

Niobium, Powder



[Identification](#) | [Characterisation](#) | [Formula](#) | [Physical and chemical properties](#) | [Safe handling](#) | [Regulations](#) | [Links](#) | [Literature register](#)

IDENTIFICATION

Niobium, Powder
Niobium

ZVG No: 7410
CAS No: 7440-03-1
EC No: 231-113-5

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.

Sensitive to moisture.

Sensitive to air.

[Substance information in Wikipedia](#)

DUST EXPLOSIVENESS

Hints on the possibility of a dust explosion are not given for this substance. Nevertheless, finely dispersed combustible solids in a whirled up state always have to be considered as a subject of dust explosion.

Quelle: [99999](#)

FORMULA

Nb

Molar mass: 92,91 g/mol

PHYSICAL AND CHEMICAL PROPERTIES

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

MELTING POINT

Melting point: 2468 °C

Reference: [00131 01221](#)

BOILING POINT

Boiling Point: 4927 °C

Reference: [00131 01231](#)

DENSITY

DENSITY

Value: 8,57 g/cm³

Temperature: 20 °C

Reference: [00107 00131](#)

EXPLOSION DATA

Lower explosion limit:

100 g/m³

Reference: [00107](#)

SOLUBILITY IN WATER

practically insoluble in water

Reference: [01221 07520](#)

HAZARDOUS REACTIONS

Thermal decomposition

Self-ignition.

Hazardous chemical reactions

Violent reaction with water.

The substance can react dangerously with:
fluorine
alkalies/heat
bromine trifluoride
chlorine/heat

SAFE HANDLING

[Handling](#) | [Storage](#) | [Fire and explosion protection](#) | [Organisational measures](#) | [Personal protection](#) | [Disposal considerations](#) | [Accidental release measures](#) | [Fire fighting measures](#)

TECHNICAL MEASURES - HANDLING

Workplace

Select ventilation measures according to the other used substances.

If there is a chance that dusts may be released, then the work room must provide adequate ventilation.

Washing facility at the workplace required.

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

Equipment

Use only closed apparatus.

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 keep workplace clean and dry.

Do not leave container open.

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 5.1 B (Oxidizing 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).
- Other explosive substances of storage class 4.1A.
- Pyrophoric substances.
- Substances liberating flammable gases in contact with water.
- Organic peroxides and self reactive substances.

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

- Flammable liquids of storage class 3.
- Flammable solid substances or desensitized substances of storage class 4.1B.
- Ammonium nitrate and preparations containing ammonium nitrate.
- Combustible and non combustible acutely toxic substances of storage classes 6.1A and 6.1B.
- Combustible toxic or chronically acting substances of storage class 6.1C.
- Noncombustible toxic or chronically acting substances of storage class 6.1D.
- Combustible corrosive substances of storage class 8A.
- Combustible liquids of storage class 10.
- Combustible solids of storage class 11.

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

TECHNICAL MEASURES - FIRE AND EXPLOSION PROTECTION

Technical, constructive measures

The substance is combustible in a finely distributed form (powder, dust).

Fire fighting equipment must be available.

Take precautionary measures against static discharges.

Earth all parts which can be electrically charged.

Precaution on handling

Area with fire risk.

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".

Only employees are permitted to enter the work areas. Signposting to this effect must be displayed.

PERSONAL PROTECTION

Body protection

Wear flameproof 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

Dry sand

cement

Unsuitable extinguishing media

Water
Foam

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.
Wear self-contained breathing apparatus.

REGULATIONS

[GHS Classification/Labelling](#) | [Workplace labelling](#) | [Water hazard class](#) | [Air quality control](#) |
[Transport Regulations](#) | [SevesoIII](#) | [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: 2021

Checked: 2021

The metal in compact form is not classified as a hazardous substance.

Reference: [01221](#) [07520](#)

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: 9760

non-hazardous to waters

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

Niobium, particle size < 1mm

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](#)

[DIRECTIVE 2012/18/EU \(Seveso III\)](#)

The substance is subject to the hazard categories of the Hazardous Incident Ordinance:

P7 Pyrophoric liquids or solids, Category 1

[Quantity thresholds for determination of operation scopes:](#)

Annex I Part 1 Section: P7

Pyrophoric liquids or solids

Qualifying quantity for the application of

Lower-tier requirements: 50 t

Upper-tier requirements: 200 t

[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,
- “whoopee” 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](#)

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: 00107

Sorbe "Sicherheitstechnische Kenndaten chemischer Stoffe" ("Safety-related characteristics of chemical substances"), ecomed Sicherheit, Landsberg, 07/2015

Quelle: 00131

The Merck-Index; 14th Edition 2006

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: 07520

Europäische Chemikalienagentur ECHA: Informationen über registrierte Substanzen

European Chemicals Agency ECHA: Information on registered substances

Quelle: 07580

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

Quelle: 99999

Angabe des Bearbeiters

Indication of the editor

[Identification](#) | [Characterisation](#) | [Formula](#) | [Physical and chemical properties](#) | [Safe handling](#) |
[Regulations](#) | [Links](#) | [Literature register](#)

This material data sheet was carefully compiled. However no liability can be assumed for the data content, whatever the legal cause may be.