

Safety Data Sheet – T5 Leaded Solder Paste

Section 1

Identification of the substance/mixture and of the company/undertaking

Product identifier:	Leaded Solder Paste
Other means of identification:	Paste, Solder Cream
Recommended use of the chemical:	Soldering components for bonding semiconductor chips and packages to circuit boards.
Restrictions on use:	None identified
Supplier:	Voltera Inc. 180 Northfield Dr W, Suite 2 Waterloo, ON N2L 0C7, Canada Email: support@voltera.io
Emergency phone number:	+1 613-996-6666 or 1-888-CAN-UTEC (226-8832) International Emergency Number, CANUTEC This telephone number is available 24 hours per day, 7 days per week.

Section 2

Hazards identification

Classified in accordance with European CLP Regulation 1272/2008

Acute toxicity (oral)	4*	H302
Acute toxicity (dermal)	4*	H317
Eye irritant	2A	H319
Skin irritant	2	H315
Skin sensitization	1	H317
Aquatic acute	1	H400
Aquatic chronic	1	H410

Reproductive toxicity	1	H360FD
Carcinogenic	2	H351
Specific target organ toxicity (STOT) – Single exposure (SE) respiratory tract irritation	3	H332, H335

Chemical name	NA
Chemical family	Mixture
Chemical formula	Proprietary
Routes of entry	Inhalation, ingestion, skin/eye contact
Target organs	Blood, kidneys, respiratory system, nasal, septum, liver, eyes

Symbols



Signal word

Danger

GHS/CLP label elements

Lead warning

Hazard statements

H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statements

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.

Chronic / acute health hazards

Lead:

Women of child-bearing age should avoid exposure to lead and its inorganic compounds due to post-natal effects. Lead can cause potential injury to a developing fetus and possible effects on reproduction. Exposure to high levels of airborne or ingested lead may produce symptoms of anemia, weakness, constipation, nausea, and abdominal pain. Prolonged exposure may result in kidney and/or nervous system involvement.

Medical conditions possibly aggravated by exposure

Diseases of the blood-forming organs, kidneys, nervous and possibly reproductive systems. Occupational Asthma.

Section 2 notes

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

Chronic Toxicity-Proposition 65, State of California: **WARNING!** This product can expose you to Lead, which is known to the State of California to cause Cancer, Birth Defects, or other Reproductive Harm. For more information, go to www.P65Warnings.ca.gov. Federal and State Laws prohibit the use of lead solder in making joints in any private or public potable (drinking) water supply system. Breathing fumes may cause respiratory system irritation or damage. After handling solder, wash hands with soap and water before eating or smoking.

Section 3

Composition/information on ingredients

Hazardous ingredients ⁽¹⁾	CAS number	Weight %	OSHA PEL mg/m ³ ³	ACGIH TLV TWA mg/m ³ ³	LD 50 Ingested g/Kg	LD 50 Inhaled g/m ³ 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
*+Lead	7439-92-1		0.05	0.05	NE	NE
Tin	7440-31-5		2.00	2.00	NE	NE
Silver	7440-31-5		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	CAS number	Weight %	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

* denotes a chemical that is also listed in 29CFR 1910.1200(D) #4 as a known or suspected cancer hazard.

+ denotes a chemical regulated as toxic by the Environmental Protection Agency (EPA) as outlined in 40CFR Part 372 (section 313).

Percentages of individual components are not listed as this information is considered a trade secret.

(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.

Section 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.

Other (Lead):

Excessive overexposure may result in an acute or chronic illness. If symptoms are present, the individual should be immediately removed from exposure and a physician consulted.

Section 5

Fire-fighting 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.

Hazardous decomposition products:

Lead oxide fumes and/or Lead particulate may be evolved.

Section 5 notes

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

Section 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 spilled paste 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.

Section 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

Keep out of reach of children.
Not for internal consumption.

Section 8

Exposure controls / personal protection

Control parameters

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.

Section 9

Physical and chemical properties

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-octano/water)	NE
Autoignition temperature	NE
Decomposition temperature	NE
Viscosity	NA

Other information

Information with regard to physical hazard classes:

No additional information available.

Other safety characteristics:

No additional information.

Section 9 notes

Other physical and chemical properties depend on alloy composition.

Section 10

Stability and reactivity

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. Lead oxide fumes and/or Lead particulate may be evolved.
Possibility of hazardous reactions	NE

Section 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: Behavioural: Convulsions or effect on seizure threshold. Behavioural: Muscle weakness. Gastrointestinal: Ulceration or bleeding from stomach.
	LD50 Inhalation	Rat	720 mg/m ³	1 hour
	LD50 Dermal	Rabbit	1560 mg/kg	Remarks: Behavioural: Tremor

Skin corrosion/irritation	NE
Serious eye damage/irritation	Not available
Respiratory or skin sensitization	NE
Germ cell mutagenicity	Not available

Carcinogenicity	OSHA: NA ACGIH: Lead (Pb)-A3 NTP: NA IARC: Lead (PB) - Group 2B
Reproductive toxicity	Not available
Stot-single exposure	Product/ingredient name: Maleic acid Category: Category 3 Route of exposure: Not applicable Target organs: Respiratory tract irritation
Stot-repeated exposure	Not available
Aspiration hazard	Not available

Information on other hazards

Endocrine disrupting properties:

Not available.

Other information:

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named manufacturer, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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.

Section 12

Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Lead	Acute EC50 105 ppb Marine water	Algae –Chaetoceros sp. –Exponential growth phase	72 hours
	Acute EC50 0.489 mg/l Marine water	Algae –Ulva pertusa	96 hours
	Acute EC50 8000 µg/l Fresh water	Aquatic plants –Lemna minor	4 days
	Acute LC50 530 µg/l Fresh water	Crustaceans – Ceriodaphnia reticulata	48 hours
	Acute LC50 4400 µg/l Fresh water	Daphnia – Daphnia magna	48 hours
	Acute LC50 0.44 ppm Fresh Water	Fish – Cyprinus carpio – Juvenile (Fledling, Hatchling, Weanling)	96 hours
	Chronic NOEC 0.25 mg/l Marine water	Algae – Ulva pertusa	96 hours
	Chronic NOEC 0.03 µg/l Fresh water	Fish – Cyprinus carpio	4 weeks
Rosin	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

Product/ingredient name	Result	Species	Exposure
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
Persistence and degradability	NE		
Bioaccumulative potential	Product/ingredient name: Rosin LogP _{ow} : 1.9 to 7.7 BCF: – Potential: High		
	Product/ingredient name: Terpineol LogP _{ow} : – BCF: – Potential: NE		
	Product/ingredient name: Maleic acid LogP _{ow} : -1.3 BCF: – Potential: Low		
Mobility in soil	NE		
Result of PBT and vPvB assessment	Not applicable		
12.6 endocrine disrupting properties	Not available		
12.7 other adverse effects	No known significant effects or critical hazards		

Section 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.

Section 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

ADG land transportation Not regulated

Section 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 (TSCA) Inventory.
TSCA 12 (b) export notification	Not required.

Canada regulatory information

CEPA DSL/NDSL status	All components are listed on or are exempt from listing on the Canadian Domestic Substances List.
U.S. federal regulations	Not regulated.
State regulations	Not regulated.
International regulations	Not regulated.
Australian regulations	Not regulated.

This product contains components known to the state of California to cause cancer or reproductive harm.

Section 16

Other information

Legend

ACGIH	American Conference of Governmental Industrial Hygienists
ADG	Australian Dangerous Goods Code
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road

AICS	Australian Inventory of Chemical Substances
BCF	Bioconcentration factor
C.A.S.	Chemical Abstract Service
CLP	Classification, Labelling, 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
NOHSC	National Occupational Health and Safety Commission (Australia)
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.

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