# TITANIUM (-46, -47, -48, -49, -50)

Chemwatch: **2878-3**
Version No: **6.1.1.1**
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Issue Date: **01/01/2013**
Print Date: **4/25/2016**
Initial Date: **Not Available**
S.GHS.USA.EN

## SECTION 1 IDENTIFICATION

### Product Identifier

| | |
|---|---|
| **Product name** | TITANIUM |
| **Chemical Name** | Titanium |
| **Synonyms** | Titanium |
| **Proper shipping name** | Not Applicable |
| **Chemical formula** | Ti |
| **Other means of identification** | Not Available |
| **CAS number** | 7440-32-6 |

### Relevant identified uses of the substance

| | |
|---|---|
| | Medical and research applications |

### Details of the manufacturer

| | |
|---|---|
| **Registered company name** | Oak Ridge National Laboratory |
| **Address** | P.O. Box 2008, Oak Ridge, Tennessee 37831-6158 |
| **Telephone** | (865) 574-6984 |
| **Fax** | (865) 574-6986 |
| **Website** | http://isotopes.gov/ |
| **Email** | isotopes@ornl.gov |

### Emergency telephone number

| | |
|---|---|
| **Association / Organization** | Oak Ridge National Laboratory |
| **Emergency telephone numbers** | (865) 574-6606 |
| **Other emergency telephone numbers** | CHEMTREC: 1-800-424-9300 |

## SECTION 2 HAZARDS IDENTIFICATION

### Classification of the substance or mixture

**CHEMWATCH HAZARD RATINGS**

| | Min | Max |
|---|---|---|
| Flammability | **0** | |
| Toxicity | **0** | |
| Body Contact | **0** | |
| Reactivity | **0** | |
| Chronic | **0** | |

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

| | |
|---|---|
| | Not classified as hazardous |

### Label elements

| | |
|---|---|
| | Not classified as hazardous |

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| | |
|---|---|

### Hazard statement(s)

| | |
|---|---|
| | N/A |

### Precautionary statement(s) Prevention

| | |
|---|---|
| | N/A |

### Precautionary statement(s) Response

| | |
|---|---|
| | N/A |

### Precautionary statement(s) Storage

| | |
|---|---|
| | Avoid creating or accumulating dust or fines as they may present a fire hazard. Provide adequate ventilation if dusts are created. Avoid breathing dust or fumes. |

### Precautionary statement(s) Disposal

Dispose of in accordance with federal, state and local regulations.

## SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

### Substances

| CAS No | %[weight] | Name |
|---|---|---|
| 7440-32-6 | 100 | titanium |

### Mixtures

See section above for composition of Substances

## SECTION 4 FIRST AID MEASURES

### Description of first aid measures

| | |
|---|---|
| **Eye Contact** | ▪ If in eyes, hold eyelids apart and flush the eye continuously with running water.<br>▪ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.<br>▪ 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.<br>▪ Seek medical attention without delay; if pain persists or recurs seek medical attention.<br>▪ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.<br>For THERMAL burns:<br>▪ Do NOT remove contact lens<br>▪ 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.<br>▪ Seek urgent medical assistance, or transport to hospital.<br>▪ **DO NOT** attempt to remove particles attached to or embedded in eye.<br>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.<br>Seek urgent medical assistance, or transport to hospital. |
| **Skin Contact** | If skin or hair contact occurs:<br>Immediately flush body and clothes with large amounts of water, using safety shower if available.<br>Quickly remove all contaminated clothing, including footwear.<br>Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.<br>Transport to hospital, or doctor.<br>In case of burns:<br>▪ Immediately apply cold water to burn either by immersion or wrapping with saturated clean cloth.<br>**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.<br>▪ **DO NOT** break blister or remove solidified material.<br>Quickly cover wound with dressing or clean cloth to help prevent infection and to ease pain.<br>▪ For large burns, sheets, towels or pillow slips are ideal; leave holes for eyes, nose and mouth.<br>▪ **DO NOT** apply ointments, oils, butter, etc. to a burn under any circumstances.<br>▪ Water may be given in small quantities if the person is conscious.<br>▪ Alcohol is not to be given under any circumstances.<br>Reassure.<br>▪ Treat for shock by keeping the person warm and in a lying position.<br>▪ 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.<br>▪ Lay patient down. Keep warm and rested.<br>▪ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.<br>▪ 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.<br>▪ Transport to hospital, or doctor.<br>▪ If dust is inhaled, remove from contaminated area.<br>▪ Encourage patient to blow nose to ensure clear breathing passages.<br>▪ |

▪

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| | |
|---|---|
| | ▪ Ask patient to rinse mouth with water but to not drink water.<br>▪ Seek immediate medical attention. |
| | ▪ Immediately give a glass of water.<br>▪ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. |

### Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

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

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

[Ellenhorn and Barceloux: Medical Toxicology]

## SECTION 5 FIREFIGHTING MEASURES

### Extinguishing media

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| | Metal dust fires need to be smothered with sand, inert dry powders.<br>**DO NOT** USE WATER, CO2 or FOAM.<br>▪ Use DRY sand, graphite powder, dry sodium chloride based extinguishers, G-1 or Met L-X to smother fire.<br>▪ Confining or smothering material is preferable to applying water as chemical reaction may produce flammable and explosive hydrogen gas. |

### Special hazards arising from the substrate or mixture

| | |
|---|---|
| | ▪ Reacts with acids producing flammable / explosive hydrogen (H2) gas<br>▪ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result<br>▪ Keep dry<br>▪ **NOTE:** May develop pressure in containers; open carefully. Vent periodically. |

### Advice for firefighters

| | |
|---|---|
| **Fire Fighting** | ▪ Wear SCBA and fully-encapsulating, gas-tight suits when handling these substances.<br>▪ Always wear thermal protective clothing when handling molten substances.<br>▪ Structural fire fighter's uniform will only provide limited protection.<br>▪ Alert Fire Brigade and tell them location and nature of hazard. |
| **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.<br>▪ **DO NOT** use water or foam as generation of explosive hydrogen may result.<br>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. |

## SECTION 6 ACCIDENTAL RELEASE MEASURES

### Personal precautions, protective equipment and emergency procedures

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|---|---|
| **Minor Spills** | ▪ Eliminate all ignition sources.<br>▪ Cover with **WET** earth, sand or other non-combustible material.<br>▪ Use clean, non-sparking tools to collect absorbed material<br>▪ Wear gloves and safety glasses as appropriate. |
| **Major Spills** | ▪ Clear area of personnel and move upwind.<br>▪ Alert Fire Brigade and tell them location and nature of hazard.<br>▪ Eliminate all ignition sources (no smoking, flares, sparks or flames)<br>▪ Stop leak if safe to do so; prevent entry into waterways, drains or confined spaces.<br>▪ May be violently or explosively reactive. |

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

## SECTION 7 HANDLING AND STORAGE

### Precautions for safe handling

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| **Safe handling** | ▪ For large scale or continuous use, spark-free, earthed ventilation system venting directly to the outside and separate from usual ventilation systems<br>▪ Provide dust collectors with explosion vents.<br>▪ Avoid all personal contact, including inhalation.<br>▪ Wear protective clothing when risk of overexposure occurs.<br>▪ Use in a well-ventilated area. |
| **Other information** | ▪ Store under an inert gas, e.g. argon or nitrogen.<br>**FOR MINOR QUANTITIES:**<br>Store in an indoor fireproof cabinet or in a room of noncombustible construction.<br>Provide adequate portable fire-extinguishers in or near the storage area.<br>**FOR PACKAGE STORAGE:**<br>Store in original containers in approved flame-proof area. |

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### Conditions for safe storage, including any incompatibilities

| | |
|---|---|
| **Suitable container** | For low viscosity materials and solids:<br>Drums and jerricans must be of the non-removable head type.<br>Where a can is to be used as an inner package, the can must have a screwed enclosure.<br>For materials with a viscosity of at least 2680 cSt. (23 deg. C):<br>▪ Removable head packaging and<br>cans with friction closures may be used. |
| **Storage incompatibility** | Titanium:<br>▪ reacts with oxidizing agents, aluminum, carbon dioxide, chlorinated solvents, strong acids, oxygen, halogens<br>▪ reacts violently with cupric or lead oxide when heated<br>▪ powder mixtures with potassium perchlorate, with nickel and infusional earth ignite with very small sparks causing severe explosion<br>▪ with trichloroethylene or trichlorofluoroethylene with flash or spark on heavy impact<br>▪ reacts with fluorine at 150 deg C, chlorine at 300 deg C, bromine at 360 deg C and iodine at >360 deg C<br>▪ when heated at red heat (700 deg C) decomposes steam to hydrogen and when heated above above 800 deg C burns vigorously in pure nitrogen; burns in carbon dioxide above 550 deg C; the hot metal explodes violently on contact with water.<br>▪ 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. |

**PACKAGE MATERIAL INCOMPATIBILITIES**

Not Available

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### Control parameters

**OCCUPATIONAL EXPOSURE LIMITS (OEL)**

**INGREDIENT DATA**

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|---|---|---|---|---|---|
| US OSHA Permissible Exposure Levels (PELs) - Table Z3 | titanium | Inert or Nuisance Dust | 5 mg/m3 / 15 mg/m3 / 15 mppcf / 50 mppcf | Not Available | Not Available | Respirable fraction;All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1. / Total dust;All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1. |

**EMERGENCY LIMITS**

| Ingredient | Material name | TEEL-1 | TEEL-2 | TEEL-3 |
|---|---|---|---|---|
| titanium | Titanium | 0.12 mg/m3 | 1.3 mg/m3 | 7.7 mg/m3 |

| Ingredient | Original IDLH | Revised IDLH |
|---|---|---|
| titanium | Not Available | Not Available |

### Exposure controls

| | |
|---|---|
| **Appropriate engineering controls** | Metal dusts must be collected at the source of generation as they are potentially explosive.<br>▪ Avoid ignition sources.<br>▪ Good housekeeping practices must be maintained.<br>▪ Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions. |
| **Personal protection** |  <br>▪ |
| **Eye and face protection** | ▪ Safety glasses with side shields<br>▪ Chemical goggles.<br>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. |
| **Skin protection** | See Hand protection below |
| **Hands/feet protection** | The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.<br>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.<br>Suitability and durability of glove type is dependent on usage. |
| **Body protection** | See Other protection below |
| **Other protection** | Wear protective clothing appropriate for the work situation.<br>For large scale or continuous use, when handling dry powder, wear :<br>tight-weave, non-static, noncombustible or flameproof clothing without cuffs, metallic fasteners, pockets, or laps in which powder may collect.<br>non-sparking safety or conductive footwear. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot and shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds. |
| **Thermal hazards** | Not Available |

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### Recommended material(s)

**GLOVE SELECTION INDEX**

Glove selection is based on a modified presentation of the:
**"Forsberg Clothing Performance Index".**
The effect(s) of the following substance(s) are taken into account in the computer generated selection:
TITANIUM Not Available

| Material | CPI |
|---|---|

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
**NOTE**: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

### Respiratory protection

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

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

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

### Information on basic physical and chemical properties

| | |
|---|---|
| | Dark grey, lustrous metal |

| | | | |
|---|---|---|---|
| **Physical state** | Divided Solid | **Relative density (Water = 1)** | 4.5 @ 20 deg.C |
| **Odor** | Not Available | **Partition coefficient n-octanol / water** | Not Available |
| **Odor threshold** | Not Available | **Auto-ignition temperature (°C)** | 330 (cloud) |
| **pH (as supplied)** | Not Applicable | **Decomposition temperature** | Not Available |
| **Melting point / freezing point (°C)** | 1650 | **Viscosity (cSt)** | Not Available |
| **Initial boiling point and boiling range (°C)** | 3287 | **Molecular weight (g/mol)** | 47.9 |
| **Flash point (°C)** | Not Available | **Taste** | Not Available |
| **Evaporation rate** | Not Applicable | **Explosive properties** | Not Available |
| **Flammability** | Not Available | **Oxidising properties** | Not Available |
| **Upper Explosive Limit (%)** | Not Applicable | **Surface Tension (dyn/cm or mN/m)** | Not Applicable |
| **Lower Explosive Limit (%)** | Not Applicable | **Volatile Component (%vol)** | Not Applicable |
| **Vapor pressure (kPa)** | Not Applicable | **Gas group** | Not Available |
| **Solubility in water (g/L)** | Immiscible | **pH as a solution** | Not Applicable |
| **Vapor density (Air = 1)** | Not Applicable | **VOC g/L** | Not Available |

## SECTION 10 STABILITY AND REACTIVITY

| | |
|---|---|
| **Reactivity** | See section 7 |
| **Chemical stability** | ▪ May heat spontaneously<br>▪ Identify and remove sources of ignition and heating.<br>▪ Incompatible material, especially oxidizers, and/or other sources of oxygen may produce unstable product(s).<br>▪ Hazardous polymerization will not occur. |
| **Possibility of hazardous reactions** | See section 7 |
| **Conditions to avoid** | See section 7 |
| **Incompatible materials** | See section 7 |
| **Hazardous decomposition products** | See section 5 |

**Continued...**

## SECTION 11 TOXICOLOGICAL INFORMATION

### Information on toxicological effects

| | |
|---|---|
| | 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.<br>Inhalation of dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.<br>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. |
| **Ingestion** | 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.<br>Dusts of titanium and titanium compounds are thought to exhibit little or no toxic effects. |
| **Skin Contact** | 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.<br>Open cuts, abraded or irritated skin should not be exposed to this material<br>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** | Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. |
| **Chronic** | Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimized as a matter of course.<br>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. |

| | | |
|---|---|---|
| **titanium** | Oral (rat) LD50: >2000 mg/kg[1] | Not Available |
| ***Legend:*** | *1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's sds Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances* | |

| | |
|---|---|
| **TITANIUM** | No significant acute toxicological data identified in literature search |

| | | | |
|---|---|---|---|
| **Acute Toxicity** | ⊘ | **Carcinogenicity** | ⊘ |
| **Skin Irritation/Corrosion** | ⊘ | **Reproductivity** | ⊘ |
| **Serious Eye Damage/Irritation** | ⊘ | **STOT - Single Exposure** | ⊘ |
| **Respiratory or Skin sensitization** | ⊘ | **STOT - Repeated Exposure** | ⊘ |
| **Mutagenicity** | ⊘ | **Aspiration Hazard** | ⊘ |

***Legend:*** ✔ *– Data required to make classification available*
✖ *– Data available but does not fill the criteria for classification*
⊘ *– Data Not Available to make classification*

### CMR Status

| | | | |
|---|---|---|---|
| **CARCINOGEN** | titanium | US Environmental Defense Scorecard Suspected Carcinogens | P65-MC |
| **RESPIRATORY** | titanium | US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) - Respiratory | X |

## SECTION 12 ECOLOGICAL INFORMATION

### Toxicity

For Metal:
Atmospheric Fate - Metal-containing inorganic substances generally have negligible vapor 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.

### Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|---|---|---|
| | No Data available for all ingredients | No Data available for all ingredients |

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### Bioaccumulative potential

| Ingredient | Bioaccumulation |
|---|---|
| | No Data available for all ingredients |

### Mobility in soil

| Ingredient | Mobility |
|---|---|
| | No Data available for all ingredients |

## SECTION 13 DISPOSAL CONSIDERATIONS

### Waste treatment methods

| | |
|---|---|
| | 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.<br>A Hierarchy of Controls seems to be common - the user should investigate:<br>▪ Reduction<br>▪ Reuse<br>▪ Recycling<br>▪ Disposal (if all else fails)<br>This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. |

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## SECTION 14 TRANSPORT INFORMATION

### Labels Required

| | |
|---|---|
| **Marine Pollutant** | NO |

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

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

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

## SECTION 15 REGULATORY INFORMATION

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

| | |
|---|---|
| | "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Hawaii Air Contaminant Limits","US - California Permissible Exposure Limits for Chemical Contaminants","US - Oregon Permissible Exposure Limits (Z-1)","International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs","US OSHA Permissible Exposure Levels (PELs) - Table Z3","US - Michigan Exposure Limits for Air Contaminants","International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft","US - Washington Permissible exposure limits of air contaminants","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory" |

## SECTION 16 OTHER INFORMATION

### Other information

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 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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**end of SDS**