M-Line 361A-20R Solder

Vishay Measurements Group GmbH

Version No: **7.0**
Safety Data Sheet according to JIS Z 7253 : 2019

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S.GHS.JPN.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	M-Line 361A-20R Solder
Chemical Name	Not Applicable
Synonyms	Not Available
Chemical formula	Not Applicable
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Welding and soldering products (with flux coatings or flux cores.), flux products.

Details of the manufacturer or importer of the safety data sheet

Registered company name	**Vishay Measurements Group GmbH**
Address	Tatschenweg 1 Heilbronn 74078 Germany
Telephone	+49 (0) 7131 39099-0
Fax	+49 (0) 7131 39099-229
Website	www.VPGSensors.com
Email	mm.de@vpgsensors.com

Emergency telephone number

Association / Organisation	**Velocity EHS**
Emergency telephone number(s)	1-813-248-0585
Other emergency telephone number(s)	Not Available

SECTION 2 Hazards identification

Classification of the substance or mixture

Classification [1]	Sensitisation (Skin) Category 1, Sensitisation (Respiratory) Category 1, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, Reproductive Toxicity Category 1A, Reproductive Toxicity Effects on or via Lactation, Specific Target Organ Toxicity - Repeated Exposure Category 1, Hazardous to the Aquatic Environment Acute Hazard Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 1
Legend:	1. Classified by Chemwatch; 2. Classification drawn from Japanese NITE GHS Classifications

Label elements

Hazard pictogram(s)	
Signal word	**Danger**

Hazard statement(s)

H317	May cause an allergic skin reaction.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H360	May damage fertility or the unborn child.
H362	May cause harm to breast-fed children.
H372	Causes damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s) Prevention

P260	Do not breathe dust/fume.
P263	Avoid contact during pregnancy and while nursing.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves and protective clothing.
P284	[In case of inadequate ventilation] wear respiratory protection.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P202	Do not handle until all safety precautions have been read and understood.
P264	Wash all exposed external body areas thoroughly after handling.
P272	Contaminated work clothing should not be allowed out of the workplace.

Precautionary statement(s) Response

P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308+P313	IF exposed or concerned: Get medical advice/ attention.
P342+P311	If experiencing respiratory symptoms: Call a POISON CENTER/doctor/physician/first aider.
P302+P352	IF ON SKIN: Wash with plenty of water and soap.
P312	Call a POISON CENTER/doctor/physician/first aider if you feel unwell.
P333+P313	If skin irritation or rash occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.
P391	Collect spillage.

Precautionary statement(s) Storage

P405	Store locked up.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.

No further product hazard information.

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name	Class Reference No. in the Gazette List		Nanoform Particle Characteristics
			CSCL	ISHL	
7440-31-5	60-65	tin	-	-	Not Available
7439-92-1	35-40	lead*	-	-	Not Available
8050-09-7	1-5	rosin-colophony	7-934	11-(4)-510, 11-(4)-95, 11-(4)-630	Not Available
7440-36-0	<1	antimony	-	-	Not Available
Legend:	[e] Substance identified as having endocrine disrupting properties				

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with eyes: • Wash out immediately with water. • If irritation continues, seek medical attention. • Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. • **DO NOT** attempt to remove particles attached to or embedded in eye . • Lay victim down, on stretcher if available and pad **BOTH** eyes, make sure dressing does not press on the injured eye by placing thick pads under dressing, above and below the eye. • Seek urgent medical assistance, or transport to hospital.
Skin Contact	If skin contact occurs: • Immediately remove all contaminated clothing, including footwear. • Flush skin and hair with running water (and soap if available). • Seek medical attention in event of irritation. In case of burns: • Immediately apply cold water to burn either by immersion or wrapping with saturated clean cloth. • **DO NOT** remove or cut away clothing over burnt areas. **DO NOT** pull away clothing which has adhered to the skin as this can cause further injury. • **DO NOT** break blister or remove solidified material. • Quickly cover wound with dressing or clean cloth to help prevent infection and to ease pain. • For large burns, sheets, towels or pillow slips are ideal; leave holes for eyes, nose and mouth. • **DO NOT** apply ointments, oils, butter, etc. to a burn under any circumstances. • Water may be given in small quantities if the person is conscious.

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	‣ Alcohol is not to be given under any circumstances. ‣ Reassure. ‣ Treat for shock by keeping the person warm and in a lying position. ‣ Seek medical aid and advise medical personnel in advance of the cause and extent of the injury and the estimated time of arrival of the patient. For thermal burns: ‣ Decontaminate area around burn. ‣ Consider the use of cold packs and topical antibiotics. For first-degree burns (affecting top layer of skin) ‣ Hold burned skin under cool (not cold) running water or immerse in cool water until pain subsides. ‣ Use compresses if running water is not available. ‣ Cover with sterile non-adhesive bandage or clean cloth. ‣ Do NOT apply butter or ointments; this may cause infection. ‣ Give over-the counter pain relievers if pain increases or swelling, redness, fever occur. For second-degree burns (affecting top two layers of skin) ‣ Cool the burn by immerse in cold running water for 10-15 minutes. ‣ Use compresses if running water is not available. ‣ Do NOT apply ice as this may lower body temperature and cause further damage. ‣ Do NOT break blisters or apply butter or ointments; this may cause infection. ‣ Protect burn by cover loosely with sterile, nonstick bandage and secure in place with gauze or tape. To prevent shock: (unless the person has a head, neck, or leg injury, or it would cause discomfort): ‣ Lay the person flat. ‣ Elevate feet about 12 inches. ‣ Elevate burn area above heart level, if possible. ‣ Cover the person with coat or blanket. ‣ Seek medical assistance. For third-degree burns Seek immediate medical or emergency assistance. In the mean time: ‣ Protect burn area cover loosely with sterile, nonstick bandage or, for large areas, a sheet or other material that will not leave lint in wound. ‣ Separate burned toes and fingers with dry, sterile dressings. ‣ Do not soak burn in water or apply ointments or butter; this may cause infection. ‣ To prevent shock see above. ‣ For an airway burn, do not place pillow under the person's head when the person is lying down. This can close the airway. ‣ Have a person with a facial burn sit up. ‣ Check pulse and breathing to monitor for shock until emergency help arrives.
Inhalation	‣ If fumes or combustion products are inhaled remove from contaminated area. ‣ Lay patient down. Keep warm and rested. ‣ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ‣ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ‣ Transport to hospital, or doctor, without delay.
Ingestion	‣ **IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.** ‣ For advice, contact a Poisons Information Centre or a doctor. ‣ Urgent hospital treatment is likely to be needed. ‣ In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition. ‣ If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the SDS should be provided. Further action will be the responsibility of the medical specialist. ‣ If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the SDS.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

Copper, magnesium, aluminium, antimony, iron, manganese, nickel, zinc (and their compounds) in welding, brazing, galvanising or smelting operations all give rise to thermally produced particulates of smaller dimension than may be produced if the metals are divided mechanically. Where insufficient ventilation or respiratory protection is available these particulates may produce "metal fume fever" in workers from an acute or long term exposure.

- Onset occurs in 4-6 hours generally on the evening following exposure. Tolerance develops in workers but may be lost over the weekend. (Monday Morning Fever)
- Pulmonary function tests may indicate reduced lung volumes, small airway obstruction and decreased carbon monoxide diffusing capacity but these abnormalities resolve after several months.
- Although mildly elevated urinary levels of heavy metal may occur they do not correlate with clinical effects.
- The general approach to treatment is recognition of the disease, supportive care and prevention of exposure.
- Seriously symptomatic patients should receive chest x-rays, have arterial blood gases determined and be observed for the development of tracheobronchitis and pulmonary edema.

[Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 Firefighting measures

Extinguishing media

Special hazards arising from the substance or mixture

Fire Incompatibility	‣ Reacts with acids producing flammable / explosive hydrogen (H2) gas ‣ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ Wear breathing apparatus plus protective gloves in the event of a fire. ‣ Prevent, by any means available, spillage from entering drains or water courses. ‣ Use fire fighting procedures suitable for surrounding area. ‣ **DO NOT** approach containers suspected to be hot. ‣ Cool fire exposed containers with water spray from a protected location. ‣ If safe to do so, remove containers from path of fire. ‣ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	‣ **DO NOT** disturb burning dust. Explosion may result if dust is stirred into a cloud, by providing oxygen to a large surface of hot metal.

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	▸ **DO NOT** use water or foam as generation of explosive hydrogen may result. With the exception of the metals that burn in contact with air or water (for example, sodium), masses of combustible metals do not represent unusual fire risks because they have the ability to conduct heat away from hot spots so efficiently that the heat of combustion cannot be maintained - this means that it will require a lot of heat to ignite a mass of combustible metal. Generally, metal fire risks exist when sawdust, machine shavings and other metal 'fines' are present. Metal powders, while generally regarded as non-combustible: ▸ May burn when metal is finely divided and energy input is high. ▸ May react explosively with water. ▸ May be ignited by friction, heat, sparks or flame. ▸ May **REIGNITE** after fire is extinguished. ▸ Will burn with intense heat. Note: ▸ Metal dust fires are slow moving but intense and difficult to extinguish. ▸ Containers may explode on heating. ▸ Dusts or fumes may form explosive mixtures with air. ▸ Gases generated in fire may be poisonous, corrosive or irritating. ▸ Hot or burning metals may react violently upon contact with other materials, such as oxidising agents and extinguishing agents used on fires involving ordinary combustibles or flammable liquids. ▸ Temperatures produced by burning metals can be higher than temperatures generated by burning flammable liquids ▸ Some metals can continue to burn in carbon dioxide, nitrogen, water, or steam atmospheres in which ordinary combustibles or flammable liquids would be incapable of burning. Combustion products include: , ▸ carbon monoxide (CO) , ▸ carbon dioxide (CO2) , metal oxides , ▸ other pyrolysis products typical of burning organic material. May emit poisonous fumes. May emit corrosive fumes. Explosions can occur with coils of foil that have been submerged or partially submerged in water for an extended period of time. Water can penetrate between the layers of foil, react with the aluminum surface and generate heat and hydrogen gas. When the coils are removed from the cooling effects of the water, rapid temperature increases can occur causing steam explosions which result in the rupture of the coils and discharge of debris. Coils of foil may be a potential hazard under the following conditions: · Coil has been annealed (annealing removes residual oil that could prevent penetration of water · Foil is very thin gauge (5-9 µm thickness which increases surface area) · Coil has been immersed for an extended period of time (several hours or more) · Wetted coil has recently been removed from the cooling effects of the water In such situations, the coils should be isolated (30 meters from any personnel) for at least 72 hours as soon as possible after removal from the water. Coils making crackling sounds or emitting steam should not be approached or transported in commerce. Wetted coils should not be charged into a furnace for remelting until completely dry.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Clean up waste regularly and abnormal spills immediately. ▸ Avoid breathing dust and contact with skin and eyes. ▸ Wear protective clothing, gloves, safety glasses and dust respirator. ▸ Use dry clean up procedures and avoid generating dust. ▸ Vacuum up or sweep up. **NOTE:** Vacuum cleaner must be fitted with an exhaust micro filter (H-Class HEPA type) (consider explosion-proof machines designed to be grounded during storage and use). H-Class HEPA filtered industrial vacuum cleaners should NOT be used on wet materials or surfaces. ▸ Dampen with water to prevent dusting before sweeping. ▸ Place in suitable containers for disposal. Environmental hazard - contain spillage.
Major Spills	Environmental hazard - contain spillage. · Do not use compressed air to remove metal dusts from floors, beams or equipment · Vacuum cleaners, of flame-proof design, should be used to minimise dust accumulation. · Use non-sparking handling equipment, tools and natural bristle brushes. · Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations · Cover and reseal partially empty containers. · Do not allow chips, fines or dusts to contact water, particularly in enclosed areas. If molten: ▸ Contain the flow using dry sand or salt flux as a dam. ▸ All tooling (e.g., shovels or hand tools) and containers which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. ▸ Allow the spill to cool before remelting scrap. Moderate hazard. ▸ **CAUTION**: Advise personnel in area. ▸ Alert Emergency Services and tell them location and nature of hazard. ▸ Control personal contact by wearing protective clothing. ▸ Prevent, by any means available, spillage from entering drains or water courses. ▸ Recover product wherever possible. ▸ **IF DRY:** Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. **IF WET:** Vacuum/shovel up and place in labelled containers for disposal. ▸ **ALWAYS:** Wash area down with large amounts of water and prevent runoff into drains. ▸ If contamination of drains or waterways occurs, advise Emergency Services.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

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SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	For molten metals: · Molten metal and water can be an explosive combination. The risk is greatest when there is sufficient molten metal to entrap or seal off water. Water and other forms of contamination on or contained in scrap or remelt ingot are known to have caused explosions in melting operations. While the products may have minimal surface roughness and internal voids, there remains the possibility of moisture contamination or entrapment. If confined, even a few drops can lead to violent explosions. · All tooling, containers, molds and ladles, which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. · Any surfaces that may contact molten metal (e.g. concrete) should be specially coated · Drops of molten metal in water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Vigorous circulation of the water and removal of the particles minimise the hazard. During melting operations, the following minimum guidelines should be observed: · Inspect all materials prior to furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage. · Store materials in dry, heated areas with any cracks or cavities pointed downwards. · Preheat and dry large objects adequately before charging in to a furnace containing molten metal. This is typically done by the use of a drying oven or homogenising furnace. The dry cycle should bring the metal temperature of the coldest item of the batch to 200 degree C (400 deg F) and then hold at that temperature for 6 hours. ‣ Avoid skin contact, including inhalation. ‣ Wear protective clothing when risk of exposure occurs. ‣ Use in a well-ventilated area. ‣ Prevent concentration in hollows and sumps. ‣ **DO NOT** enter confined spaces until atmosphere has been checked. ‣ **DO NOT** allow material to come in direct contact with human skin or eyes. ‣ **DO NOT** allow material to come in contact with exposed food or food contact surfaces. ‣ Suitable PPE must be worn at all times. ‣ Avoid contact with incompatible materials. ‣ When handling, **DO NOT** eat, drink or smoke. ‣ Keep containers securely sealed when not in use. ‣ Avoid physical damage to containers. ‣ Always wash hands with soap and water after handling. ‣ Work clothes should be laundered separately. Launder contaminated clothing before re-use. ‣ Use good occupational work practice. ‣ Observe manufacturer's storage and handling recommendations contained within this SDS. ‣ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. ‣ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions) ‣ Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame. ‣ Establish good housekeeping practices. ‣ Remove dust accumulations on a regular basis by vacuuming or gentle sweeping to avoid creating dust clouds. ‣ Use continuous suction at points of dust generation to capture and minimise the accumulation of dusts. Particular attention should be given to overhead and hidden horizontal surfaces to minimise the probability of a "secondary" explosion. According to NFPA Standard 654, dust layers 1/32 in.(0.8 mm) thick can be sufficient to warrant immediate cleaning of the area. ‣ Do not use air hoses for cleaning. ‣ Minimise dry sweeping to avoid generation of dust clouds. Vacuum dust-accumulating surfaces and remove to a chemical disposal area. Vacuums with explosion-proof motors should be used. ‣ Control sources of static electricity. Dusts or their packages may accumulate static charges, and static discharge can be a source of ignition. ‣ Solids handling systems must be designed in accordance with applicable standards (e.g. NFPA including 654 and 77) and other national guidance. ‣ Do not empty directly into flammable solvents or in the presence of flammable vapors. ‣ The operator, the packaging container and all equipment must be grounded with electrical bonding and grounding systems. Plastic bags and plastics cannot be grounded, and antistatic bags do not completely protect against development of static charges. Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source. ‣ Do NOT cut, drill, grind or weld such containers. ‣ In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.
Other information	‣ Store in original containers. ‣ Keep containers securely sealed. ‣ Store in a cool, dry area protected from environmental extremes. ‣ Store away from incompatible materials and foodstuff containers. ‣ Protect containers against physical damage and check regularly for leaks. ‣ Observe manufacturer's storage and handling recommendations contained within this SDS. For major quantities: ‣ Consider storage in bunded areas - ensure storage areas are isolated from sources of community water (including stormwater, ground water, lakes and streams}. ‣ Ensure that accidental discharge to air or water is the subject of a contingency disaster management plan; this may require consultation with local authorities.

Conditions for safe storage, including any incompatibilities

Suitable container	‣ Bulk bags: Reinforced bags required for dense materials. ‣ **CARE**: Packing of high density product in light weight metal or plastic packages may result in container collapse with product release ‣ Heavy gauge metal packages / Heavy gauge metal drums
Storage incompatibility	Chips, fines and dust are considerably more reactive in the presence of: ‣ Water - slowly generates flammable/explosive hydrogen gas and heat (generation rate is greatly increased with smaller particles (e.g., fines and dusts). ‣ Heat - oxidise at a rate dependent upon temperature and particle size. ‣ Strong oxidisers - violent reaction with considerable heat generation; an react explosively with nitrates (e.g., ammonium nitrate and fertilizers containing nitrate) when heated or molten. ‣ Acids and alkalis - reacts to generate flammable/explosive hydrogen gas; generation rate is greatly increased with smaller particles (e.g., fines and dusts). ‣ Halogenated compounds including halogenated fire extinguishing agents, which may react violently with finely divided or molten metals ‣ Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides) which may produce a violent thermit reaction, initiated by a weak ignition source, generating considerable heat.. ‣ Iron powder and water which may react explosively forming hydrogen gas when heated above 800 degrees C (1470 deg F). Finely divided metals (e.g., powders or wire) may have enough surface oxide to produce thermit reactions/explosions

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The material is described as an electropositive metal.
The activity or electromotive series of metals is a listing of the metals in decreasing order of their reactivity with hydrogen-ion sources such as water and acids. In the reaction with a hydrogen-ion source, the metal is oxidised to a metal ion, and the hydrogen ion is reduced to H2. The ordering of the activity series can be related to the standard reduction potential of a metal cation. The more positive the standard reduction potential of the cation, the more difficult it is to oxidise the metal to a hydrated metal cation and the later that metal falls in the series
Three notable groups comprise the series
- very electropositive metals
- electropositive metals
- electronegative metals

Electropositive metals.have electronegativities that fall between 1.4 and 1.9 Cations of these metals generally have standard reduction potentials between 0.0 and -1.6 V
They:
- do not react very readily with water to release hydrogen
- react with H+ (acids)

Electropositive metals do not burn in air as readily as do very electropositive metals. The surfaces of these metals will tarnish in the presence of oxygen forming a protective oxide coating. This coating protects the bulk of the metal against further oxidation (the metal is passivated).

Reaction is reduced in the massive form (sheet, rod, or drop), compared with finely divided forms. The less active metals will not burn in air but:
- can react exothermically with oxidising acids to form noxious gases.
- catalyse polymerisation and other reactions, particularly when finely divided
- react with halogenated hydrocarbons (for example, copper dissolves when heated in carbon tetrachloride), sometimes forming explosive compounds.
- Elemental metals may react with azo/diazo compounds to form explosive products

- Finely divided metal powders develop pyrophoricity when a critical specific surface area is exceeded; this is ascribed to high heat of oxide formation on exposure to air.
- Safe handling is possible in relatively low concentrations of oxygen in an inert gas
- Several pyrophoric metals, stored in glass bottles have ignited when the container is broken on impact. Storage of these materials moist and in metal containers is recommended.
- The reaction residues from various metal syntheses (involving vacuum evaporation and co-deposition with a ligand) are often pyrophoric

If the surface of the metal is in contact with both oxygen and water, corrosion can occur. In corrosion, the metal acts as an anode and is oxidised.

Many metals may incandesce, react violently, ignite or react explosively upon addition of concentrated nitric acid.
Some electropositive metals do not react with nitric acid because they are passivated.

https://www.wou.edu/las/physci/ch412/activity.htm
41terpx
- Many metals may incandesce, react violently, ignite or react explosively upon addition of concentrated nitric acid.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Japan Working Environment Evaluation Standards	tin	Mineral, metal or carbon dusts	E=3.0/(1.19Q+1) mg/m3	Not Available	Not Available	E ; administrative control level (mg/m3), Q ; content of free silica (parcent)
Japan Occupational Exposure Limits	tin	Dusts	Not Available	Not Available	Not Available	Not Available
Japan Occupational Exposure Limits for Dusts	tin	Mineral, inorganic, and organic dusts other than Classes 1 and 2 - Total dust	8 mg/m3	Not Available	Not Available	OEL for 'Mineral, inorganic, and organic dusts other than Classes 1 and 2' is a reference value assigned for dusts that are insoluble or poorly soluble in water to prevent from pneumoconiosis caused by inhaling large amount of those; thus, be aware that unknown toxocity may be developed even below this value
Japan Occupational Exposure Limits for Dusts	tin	Mineral, inorganic, and organic dusts other than Classes 1 and 2 - Respirable dust	2 mg/m3	Not Available	Not Available	OEL for 'Mineral, inorganic, and organic dusts other than Classes 1 and 2' is a reference value assigned for dusts that are insoluble or poorly soluble in water to prevent from pneumoconiosis caused by inhaling large amount of those; thus, be aware that unknown toxocity may be developed even below this value
Japan Working Environment Evaluation Standards	lead*	Mineral, metal or carbon dusts	E=3.0/(1.19Q+1) mg/m3	Not Available	Not Available	E ; administrative control level (mg/m3), Q ; content of free silica (parcent)
Japan Working Environment Evaluation Standards	lead*	Lead and its compounds	0.05 mg/m3	Not Available	Not Available	mg/m3 as lead
Japan Occupational Exposure Limits	lead*	Dusts	Not Available	Not Available	Not Available	Not Available
Japan Occupational Exposure Limits	lead*	Lead and compounds (as Pb	0.03 mg/m3	Not Available	Not Available	Carc: 2B; Repro: 1

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Source	Ingredient	Material name	TWA	STEL	Peak	Notes
		except alkyl lead compounds)				
Japan Occupational Exposure Limits for Dusts	lead*	Mineral, inorganic, and organic dusts other than Classes 1 and 2 - Respirable dust	2 mg/m3	Not Available	Not Available	OEL for 'Mineral, inorganic, and organic dusts other than Classes 1 and 2' is a reference value assigned for dusts that are insoluble or poorly soluble in water to prevent from pneumoconiosis caused by inhaling large amount of those; thus, be aware that unknown toxocity may be developed even below this value
Japan Occupational Exposure Limits for Dusts	lead*	Mineral, inorganic, and organic dusts other than Classes 1 and 2 - Total dust	8 mg/m3	Not Available	Not Available	OEL for 'Mineral, inorganic, and organic dusts other than Classes 1 and 2' is a reference value assigned for dusts that are insoluble or poorly soluble in water to prevent from pneumoconiosis caused by inhaling large amount of those; thus, be aware that unknown toxocity may be developed even below this value
Japan Working Environment Evaluation Standards	rosin-colophony	Mineral, metal or carbon dusts	E=3.0/(1.19Q+1) mg/m3	Not Available	Not Available	E ; administrative control level (mg/m3), Q ; content of free silica (parcent)
Japan Occupational Exposure Limits	rosin-colophony	Dusts	Not Available	Not Available	Not Available	Not Available
Japan Occupational Exposure Limits for Dusts	rosin-colophony	Mineral, inorganic, and organic dusts other than Classes 1 and 2 - Respirable dust	2 mg/m3	Not Available	Not Available	OEL for 'Mineral, inorganic, and organic dusts other than Classes 1 and 2' is a reference value assigned for dusts that are insoluble or poorly soluble in water to prevent from pneumoconiosis caused by inhaling large amount of those; thus, be aware that unknown toxocity may be developed even below this value
Japan Occupational Exposure Limits for Dusts	rosin-colophony	Mineral, inorganic, and organic dusts other than Classes 1 and 2 - Total dust	8 mg/m3	Not Available	Not Available	OEL for 'Mineral, inorganic, and organic dusts other than Classes 1 and 2' is a reference value assigned for dusts that are insoluble or poorly soluble in water to prevent from pneumoconiosis caused by inhaling large amount of those; thus, be aware that unknown toxocity may be developed even below this value
Japan Working Environment Evaluation Standards	antimony	Mineral, metal or carbon dusts	E=3.0/(1.19Q+1) mg/m3	Not Available	Not Available	E ; administrative control level (mg/m3), Q ; content of free silica (parcent)
Japan Occupational Exposure Limits	antimony	Antimony and compounds (as Sb except stibine)	0.1 mg/m3	Not Available	Not Available	Not Available
Japan Occupational Exposure Limits	antimony	Dusts	Not Available	Not Available	Not Available	Not Available
Japan Occupational Exposure Limits for Dusts	antimony	Mineral, inorganic, and organic dusts other than Classes 1 and 2 - Total dust	8 mg/m3	Not Available	Not Available	OEL for 'Mineral, inorganic, and organic dusts other than Classes 1 and 2' is a reference value assigned for dusts that are insoluble or poorly soluble in water to prevent from pneumoconiosis caused by inhaling large amount of those; thus, be aware that unknown toxocity may be developed even below this value
Japan Occupational Exposure Limits for Dusts	antimony	Mineral, inorganic, and organic dusts other than Classes 1 and 2 - Respirable dust	2 mg/m3	Not Available	Not Available	OEL for 'Mineral, inorganic, and organic dusts other than Classes 1 and 2' is a reference value assigned for dusts that are insoluble or poorly soluble in water to prevent from pneumoconiosis caused by inhaling large amount of those; thus, be aware that unknown toxocity may be developed even below this value

Exposure controls

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Appropriate engineering controls	Metal dusts must be collected at the source of generation as they are potentially explosive. • Avoid ignition sources. • Good housekeeping practices must be maintained. • Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions. • Do not use compressed air to remove settled materials from floors, beams or equipment • Vacuum cleaners, of flame-proof design, should be used to minimise dust accumulation. • Use non-sparking handling equipment, tools and natural bristle brushes. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations. • Do not allow chips, fines or dusts to contact water, particularly in enclosed areas. • Metal spraying and blasting should, where possible, be conducted in separate rooms. This minimises the risk of supplying oxygen, in the form of metal oxides, to potentially reactive finely divided metals such as aluminium, zinc, magnesium or titanium. • Work-shops designed for metal spraying should possess smooth walls and a minimum of obstructions, such as ledges, on which dust accumulation is possible. • Wet scrubbers are preferable to dry dust collectors. • Bag or filter-type collectors should be sited outside the workrooms and be fitted with explosion relief doors. • Cyclones should be protected against entry of moisture as reactive metal dusts are capable of spontaneous combustion in humid or partially wetted states. • Local exhaust systems must be designed to provide a minimum capture velocity at the fume source, away from the worker, of 0.5 metre/sec. • Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuum and electrostatic precipitators must not be used, unless specifically approved for use with flammable/ explosive dusts. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant. Type of Contaminant: — Air Speed: welding, brazing fumes (released at relatively low velocity into moderately still air) — 0.5-1.0 m/s (100-200 f/min.) Within each range the appropriate value depends on: Lower end of the range — Upper end of the range 1: Room air currents minimal or favourable to capture — 1: Disturbing room air currents 2: Contaminants of low toxicity or of nuisance value only. — 2: Contaminants of high toxicity 3: Intermittent, low production. — 3: High production, heavy use 4: Large hood or large air mass in motion — 4: Small hood-local control only Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2.5 m/s (200-500 f/min.) for extraction of gases discharged 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.
Individual protection measures, such as personal protective equipment	
Eye and face protection	• Safety glasses with side shields. • Chemical goggles.[AS/NZS 1337.1, EN166 or national equivalent] • Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].
Skin protection	See Hand protection below
Hands/feet protection	**NOTE:** • The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. • Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended. Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: · frequency and duration of contact, · chemical resistance of glove material, · glove thickness and · dexterity Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent). · When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. · When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. · Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use. · Contaminated gloves should be replaced. As defined in ASTM F-739-96 in any application, gloves are rated as: · Excellent when breakthrough time > 480 min · Good when breakthrough time > 20 min · Fair when breakthrough time < 20 min · Poor when glove material degrades For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.

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	It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times. Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers technical data should always be taken into account to ensure selection of the most appropriate glove for the task. Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example: · Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of. · Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended. ‣ Protective gloves eg. Leather gloves or gloves with Leather facing Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present. ‣ polychloroprene. ‣ nitrile rubber. ‣ butyl rubber. ‣ fluorocaoutchouc. ‣ polyvinyl chloride. Gloves should be examined for wear and/ or degradation constantly.
Body protection	See Other protection below
Other protection	‣ Overalls. ‣ P.V.C apron. ‣ Barrier cream. ‣ Skin cleansing cream. ‣ Eye wash unit.

Respiratory protection

Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	A P1 Air-line*	- -	A PAPR-P1 -
up to 50 x ES	Air-line**	A P2	A PAPR-P2
up to 100 x ES	-	A P3	-
		Air-line*	-
100+ x ES	-	Air-line**	A PAPR-P3

* - Negative pressure demand ** - Continuous flow
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

· Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
· The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
· Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
· Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
· Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)
· Use approved positive flow mask if significant quantities of dust becomes airborne.
· Try to avoid creating dust conditions.
Class P2 particulate filters are used for protection against mechanically and thermally generated particulates or both.
P2 is a respiratory filter rating under various international standards, Filters at least 94% of airborne particles
Suitable for:
· Relatively small particles generated by mechanical processes eg. grinding, cutting, sanding, drilling, sawing.
· Sub-micron thermally generated particles e.g. welding fumes, fertilizer and bushfire smoke.
· Biologically active airborne particles under specified infection control applications e.g. viruses, bacteria, COVID-19, SARS

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Silver - Grey metal in wire form

Physical state	Solid	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (℃)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature (℃)**	Not Available
Melting point / freezing point (℃)	Not Available	**Viscosity (mm2/s)**	Not Available
Initial boiling point and boiling range (℃)	Not Applicable	**Molecular weight (g/mol)**	Not Available
Flash point (℃)	Not Applicable	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available

Continued...

Upper Explosive Limit (%)	Not Applicable	**Surface Tension (dyn/cm or mN/m)**	Not Applicable
Lower Explosive Limit (%)	Not Applicable	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	Immiscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available
Heat of Combustion (kJ/g)	Not Available	**Ignition Distance (cm)**	Not Available
Flame Height (cm)	Not Available	**Flame Duration (s)**	Not Available
Enclosed Space Ignition Time Equivalent (s/m3)	Not Available	**Enclosed Space Ignition Deflagration Density (g/m3)**	Not Available
Nanoform Solubility	Not Available	**Nanoform Particle Characteristics**	Not Available
Particle Size	Not Available		

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

a) Acute Toxicity	Based on available data, the classification criteria are not met.
b) Skin Irritation/Corrosion	Based on available data, the classification criteria are not met.
c) Serious Eye Damage/Irritation	Based on available data, the classification criteria are not met.
d) Respiratory or Skin sensitisation	There is sufficient evidence to classify this material as sensitising to skin or the respiratory system
e) Mutagenicity	Based on available data, the classification criteria are not met.
f) Carcinogenicity	Based on available data, the classification criteria are not met.
g) Reproductivity	There is sufficient evidence to classify this material as toxic to reproductivity
h) STOT - Single Exposure	There is sufficient evidence to classify this material as toxic to specific organs through single exposure
i) STOT - Repeated Exposure	There is sufficient evidence to classify this material as toxic to specific organs through repeated exposure
j) Aspiration Hazard	Based on available data, the classification criteria are not met.

Inhaled	Component metals which form part of massive metals and their alloys are “locked” into a metal lattice, and as a result they are not easily absorbed following inhalation. Secondary processes (for example, a change in pH or the action of bacteria in the gut) may allow certain substances to be released in low concentrations. Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled. If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures. The inhalation of small particles of metal oxide results in sudden thirst, a sweet, metallic foul taste, throat irritation, cough, dry mucous membranes, tiredness and general unwellness. Headache, nausea and vomiting, fever or chills, restlessness, sweating, diarrhoea, excessive urination and prostration may also occur. Inhalation of dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.
Ingestion	Metals which form part of massive metals and their alloys, are "locked" into a metal lattice; as a result they are not readily bioavailable following ingestion. Secondary processes (e.g. change in pH or intervention by gastrointestinal microorganisms) may allow certain substances to be released in low concentrations. Poorly absorbed from the gut, tin salts are most likely to cause poisoning if injected. Tin is **highly toxic**, producing diarrhoea, muscle paralysis, twitching and nervous damage. Tin salts are not very toxic. However, at high concentration, nausea, vomiting and diarrhoea can occur. The material is not expected to produce harmful effects following ingestion based on the available information. However, the material may still cause adverse health effects following ingestion, particularly in individuals with pre-existing organ damage (e.g. liver or kidney impairment). Gastrointestinal discomfort may occur and may result in nausea and vomiting. In an occupational setting, ingestion of incidental quantities should be avoided, and good hygiene practices should be followed to prevent ingestion. Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
Skin Contact	Skin contact is not expected to result in harmful health effects and the material is not classified as hazardous by the dermal route under Regulation (EC) No 1272/2008 (CLP), as amended. However, the material may cause harm following entry through wounds, lesions or abrasions. There is some evidence to suggest that this material can cause inflammation of the skin on contact in some persons. Particles and foreign bodies produced by high speed processes may penetrate the skin. Even after the wound heals, persons with retained foreign bodies may experience sharp pain with movement or pressure over the site. Discolouration or a visible mass under the epidermis may be obvious. A foreign body pressing against nerves may result in numbness or tingling (“pins and needles”), with decreased sensation. Persons with diabetes, or a history of vascular problems, have a higher potential to acquire an infection.

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	Open cuts, abraded or irritated skin should not be exposed to this material
Eye	Although the material is not classified as an eye irritant under Regulation (EC) No 1272/2008 (CLP), as amended, direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals. Contact with the eye by metal dusts may cause scratching on the cornea and other injuries, which are usually minor. However, foreign body penetration of the eyeball may cause infection or result in permanent loss of vision. High-speed machines (such as drills and saws) can produce white-hot particles of metal that resemble sparks. Any of these white-hot particles can enter the unprotected eye, and become embedded deep within it. Foreign bodies that penetrate the inside of the eye can cause infection (endophthalmitis). During the first hours after injury, symptoms of foreign bodies within the eye may be similar to those of scratching of the cornea. However, people with foreign bodies within the eye may also have a noticeable loss of vision. Fluid may leak from the eye, although this may not be noticeable if the foreign body is small. Pain may also increase after the first few hours. Scratches of the cornea, caused by particles and foreign bodies, usually cause pain, tearing, and a feeling that there is something in the eye. They may also cause redness (due to inflamed blood vessels on the surface of the eye), or occasionally, a swelling of the eye and eyelid. Vision may become blurred. Light may be a source of irritation or may cause the muscle that constructs the pupil to undergo a painful spasm. Injuries that penetrate the eye may cause similar symptoms. If a foreign object penetrates the inside of the eye, fluid may leak out.
Chronic	Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment. Inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population. Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population. Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed. This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects. Ample evidence exists that this material directly causes reduced fertility Ample evidence exists that developmental disorders are directly caused by human exposure to the material. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. Chronic exposure to tin dusts and fume can result in substantial amounts being deposited in the lungs and result in reduced lung function and difficulty breathing. Metallic dusts generated by the industrial process give rise to a number of potential health problems. The larger particles, above 5 micron, are nose and throat irritants.

M-Line 361A-20R Solder	**TOXICITY**	**IRRITATION**
	Not Available	Not Available

tin	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: >4.75 mg/l4h[1]	Skin: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: >2000 mg/kg[1]	

lead*	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: >5.05 mg/l4h[1]	Skin: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: >2000 mg/kg[1]	

rosin-colophony	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: >1000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]

antimony	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >8000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: >5.2 mg/l4h[1]	Skin: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: 7000 mg/kg[2]	

Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances

M-Line 361A-20R Solder	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production. Allergic reactions involving the respiratory tract are usually due to interactions between IgE antibodies and allergens and occur rapidly. Allergic potential of the allergen and period of exposure often determine the severity of symptoms. Some people may be genetically more prone than others, and exposure to other irritants may aggravate symptoms. Allergy causing activity is due to interactions with proteins. Attention should be paid to atopic diathesis, characterised by increased susceptibility to nasal inflammation, asthma and eczema. Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure.
TIN	No significant acute toxicological data identified in literature search.
LEAD*	WARNING: Lead is a cumulative poison and has the potential to cause abortion and intellectual impairment to unborn children of pregnant workers.

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ROSIN-COLOPHONY	Different rosin types are used interchangeably and are often chemically modified.. Colophony (rosin) is the nonvolatile fraction of the exudates from coniferous trees, and its main constituent is abietic acid. Abietic acid has been described as the allergenic constituent. Because it is not an electrophile, its sensitizing capacity was questioned when investigations regarding the allergenic properties of colophony started many years ago. It was found that highly purified abietic acid is nonallergenic but rapidly autooxidises forming a hydroperoxide which subsequently was identified as a major allergen of colophony . A variety of other oxidation products from abietic acid and dehydroabietic acid (the other major resin acid in colophony) were isolated and identified, some of which were shown to be sensitizers in guinea pig studies. Clinical investigations have shown that patch testing with the hydroperoxide detects about 50% of the patients with contact allergy to colophony. Abietic acid,a rosin acid, is converted into a highly reactive hydroperoxide by contact with air. Unmodified colophony is a complex mixture of diterpenoid acids (i.e., resin acids, ca. 90%), diterpene alcohols, aldehydes, and hydrocarbons To cause sensitization, a chemical must bind to macromolecules (proteins) in the skin (producing so-called haptenation). Hydroperoxy resin acids are dermal sensitizers, with haptenation thought to occur via radical mechanisms. Conjugation of L-lysine to the resin is predicted, with a Schiff base (or imine) linkage formed between the C-7 of the resin and the free amino group of lysine. Resin acids accumulate in the plasma membrane, a non-aqueous environment apparently conducive to conjugation of hydroperoxy resin acids with lysine side chains of membrane proteins, through covalent binding. Such binding might lead to interaction with immune cells having resin acid specificity. The haptenation mechanism may be involved in allergic contact dermatitis and occupational asthma observed from exposure to resin acid solids and aerosols. For a better understanding of the mechanisms of contact allergic reactions, the patterns of cross-reactivity between different resin acid oxidation products were studied. The 13,14(alpha)-epoxide and the 13,14(beta)-epoxide of abietic acid and 15-hydroperoxydehydroabietic acid (15-HPDA) were shown in experimental sensitization studies to be contact allergens. Cross-reactivity was observed between the alpha- and beta-epoxides and also between the epoxides and the previously identified rosin allergen 15-hydroperoxyabietic acid (15-HPA). This indicates that 15-HPA may form an epoxide which then reacts with skin protein to generate the complete antigen. 15-HPA and 15-HPDA cross-reacted as well. This can be explained by the formation of similar alkoxy radicals from both hydroperoxides which further react with skin protein. Cross-reactivity patterns of the resin acid oxidation products indicate that 15-HPA may react with skin proteins either as a radical or as an epoxide, thus generating different antigens. The presence in rosin of the epoxides of abietic acid was also studied. The beta-epoxide was detected in gum rosin. Moreover, the epoxides elicited reactions in rosin-allergic individuals. Thus, the 13,14(beta)-epoxide of abietic acid was identified as a new, important rosin allergen.
M-Line 361A-20R Solder & ROSIN-COLOPHONY	The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested. No evidence of a sensitization response was observed in the Gum roins key study, a guideline Local Lymph Node Assay conducted in mice, or in ten supporting studies conducted in guinea pigs according to the GPMT or Buehler methods. Gum Rosin is not classified for dermal sensitization according to the UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS). Gum Rosin is currently classified for Skin Sensitization according to Annex I to Directive 67/548/EEC as R43: May cause sensitization by skin contact. Gum Rosin is also classified according to EU Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulation (EC) No. 1272/2008. As part of the harmonized translation between Directive 67/548/EEC and EU CLP Regulation (EC) No. 1272/2008, Table 3.1 of EU CLP Regulation (EC) No. 1272/2008 classifies Gum Rosin as “Skin Sensitizer Category 1” and assigns the hazard statement H317: May cause an allergic skin reaction. Table 3.2 of EU CLP Regulation (EC) No. 1272/2008 contains a list of harmonized classifications and labelling of hazardous substances from Annex I to Directive 67/548/EEC. Gum Rosin is assigned the risk phrase R43: May cause sensitization by skin contact in Table 3.2. Subsequent evaluation determined that the single positive study for Gum Rosin was actually conducted with an oxidized form of the test material. Several esters of Rosin have been tested using similar protocols with similar results. When the Rosin esters were heated beyond the specified protocol, the oxidized material caused a positive sensitization response. When those same esters were retested using a different protocol which did not cause oxidation, all sensitization responses were negative. While the oxidized form of Gum Rosin should be considered a skin sensitizer, the recommendation is made to declassify non-oxidized Gum Rosin (CAS # 8050-09-7).

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✓
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✓
Respiratory or Skin sensitisation	✓	**STOT - Repeated Exposure**	✓
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
✓ – Data available to make classification

Endocrine disrupting properties

No evidence of endocrine disrupting properties were found in the current literature.

SECTION 12 Ecological information

Toxicity

M-Line 361A-20R Solder

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

tin

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>0.019mg/L	2
NOEC(ECx)	168h	Crustacea	<0.005mg/L	2
LC50	96h	Fish	>0.012mg/L	2

lead*

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	0.021mg/L	2
EC50	48h	Crustacea	0.029mg/L	2
NOEC(ECx)	672h	Crustacea	<0.001mg/L	2
EC50	96h	Algae or other aquatic plants	0.282-0.864mg/l	4

Continued...

	LC50	96h	Fish	0.008mg/L	2

rosin-colophony

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>10<20mg/l	2
EC50	48h	Crustacea	4.5mg/l	1
EC50	96h	Algae or other aquatic plants	0.031mg/l	2
LC50	96h	Fish	1.5mg/l	2
EC0(ECx)	48h	Crustacea	2.15mg/l	1

antimony

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>2.4mg/l	2
EC50	48h	Crustacea	423.45mg/l	2
NOEC(ECx)	720h	Fish	>0.008mg/L	2
EC50	96h	Algae or other aquatic plants	0.61mg/l	2
LC50	96h	Fish	0.93mg/l	2

Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. US EPA, Ecotox database - Aquatic Toxicity Data 4. ECETOC Aquatic Hazard Assessment Data 5. NITE (Japan) - Bioconcentration Data 6. METI (Japan) - Bioconcentration Data 7. Vendor Data 8. User defined data

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.
Wastes resulting from use of the product must be disposed of on site or at approved waste sites.
For Metal:
Atmospheric Fate - Metal-containing inorganic substances generally have negligible vapour pressure and are not expected to partition to air.
Environmental Fate: Environmental processes, such as oxidation, the presence of acids or bases and microbiological processes, may transform insoluble metals to more soluble ionic forms. Environmental processes may enhance bioavailability and may also be important in changing solubilities.
Aquatic/Terrestrial Fate: When released to dry soil, most metals will exhibit limited mobility and remain in the upper layer; some will leach locally into ground water and/ or surface water ecosystems when soaked by rain or melt ice. A metal ion is considered infinitely persistent because it cannot degrade further. Once released to surface waters and moist soils their fate depends on solubility and dissociation in water. A significant proportion of dissolved/ sorbed metals will end up in sediments through the settling of suspended particles. The remaining metal ions can then be taken up by aquatic organisms. Ionic species may bind to dissolved ligands or sorb to solid particles in water.
Ecotoxicity: Even though many metals show few toxic effects at physiological pH levels, transformation may introduce new or magnified effects.
For Lead:
Environmental Fate: Lead is assessed as low hazard if it remains in its solid, massive, metallic form. Lead, in the form of alkyls, has been introduced to the environment primarily from leaded gasoline/petrol. These are converted to water-soluble lead compounds of high toxicity and availability to plants.
Atmospheric Fate: Lead is primarily an atmospheric pollutant that enters soil and water as fallout, a process determined by the physical form involved and particle size. Lead, in the form of alkyls, has been introduced to the environment primarily from leaded gasoline/petrol. Lead is absorbed by mammals/humans via vapors, contaminated dust, and fumes.
Terrestrial Fate: Soil - Lead alkyls easily leach from soil to contaminate water sources close to highways. Plants - Lead alkyls that have been converted to water soluble lead compounds have high toxicity/availability to plants.
Aquatic Fate: Lead that has entered the aquatic system is expected to be found in sediments.
Ecotoxicity: Soluble or insoluble lead may enter the environment and accumulate.

Tin may exist as either divalent (TinII) or tetravalent (TinIV) cations under environmental conditions. TinII prevails in oxygen-poor water and will readily precipitate as a sulfide or as a hydroxide in alkaline water. Tin(IV) readily breaks down in water through hydrolysis, and can precipitate as a hydroxide. In general, tin(IV) would be expected to be the only stable ionic species in the weathering cycle. Tin is generally considered to be relatively immobile in the environment. In water tin may partition to soils and sediments, where it may adhere to soil particles thus reducing its mobility. Some transportation may occur if it adheres to suspended sediments. Bioconcentration factor (BCF) estimations of tin for marine and freshwater plants, invertebrates, and fish were 100, 1000, and 3000 respectively, indicating that tin can accumulate in the tissue of living organisms, and become more concentrated higher up the food chain. While inorganic tin cannot be degraded in the environment, it may undergo chemical reactions or be transformed into organometallic forms by microbial methylation. Inorganic tin may also be converted to stannane (H4Sn) by macroalgae in extremely anaerobic (oxygen-poor) conditions.
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
rosin-colophony	HIGH	HIGH

Bioaccumulative potential

Ingredient	Bioaccumulation
tin	LOW (LogKOW = 1.29)
lead*	LOW (LogKOW = 0.73)
rosin-colophony	HIGH (LogKOW = 6.46)

Mobility in soil

Ingredient	Mobility
rosin-colophony	LOW (Log KOC = 21990)

Endocrine disrupting properties

No evidence of endocrine disrupting properties were found in the current literature.

Other adverse effects

No evidence of ozone depleting properties were found in the current literature.

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	‣ Recycle wherever possible or consult manufacturer for recycling options. ‣ Consult State Land Waste Management Authority for disposal.

Continued...

	Metal scrap recycling operations present a wide variety of hazards, including health hazards associated with chemical exposures and safety hazards associated with material processing operations and the equipment used in these tasks. Many of these metals do not pose any hazard to people who handle objects containing the metal in everyday use. In cases where employees could be exposed to multiple hazardous metals or other hazardous substances at the same time or during the same workday, employers must consider the combined effects of the exposure in determining safe exposure levels. The recycling of scrap metals is associated with illness and injury The most common causes of illness were poisoning (e.g., lead or cadmium poisoning), disorders associated with repeated trauma, skin diseases or disorders, and respiratory conditions due to inhalation of, or other contact with, toxic agents. The most common events or exposures leading to these cases were contact with an object or piece of equipment; overextension; and exposure to a harmful substance. The most common types of these injuries were sprains and strains; heat burns; and cuts, lacerations, and punctures. Any combustible material can burn rapidly when in a finely divided form. If such a dust is suspended in air in the right concentration, under certain conditions, it can become explosible. Even materials that do not burn in larger pieces (such as aluminum or iron), given the proper conditions, can be explosible in dust form. The force from such an explosion can cause employee deaths, injuries, and destruction of entire buildings. Breaking apart large metal pieces may involve the use of gas cutting torch. Classic cutting torches use gas, while other torches use plasma or powder, or even water. Thermal (gas) torches expose employees to sprays of sparks and metal dust particles, to high temperatures, to bright light that could damage eyes (light both inside and outside of the visible spectrum), and to various gases. Materials that require higher temperatures to cut, such as pig iron and heat-resistant alloyed scrap, or materials that conduct heat too well to be cut with thermal torches, such as copper and bronze, may be cut with non-thermal methods such as plasma torches or powder cutting torches. Plasma torches are often used for superconductors of heat or heat-resistant metals, such as alloy steels containing nickel and/or chromium. Plasma torches generate a large amount of smoke and noise, as well as ultraviolet (UV) and infrared(IR) light. Depending on the metal, this smoke could contain toxic fumes or dusts. Other hazards common to cutting operations (as well as to welding and brazing) include burns, fires, explosions, electric shock, and heat stress. Even chemicals that are generally not flammable may burn readily when vapourised. Larger scrap metal objects are often broken apart using stationary shears, such as alligator shears used to cut apart short steel for foundries or to cut nonferrous metals. These machines can send small pieces of metal flying. Many scrap metal recycling operations heat scrap pieces to high temperatures to separate different metal components, increase the purity of scrap, bake out non-metal substances, burn off contaminants, remove insulation from wire, or otherwise process the metal scrap. This may be done using furnaces or ovens that use fuel or electrical heating sources. Furnaces generate smoke, dust, and metal fumes, depending on temperature and content. Combustion by-products may include sulfur and nitrogen oxides, and carbon monoxide and carbon dioxide. Organic compounds may be emitted as heating vapourises oil and grease on scraps. In addition, heating or burning of certain plastics (such as plastic-coated wiring) may release phosgene or other hazardous substances. Emissions from fluxing typically include chlorides and fluorides. The highest concentrations of 'fugitive emissions (i.e., gases and vapours that escape from equipment) occur when the lids and doors of a furnace are opened during charging, alloying, and other operations. Chemical processes are also used in a wide range of metal scrap recycling industries as a means to separate scrap into its component metals, to clean scrap metal prior to using physical processes, to remove contaminants (such as paint) from scrap material, or to extract selected metals from a batch of scrap containing many metal types. Chemical processes may include high-temperature chlorination, electrorefining, plating, leaching, chemical separation, dissolution, reduction, or galvanizing. The most probable emissions from these processes include metal fumes and vapours, organic vapours, and acid gases. Other potential hazards may include high amounts of heat, splashing of caustic or other-wise hazardous chemicals, or combustion hazards. The recycling of scrap metals or metals found in e-waste (such as printed circuit boards) may present a significant environmental and human health risk. These may contain heavy metals such as cadmium, cobalt, chrome, copper, nickel, lead and zinc. Roads and premises of nearby public facilities such as a school-yard and outdoor food market have been shown to be adversely impacted by the uncontrolled recycling activity. Heavy metal concentrations, especially lead and copper, in workshop and road dusts were found to be severely enriched, posing potential health risks, especially to children. ▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Where in doubt contact the responsible authority.

SECTION 14 Transport information

Labels Required

Marine Pollutant	

Land transport (UN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

14.7. Maritime transport in bulk according to IMO instruments

14.7.1. Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

14.7.2. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
tin	Not Applicable
lead*	Not Applicable
rosin-colophony	Not Applicable
antimony	Not Applicable

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
tin	Not Applicable
lead*	Not Applicable

Continued...

Product name	Ship Type
rosin-colophony	Not Applicable
antimony	Not Applicable

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

tin is found on the following regulatory lists

International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)
Japan GHS Classifications (Japanese)
Japan Industrial Safety and Health Act (ISHA) - Dangerous Substances
Japan Industrial Safety and Health Act (ISHA) - Dangerous Substances (Japanese)
Japan Industrial Safety and Health Act (ISHA) - Substances for which SDS/Labels are required
Japan Occupational Exposure Limits
Japan Occupational Exposure Limits for Dusts
Japan Working Environment Evaluation Standards

lead* is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)
Japan GHS Classifications (Japanese)
Japan Industrial Safety and Health Act (ISHA) - Dangerous Substances
Japan Industrial Safety and Health Act (ISHA) - Dangerous Substances (Japanese)
Japan Industrial Safety and Health Act (ISHA) - Lead (Japanese)
Japan Industrial Safety and Health Act (ISHA) - Substances for which SDS/Labels are required
Japan Occupational Exposure Limits
Japan Occupational Exposure Limits for Dusts
Japan PRTR Law (Effective from April 1, 2023)
Japan Water Pollution Control Law - National Effluent Standards
Japan Working Environment Evaluation Standards

rosin-colophony is found on the following regulatory lists

International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)
Japan Chemical Substances Control Law - Existing/Newly Announced Chemical Substances (Japanese)
Japan GHS Classifications (Japanese)
Japan Industrial Safety and Health Act (ISHA) - Existing/Newly Announced Chemical Substances (Japanese)
Japan Industrial Safety and Health Act (ISHA) - Substances for which SDS/Labels are required
Japan Industrial Safety and Health Act (ISHA): Chemical Substances That Cause Skin Disorders And Substances for Which the Use of Impermeable Protective Equipment is Mandatory Based on Special Regulations (Japanese)
Japan Occupational Exposure Limits
Japan Occupational Exposure Limits for Dusts
Japan Working Environment Evaluation Standards

antimony is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)
Japan GHS Classifications (Japanese)
Japan Industrial Safety and Health Act (ISHA) - Substances for which SDS/Labels are required
Japan Occupational Exposure Limits
Japan Occupational Exposure Limits for Dusts
Japan PRTR Law (Effective from April 1, 2023)
Japan Working Environment Evaluation Standards

Additional Regulatory Information

Not Applicable

National Inventory Status

ISHA – Industrial Safety and Health Act

Labeling and Deliver of Documents, etc.
SDS required

Cabinet Order Name	Cabinet Order No
Tin and its compounds	Attached table 9-15 of Cabinet order
Lead and its inorganic compounds	Attached table 9-23 of Cabinet order
Rosin	Attached table 2-2274 of Ordinance
Antimony and its compounds	Attached table 9-5 of Cabinet order

Labeling, etc.

Cabinet Order Name	Cabinet Order No
Tin and its compounds	Attached table 9-15 of Cabinet order
Lead and its inorganic compounds	Attached table 9-23 of Cabinet order
Rosin	Attached table 2-2274 of Ordinance

Permission for Manufacturing

Cabinet Order Name	Cabinet Order No

Continued...

	Not Applicable / Not Applicable

Relevant Ordinances

Dangerous Substances - Oxidising	Not Applicable
Dangerous Substances - Flammable	Not Applicable
Organic Chemical Substance	Not Applicable
Specified Chemical Substances	Not Applicable

PRTR - Pollutant Release and Transfer Register Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof

Japan PRTR Law (Effective from April 1, 2023)

Classification	Cabinet Order Name	Japan PRTR-SDS Number
A specified Class I Designated Chemical Substance	Lead and its compounds	697

PDSCL - Poisonous and Deleterious Substances Control Act: Not Applicable

CSCL - Chemical Substances Control Law

Priority Assessment Chemical Substances	Not Applicable
Class I Specified Chemical Substances	Not Applicable
Class II Specified Chemical Substances	Not Applicable
Monitoring Chemical Substances	Not Applicable
General Chemical Substances	Tall oil rosin

Fire Service Law: No Data

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (tin; lead*; rosin-colophony; antimony)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (tin; lead*; antimony)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
UAE - Control List (Banned/Restricted Substances)	No (tin; lead*; rosin-colophony; antimony)
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	09/01/2026
Initial Date	11/26/2025

Other information

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Powered by AuthorITe, from Chemwatch.

end of SDS

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