Masters Tinning Flux

Oatey

Version No: **2.11**
Safety Data Sheet according to WHMIS 2015 requirements

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S.GHS.CAN.EN

SECTION 1 Identification

Product Identifier

Product name	Masters Tinning Flux
Synonyms	Not Available
Proper shipping name	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (contains zinc chloride)
Other means of identification	TF227; TF454; TF20L

Recommended use of the chemical and restrictions on use

Relevant identified uses	Flux for soldering.

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	**Oatey**
Address	620 Steven Court, New Market, ON L3Y 622 Canada
Telephone	905-898-2557
Fax	Not Available
Website	Not Available
Email	info@oatey.com

Emergency phone number

Association / Organisation	**ChemTrec**
Emergency telephone numbers	1-800-424-9300 (Outside the US 1-703-527-3887)
Other emergency telephone numbers	Emergency First Aid: 1-877-740-5015

SECTION 2 Hazard(s) identification

Classification of the substance or mixture

Classification	Skin Corrosion/Irritation Category 1B, Corrosive to Metals Category 1, Serious Eye Damage/Eye Irritation Category 1, Acute Toxicity (Oral) Category 4,Health hazards not otherwise classified Category 1, Physical hazards not otherwise classified Category 1

Label elements

Hazard pictogram(s)	 

Signal word	**Danger**

Hazard statement(s)

H314	Causes severe skin burns and eye damage.
H290	May be corrosive to metals.
H302	Harmful if swallowed.

Physical and Health hazard(s) not otherwise classified

Toxic fumes may be released during a fire. Inhalation of fumes may result in metal fume fever, a flu-like illness.

Precautionary statement(s) Prevention

P264	Wash thoroughly after handling
P260	Do not breathe mist/vapours/spray.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P234	Keep only in original packaging.
P270	Do not eat, drink or smoke when using this product.

Precautionary statement(s) Response

P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER/doctor/physician/first aider.
P321	Specific treatment (see....on this label)
P330	Rinse mouth.
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P301+P312	IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider/if you feel unwell.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Precautionary statement(s) Storage

P405	Store locked up.
P406	Store in a corrosion resistant container with a resistant inner liner.

Precautionary statement(s) Disposal

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

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
8009-03-8.	45-70	petrolatum
7646-85-7*	15-25	zinc chloride
7440-31-5	3-7	tin
12125-02-9	1-5	ammonium chloride
7440-22-4	0.02	silver

SECTION 4 First-aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Immediately hold eyelids apart and flush the eye continuously with running water.

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	‣ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ‣ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ‣ Transport to hospital or doctor without delay. ‣ 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 or hair contact occurs: ‣ Immediately flush body and clothes with large amounts of water, using safety shower if available. ‣ Quickly remove all contaminated clothing, including footwear. ‣ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ‣ Transport to hospital, or doctor. 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. ‣ 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.
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. ‣ Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema. ‣ Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs). ‣ As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested. ‣ Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered. **This must definitely be left to a doctor or person authorised by him/her.** (ICSC13719)
Ingestion	‣ For advice, contact a Poisons Information Centre or a doctor at once. ‣ Urgent hospital treatment is likely to be needed. ‣ If swallowed do **NOT** induce vomiting. ‣ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ‣ Observe the patient carefully. ‣ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ‣ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ‣ Transport to hospital or doctor without delay.

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.

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[Ellenhorn and Barceloux: Medical Toxicology]

- Heavy and persistent skin contamination over many years may lead to dysplastic changes. Pre-existing skin disorders may be aggravated by exposure to this product.
- In general, emesis induction is unnecessary with high viscosity, low volatility products, i.e. most oils and greases.
- High pressure accidental injection through the skin should be assessed for possible incision, irrigation and/or debridement.

NOTE: Injuries may not seem serious at first, but within a few hours tissue may become swollen, discoloured and extremely painful with extensive subcutaneous necrosis. Product may be forced through considerable distances along tissue planes.

For acute or short term repeated exposures to strong acids:

- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

INGESTION:

- Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- **DO NOT** attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.
- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjuctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT** use neutralising agents or any other additives. Several litres of saline are required.
- Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 Fire-fighting measures

Extinguishing media

Use of carbon tetrachloride to extinguish a wax fire produced an explosion.It is postulated that to a violent reaction between unsaturated wax components and carbon tetrachloride initiated by free radicals from decomposing peroxides might have occurred; alternately contact of cold water with the molten material might have lead to a vapour explosion.

Metal dust fires need to be smothered with sand, inert dry powders.

DO NOTUSE WATER, CO2 or FOAM.

- Use DRY sand, graphite powder, dry sodium chloride based extinguishers, G-1 or Met L-X to smother fire.
- Confining or smothering material is preferable to applying water as chemical reaction may produce flammable and explosive hydrogen gas.
- Chemical reaction with CO2 may produce flammable and explosive methane.
- If impossible to extinguish, withdraw, protect surroundings and allow fire to burn itself out.
- **Do NOT direct a solid stream of water or foam into burning molten material; this may cause spattering and spread the fire.**
- **DO NOT** use halogenated fire extinguishing agents.

Special hazards arising from the substrate 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

Special protective equipment and precautions for fire-fighters

Fire Fighting	- Alert Fire Brigade and tell them location and nature of hazard. - Wear full body protective clothing with breathing apparatus. - Prevent, by any means available, spillage from entering drains or water course. - 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. - **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.

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	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. ▸ Slight fire hazard when exposed to heat or flame. ▸ Acids may react with metals to produce hydrogen, a highly flammable and explosive gas. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ May emit acrid smoke and corrosive fumes. Combustion products include: carbon monoxide (CO) carbon dioxide (CO2) hydrogen chloride phosgene metal oxides other pyrolysis products typical of burning organic material. **NOTE:** Burns with intense heat. Produces melting, flowing, burning liquid and dense acrid black smoke. **CARE**: Water in contact with hot liquid may cause foaming and a steam explosion with wide scattering of hot oil and possible severe burns. Foaming may cause overflow of containers and may result in possible fire.

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	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Use dry clean up procedures and avoid generating dust. ▸ Place in a suitable, labelled container for waste disposal. ▸ Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material. ▸ Check regularly for spills and leaks.
Major Spills	· 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. ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Consider evacuation (or protect in place). ▸ Stop leak if safe to do so.

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	‣ Contain spill with sand, earth or vermiculite. ‣ Collect recoverable product into labelled containers for recycling. ‣ Neutralise/decontaminate residue (see Section 13 for specific agent). ‣ Collect solid residues and seal in labelled drums for disposal. ‣ Wash area and prevent runoff into drains. ‣ After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using. ‣ If contamination of drains or waterways occurs, advise emergency services.

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

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. ‣ The greatest potential for injury caused by molten materials occurs during purging of machinery (moulders, extruders etc.) ‣ It is essential that workers in the immediate area of the machinery wear eye and skin protection (such as full face, safety glasses, heat resistant gloves, overalls and safety boots) as protection from thermal burns. ‣ Fumes or vapours emitted from hot melted materials, during converting operations, may condense on overhead metal surfaces or exhaust ducts. The condensate may contain substances which are irritating or toxic. Avoid contact of that material with the skin. Wear rubber or other impermeable gloves when cleaning contaminated areas. ‣ Avoid process temperatures above decomposition temperatures. Overheating may occur at excessively high cylinder heats, overworking of the melt by wrong screw configuration, or by long dwell time in the machine. Under such conditions, thermal emissions and heat-degradation products might, without proper ventilation, reach hazardous concentrations in the converting area. Hot purgings should be collected only as thin flat strands to allow for rapid cooling. Hot purgings should be cooled by quenching in water in a well-ventilated area. ‣ Electrostatic discharge may be generated during pumping - this may result in fire. ‣ Ensure electrical continuity by bonding and grounding (earthing) all equipment. ‣ Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<=1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). ‣ Avoid splash filling. ‣ Do NOT use compressed air for filling discharging or handling operations. ‣ Avoid all personal contact, including inhalation. ‣ Wear protective clothing when risk of exposure occurs. ‣ Use in a well-ventilated area. ‣ Avoid contact with moisture. ‣ 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.
Other information	‣ Store in original containers. ‣ Keep containers securely sealed. ‣ Store in a cool, dry, well-ventilated area. ‣ 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.

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Conditions for safe storage, including any incompatibilities

Suitable container	‣ **DO NOT**use aluminium or galvanised containers ‣ Check regularly for spills and leaks ‣ Lined metal can, lined metal pail/ can. ‣ Plastic pail. ‣ Polyliner drum. ‣ Packing as recommended by manufacturer. ‣ Check all containers are clearly labelled and free from leaks. For low viscosity materials ‣ Drums and jerricans must be of the non-removable head type. ‣ Where a can is to be used as an inner package, the can must have a screwed enclosure. For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.): ‣ Removable head packaging; ‣ Cans with friction closures and ‣ low pressure tubes and cartridges may be used. - Where combination packages are used, and the inner packages are of glass, porcelain or stoneware, there must be sufficient inert cushioning material in contact with inner and outer packages unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.
Storage incompatibility	‣ Many metals may incandesce, react violently, ignite or react explosively upon addition of concentrated nitric acid. **CARE**: Water in contact with heated material may cause foaming or a steam explosion with possible severe burns from wide scattering of hot material. Resultant overflow of containers may result in fire. Metals exhibit varying degrees of activity. 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. ‣ 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. Factors influencing the pyrophoricity of metals are particle size, presence of moisture, nature of the surface of the particle, heat of formation of the oxide, or nitride, mass, hydrogen content, stress, purity and presence of oxide, among others. ‣ Many metals in elemental form react exothermically with compounds having active hydrogen atoms (such as acids and water) to form flammable hydrogen gas and caustic products. ‣ Elemental metals may react with azo/diazo compounds to form explosive products. ‣ Some elemental metals form explosive products with halogenated hydrocarbons. ‣ Segregate from alkalies, oxidising agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates. ‣ Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air. ‣ Avoid strong bases.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	petrolatum	Oil mist, mineral	5 mg/m3	10 mg/m3	Not Available	Not Available
Canada - Nova Scotia Occupational Exposure Limits	petrolatum	Oil mist - mineral	5 mg/m3	10 mg/m3	Not Available	TLV Basis: lung. As sampled by method that does not collect vapor.
Canada - Alberta Occupational Exposure Limits	petrolatum	Oil mist, mineral	5 mg/m3	10 mg/m3	Not Available	Not Available

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Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	petrolatum	Oil mist, mineral	5 mg/m3	10 mg/m3	Not Available	Not Available
Canada - Manitoba Occupational Exposure Limits	petrolatum	Not Available	5 mg/m3	Not Available	Not Available	TLV® Basis: URT irr
Canada - Manitoba Occupational Exposure Limits	petrolatum	Not Available	Not Available	Not Available	Not Available	TLV® Basis: URT irr
Canada - British Columbia Occupational Exposure Limits	petrolatum	Oil mist - mineral, severely refined	1 mg/m3	Not Available	Not Available	Not Available
Canada - British Columbia Occupational Exposure Limits	petrolatum	Oil mist - mineral, mildly refined	0.2 mg/m3	Not Available	Not Available	Not Available
Canada - Prince Edward Island Occupational Exposure Limits	petrolatum	Mineral oil, excluding metal working fluids - Pure, highly and severely refined	5 mg/m3	Not Available	Not Available	TLV® Basis: URT irr
Canada - Prince Edward Island Occupational Exposure Limits	petrolatum	Mineral oil, excluding metal working fluids - Poorly and mildly refined	Not Available	Not Available	Not Available	TLV® Basis: URT irr
Canada - Northwest Territories Occupational Exposure Limits	petrolatum	Oil mist, mineral	5 mg/m3	10 mg/m3	Not Available	Not Available
Canada - Quebec Permissible Exposure Values for Airborne Contaminants	petrolatum	Mineral oil (mist)	5 mg/m3	10 mg/m3	Not Available	Not Available
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	zinc chloride	Zinc chloride fume	1 mg/m3	2 mg/m3	Not Available	Not Available
Canada - Nova Scotia Occupational Exposure Limits	zinc chloride	Zinc chloride - Fume	1 mg/m3	2 mg/m3	Not Available	TLV Basis: lower & upper respiratory tract irritation
Canada - Alberta Occupational Exposure Limits	zinc chloride	Zinc chloride fume	1 mg/m3	2 mg/m3	Not Available	Not Available
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	zinc chloride	Zinc chloride fume	1 mg/m3	2 mg/m3	Not Available	Not Available
Canada - Manitoba Occupational Exposure Limits	zinc chloride	Not Available	1 mg/m3	2 mg/m3	Not Available	TLV® Basis: LRT & URT irr
Canada - British Columbia Occupational Exposure Limits	zinc chloride	Zinc chloride - Fume	1 mg/m3	2 mg/m3	Not Available	Not Available
Canada - Prince Edward Island Occupational Exposure Limits	zinc chloride	Zinc chloride fume	1 mg/m3	2 mg/m3	Not Available	TLV® Basis: LRT & URT irr
Canada - Northwest Territories Occupational Exposure Limits	zinc chloride	Zinc chloride fume	1 mg/m3	2 mg/m3	Not Available	Not Available
Canada - Quebec Permissible Exposure Values for Airborne Contaminants	zinc chloride	Zinc chloride, fume	1 mg/m3	Not Available	Not Available	Not Available
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	tin	Tin, organic compounds (as Sn) - Skin	0.1 mg/m3	0.2 mg/m3	Not Available	Not Available
Canada - Nova Scotia Occupational Exposure Limits	tin	Tin - Metal	2 mg/m3	Not Available	Not Available	Not Available

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Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Canada - Alberta Occupational Exposure Limits	tin	Tin, as Sn: Metal	2 mg/m3	Not Available	Not Available	Not Available
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	tin	Tin, (as Sn):	Not Available	Not Available	Not Available	Not Available
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	tin	Tin, (as Sn): metal	2 mg/m3	4 mg/m3	Not Available	Not Available
Canada - British Columbia Occupational Exposure Limits	tin	Tin - Metal	2 mg/m3	Not Available	Not Available	Not Available
Canada - Prince Edward Island Occupational Exposure Limits	tin	Tin, and inorganic compounds, excluding Tin hydride, as Sn - Metal	2 mg/m3	Not Available	Not Available	TLV® Basis: Pneumoconiosis (or Stannosis)
Canada - Ontario Occupational Exposure Limits	tin	Tin, as Sn - Metal	2 mg/m3	Not Available	Not Available	Not Available
Canada - Northwest Territories Occupational Exposure Limits	tin	Tin, (as Sn): metal	2 mg/m3	4 mg/m3	Not Available	Not Available
Canada - Quebec Permissible Exposure Values for Airborne Contaminants	tin	Tin	Not Available	Not Available	Not Available	Not Available
Canada - Quebec Permissible Exposure Values for Airborne Contaminants	tin	Tin: Metal	2 mg/m3	Not Available	Not Available	Not Available
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	ammonium chloride	Ammonium chloride - fume	10 mg/m3	20 mg/m3	Not Available	Not Available
Canada - Nova Scotia Occupational Exposure Limits	ammonium chloride	Ammonium chloride - Fume	10 mg/m3	20 mg/m3	Not Available	TLV Basis: Eye & upper respiratory tract irritation
Canada - Alberta Occupational Exposure Limits	ammonium chloride	Ammonium chloride fume	10 mg/m3	20 mg/m3	Not Available	Not Available
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	ammonium chloride	Ammonium chloride fume	10 mg/m3	20 mg/m3	Not Available	Not Available
Canada - Manitoba Occupational Exposure Limits	ammonium chloride	Not Available	10 mg/m3	20 mg/m3	Not Available	TLV® Basis: Eye & URT irr
Canada - British Columbia Occupational Exposure Limits	ammonium chloride	Ammonium chloride - Fume	10 mg/m3	20 mg/m3	Not Available	Not Available
Canada - Prince Edward Island Occupational Exposure Limits	ammonium chloride	Ammonium chloride, fume	10 mg/m3	20 mg/m3	Not Available	TLV® Basis: Eye & URT irr
Canada - Northwest Territories Occupational Exposure Limits	ammonium chloride	Ammonium chloride fume	10 mg/m3	20 mg/m3	Not Available	Not Available
Canada - Quebec Permissible Exposure Values for Airborne Contaminants	ammonium chloride	Ammonium chloride fume	10 mg/m3	20 mg/m3	Not Available	Not Available
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	silver	Silver, metal and soluble compounds (as Ag)	0.01 mg/m3	0.03 mg/m3	Not Available	Not Available
Canada - Nova Scotia Occupational Exposure Limits	silver	Silver - Elemental / Metal	0.1 mg/m3	Not Available	Not Available	TLV Basis: argyria

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Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Canada - Alberta Occupational Exposure Limits	silver	Silver - Metal	0.1 mg/m3	Not Available	Not Available	Not Available
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	silver	Silver, metal	0.1 mg/m3	0.3 mg/m3	Not Available	Not Available
Canada - Manitoba Occupational Exposure Limits	silver	Not Available	0.1 mg/m3	Not Available	Not Available	TLV® Basis: Argyria
Canada - Manitoba Occupational Exposure Limits	silver	Not Available	0.01 mg/m3	Not Available	Not Available	TLV® Basis: Argyria
Canada - British Columbia Occupational Exposure Limits	silver	Silver and Compounds (as Ag)	0.01 mg/m3	0.03 mg/m3	Not Available	Not Available
Canada - Prince Edward Island Occupational Exposure Limits	silver	Silver, and compounds - Soluble compounds, as Ag	0.01 mg/m3	Not Available	Not Available	TLV® Basis: Argyria
Canada - Prince Edward Island Occupational Exposure Limits	silver	Silver, and compounds - Metal, dust and fume	0.1 mg/m3	Not Available	Not Available	TLV® Basis: Argyria
Canada - Northwest Territories Occupational Exposure Limits	silver	Silver, metal	0.1 mg/m3	0.3 mg/m3	Not Available	Not Available
Canada - Quebec Permissible Exposure Values for Airborne Contaminants	silver	Silver: Metal	0.1 mg/m3	Not Available	Not Available	Not Available
Canada - Quebec Permissible Exposure Values for Airborne Contaminants	silver	Silver	Not Available	Not Available	Not Available	Not Available

Exposure controls

Appropriate engineering controls	For molten materials: Provide mechanical ventilation; in general such ventilation should be provided at compounding/ converting areas and at fabricating/ filling work stations where the material is heated. Local exhaust ventilation should be used over and in the vicinity of machinery involved in handling the molten material. Keep dry!! Processing temperatures may be well above boiling point of water, so wet or damp material may cause a serious steam explosion if used in unvented equipment. 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.

Continued...

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.

Personal protection

Eye and face protection

- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes.
- 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], [AS/NZS 1336 or national equivalent]

Skin protection

See Hand protection below

Hands/feet protection

- Wear chemical protective gloves, e.g. PVC.
- Wear safety footwear or safety gumboots, e.g. Rubber
- Protective gloves eg. Leather gloves or gloves with Leather facing
- When handling hot materials wear heat resistant, elbow length gloves.
- Rubber gloves are not recommended when handling hot objects, materials

Body protection

See Other protection below

Other protection

- When handling hot or molten liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.
- Usually handled as molten liquid which requires worker thermal protection and increases hazard of vapour exposure.
- **CAUTION:** Vapours may be irritating.
- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.
- Ensure there is ready access to a safety shower.

Respiratory protection

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

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Gray to Greenish Paste

Continued...

Physical state	Paste	**Relative density (Agua= 1)**	0.87
Odour	Slight petroleum	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	35	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Available
Flash point (°C)	182 - 221	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**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**	11.7

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	‣ Contact with alkaline material liberates heat
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

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness. Hydrogen chloride (HCl) vapour or fumes present a hazard from a single acute exposure. Exposures of 1300 to 2000 ppm have been lethal to humans in a few minutes. Inhalation of HCl may cause choking, coughing, burning sensation and may cause ulceration of the nose, throat and larynx. Fluid on the lungs followed by generalised lung damage may follow. Breathing of HCl vapour may aggravate asthma and inflammatory or fibrotic pulmonary disease. High concentrations cause necrosis of the tracheal and bronchial epithelium, pulmonary oedema, atelectasis and emphysema and damage to the pulmonary blood vessels and liver. Processing for an overly long time or processing at overly high temperatures may cause generation and release of highly irritating vapours, which irritate eyes, nose, throat, causing red itching eyes, coughing, sore throat. ‣ Usually handled as molten liquid which requires worker thermal protection and increases hazard of vapour exposure. ‣ **CAUTION:** Vapours may be irritating.
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. The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion. Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident.

Continued...

Skin Contact	The material can produce chemical burns following direct contact with the skin. Irritation and skin reactions are possible with sensitive skin The liquid may be able to be mixed with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis. The material is unlikely to produce an irritant dermatitis as described in EC Directives. The material may accentuate any pre-existing dermatitis condition Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating. If applied to the eyes, this material causes severe eye damage.
Chronic	Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. Implantation studies in rats show that paraffin oils may cause tumours. As a general rule, the highly refined paraffins are believed to contain less suspect polyaromatic hydrocarbons than less refined grades or waxes derived from napthenic base-stocks. Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs. Oil may contact the skin or be inhaled. Extended exposure can lead to eczema, inflammation of hair follicles, pigmentation of the face and warts on the soles of the feet.

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*

SECTION 12 Ecological information

Toxicity

Masters Tinning Flux

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

petrolatum

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

zinc chloride

Endpoint	Test Duration (hr)	Species	Value	Source
NOEC(ECx)	720	Algae or other aquatic plants	0.001mg/L	4
BCF	1680	Fish	58-116	7
LC50	96	Fish	0.012-0.019mg/L	4
EC50	48	Crustacea	0.56mg/L	5
EC50	72	Algae or other aquatic plants	0.011mg/L	4
EC50	96	Algae or other aquatic plants	0.68-2.9mg/l	4

tin

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

ammonium chloride

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	48	Crustacea	0.075-0.126mg/l	4
LC50	96	Fish	0.002-0.004mg/L	4

Continued...

EC50	72	Algae or other aquatic plants	>76.6mg/l	4
NOEC(ECx)	Not Available	Fish	0.002mg/L	5
EC50	96	Algae or other aquatic plants	58.476-59.706mg/L	4

silver

Endpoint	Test Duration (hr)	Species	Value	Source
EC50(ECx)	48	Crustacea	<0.001mg/L	4
LC50	96	Fish	<0.001mg/L	4
EC50	48	Crustacea	<0.001mg/L	4
EC50	72	Algae or other aquatic plants	11.89mg/l	2
EC50	96	Algae or other aquatic plants	0.002mg/L	4

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
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.
Ecotoxicity:
The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC50 at about pH 3.5
for petroleum waxes:
Environmental fate:
Most hydrocarbon components of substances in this Group will have little or no tendency to partition to air . The half lives for degradation of these hydrocarbons by reaction with hydroxyl radicals, in the troposphere, under the influence of sunlight, will all be less than one day, by extrapolation from the data quoted by Atkinson. Accordingly, any hydrocarbon material which does partition to air will be rapidly photodegraded
As hydrocarbon number increases above C13, as is the case for the majority of the wax constituents, Log K values >6 are predicted. Substances having Log K estimates greater than 6 are characterised by extremely large molecular weight and subsequent hydrophobicity, therefore no significant aqueous exposures or bioaccumulation are expected to occur.
Since molecular weight and structural conformation determines in large part the solubility and vapour pressure characteristics of the hydrocarbons, modeling focused on the lower molecular weight hydrocarbons. These would be selected C13 and C20 hydrocarbons since waxes consist mostly of C20 to C85 compounds, with some minimal percent of C13 through C20 hydrocarbons. Therefore, the majority of the physicochemical modeling was performed on various paraffinic, naphthenic and aromatic representatives containing 13 and C20 carbon atoms.
log Kow ranged from 4.7 >6.7
Water solubility: The water solubility of waxes cannot be determined due to their complex mixture characteristics. The highest solubilities would be exhibited by only a small fraction of the hydrocarbon molecules present in waxes. Increasing carbon number results in rapidly decreasing solubility, so that the most-soluble (predominantly methyl-substituted diaromatic) C18 and C20 analogues yield model values of 0.01195 and 0.00125 mg/l, respectively. Higher molecular weight (higher carbon number) components are even less water soluble. Based on water solubility modeling for C13 components of complex mixtures, aqueous solubilities of these waxes are typically much less than 1 ppm, due to differential partitioning of components between the aqueous and organic phases.
Hydrolysis: Materials in the waxes category are not subject to hydrolysis, as they lack these reactive groups with which a water molecule or hydroxide ion reacts to form a new carbon-oxygen bond.
Photodegradation: Although waxes typically have low vapour pressures, volatilisation of some lower molecular weight components exhibit relatively high atmospheric oxidation half-lives. Therefore, those compounds that may partition to the atmosphere will be removed through indirect photochemical degradation. All modeled components exhibited rapid degradation in the atmosphere; the value presented represents both the most volatile component and the longest modeled half-life. All other modeled C13 components had both lower volatility and shorter half-lives.
Result : t1/2 = 0.913 days (10.96 hr) for most volatile C13 component modeled
Transport between Environmental Compartments: Fugacity-based computer modeling indicated that the majority of high molecular weight hydrocarbons with carbon numbers of C20 and greater in waxes would be distributed to soil. Percent distribution estimates were modeled with C13 to C29 branched paraffins as this class of wax hydrocarbons shows the greater distribution to air. Aromatic compounds with carbon numbers from C13 through C85 will partition principally to soil. Linear paraffins and naphthenes distribute to both soil and air, with increasing partitioning to soil for hydrocarbons greater than C20 as vapour pressure decreases. Since the majority of hydrocarbon components in waxes are primarily normal paraffins of C20. and greater, with moderate to minimal amounts of naphthenics, isoparaffins and trace amounts of aromatics, volatility is not a significant fate process for these petroleum substances due to negligible vapor pressures at ambient temperatures and their high molecular weight. As hydrocarbon number increases above C20, partitioning to soil is the predominant behavior of these compounds.
Biodegradation: Not readily biodegradable; inherently biodegradable and extensively biodegradable in long-term exposures. Waxed paper decomposes at about the same rate as unwaxed paper. Soil invertebrates contribute significantly to the decomposition of waxed paper in leaf litter. Decomposition of waxed paper occurs more rapidly during the autumn/winter, when there is a fresh layer of leaf litter on the ground, than during the spring/summer, when the last autumns leaf

Continued...

litter has been largely reduced to humus
Degradation (28 days): 21% OECD 301B
Ecotoxicity:
Fish LC50 (96 h): Oncorhyncus mykiss >6000 mg/l (hydrotreated heavy paraffinic distillate); >1000 mg/l (solvent refined heavy paraffinic distillate); >10000 mg/l (white mineral oil)
Daphnia magna EC50: (48 h): >10000 mg/l (solvent refined heavy paraffinic distillate) (immobilisation)
Algae EC50 (96 h): Scenedesmus subspicatus >1000 mg/l (solvent refined residual oil) (growth rate, biomass)
It has been confirmed experimentally that for fish and invertebrates, paraffinic hydrocarbons with a carbon number of 10 or higher (log Kow >5) show no acute toxicity and that alkylbenzenes with a carbon number of 14 or greater (log Kow >5) similarly show no acute toxicity From these well-demonstrated solubility 'cut-offs' for acute toxicity of hydrocarbon substances, which directly relate to their physico-chemical properties, it is clear that the same should hold for complex petroleum substances.
Paraffinic hydrocarbons with carbon numbers of greater than 14 (log Kow >7.3) should show no measurable chronic toxicity. The existence of this cut-off for chronic toxicity is supported for petroleum substances by the numerous chronic toxicity studies reported on lubricant base oils, which demonstrate that for these substances which are composed primarily of alkanes and naphthenes of C15 and greater, no evidence of chronic toxicity is seen.
Drinking Water Standards: hydrocarbon total: 10 ug/l (UK max.).
For Zinc and its Compounds: BCF: 4 to 24,000.
Environmental Fate: Zinc is capable of forming complexes with a variety of organic and inorganic groups and is an essential nutrient present in all organisms.
Atmospheric Fate: Zinc concentrations in the air are relatively low, except near industrial sources, such as smelters. There is no estimate for the atmospheric lifetime of zinc, but, since zinc is transported long distances in air, its lifetime in air is at least on the order of days. Zinc is removed from the air by dry/wet deposition.
Terrestrial Fate: Soil � Zinc may magnify in the soil if concentrations of the substance exceed 1632 ppm. The relative mobility of zinc in soil is determined by the same factors that affect its transport in aquatic systems, (i.e. solubility of the compound, pH, and salinity). The mobility of zinc in soil increases at lower soil pH, under oxidizing conditions, and at lower cation, (positive ion), exchange capacities. However, the amount of zinc in solution generally increases @ pH >7, in soils high in organic matter. Clay and metal oxides sorb zinc and tend to retard its mobility in soil. Zinc is more mobile at pH 4 than at pH 6.5 as a consequence of sorption. Under low oxygen conditions, zinc sulfide is the controlling species, which has low mobility. Plants - Zinc is not expected to concentrate in plants, however, this depends on plant species, soil pH, and soil composition.
Aquatic Fate: Zinc readily adsorbs to sediment and suspended particles. The substance can persist in water indefinitely and can be toxic to aquatic life. Hydrous iron, manganese oxides, clay minerals, and organic material may help remove zinc from sediment since they adsorb the substance. Environmental toxicity of zinc in water is dependent upon the concentration of other minerals and the pH of the solution. Zinc remains as the free ion at lower pH levels. At high pH levels, zinc in solution is precipitated as zinc hydroxide, zinc carbonate, or calcium zincate.
Ecotoxicity: Zinc concentrates moderately in aquatic organisms; concentration is higher in crustaceans and bivalve species than in fish. Zinc is not expected to magnify as it moves up the land-based food chain. Zinc can concentrate over 200,000 times in oysters. Copper can increase toxicity to fish and calcium can decrease toxicity. Zinc can accumulate in freshwater species at 5 -1,130 times the concentration present in the water. Crustaceans and fish accumulate zinc from water and food. The substance has been found in very high concentration in aquatic invertebrates. Sediment dwelling organisms have higher zinc concentrations than those living in the aqueous layer. Overexposures to zinc also have been associated with toxic effects in mammals, including man. Ingestion of zinc or zinc-containing compounds has resulted in a variety of effects in the gastrointestinal tract and blood in humans and animals. The substance may cause lesions in the liver, pancreas, and kidneys.

Prevent, by any means available, spillage from entering drains or water courses.
DO NOTdischarge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
zinc chloride	HIGH	HIGH

Bioaccumulative potential

Ingredient	Bioaccumulation
zinc chloride	HIGH (BCF = 16000)

Mobility in soil

Ingredient	Mobility
zinc chloride	LOW (KOC = 23.74)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	‣ Containers may still present a chemical hazard/ danger when empty. ‣ Return to supplier for reuse/ recycling if possible. Otherwise: ‣ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ‣ Where possible retain label warnings and SDS and observe all notices pertaining to the product.

Continued...

	Recycle wherever possible. ‣ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ‣ Treat and neutralise at an approved treatment plant. Treatment should involve: Mixing or slurrying in water; Neutralisation with soda-lime or soda-ash followed by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material) ‣ Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water. Observe all label safeguards until containers are cleaned and destroyed.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO

Land transport (TDG)

UN number	3260
UN proper shipping name	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (contains zinc chloride)
Transport hazard class(es)	Class: 8 Subrisk: Not Applicable
Packing group	III
Environmental hazard	Not Applicable
Special precautions for user	Special provisions: 16 Explosive Limit and Limited Quantity Index: 5 kg ERAP Index: Not Applicable

Air transport (ICAO-IATA / DGR)

UN number	3260
UN proper shipping name	Corrosive solid, acidic, inorganic, n.o.s. * (contains zinc chloride)
Transport hazard class(es)	ICAO/IATA Class: 8 ICAO / IATA Subrisk: Not Applicable ERG Code: 8L
Packing group	III
Environmental hazard	Not Applicable
Special precautions for user	Special provisions: A3 A803 Cargo Only Packing Instructions: 864 Cargo Only Maximum Qty / Pack: 100 kg Passenger and Cargo Packing Instructions: 860 Passenger and Cargo Maximum Qty / Pack: 25 kg Passenger and Cargo Limited Quantity Packing Instructions: Y845 Passenger and Cargo Limited Maximum Qty / Pack: 5 kg

Sea transport (IMDG-Code / GGVSee)

UN number	3260
UN proper shipping name	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (contains zinc chloride)
Transport hazard class(es)	IMDG Class: 8 IMDG Subrisk: Not Applicable

Continued...

Packing group	III
Environmental hazard	Not Applicable
Special precautions for user	EMS Number: F-A , S-B Special provisions: 223 274 Limited Quantities: 5 kg

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

Not Applicable

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

Product name	Group
petrolatum	Not Available
zinc chloride	Not Available
tin	Not Available
ammonium chloride	Not Available
silver	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
petrolatum	Not Available
zinc chloride	Not Available
tin	Not Available
ammonium chloride	Not Available
silver	Not Available

SECTION 15 Regulatory information

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

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations and the SDS contains all the information required by the Hazardous Products Regulations.

petrolatum is found on the following regulatory lists

- Canada Categorization decisions for all DSL substances
- Canada Domestic Substances List (DSL)
- Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS GHS
- 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

zinc chloride is found on the following regulatory lists

- Canada Categorization decisions for all DSL substances
- Canada Domestic Substances List (DSL)

tin is found on the following regulatory lists

- Canada Categorization decisions for all DSL substances
- Canada Domestic Substances List (DSL)
- Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS GHS

ammonium chloride is found on the following regulatory lists

- Canada Categorization decisions for all DSL substances
- Canada Domestic Substances List (DSL)
- Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS GHS

silver is found on the following regulatory lists

- Canada Categorization decisions for all DSL substances
- Canada Domestic Substances List (DSL)
- Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS GHS
- International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

National Inventory Status

Continued...

National Inventory	Status
Canada - DSL	Yes
Canada - NDSL	No (petrolatum; zinc chloride; tin; ammonium chloride; silver)
USA - TSCA	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 Other information

Revision Date	04/05/2021
Initial Date	03/15/2021

SDS Version Summary

Version	Issue Date	Sections Updated
1.11.1.1.1	04/04/2021	Classification, Fire Fighter (fire/explosion hazard), Ingredients

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.

Definitions and abbreviations

PC－TWA: Permissible Concentration-Time Weighted Average
PC－STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
ES: Exposure Standard
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index
AIIC: Australian Inventory of Industrial Chemicals
DSL: Domestic Substances List
NDSL: Non-Domestic Substances List
IECSC: Inventory of Existing Chemical Substance in China
EINECS: European INventory of Existing Commercial chemical Substances
ELINCS: European List of Notified Chemical Substances
NLP: No-Longer Polymers
ENCS: Existing and New Chemical Substances Inventory
KECI: Korea Existing Chemicals Inventory
NZIoC: New Zealand Inventory of Chemicals
PICCS: Philippine Inventory of Chemicals and Chemical Substances
TSCA: Toxic Substances Control Act
TCSI: Taiwan Chemical Substance Inventory
INSQ: Inventario Nacional de Sustancias Químicas
NCI: National Chemical Inventory
FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

end of SDS