Non-Hazardous |
| ADR Road Regulations | Not regulated |
| IMDG Sea Regulations | Not regulated |

15. REGULATORY INFORMATION

All ingredients used to manufacture this product are listed on the EPA TSCA Inventory. Finished product is not listed on the EPA TSCA Inventory.

| | |
|-----------------------------------|---------------|
| U.S. FEDERAL REGULATIONS: | Not regulated |
| STATE REGULATIONS: | Not regulated |
| INTERNATIONAL REGULATIONS: | Not regulated |

16. OTHER INFORMATION

LEGEND:

| | |
|-----------------------|---|
| ACGIH | American Conference of Governmental Industrial Hygienists |
| ADR | European Agreement concerning the International Carriage of Dangerous Goods by Road |
| BCF | Bioconcentration factor |
| C.A.S. | Chemical Abstract Service |
| CLP | Classification, Labeling and Packaging |
| DOT | Department of Transportation |
| EC | Effective Concentration |
| EPA | Environmental Protection Agency |
| GHS | Global Harmonized System |
| HMIS | Hazardous Material Identification System |
| IARC | International Agency for Research on Cancer |
| IATA | International Air Transport Association |
| IMDG | International Maritime Dangerous Goods Code |
| LC | Lethal Concentration |
| LD | Lethal Dose |
| NA | Not available |
| NE | Not established |
| NIOSH | National Institute for Occupational Safety & Health |
| NOEC | No observed effective concentration |
| NTP | National Toxicology Program |
| OSHA | Occupational Safety and Health Administration |
| PEL | Permissible Exposure Limit |
| P_{ow} | Octanol water partition coefficient |
| SDS | Safety Data Sheet |
| STEL | Short-Term Exposure Limit |
| STOT | Specific target organ toxicity |
| TLV | Threshold Limit Value |
| TSCA | Toxic Substance Control Act |
| TWA: | Time Weighted Average |
| US DOT: | United States Department of Transportation |

PREPARATION INFORMATION:

This update supersedes all previously released documents.

DISCLAIMER:

The information and recommendations contained within this publication have been compiled from sources believed to be reliable and to represent the best information available to Chip Quik at the time of issue. No warranty, guarantee, or representation is made by Chip Quik nor does Chip Quik assume any responsibility in connection there within; nor can it be assumed that all acceptable safety measures or other safety measures may not be required under particular or exceptional conditions or circumstances. The data on this Safety Data Sheet relates only to this product and does not relate to use with any other material or in any process. All chemical products should be used only by, or under the direction of, technically qualified personnel who are aware of the hazards involved and necessity for reasonable care in handling. Hazard communication regulations require that employees must be trained on how to use a Safety Data Sheet as a source for hazard information.