

Iron Titanium powder

sc-300841



The Power to Question

Material Safety Data Sheet

Hazard Alert Code
Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Iron Titanium powder

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

Fe:Ti; 60:40 wt% (Al 2% max), "HY-STOR 101"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

| | Min | Max | |
|--------------|-----|-----|---|
| Flammability | 3 | |  Min/Nil=0 Low=1 Moderate=2 High=3 Extreme=4 |
| Toxicity | 2 | | |
| Body Contact | 2 | | |
| Reactivity | 2 | | |
| Chronic | 2 | | |

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Highly flammable.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion".

This is because of the lack of corroborating animal or human evidence.

■ Dusts of titanium and titanium compounds are thought to exhibit little or no toxic effects.

EYE

■ There is some evidence to suggest that this material can cause eye irritation and damage in some persons.

■ Contact with the eye by metal dusts may cause mechanical abrasion or foreign body penetration of the eyeball.

SKIN

■ The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models).

Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

■ 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.

INHALED

■ The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models).

Nevertheless inhalation of dusts, or fumes, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.

■ 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.

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.

CHRONIC HEALTH EFFECTS

■ Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

Overexposure to respirable dust may cause coughing, wheezing, difficulty in breathing and impaired lung function. Chronic symptoms may include decreased vital lung capacity, chest infections

Repeated exposures, in an occupational setting, to high levels of fine- divided dusts may produce a condition known as pneumoconiosis which is the lodgement of any inhaled dusts in the lung irrespective of the effect.

Chronic excessive intake of iron have been associated with damage to the liver and pancreas. People with a genetic disposition to poor control over iron are at an increased risk. Iron overload in men may lead to diabetes, joint inflammation, liver cancer, heart irregularities and problems with other organs.

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. Smaller particles however, may cause lung deterioration.

Particles of less than 1.5 micron can be trapped in the lungs and, dependent on the nature of the particle, may give rise to further serious health consequences.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

| NAME | CAS RN | % |
|---------------------|------------|-----|
| titanium-iron alloy | 77980-77-9 | >98 |

Section 4 - FIRST AID MEASURES

SWALLOWED

- Immediately give a glass of water.
- First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

EYE

If this product comes in contact with the eyes

- Wash out immediately with fresh 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.
- Seek medical attention without delay; if pain persists or recurs 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

If skin or hair contact occurs

- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Protheses 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.

NOTES TO PHYSICIAN

■ 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.

For acute or short term repeated exposures to iron and its derivatives

- Always treat symptoms rather than history.
- In general, however, toxic doses exceed 20 mg/kg of ingested material (as elemental iron) with lethal doses exceeding 180 mg/kg.
- Control of iron stores depend on variation in absorption rather than excretion. Absorption occurs through aspiration, ingestion and burned skin.
- Hepatic damage may progress to failure with hypoprothrombinaemia and hypoglycaemia. Hepatorenal syndrome may occur.

Section 5 - FIRE FIGHTING MEASURES

| | |
|----------------------------|----------------|
| Vapour Pressure (mmHG) | Not applicable |
| Upper Explosive Limit (%) | Not applicable |
| Specific Gravity (water=1) | Not available |
| Lower Explosive Limit (%) | Not applicable |

EXTINGUISHING MEDIA

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

DO NOT USE 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.
- DO NOT use halogenated fire extinguishing agents.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- Fight fire from a safe distance, with adequate cover.

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

- 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.
- <. Decomposition may produce toxic fumes of metal oxides.

FIRE INCOMPATIBILITY

- Reacts with acids producing flammable / explosive hydrogen (H₂) gas
- Keep dry
- NOTE May develop pressure in containers; open carefully. Vent periodically.

None known.

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Remove all ignition sources.
- DO NOT touch or walk through spilled material.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- DO NOT touch or walk through spilled material.
- Control personal contact by using protective equipment.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of overexposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.

RECOMMENDED STORAGE METHODS

- 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

For low viscosity materials and solids

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

FOR MINOR QUANTITIES

- Store in an indoor fireproof cabinet or in a room of noncombustible construction.
- Provide adequate portable fire-extinguishers in or near the storage area.

FOR PACKAGE STORAGE

- Store in original containers in approved flame-proof area.
- No smoking, naked lights, heat or ignition sources.

Air and moisture sensitive.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

| Source | Material | TWA ppm | TWA mg/m³ | STEL ppm | STEL mg/m³ | Peak ppm | Peak mg/m³ | TWA F/CC | Notes |
|---|---|---------|-----------|----------|------------|----------|------------|----------|-------|
| Canada - Ontario Occupational Exposure Limits | titanium-iron alloy (Particles Insoluble or Poorly Soluble) Not Otherwise) | | 10 (I) | | | | | | |
| Canada - British Columbia Occupational Exposure Limits | titanium-iron alloy (Particles Insoluble or Poorly Soluble) Not Otherwise Classified (PNOC)) | | 10 (N) | | | | | | |
| Canada - Ontario Occupational Exposure Limits | titanium-iron alloy (Specified (PNOS) / Particules (insolubles ou peu solubles) non précisées par ailleurs) | | 3 (R) | | | | | | |
| US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants | titanium-iron alloy (Particulates not otherwise regulated Respirable fraction) | | 5 | | | | | | |
| US - California Permissible Exposure Limits for Chemical Contaminants | titanium-iron alloy (Particulates not otherwise regulated Respirable fraction) | | 5 | | | | | | (n) |

| | | | | |
|---|---|---|----|---|
| US - Oregon Permissible Exposure Limits (Z-1) | titanium-iron alloy (Particulates not otherwise regulated (PNOR) (f) Total Dust) | - | 10 | Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means "particles not otherwise regulated." |
| US - Michigan Exposure Limits for Air Contaminants | titanium-iron alloy (Particulates not otherwise regulated, Respirable dust) | | 5 | |
| US - Oregon Permissible Exposure Limits (Z-1) | titanium-iron alloy (Particulates not otherwise regulated (PNOR) (f) Respirable Fraction) | - | 5 | Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means "particles not otherwise regulated." |
| US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants | titanium-iron alloy (Particulates not otherwise regulated (PNOR)(f)- Respirable fraction) | | 5 | |

PERSONAL PROTECTION



RESPIRATOR

- Particulate. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens 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]

HANDS/FEET

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
- Protective gloves eg. Leather gloves or gloves with Leather facing
- Wear physical protective gloves, eg. leather.
- Wear safety footwear.

OTHER

- Overalls.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

ENGINEERING CONTROLS

For large scale or continuous use

- Spark-free, earthed ventilation system, venting directly to the outside and separate from usual ventilation systems
- Provide dust collectors with explosion vents

Metal dusts must be collected at the source of generation as they are potentially explosive.

- Vacuum cleaners, of flame-proof design, should be used to minimise dust accumulation.
- 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.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

| | | | |
|---------------------------|----------------|---------------------------------|-----------------|
| State | Divided solid | Molecular Weight | 103.71 |
| Melting Range (°F) | Not available | Viscosity | Not Applicable |
| Boiling Range (°F) | Not available | Solubility in water (g/L) | Reacts |
| Flash Point (°F) | Not applicable | pH (1% solution) | Not applicable. |
| Decomposition Temp (°F) | Not Applicable | pH (as supplied) | Not applicable |
| Autoignition Temp (°F) | Not available | Vapour Pressure (mmHG) | Not applicable |
| Upper Explosive Limit (%) | Not applicable | Specific Gravity (water=1) | Not available |
| Lower Explosive Limit (%) | Not applicable | Relative Vapour Density (air=1) | Not applicable |
| Volatile Component (%vol) | Not applicable | Evaporation Rate | Not applicable |

APPEARANCE

Metal powder; reacts slowly with water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of heat source and ignition source

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

STORAGE INCOMPATIBILITY

- **WARNING** Avoid or control reaction with peroxides. All transition metal peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively.
- The pi-complexes formed between chromium(0), vanadium(0) and other transition metals (haloarene-metal complexes) and mono-or poly-fluorobenzene show extreme sensitivity to heat and are explosive.
- Avoid reaction with borohydrides or cyanoborohydrides
- Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
- These trifluorides are hypergolic oxidisers. They ignite 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.
- Many metals may incandesce, react violently, ignite or react explosively upon addition of concentrated nitric acid.
- Segregate from alcohol, water.

Metals exhibit varying degrees of activity. Reaction is reduced in the massive form (sheet, rod, or drop), compared with finely divided forms.

- can react exothermically with oxidising acids to form noxious gases.
- catalyse polymerisation and other reactions, particularly when finely divided
- 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.
- Reacts with acids producing flammable / explosive hydrogen (H₂) gas
- 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
- Reacts slowly with water.
- **CAUTION** contamination with moisture will liberate explosive hydrogen gas, causing pressure build up in sealed containers.
- Reacts violently with caustic soda, other alkalis - generating heat, highly flammable hydrogen gas.
- If alkali is dry, heat generated may ignite hydrogen - if alkali is in solution may cause violent foaming

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

Section 11 - TOXICOLOGICAL INFORMATION

titanium-iron alloy

TOXICITY AND IRRITATION

- No significant acute toxicological data identified in literature search.

Section 12 - ECOLOGICAL INFORMATION

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

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)

Disposal Instructions

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

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. In most instances the supplier of the material should be consulted.

- 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.
- 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.
- Dispose of by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus (after admixture with suitable combustible material)
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION

DOT:

| | | | |
|---|--------|---|-------------------------|
| Symbols: | None | Hazard class or Division: | 4.1 |
| Identification Numbers: | UN3089 | PG: | II |
| Label Codes: | 4.1 | Special provisions: | IB8, IP2, IP4, T3, TP33 |
| Packaging: Exceptions: | 151 | Packaging: Non-bulk: | 212 |
| Packaging: Exceptions: | 151 | Quantity limitations: Passenger aircraft/rail: | 15 kg |
| Quantity Limitations: Cargo aircraft only: | 50 kg | Vessel stowage: Location: | B |
| Vessel stowage: Other: | None | | |

Hazardous materials descriptions and proper shipping names:

Metal powders, flammable, n.o.s.

Air Transport IATA:

| | | | |
|-----------------------|------|---------------------|-------|
| ICAO/IATA Class: | 4.1 | ICAO/IATA Subrisk: | None |
| UN/ID Number: | 3089 | Packing Group: | II |
| Special provisions: | A3 | | |
| Cargo Only | | | |
| Packing Instructions: | 448 | Maximum Qty/Pack: | 50 kg |
| Passenger and Cargo | | Passenger and Cargo | |
| Packing Instructions: | 445 | Maximum Qty/Pack: | 15 kg |

| | | | |
|---|---------|--------------------------------------|------|
| Passenger and Cargo Limited Quantity | | Passenger and Cargo Limited Quantity | |
| Packing Instructions: | Y441 | Maximum Qty/Pack: | 5 kg |
| Shipping name: METAL POWDER, FLAMMABLE, N.O.S. (contains titanium-iron alloy) | | | |
| Maritime Transport IMDG: | | | |
| IMDG Class: | 4.1 | IMDG Subrisk: | None |
| UN Number: | 3089 | Packing Group: | II |
| EMS Number: | F-G,S-G | Special provisions: | None |
| Limited Quantities: | 1 kg | | |
| Shipping name: METAL POWDER, FLAMMABLE, N.O.S. (contains titanium-iron alloy) | | | |

Section 15 - REGULATORY INFORMATION

titanium-iron alloy (CAS: 77980-77-9) is found on the following regulatory lists;

"Canada - Alberta Ambient Air Quality Guidelines", "Canada - Alberta Ambient Air Quality Objectives", "Canada - British Columbia Occupational Exposure Limits", "Canada - Ontario Occupational Exposure Limits", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada National Pollutant Release Inventory (NPRI)", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - Michigan Exposure Limits for Air Contaminants", "US - Oregon Permissible Exposure Limits (Z-1)", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants", "US Clean Air Act (CAA) National Ambient Air Quality Standards (NAAQS)"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Inhalation may produce health damage*.
- Cumulative effects may result following exposure*.
- May produce discomfort of the eyes*.

* (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.

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