

Tungsten, Powder



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IDENTIFICATION

Tungsten, Powder

ZVG No: 7740
CAS No: 7440-33-7
EC No: 231-143-9

CHARACTERISATION

SUBSTANCE GROUP CODE

134000 Metals

STATE OF AGGREGATION

The substance is solid.

PROPERTIES

metal powder
grey
odourless

CHEMICAL CHARACTERISATION

Flammable solid.

Can be ignited by the brief effects of exposure to sources of ignition and continues to burn when these are no longer present. The risk of ignition is greater the more finely the substance is spread.

The metal is non-flammable in compact form.

Practically insoluble in water.

[Substance information in Wikipedia](#)

DUST EXPLOSIVENESS

There is a risk of a dust explosion if the following conditions are met:

- The substance is given in very finely distributed form (powder, dust).
- The substance is whirled up in sufficient quantity in the air.
- An ignition source is present (flame, spark, electrostatic discharge, etc.)

Quelle: 01231 99999

FORMULA

W

Molar mass: 183,85 g/mol

PHYSICAL AND CHEMICAL PROPERTIES

[Melting point](#) | [Boiling point](#) | [Density](#) | [Solubility](#) | [Hazardous reactions](#)

MELTING POINT

Melting point: 3410 °C

Reference: [00454 01221 01231](#)

BOILING POINT

Boiling Point: 5900 °C

Reference: [00454 01231](#)

DENSITY

DENSITY

Value: 19,3 g/cm³

Reference: [01221 01231](#)

SOLUBILITY IN WATER

practically insoluble in water

Reference: [01231](#)

HAZARDOUS REACTIONS

Thermal decomposition

Self-ignition.

Hazardous chemical reactions

Risk of explosion in contact with:
potassium dichromate
potassium perchlorate

The substance can react dangerously with:
bromine
chlorine
fluorine
oxidizing agents
hydrogen peroxide
lead dioxide
bromine pentafluoride
bromine trifluoride
chlorine trifluoride
air (finely dispersed, heat)
sodium peroxide (heat)
nitryl fluoride
hydrogen sulfide

OCCUPATIONAL HEALTH AND FIRST AID

[Routes of exposure](#) | [Toxic effects](#) |
[First Aid](#)

ROUTES OF EXPOSURE

Main routes of exposure

During the production and use of tungsten (T.) the main route for intake proceeds via the respiratory tract.[99999]

Respiratory tract

Exposure is possible to very finely dispersed dust particles which can be released during the reductive ore dressing or pyrolysis of gaseous tungsten compounds.[07866]

Data on the (certainly very slow) absorbability via the respiratory tract is not available.[99983]

However, in comparison to its carbide the metal should be denoted as less inert.[07748]

Skin

Because of its physicochemical properties, T. is not expected to be absorbed via the intact skin.
[99999]

Kinetic data for T. is not available.[99983]

Gastrointestinal tract

Data on the absorbability of T. via the gastrointestinal tract is contradictory.[99997]

However, it can be assumed that only minor parts of a dose taken in orally can be transformed into a soluble form which could be absorbed.[99999]

TOXIC EFFECTS

Main toxic effects

Acute:

Slight irritation to the mucous membranes and skin;[00438]

data for humans not available

Chronic:

dto.[99983]

Acute toxicity

The toxicological data base for T. is extremely narrow.[99983]
In experiments in which 500 mg T. dust were applied to rabbits' eyes and skin each only caused slight irritation (probably mechanically conditioned).[00438]
Absorptive toxic effects following contact with the skin are not expected although test results for this are not available. The same applies to the skin sensitizing potential:[99999] Even after subcutaneous application of the soluble sodium tungstate, no significant differences compared with the control animals could be determined regarding reactions to the skin.[07647]
Inhalative studies with T. dusts have apparently not been carried out to date.[99983]
Instillation of a 5 % suspension of T. powder into the bronchial tube of rats did not cause acute effects.
In a further intratracheal study on rats, a single application of 50 mg T. dust suspended in 0.5 ml physiological saline also did not produce detectable symptoms. The histological examination of the animals after they were sacrificed at 4; 6 or 8 months exclusively yielded changes of the lung tissue: proliferative reaction of the lymphoid and histiocytic elements with subsequent mild fibrosis. The walls of small vessels were thickened and their endothelium swollen. Summarizing these results, the lung damaging effect of T. dusts was considered to be minor.
Regarding oral toxicity older information is available. Patients who received 25 - 80 g T. as a substitute for barium (in radiological studies) did not suffer from health disturbances.[99997]
Acute oral animal experiments are not available.[99983]
An intraperitoneal LD50 value for rats was determined to be 5 g/kg bw. The animals died within 24 hours after injection. Surviving animals sacrificed after 45 days p.appl. showed minor morphological changes in the liver and spleen.[07748]

Chronic toxicity

Consequences of occupational exposure to T. have not been reported.
It is unclear if the metal plays a role or what role the metal plays. It is rather assumed that during ore processing and the handling of T. as a component of an alloy other substances are toxicologically more relevant than T. itself.
For T. itself only animal experiments are available.[99983]
Findings after intratracheal application of 50 mg T. dust/w for 3 weeks to guinea pigs led to the estimation that the material is relatively inert. Nevertheless, a minor effect to the lung tissue (interstitial cellular proliferation) was detectable.
T. dust was added to the diet of very young rats in concentrations of 2; 5 or 10 % for 70 days. It caused a 15 % reduction of the body weight gain for the female rats but not for the male rats. Further effects were not reported.[07748]

Reproductive toxicity, mutagenicity, carcinogenicity

Reproductive toxicity:
Insufficient data is available.
Mutagenicity:
Substance specific data is not available.
Carcinogenicity:
No data is available.[99983]

Biotransformation and excretion

In an older feeding study on rats carried out with T. dust, tungsten oxide, sodium tungstate and ammonium paratungstate (the individual test components having differing concentrations) the distribution pattern of T. in the organs differed only quantitatively.[07866]
Therefore, it is to be assumed that the main absorbed part of the applied W. is rapidly excreted via the kidneys.[99999]
In the case of chronic intake, a distinct accumulation in the skeleton is to be taken into account although the part deposited there is minor in comparison to the total amount absorbed (for T. certainly very minor indeed).[99997]

Annotation

This occupational health information was compiled on 03.09.2001.
It will be updated if necessary.

FIRST AID

Eyes

Rinse the affected eye with widely spread lids for 10 minutes under running water whilst protecting the unimpaired eye.

Arrange medical treatment.

[07750]

Skin

Cleanse the affected skin areas thoroughly with soap under running water.

In the case of (less probable) pronounced irritation:

Arrange for medical treatment.

[07750, 99999]

Respiratory tract

Whilst protecting yourself remove the casualty from the hazardous area and take him to the fresh air.

Lay the casualty down in a quiet place and protect him against hypothermia.

In the case of breathing difficulties have the casualty inhale oxygen.

Arrange medical treatment.

[07750]

Swallowing

Rinse the mouth and spit the fluids out.

If the casualty is conscious have him drink 1 glass of water (ca 200 ml).

Do not make the casualty vomit.

Arrange medical treatment.

[07750, 99999]

Information for physicians

Metallic tungsten is relevant from an occupational medical-toxicological standpoint only in the form of dusts. However, as dusts it mostly occurs in a combined form as raw materials (tungsten oxides) or as additives (with carbon, tungsten carbide, titanium, vanadium, zirconium and their oxides) so that possible health disturbances through pure tungsten dust are not definable.[07866]

- Symptoms following acute impact:

Eyes/skin: possible slight irritation (probably mechanically conditioned);[00438] skin sensitization or absorptive-toxic effects hardly to be expected

Inhalation: irritation to the airways probably only to be expected through massive exposure to dusts, lung damage after short-term exposure hardly to be expected;[99983] mild fibrotic changes not to be excluded but only after long-term massive exposure; systemic effects unlikely

Ingestion: only minor irritation to the mucous membranes, systemic effects not to be excluded but probably only following very massive ingestion[99997]

Absorption: no data available, neither from animal experiments.[99983]

- Medical advice:

After eye contact ophthalmologic aftercare should follow first aid measures (carefully rinse with water or physiological saline) because of possible cornea damage. This can be mechanically conditioned through rubbing one's eyes initially.

Even massive skin contact should generally not require further treatment following careful cleaning and possible application of a dermotic.

Following inhalation, treatment can only be done according to the symptoms.

Ingestion of dusts (hardly to be expected) only requires oral application of liquids (tea or water).

[99999]

Recommendations

Provide the physician information about the substance/product and treatment already administered.

Annotation

This first aid information was compiled on 03.09.2001.

It will be updated if necessary.

SAFE HANDLING

TECHNICAL MEASURES - HANDLING

Workplace

Provision of good ventilation in the working area.

Washing facility at the workplace required.

When handling excessive amounts of the substance an emergency shower is required.

Equipment

If release of the substance cannot be prevented, then it should be suctioned off at the point of exit.

Consider emission limit values, a purification of waste gases if necessary.

Label containers and pipelines clearly.

Advice on safer handling

Take care to maintain clean working place.

The substance must not be present at workplaces in quantities above that required for work to be progressed.

Do not leave container open.

Sufficient ventilation must be guaranteed for refilling, transfer, or open use.

Avoid spillage.

Fill only into labelled container.

Avoid rising dust.

Use an appropriate exterior vessel when transporting in fragile containers.

Cleaning and maintenance

Avoid dust formation. Dust formation that cannot be avoided must be collected regularly.

Use tested industrial vacuum cleaners or suction systems for areas with a high risk of explosion.

Do not raise dust while cleaning.

Use of a blower for cleaning is not permitted.

TECHNICAL MEASURES - STORAGE

Storage

Do not use any food containers - risk of mistake.

Containers have to be labelled clearly and permanently.

Store in the original container as much as possible.

Keep container tightly closed in a dry and well-ventilated place.

Store apart from sources of ignition and heat.

Conditions of collocated storage

Storage class 4.1 B (Flammable solid or desensitized substances)

Only substances of the same storage class should be stored together.

Collocated storage with the following substances is prohibited:

- Pharmaceuticals, foods, and animal feeds including additives.

- Infectious, radioactive und explosive substances.

- Gases.

- Aerosols (spray bottles).

- Flammable liquids of storage class 3.

- Strongly oxidizing substances of storage class 5.1A.

- Ammonium nitrate and preparations containing ammonium nitrate.

- Non combustible acutely toxic substances of storage class 6.1B.

Under certain conditions the collocated storage with the following sub-stances is permitted (For more details see [TRGS 510](#)):

- Other explosive substances of storage class 4.1A.

- Pyrophoric substances.
- Substances liberating flammable gases in contact with water.
- Oxidizing substances of storage class 5.1B.
- Organic peroxides and self reactive substances.
- Combustible acutely toxic substances.
- Noncombustible toxic or chronically acting substances of storage class 6.1D.

The substance should not be stored with substances with which hazardous chemical reactions are possible.

TECHNICAL MEASURES - FIRE AND EXPLOSION PROTECTION

Technical, constructive measures

Substance is combustible.

Fire fighting equipment must be available.

If there is a risk of a dust explosion due to the dust-like distribution and the quantities used, measures according to [TRGS 722](#) (prevention of formation), 723 (prevention of ignition) and [TRGS 724](#) (constructive explosion protection) may become necessary.

Precaution on handling

Area with fire risk.

Areas in which the substance can arise as a dust in such quantities that a dust explosion could occur are to be considered as at a risk of explosion.

Keep away from sources of ignition (e.g. open flames, heat sources and sparks).

Observe the smoking prohibition!

Absolutely no welding in the working area.

Only work with vessels and lines after these have been thoroughly rinsed and inerting.

Work done with fire or open flame should only be carried out with written permission if the risk of fire or explosion cannot be completely eliminated.

ORGANISATIONAL MEASURES

Instruction on the hazards and the protective measures using instruction manual ([TRGS 555](#)) are required with signature if just more than one minor hazard was detected.

Instruction must be provided before employment and then at a minimum of once per annum thereafter.

An escape and rescue plan must be prepared when the location, scale, and use of the work-site so demand.

Observe the restrictions on juvenile employment as defined in the "Jugendarbeitsschutzgesetz".

PERSONAL PROTECTION

Body protection

Wear flameproof, antistatic protective clothing.

Respiratory protection

In an emergency (e.g.: unintentional release of the substance) respiratory protection must be worn. Consider the maximum period for wear.

Respiratory protection: Particle filter P1, colour code white.

Eye protection

Sufficient eye protection should be worn.

Wear glasses with side protection.

Hand protection

The use of resistant protective gloves is recommended.

Skin protection cremes do not protect as effectively against the substance as protective gloves. Therefore suitable protective gloves should be preferred as far as possible.

Currently there is no information available regarding suitable glove materials.

Experience says that polychloroprene, nitrile rubber, butyl rubber, fluoro-caoutchouc, and polyvinyl chloride are suitable as glove materials for protection against un-dissolved solids.

Occupational hygiene

Take heed of usual occupational hygiene measures when handling chemical substances, especially wash the skin with soap and water before breaks and at the end of work and apply fatty skin-care products after washing.

Avoid inhalation of dust.

DISPOSAL CONSIDERATIONS

Hazardous waste according to Waste Catalogue Ordinance (AVV).

If there is no way of recycling it must be disposed of in compliance with the respective national and local regulations.

Collection of small amounts of substance:

Residues should be recycled.

Collect in container for recyclable metal residues. All metals should be collected separately.

Collection vessels must be clearly labelled with a systematic description of their contents. Store the vessels in a well-ventilated location. Entrust them to the appropriate authorities for disposal.

ACCIDENTAL RELEASE MEASURES

Shut off all sources of ignition.

Evacuate area. Warn affected surroundings.

Wear a dust mask.

Pick up without creating dust.

Use non-sparking tools.

Afterwards ventilate area and wash spill site.

Endangerment of watert:

No hazards to sources of water are to be feared if released into water, drainage, sewer, or the ground.

FIRE FIGHTING MEASURES

Classes of fires

D combustible metals

Suitable extinguishing media

Metal fire extinguisher

Sand

cerment

Unsuitable extinguishing media

Water

Carbon dioxide

Instructions

Seek immediate cover in case of sudden release and raising of large quantities of dust.

If possible, take container out of dangerous zone.

Shut off sources of ignition.

Special protective equipment

In the case of a fire hazardous substances can be released.

Metal oxide fume

Wear self-contained breathing apparatus.

REGULATIONS

[GHS Classification/Labelling](#) | [Workplace labelling](#) | [Water hazard class](#) | [Air quality control](#) | [Transport Regulations](#) | [MAK recommendations](#) | [Restriction of use](#) | [Technical rules](#) | [Regulations of accident insurers](#)

EUROPEAN GHS CLASSIFICATION AND LABELLING

Classification

Flammable solids, Category 1; H228



Signal Word "Danger"

Hazard Statement - H-phrases

H228: Flammable solid.

Precautionary Statement - P-phrases

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Manufacturer's specification by Thermo Fisher Scientific

Reference: [01231](#)

State: 2018

Checked: 2019

WORKPLACE LABELLING ACCORDING TO GERMAN [ASR A1.3](#)

Prohibition label



No open flame; fire, open ignition sources and smoking prohibited



Do not extinguish with water



No admittance for unauthorized persons

Warning label



Caution - inflammable material

Precept label



Use safety goggles

GERMAN WATER HAZARD CLASS

Substance No: 11032

non-hazardous to waters

Tungsten, particle size < 1mm

Classification according to the announcement of the list of substances hazardous to water in the Federal Register of 10.08.2017, last update 24.11.2023

TECHNICAL INSTRUCTIONS ON AIR QUALITY CONTROL (TA LUFT)

Chapter 5.2.1 Overall Dust, including fine dust

The emissions of dust in the exhaust gas are not allowed to exceed the following values:

Mass flow: 0,20 kg/hr

or

Mass conc.: 20 mg/m³

The mass per unit volume of 0,15 g/m³ in exhaust gas is not allowed to be exceeded also on observance or lower deviation of a mass flow of 0,20 kg/h.

TRANSPORT REGULATIONS

UN Number: 3089

Shipping name: Metal powder, flammable,
n.o.s.

Hazard Identification Number: 40

Class: 4.1 (Flammable solids)

Packing Group: II (medium danger)

Danger Label: 4.1



Classification code: F3

Tunnel restrictions:

Passage forbidden through tunnels of category E.

Reference: [01231](#)

RECOMMENDATIONS OF MAK-COMMISSION

This data is recommended by scientific experience and is not established law.

II b) substances, for which (still) no MAK-values can be established

RESTRICTIONS OF USE / BANS OF USE

REACH Regulation (EC) No 1907/2006 Annex XVII

Annex XVII, Point 40

Shall not be used, as substance or as mixtures in aerosol dispensers where these aerosol dispensers are intended for supply to the general public for entertainment and decorative purposes such as the following:

- metallic glitter intended mainly for decoration,
- artificial snow and frost,
- “whoopie” cushions,
- silly string aerosols,
- imitation excrement,
- horns for parties,
- decorative flakes and foams,
- artificial cobwebs,
- stink bombs.

Further information on prohibitions and exceptions can be taken from the regulation.

Annex XVII to Regulation (EC) No 1907/2006, [consolidated version](#) (BAUA) (only in German)

TECHNICAL RULES FOR HAZARDOUS SUBSTANCES

[TRGS 201](#)

Einstufung und Kennzeichnung bei Tätigkeiten mit Gefahrstoffen; Ausgabe Februar 2017, zuletzt geändert und ergänzt April 2018

[TRGS 400](#)

Gefährdungsbeurteilung für Tätigkeiten mit Gefahrstoffen; Ausgabe Juli 2017

[TRGS 555](#)

Betriebsanweisung und Information der Beschäftigten; Ausgabe Februar 2017

[TRGS 600](#)

Substitution; Ausgabe Juli 2020

[TRGS 500](#)

Schutzmaßnahmen; Ausgabe September 2019

[TRGS 509](#)

Lagern von flüssigen und festen Gefahrstoffen in ortsfesten Behältern sowie Füll- und Entleerstellen für ortsbewegliche Behälter; Ausgabe Juni 2022

[TRGS 510](#)

Lagerung von Gefahrstoffen in ortsbeweglichen Behältern; Ausgabe Januar Dezember 2020

[TRGS 800](#)

Brandschutzmaßnahmen; Ausgabe Dezember 2010

[TRGS 720](#)

Gefährliche explosionsfähige Gemische - Allgemeines; Ausgabe Juli 2020, zuletzt berichtigt März 2021

[TRGS 721](#)

Gefährliche explosionsfähige Gemische - Beurteilung der Explosionsgefährdung; Ausgabe Oktober 2020, zuletzt berichtigt Dezember 2020

[TRGS 722](#)

Vermeidung oder Einschränkung gefährlicher explosionsfähiger Atmosphäre; Ausgabe Februar 2021

[TRGS 723](#)

Gefährliche explosionsfähige Gemische - Vermeidung der Entzündung gefährlicher explosionsfähiger Gemische; Ausgabe Juli 2019, zuletzt geändert Oktober 2020

[TRGS 724](#)

Gefährliche explosionsfähige Gemische - Maßnahmen des konstruktiven Explosionsschutzes, welche die Auswirkung einer Explosion auf ein unbedenkliches Maß beschränken; Ausgabe Juli 2019

REGULATIONS OF GERMAN ACCIDENT INSURERS

[DGUV Regel 112-190](#)

Benutzung von Atemschutzgeräten, Ausgabe November 2021
(in German only)

LINKS

[International Limit Values](#)

[The MAK Collection for Occupational Health and Safety](#)

[DGUV Information 213-098: List of substances - lesson in schools \(in German only\)](#)

REFERENCES

Quelle: 00001

IFA: Erfassungs- und Pflegehandbuch der GESTIS-Stoffdatenbank (nicht öffentlich)
Data acquisition and maintenance manual of the GESTIS substance database (non-public)

Quelle: 00438

Registry of Toxic Effects of Chemical Substances (RTECS)

Quelle: 00454

Hazardous Substances Data Bank (HSDB)

Quelle: 01211

GHS-Sicherheitsdatenblatt, Merck
GHS Material Safety Data Sheet, Merck

Quelle: 01221

GHS-Sicherheitsdatenblatt, Sigma-Aldrich
GHS Material Safety Data Sheet, Sigma-Aldrich

Quelle: 01231

GHS-Sicherheitsdatenblatt, Thermo Fisher Scientific
GHS Material Safety Data Sheet, Thermo Fisher Scientific

Quelle: 05300

[TRGS 510](#) "Lagerung von Gefahrstoffen in ortsbeweglichen Behältern" Ausgabe Dezember 2020

Quelle: 06002

L. Roth, U. Weller
"Gefährliche Chemische Reaktionen" Loseblattsammlung mit Ergänzungslieferungen, ecomed-Verlag
("Dangerous chemical reactions" loose-leaf collection with supplement deliveries)

Quelle: 07580

Bekanntmachung der Liste der wassergefährdenden Stoffe im Bundesanzeiger vom 10.08.2017,
zuletzt geändert 24.11.2023

Quelle: 07647

H.G. Seiler, H. Sigel, A. Sigel "Handbook on toxicity of inorganic compounds" Marcel Dekker, Inc.,
New York 1980

Quelle: 07748

American Conference of Governmental Industrial Hygienists "Documentation of the threshold limit
values and biological exposure indices Loseblattsammlung mit Ergänzungslieferungen

Quelle: 07750

R. E. Lenga "The Sigma-Aldrich Library of Chemical Safety Data" 2nd edition, Sigma-Aldrich,
Milwaukee 1988

Quelle: 07866

G.D. Clayton, F.E. Clayton (edt.) "Patty's Industrial Hygiene and Toxicology" Volume II "Toxicology"
Fourth Edition, John Wiley & Sons, New York 1993

Quelle: 08112

DFG Deutsche Forschungsgemeinschaft: MAK- und BAT-Werte-Liste 2023, Senatskommission zur
Prüfung gesundheitsschädlicher Arbeitsstoffe, Mitteilung 59; GMS PUBLISSO

Quelle: 99983

Liste arbeitsmedizinisch-toxikologischer Standardwerke (2)

List of standard references regarding occupational health and toxicology (2)

Quelle: 99997

Projektgebundene arbeitsmedizinisch-toxikologische Literatur (1)

Project related bibliographical references regarding occupational health and toxicology (1)

Quelle: 99999

Angabe des Bearbeiters

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