

Diatomaceous silica, flux-calcined



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IDENTIFICATION

Diatomaceous silica, flux-calcined

Calcinated diatomaceous earth

Diatomite

Infusorial earth

ZVG No: 491121
CAS No: 68855-54-9
EC No: 272-489-0

Related

CAS No: 69012-64-2	silica fume
EC No: 273-761-1	

CHARACTERISATION

SUBSTANCE GROUP CODE

126100 Silicon dioxide, amorphous

STATE OF AGGREGATION

The substance is solid.

PROPERTIES

white
odourless

CHEMICAL CHARACTERISATION

Non-combustible substance.
Practically insoluble in water.
Acute or chronic health hazards result from the substance.
(see: chapter REGULATIONS).

[Substance information in Wikipedia](#)

DUST EXPLOSIVENESS

No risk of dust explosion.

Quelle: [99999](#)

FORMULA

SiO₂

O₂Si

Molar mass: 60,08 g/mol

PHYSICAL AND CHEMICAL PROPERTIES

Solubility

SOLUBILITY IN WATER

Concentration: < 0,001 g/l

Temperature: 20 °C

Reference: [01211](#)

OCCUPATIONAL HEALTH AND FIRST AID

[Routes of exposure](#) | [Toxic effects](#) |
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ROUTES OF EXPOSURE

Main routes of exposure

The main route of exposure for silica fumes (SF) is via the respiratory tract.[99999]

Respiratory tract

Exposures to SF are particularly possible in metallurgical and other thermal treatment processes in which silicon dioxide modifications (especially quartz) are exposed to very high temperatures. These are almost exclusively respirable dusts with geometric particle diameters of 0.1–1 µm. [07619]

Data on the solubility of these particles, which have mostly amorphous, but sometimes also crystalline structures, are lacking.

However, in-vitro studies indicate that the particles are attacked by alveolar macrophages and can partially be eliminated via the mucociliary clearance pathway.[99983]

Skin

Absorption of SF particles via intact skin and consequential absorptive effects that are harmful to health is very unlikely.[99999]

Gastrointestinal tract

Substance-specific data on the effects of oral substance intake are not available, including from animal experiments.[99983]

Absorption of toxicologically relevant amounts via the gastrointestinal tract is improbable.[99999]

TOXIC EFFECTS

Main toxic effects

Acute effects:

impairment of the lung functions through high exposures

Chronic effects:

weak fibrogenic effect with minor tendency to progression after termination of the exposure [07748]

Acute toxicity

Data on a direct irritant potential of SF on the mucosae of the eyes and the respiratory tract as well as on the skin are lacking.[99983]

The particle size might be too small to trigger a mechanical irritant effect.[99999]

Inhalative exposure to freshly generated SF caused acute reactions in humans, similar to those of metal fume fever (fever, mucosal irritations, general disorders).

In-vitro studies on macrophages from the abdominal area of guinea pigs demonstrated that SF has a cytotoxic potential equivalent to approx. 76% of the cytotoxic potential of quartz.[07748]

Data on the importance of these results with regard to a potential fibrogenic potential of SF on human tissue are lacking.[99983]

Chronic toxicity

Several studies on workers involved in the production of ferrosilicon yielded indications of a weak potential of SF to cause silicosis.[07619]

Continued exposure caused recurrent periods of fever of 3–12 weeks and X-ray findings similar to silicosis. However, the symptoms were less severe and a progressive development was not observed. A threshold concentration value for these symptoms could not be derived.

Overall, assessment of these findings was considered to be complicated, since clear differentiations between exposure to pure amorphous SiO₂ and crystalline portions were not determined in the majority of the studies. In addition, according to the production profile, the dusts were expected to have metal contents of different quality and quantity (1–9%).[07748]

Moreover, multifactorial exposures could not be definitely ruled out in the groups of exposed individuals (for instance, to the original product quartz dust).[07619]

Reproductive toxicity, mutagenicity, carcinogenicity

For classifying the reproductive toxicity and mutagenic and carcinogenic potential see list in Annex VI of the CLP regulation / TRGS 905 / List of MAK values (see section REGULATIONS).

Reproductive toxicity:

There is no reason to fear a risk of damage to the developing embryo or foetus when MAK and BAT values are observed.

[07908]

Mutagenicity:

genotoxic studies on microorganisms and cell cultures yielded almost exclusively negative results.

[07784]

Data pertaining to humans are not available.

Carcinogenic potential:

available substance-specific information is insufficient.[99983]

Biotransformation and excretion

In the case of amorphous SiO₂ modifications the particle size of the dusts deposited in the alveolar area apparently plays a key role for the elimination behaviour. Despite the lower cytotoxic potential larger particles were retained longer than smaller ones; those however, have higher histopathogenic potentials.

With regard to histotoxicity, SF was said to be at a medium level within the different SiO₂ modifications, which was derived from results of animal experiments regarding the organ weights and the collagen level in the lungs.[07619]

Annotation

This occupational health information was compiled on 06.03.1995.

It will be updated if necessary.

This information was translated from German into English by Übersetzungsbüro Branco.

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.

Skin

It is sufficient:
Cleanse the affected skin areas thoroughly with soap under running water.

Respiratory tract

Whilst protecting yourself remove the casualty from the hazardous area and take him to the fresh air.
In case of massive inhalation:
In the case of breathing difficulties have the casualty inhale oxygen.
As soon as possible repeatedly have the casualty deeply breath a glucocorticoid inhalation spray in.
Arrange medical treatment.

Swallowing

Rinse the mouth and spit the fluids out.
If the casualty is conscious have him drink 1 glass of water (ca 200 ml).
Further first aid measures are usually not required.

Information for physicians

- Symptoms of acute (= < one work shift) exposures:
SF causes hardly any injuries of the eyes.
Skin contamination is neither toxic nor irritant.[99999]
Acute inhalation entailed fever, coughing and discomfort, symptoms that clinically corresponded to "metal fume fever, but were possibly only induced by metal components of the SF.[07748]
In general, inhaled SF can cause short-term and reversible reactions of the bronchial lumen and the lung volume.
SF fumes that entered the gastrointestinal tract with the saliva or due to the bronchial flutter clearance only triggers insignificant digestive disorders, if any.[99992]

- Notes on first aid:
Re-rinse affected eye, as required; ensure skin cleansing.
Have the casualty inhale a glucocorticoid after SF inhalation; administration of bronchodilators/expectorants should be considered.
In general, further medical measures are not required.[99999]

Recommendations

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

Annotation

This first aid information was compiled on 06.03.1995.
It will be updated if necessary.
This information was translated from German into English by Übersetzungsbüro Branco.

SAFE HANDLING

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

TECHNICAL MEASURES - HANDLING

Workplace

Provision of good ventilation in the working area.
Washing facility at the workplace required.

Equipment

Use closed apparatus if possible.
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

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.

Cleaning and maintenance

Use protective equipment while cleaning if necessary.
Avoid dust formation. Dust formation that cannot be avoided must be collected regularly.
Use a tested industrial vacuum cleaner or suction device.
Do not raise dust while cleaning.
Use of a blower for cleaning is not permitted.
Only conduct maintenance and other work on or in the vessel or closed spaces after obtaining written permission.

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.
Recommended storage at room temperature.
Store in a dry place.

Conditions of collocated storage

Storage class 10 - 13 (Other liquids and solids)

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.
- Strongly oxidizing substances of storage class 5.1A.

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

- Gases.
 - Flammable liquids of storage class 3.
 - 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.
 - Ammonium nitrate and preparations containing ammonium nitrate.
 - Organic peroxides and self reactive substances.
 - Combustible and non combustible acutely toxic substances of storage classes 6.1A and 6.1B.
- 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 non-combustible. Select fire and explosion prevention measures according to the other used substances.

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.

It must be assured that the workplace limit values are being maintained. If the limit values are exceeded, additional protection measures are necessary.

The measurements must be recorded and kept on file.

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

PERSONAL PROTECTION

Body protection

Depending on the risk, wear a suitable protective clothing or a suitable chemical protection suit.

Respiratory protection

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

Respiratory protection: Particle filter P2, colour code white.

Use insulating device for concentrations above the usage limits for filter devices, for oxygen concentrations below 17% volume, or in circumstances which are unclear.

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

Foods, beverages and other articles of consumption must not be consumed at the work areas.

Suitable areas are to be designated for these purposes.

Avoid inhalation of dust.

Avoid contact with clothing. Contaminated clothes must be exchanged and cleaned carefully.

Provide washrooms with showers and if possible rooms with separate storage for street clothing and work clothing.

The skin must be washed with soap and water before breaks and at the end of work. Apply fatty skin-care products after washing.

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:

Collect in resistant, closed containers.

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

Wear personal protective equipment (see chapter Personal Protection).

Pick up without creating dust.

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

Instructions

Substance is incombustible. Select fire fighting measures according to the surrounding conditions.

REGULATIONS

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

EUROPEAN GHS CLASSIFICATION AND LABELLING

Classification

Specific Target Organ Toxicity (repeated exposure), Category 2; H373



Signal Word "Warning"

Hazard Statement - H-phrases

H373: May cause damage to organs through prolonged or repeated exposure.

----- Route of exposure: Inhalative

Registration entry of the manufacturer on the ECHA website
No P-phrases have been assigned.

GESTIS advice:

The classification depends on the cristobalite fraction:
Respirable cristobalite fraction < 1% w/w --> Not classified
Respirable cristobalite fraction 1% - 10% w/w --> H373
Respirable cristobalite fraction ≥ 10% w/w --> H372

Reference: [07520](#)

State: 2020

Checked: 2020

GHS-CLASSIFICATION OF MIXTURES

The classification of mixtures containing this substance results from Annex 1 of Regulation (EC) 1272/2008.

Reference: [99999](#)

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

Precept label



Use safety goggles

GERMAN WATER HAZARD CLASS

Substance No: 849

non-hazardous to waters

Scope: silicon dioxide

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

Not subject to transport regulations.

Reference: 01211

TRGS 900 - GERMAN OCCUPATIONAL EXPOSURE LIMIT VALUES

0,3 mg/m³

with reference to the respirable fraction

There is no reason to fear a risk of damage to the developing embryo or foetus when AGW and BGW are adhered to.

Source: DFG

Depending on its origin silica can contain quartz. The calcination of silica leads to an increasing fraction of cristobalite. Activated silica can contain up to 60 % (w/w) cristobalite. For the assessment of the exposure to (calcined) silica both the amorphous fraction (limit value for silica and calcined silica respectively) and the sum of the fractions of cristobalite and quartz (carcinogenic according to [TRGS 906](#)) have to be determined and evaluated.

Conditioned by the manufacturing, silica fumes can contain quartz which in addition to the silica fumes must be separately determined and evaluated.

RECOMMENDATIONS OF MAK-COMMISSION

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

0,3 mg/m³

with reference to the respirable fraction

Pregnancy: Group C

There is no reason to fear damage to the embryo or foetus when MAK and BAT values are observed.

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 402](#)

Ermitteln und Beurteilen der Gefährdungen bei Tätigkeiten mit Gefahrstoffen: Inhalative Exposition; Ausgabe September 2023

[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

REGULATIONS OF GERMAN ACCIDENT INSURERS

[DGUV Regel 112-190](#)

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

LINKS

[International Limit Values](#)

[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: 01211

GHS-Sicherheitsdatenblatt, Merck

GHS Material Safety Data Sheet, Merck

Quelle: 05300

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

Quelle: 05350

[TRGS 900](#) "Arbeitsplatzgrenzwerte" Ausgabe Januar 2006, zuletzt geändert und ergänzt Juni 2023

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: 07619

DFG Deutsche Forschungsgemeinschaft: The MAK-Collection for Occupational Health and Safety, nach Veröffentlichungsdatum zu finden unter:

bis 2002 Verlag Chemie

ab 2002 Online: <http://onlinelibrary.wiley.com/book/10.1002/3527600418/topics?filter=#>

ab 2020 Online:

<https://series.publisso.de/en/pgseries/overview/mak/dam/allContents/alphabetical>

Quelle: 07748

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

Quelle: 07784

M.L. Richardson, S. Gangolli "The Dictionary of Substances and their Effects" Royal Society of Chemistry, 1992

Quelle: 07908

DFG: MAK- und BAT-Werte-Liste der jeweils gültigen Fassung

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: 99992

Projektgebundene Literatur zur Ersten Hilfe

(Project related bibliographical references regarding first aid)

Quelle: 99999

Angabe des Bearbeiters

Indication of the editor

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