

Indium(III) iodide

sc-257605



The Power is Question

Material Safety Data Sheet

Hazard Alert Code Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Indium(III) iodide

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

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EMERGENCY

ChemWatch

Within the US & Canada: 877-715-9305

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(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

In-I₃, "indium triiodide"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

| | Min | Max |
|---------------|-----|-----|
| Flammability: | 0 | ■ |
| Toxicity: | 2 | ■ |
| Body Contact: | 3 | ■ |
| Reactivity: | 0 | ■ |
| Chronic: | 2 | ■ |

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Causes burns.

Risk of serious damage to eyes.

May cause SENSITISATION by inhalation and skin contact.

Possible risk of harm to the unborn child.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

■ Accidental ingestion of the material may be damaging to the health of the individual.

■ Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and esophagus.

■ Indium is poorly absorbed from the gut, but accumulation in the liver occurs when indium compounds are injected.

Symptoms of indium poisoning include loss of appetite, nose-bleed, paralysis of limbs, rapid breathing, twitching, convulsions and tissue death of the liver and kidneys.

EYE

■ The material can produce chemical burns to the eye following direct contact.

Vapors or mists may be extremely irritating.

■ If applied to the eyes, this material causes severe eye damage.

■ Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns.

Mild burns of the epithelia generally recover rapidly and completely.

SKIN

■ The material can produce chemical burns following direct contact with the skin.

■ Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.

■ Open cuts, abraded or irritated skin should not be exposed to this material.

■ Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.

■ Solution of material in moisture on the skin, or perspiration, may increase irritant effects.

■ 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.

INHALED

■ If inhaled, this material can irritate the throat and lungs of some persons.

■ Inhalation of dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.

■ 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.

■ Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage.

There may be dizziness, headache, nausea and weakness.

■ Exposure to indium compounds leads to tooth decay, joint and bone pain, disorders in the nervous and gastrointestinal systems, heart pains and general debility.

Swelling of the lungs is common although scarring is rarely seen.

CHRONIC HEALTH EFFECTS

■ Inhaling this product is more likely to cause a sensitization reaction in some persons compared to the general population.

Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.

Results in experiments suggest that this material may cause disorders in the development of the embryo or fetus, even when no signs of poisoning show in the mother.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.

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.

Chronic indium intoxication leads to weight loss, poor growth and extensive necrotic damage to the liver and kidneys.

Indium can impede protein synthesis, thereby affecting numerous essential physiological processes, including detoxification of organic carcinogens. Intravenous indium chloride exposure to mice had a toxic effect on the kidney and resulted in necrosis of the liver.

Damage to the brain, heart, adrenals, spleen and blood may also result from chronic exposures.

Iodine and iodides, may give rise to local allergic reactions such as hives, rupture of skin blood vessels, pain in joints or diseases of the lymph nodes.

Iodine and iodides cause goiter and diminished as well as increased activity of the thyroid gland. A toxic syndrome resulting from chronic iodide overdose and from repeated administration of small amounts of iodine is characterized by excessive saliva production, head cold, sneezing, conjunctivitis, headache, fever, laryngitis, inflammation of the bronchi and mouth cavity, inflamed parotid gland, and various skin rashes.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

| NAME | CAS RN | % |
|--------------------|------------|-----|
| indium(III) iodide | 13510-35-5 | >98 |
| hydrolyses to | | |

Section 4 - FIRST AID MEASURES

SWALLOWED

· For advice, contact a Poisons Information Center or a doctor at once. · Urgent hospital treatment is likely to be needed.

EYE

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

SKIN

■ 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.

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested. Inhalation of vapors or aerosols (mists, fumes) may cause lung edema. Corrosive substances may cause lung damage (e.g.

NOTES TO PHYSICIAN

■ Treat symptomatically.

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.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG): Not applicable

Upper Explosive Limit (%): Not applicable

Specific Gravity (water=1): 5.31

Lower Explosive Limit (%): Not applicable

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
 - Wear full body protective clothing with breathing apparatus.
- When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Non combustible.
 - Not considered to be a significant fire risk.
- Decomposition may produce toxic fumes of: hydrogen iodide, metal oxides.

FIRE INCOMPATIBILITY

■ None known.

PERSONAL PROTECTION

Glasses:

Full face- shield.

Gloves:

Respirator:

Type B-P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact 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

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS

- DO NOT use aluminum or galvanized containers.

Check regularly for spills and leaks.

Glass container.

- Lined metal can, Lined metal pail/drum

- Plastic pail.

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.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

| Source | Material | TWA ppm | TWA mg/m ³ | STEL ppm | STEL mg/m ³ | Peak ppm | Peak mg/m ³ | TWA F/CC | Notes |
|---|---|---------|-----------------------|----------|------------------------|----------|------------------------|----------|---|
| US ACGIH Threshold Limit Values (TLV) | indium(III) iodide (Indium and compounds (as In)) | | 0.1 | | | | | | TLV Basis: pulmonary edema; pneumonitis; dental erosion; malase |
| Canada - Alberta Occupational Exposure Limits | indium(III) iodide (Indium & compounds, as In) | | 0.1 | | | | | | |
| Canada - Prince Edward Island Occupational Exposure Limits | indium(III) iodide (Indium and compounds (as In)) | | 0.1 | | | | | | TLV Basis: pulmonary edema; pneumonitis; dental erosion; malase |
| Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English) | indium(III) iodide (Indium and compounds (as In)) | | 0.1 | | | | | | |
| US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants | indium(III) iodide (Indium and compounds (as in)) | | 0.1 | | | | | | |
| US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants | indium(III) iodide (Indium and compounds (as In)) | | 0.1 | | | | | | |
| Canada - British Columbia Occupational Exposure Limits | indium(III) iodide (Indium and compounds, as In) | | 0.1 | | | | | | |
| US - Minnesota Permissible Exposure Limits (PELs) | indium(III) iodide (Indium and compounds (as In)) | | 0.1 | | | | | | |

| | | | | | | |
|---|--|------|---|-----|-----|---|
| Canada - Nova Scotia Occupational Exposure Limits | indium(III) iodide (Indium and compounds (as In)) | 0.1 | | | | TLV Basis: pulmonary edema; pneumonitis; dental erosion; malase |
| Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits | indium(III) iodide (Indium and Compounds, (as In)) | 0.1 | | 0.3 | | T20 (Indium pho-sphide) |
| US - Hawaii Air Contaminant Limits | indium(III) iodide (Indium and compounds (as In)) | 0.1 | | 0.3 | | |
| Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances | indium(III) iodide (Indium and compounds (as In)) | 0.1 | - | | 0.3 | |
| US - Washington Permissible exposure limits of air contaminants | indium(III) iodide (Indium and compounds (as In)) | 0.1 | | | 0.3 | |
| US - Oregon Permissible Exposure Limits (Z-1) | indium(III) iodide (Indium and compounds (as In)) | 0.1 | | | | Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits. |
| Canada - Northwest Territories Occupational Exposure Limits (English) | indium(III) iodide (Indium & Compounds (as In)) | 0.1 | | | 0.3 | |
| US - Alaska Limits for Air Contaminants | indium(III) iodide (Indium and compounds (as In)) | 0.1 | | | | |
| US - Michigan Exposure Limits for Air Contaminants | indium(III) iodide (Indium and compounds (as In)) | 0.1 | | | | |
| US - California Permissible Exposure Limits for Chemical Contaminants | indium(III) iodide (Indium compounds) | 0.1 | | | | |
| Canada - Nova Scotia Occupational Exposure Limits | hydrogen iodide (Iodides) | 0.01 | | | | TLV Basis: Hypothyroidism; upper respiratory tract irritation |
| US ACGIH Threshold Limit Values (TLV) | hydrogen iodide (Iodides) | 0.01 | | | | TLV Basis: Hypothyroidism; upper respiratory tract irritation |
| Canada - Prince Edward Island Occupational Exposure Limits | hydrogen iodide (Iodides) | 0.01 | | | | TLV Basis: Hypothyroidism; upper respiratory tract irritation |

ENDOELTABLE

PERSONAL PROTECTION



RESPIRATOR

- type b-p filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)
- Consult your EHS staff for recommendations

EYE

- Chemical goggles.
- Full face shield.

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.

NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- 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.

- Contaminated gloves should be replaced.

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.

OTHER

- Overalls.
- PVC Apron.

ENGINEERING CONTROLS

- Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Mixes with water.

Corrosive.

Acid.

| | | | |
|---------------------------|----------------|--------------------------------|----------------|
| State | DIVIDED SOLID | Molecular Weight | 495.53 |
| Melting Range (°F) | 664 | Viscosity | Not Applicable |
| Boiling Range (°F) | Not available | Solubility in water (g/L) | Miscible |
| Flash Point (°F) | Not applicable | pH (1% solution) | Not available. |
| Decomposition Temp (°F) | Not available. | pH (as supplied) | Not applicable |
| Autoignition Temp (°F) | Not applicable | Vapour Pressure (mmHG) | Not applicable |
| Upper Explosive Limit (%) | Not applicable | Specific Gravity (water=1) | 5.31 |
| Lower Explosive Limit (%) | Not applicable | Relative Vapor Density (air=1) | Not applicable |
| Volatile Component (%vol) | Not applicable | Evaporation Rate | Not applicable |

APPEARANCE

Orange powder; mixes with water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Contact with alkaline material liberates heat.

STORAGE INCOMPATIBILITY

- Inorganic acids are generally soluble in water with the release of hydrogen ions. The resulting solutions have pH's of less than 7.0.
- Inorganic acids neutralize chemical bases (for example: amines and inorganic hydroxides) to form salts.
- Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.

- These trifluorides are hypergolic oxidisers. They ignites on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.
- The state of subdivision may affect the results.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

indium(III) iodide

TOXICITY AND IRRITATION

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.
- No significant acute toxicological data identified in literature search.
- Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. 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. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

INDIUM(III) IODIDE:

- Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's edema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. 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. Attention should be paid to atopic diathesis, characterized 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.

CARCINOGEN

| | | | |
|--------------------|---|---------------------|----|
| indium(III) iodide | US - Rhode Island Hazardous Substance List | IARC | |
| Iodides | US ACGIH Threshold Limit Values (TLV) - Carcinogens | Carcinogen Category | A4 |
| hydrogen iodide | US - Rhode Island Hazardous Substance List | IARC | |
| TWA_F_CC~ | US - Maine Chemicals of High Concern List | Carcinogen | A4 |

Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

Ecotoxicity

| Ingredient | Persistence: Water/Soil | Persistence: Air | Bioaccumulation | Mobility |
|--------------------|-------------------------|-------------------|-----------------|----------|
| indium(III) iodide | No Data Available | No Data Available | | |
| hydrogen iodide | No Data Available | No Data Available | | |

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

! Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols: None Hazard class or Division: 8

Identification Numbers: UN3260 PG: III

Label Codes: 8 Special provisions: IB8, IP3, T1, TP33

Packaging: Exceptions: 154 Packaging: Non- bulk: 213

Packaging: Exceptions: 154 Quantity limitations: 25 kg

Passenger aircraft/rail:

Quantity Limitations: Cargo 100 kg Vessel stowage: Location: A aircraft only:

Vessel stowage: Other: None

Hazardous materials descriptions and proper shipping names:

Corrosive solid, acidic, inorganic, n.o.s.

Air Transport IATA:

UN/ID Number: 3260 Packing Group: III

Special provisions: A3

Cargo Only

Packing Instructions: 100 kg Maximum Qty/Pack: 864

Passenger and Cargo Passenger and Cargo

Packing Instructions: 25 kg Maximum Qty/Pack: 860

Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity

Packing Instructions: 5 kg Maximum Qty/Pack: Y845

Shipping Name: CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.

*(CONTAINS INDIUM(III) IODIDE)

Maritime Transport IMDG:

IMDG Class: 8 IMDG Subrisk: None

UN Number: 3260 Packing Group: III

EMS Number: F-A,S-B Special provisions: 223 274

Limited Quantities: 5 kg

Shipping Name: CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.(contains indium(III) iodide)

Section 15 - REGULATORY INFORMATION

hydrogen iodide (CAS: 10034-85-2) is found on the following regulatory lists;

"Canada - Saskatchewan Industrial Hazardous Substances", "Canada Controlled Drugs and Substances Act Schedule VI", "Canada Domestic Substances List (DSL)", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "US - Alabama Precursor Chemicals", "US - Florida Essential Chemicals", "US - Florida Precursor Chemicals", "US - Massachusetts Oil & Hazardous Material List", "US - New Jersey Right to Know Hazardous Substances", "US - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest", "US Department of Transportation (DOT), Hazardous Material Table", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals", "US EPA Acute Exposure Guideline Levels (AEGs) - Interim", "US NFPA 45 Fire Protection for Laboratories Using Chemicals - Flammability Characteristics of Common Compressed and Liquefied Gases", "US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Inhalation, skin contact and/or ingestion may produce health damage*.
- Cumulative effects may result following exposure*.

* (limited evidence).

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- Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references.

- The (M)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.

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