



Disodium dihydrogen ethylenediaminetetraacetate



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IDENTIFICATION

Disodium dihydrogen ethylenediaminetetraacetate

EDTA, disodium salt

(Ethylenedinitrilo)tetraacetic acid, disodium salt

ZVG No:	13030	
CAS No:	139-33-3	anhydrous
EC No:	205-358-3	

Related		
CAS No:	6381-92-6	dihydrate

CHARACTERISATION

SUBSTANCE GROUP CODE

122200	Sodium compounds
143801	Carboxylic acid salts, substituted
144200	Amino compounds

STATE OF AGGREGATION

The substance is solid.

PROPERTIES

powder
white
characteristic odour

CHEMICAL CHARACTERISATION

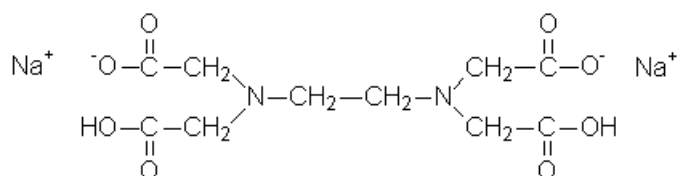
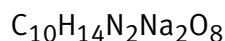
Combustible substance, poorly flammable.
Freely soluble in water.
Sensitive to moisture.
Acute or chronic health hazards result from the substance.
The substance is hazardous to the aquatic environment.
(see: chapter REGULATIONS).

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: [01271](#)

FORMULA

Molar mass: 336,21 g/mol

PHYSICAL AND CHEMICAL PROPERTIES

[Melting point](#) | [Density](#) | [Solubility](#) | [pH-value](#) | [Hazardous reactions](#)

MELTING POINT

The substance decomposes when heated (see decomposition temperature).

Reference: [99999](#)

DENSITY

DENSITY

Value: 1,77 g/cm³

Temperature: 20 °C

Reference: [07520](#)

SOLUBILITY IN WATER

Concentration: ca. 100 g/l

Temperature: 20 °C

Reference: [01221](#)

pH-VALUE

pH-value: 4,0 ... 5,5

Temperature: 23 °C

Concentration: 10 g/l

Reference: [01221](#)

HAZARDOUS REACTIONS

Decomposition temperature: 252 °C

TOXICOLOGY / ECOTOXICOLOGY**TOXICOLOGICAL DATA****LD50 oral rat**

Value: 2000 mg/kg

Federation Proceedings, Federation of American Societies for Experimental Biology. Vol. 27, Pg. 465, 1968.

Reference: 02071

OCCUPATIONAL HEALTH AND FIRST AID

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

ROUTES OF EXPOSURE**Main routes of exposure**

In the workplace, inhalation of aerosols is the only significant intake pathway by which the disodium salt of ethylenediaminetetraacetic acid (Na₂EDTA) is expected to enter the body. [7619, 99996]

Respiratory tract

Na₂EDTA can be inhaled as dust or during spray-application of solutions as droplet aerosol. [7619, 2050]

The release of vapors containing EDTA during the handling of aqueous formulations is negligible because the EDTA available in the dissociation equilibrium does not have any significant vapor pressure. [2050, 99999]

No experimental data is available on the kinetics of uptake in the respiratory tract. [99983]

Information available for free EDTA and for the tetrasodium salt of EDTA indicates that the proportion of inhalable particles during exposure to dust should be very low. Fine aerosol droplets are much more likely to reach the deeper respiratory tract during exposure to aerosols from solutions. [2050, 7619]

Skin

Only very small proportions were absorbed through the skin in studies on volunteers with the EDTA calcium disodium salt and an EDTA sodium salt (max. 0.001% following application over a large area). Only minimal absorption would therefore also be expected for Na₂EDTA. [2050, 7619]

Gastrointestinal tract

Only about 5% was absorbed following oral intake of the EDTA calcium disodium salt by volunteers [2050, 7619]. The absorption of NaEDTA in animal experiments was similarly low. [99996] As the degree of dissociation and the extent to which EDTA alkali salts form complexes is determined by the physiological pH in the gastrointestinal tract, a low absorption rate is expected for all of these salts. [7619]

TOXIC EFFECTS**Main toxic effects**

Acute:

No significant potential to irritate, [7922]

respiratory reactions for persons with disposition; [2050]

at high levels of bioavailability: disturbance to general well being, effects resulting from calcium depletion [7714, 8088]

Chronic:

Interference with the metal metabolism;

kidney damage at very high levels of bioavailability [7922, 99996]

Acute toxicity

Na₂EDTA is well tolerated by the skin and mucous membranes based on results of animal experiments. The substance proved not to be irritating either to the eyes or to the skin of rabbits. [7922]

Tests on the potential of EDTA to sensitize the skin have been carried out on guinea pigs using Na₂EDTA (Maximization Test according to OECD Guideline 406) and the trisodium salt of EDTA (Repeated Insult Patch Test). The results indicate either no or at least only a very weak potential to sensitize. [7619]

Isolated cases of allergic skin reactions to EDTA/its alkali salts have been described for humans (see "Chronic toxicity"). [7619, 99996]

Acute toxic effects following skin contact with EDTA/EDTA sodium salts are not expected. [2050]

For the inhalative toxicity a screening test on rats is available. The rats were exposed for 8 hours to an atmosphere enriched with Na₂EDTA dust at 20°C. All the animals survived the exposure. [7922]

Indications that persons predisposed can suffer respiratory reactions were found in experiments carried out with aerosols from EDTA solutions. 6 of 22 asthmatics who inhaled a mist from an EDTA solution (0.25 - 10 g/l) suffered a bronchoconstriction (for > 1 h). [7619] Obstruction in the airways was able to be stimulated also in tests using a mist from a Na₂EDTA solution on dogs having pre-existing hyperactivity in the airways. The investigators suspected that the reaction was caused by chelate formation of EDTA with calcium ions in the respiratory tract. [2050]

The oral toxicity in animal experiments was low. The LD₅₀ values determined for rats, mice and rabbits were between 2000 and 2800 mg/kg bw. The animals showed gastrointestinal disturbances (including diarrhea) and symptoms in the CNS. [7922]

Indications of the systemic effects caused by EDTA and its alkali salts were seen during the intravenous, therapeutic use of the EDTA calcium disodium salt as a chelating agent, mainly for the purpose to remove heavy metals from the body (usual initial dose 15 - 20 mg/kg bw as a solution within 2 hours). Side effects reported in particular for dosages which were massive, too rapidly administered or too high were flu-like complaints (muscle and head pains, nausea, chills, fever, disorders of micturition), serious neuromuscular disturbances (hypocalcemic tetany caused by the drop in the serum level of ionized calcium), kidney damage (see "Chronic toxicity") and in isolated cases cardiac effects (repolarization disturbances or ventricular fibrillation). [7922, 7906]

Although the effects caused by Na₂EDTA are assumed to be stronger than those caused by the EDTA calcium disodium salt, [99996] these effects are not considered to be relevant in the context of the very limited possibilities of intake in the workplace. [7619]

Chronic toxicity

No adverse respiratory reactions or other complaints have been reported following exposure to EDTA or to its tetrasodium salt in four factories producing or processing EDTA (no detailed information available). [7619]

No workplace studies are available for Na₂EDTA, [99983] frequently used in cosmetic formulations. [99996]

There have been isolated cases of persons who showed allergic skin reactions following external application of medical or cosmetic formulations containing EDTA (eczema, dermatitis, periorbital edema, also conjunctivitis) and who showed positive reactions to EDTA or sodium salts of EDTA in patch tests. Isolated cases of allergic reactions in the workplace have also been seen following contact with preparations containing EDTA. [7619, 2050, 7714, 99996]

In studies on large groups of unselected skin patients, very few of those tested reacted positively to EDTA (0.4% - 2.8%). In some cases there were simultaneous positive reactions to ethylene diamine (which has been proven to have a sensitizing effect). A cross reactivity between the two substances is possible but has not definitely been demonstrated. [2050, 7619]

Animal experiments were carried out to determine the systemic toxicity of EDTA and its alkali salts, in particular using the trisodium salt of EDTA and Na₂EDTA. The results can be applied to all EDTA alkali salts because the degree of dissociation and the capability to form complexes are only determined by the physiological pH and are independent of which alkali salt it is.

The lowest NOAEL found in a 2-year study on rats and mice which received the trisodium salt of EDTA orally was approx. 500 mg/kg bw x d. [2050] In subchronic studies with Na₂EDTA on rats, doses from approx. 1000 mg/kg bw x d upwards caused diarrhea, loss of weight and influenced clinical-chemical parameters. [7619]

EDTA can be taken in outside the workplace via drinking water and food. The depletion of essential metals in the organism, in particular zinc, is considered to be the critical effect of excessive intake. This effect can be caused by bioavailable EDTA but also by the direct formation of EDTA complexes with metals contained in food. [99996, 7922]

For the application of the EDTA calcium disodium salt as food additive, daily doses of 2.5 mg/kg bw (corresponding to 1.9 mg/kg bw based on free EDTA) are considered as tolerable lifelong. [99996]

The only indications of a damaging effect to the kidneys are from the use of the EDTA calcium disodium salt in chelation therapy. In some cases kidney function disturbances through to serious, sometimes fatal kidney damage (tubular necrosis) developed following repeated intravenous administration (mostly overdose). [7922]

It is not possible for such high doses to become bioavailable in the workplace under the usual conditions encountered during handling. [2050, 7619]

Reproductive toxicity, mutagenicity, carcinogenicity

Reproductive toxicity:

EDTA and its alkali salts including Na₂EDTA did not show any effects in tests on the developmental toxicity when they were administered in doses up to 1000 mg/kg bw x d. At 1250 mg/kg bw x d there were embryotoxic and also teratogenic effects which were attributed to a depletion of zinc levels in fetes.

No influence on fertility could be found in a multi-generation study with doses up to 250 mg CaNa₂EDTA /kg bw x d. Indications of a reduction in fertility were seen at very high doses of Na₂EDTA (3000 mg/kg bw x d). [2050, 7619]

Mutagenicity:

Numerous tests carried out with EDTA and its alkali salts provided no valid indication of any genotoxic effect. Damage to chromosomes (aneugenic effect) was found in isolated tests at very high doses and was attributed to a chelating effect. [7619]

Carcinogenicity:

Oral carcinogenicity studies carried out with the EDTA trisodium salt on rats and mice provided negative results (doses corresponded to 400 or 760 mg EDTA/kg bw x d)..

Na₂EDTA is not suspected of causing any carcinogenic effects. [7619, 2050]

Biotransformation and excretion

The kinetic behavior of bioavailable EDTA released from its sodium salts is no different from that following uptake of EDTA as a free acid. [2050, 7619]

Kinetic studies carried out with ¹⁴C labeled EDTA on volunteers using different intake pathways (i.v., i.m., s.c., oral) showed that the substance is distributed almost completely within the bodily fluids. [7714] Investigations of the spinal liquids showed that very little passes the blood-liquor barrier. [7922]

Metabolic transformation does not take place. Elimination is almost entirely with the urine as calcium chelate and a large part is excreted within the first hours. [7714] The elimination is effectively completed within 24 hours and only small amounts remain in the kidney tissue (as zinc chelate). [7922]

The most important interaction of EDTA with biological systems is its capability to form stable metal chelates. The active part which forms complexes is the fully dissociated EDTA anion for which the concentration increases with increasing pH in aqueous solutions.

The formation of complexes is used in chelation therapy to bind heavy metals and remove them from the body. The main acute side effects are attributed to the blocking of calcium in the serum [7714] and effects following long-term application can be caused by the depletion of essential metals (particularly zinc). [7922] The damage to the tubules in the kidneys is attributed to the breakdown of collages in this area. [7714]

Annotation

This occupational health information was compiled on 13.11.2012.
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.

[2001]

Skin

Remove contaminated clothing while protecting yourself.

Rinse the affected skin areas for at least 10 to 20 minutes under running water.

For irritation:

Arrange for medical treatment.

[454]

Respiratory tract

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

Following massive inhalation/if there are respiratory complaints:

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.

[2001, 454]

Swallowing

Rinse the mouth and spit the fluids out.

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

Arrange medical treatment.

During spontaneous vomiting hold the head of the casualty low with the body in a prone position in order to avoid aspiration. [2001, 22]

Information for physicians

As for free EDTA, its sodium salts have a low systemic toxicity. The effects are known from the (seldom seen) side effects caused during intravenous application of the EDTA calcium disodium salt as a chelation therapy (to remove heavy metals from the body). [7922, 7619] The local effects of the EDTA disodium salt are also very low. The first aid information makes use of information available for EDTA. [99999]

- Symptoms of acute poisoning:

Eyes: no or mild irritation [7922]

Skin: no primary irritation, allergic reactions possible but occur seldom; absorptive effects not expected [7922, 2050]

Inhalation: following massive inhalation non-specific irritation of the upper airways possible, [2001] for persons predisposed (asthmatics), obstructions of the airways (caused by fine aerosols, possibly already at low concentrations) [7619]

Ingestion: gastrointestinal complaints (at high doses diarrhea, possibly changes of intestinal mucosa); absorptive effects only following very high doses [2050, 8088]

Absorption: If a high amount of EDTA becomes bioavailable there could be symptoms such as nausea, dizziness, myalgia, headache, fever, disorders of micturition, possibly cardiovascular response, in extreme cases strong neuromuscular disturbances resulting from a rapid drop in the serum calcium level (hypocalcemic tetany) or -after a latency period- kidney damage (proximal tubules with early symptoms of alpha-aminoaciduria, pathological bladder sediment, albuminuria), more likely to occur for persons who had already suffered kidney diseases. [7922, 7714, 8088]

- Medical advice:

Following contact with the eyes, thorough rinsing with water/physiological salt solution, then consult an ophthalmologist as a precaution. [454]

Clean affected skin areas thoroughly. Further treatment should not be necessary. If irritation is visible, skin can be treated with a dermatocorticoid foam spray. [99999]

Following inhalation of dusts/aerosols from solutions apply fresh air generously. If there are respiratory disturbances have the casualty inhale oxygen. For airway obstruction apply bronchodilators. In extreme cases, application of glucocorticoids and further measures for pulmonary edema as also prophylaxis for pneumonia could become necessary. [454]

If the salt or its solutions have been swallowed, administer water.

If very high doses of concentrated preparation have been swallowed, an immediate gastrolavage (under endoscopic visual control) is worthy of consideration. [99999]

To promote excretion via the kidneys, a controlled supply of liquids or forced diuresis are recommended.

Do not treat systemic effects excessively because the complaints are expected to disappear of their own accord. [8088]

If there is hemorrhagic diathesis or if tetanus-like cramps appear in extreme cases, the administration of calcium gluconate could become necessary. [454, 8088] Take particular care if cortisone or pharmaceuticals with a nephrotoxic effect are being used.

Even if there are no complaints, the casualty should be hospitalized at least for a short period to enable the kidney and heart-circulatory function, the water and electrolyte balance and the hemogram to be checked. If necessary, carry out careful substitution of biometals which have been removed from the body. Possibly endoscopic inspection of the mucous membranes. [8088]

Recommendations

Provide the physician information about the substance/product and treatment already administered. [99999]

Annotation

This first aid information was compiled on 13.11.2012.
It will be updated if necessary.

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.

The floor should not have a floor drain.

Washing facility at the workplace 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.

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 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.

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 marked clearly and permanently.

Keep container tightly closed.

Keep container tightly closed.

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 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

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).

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.

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

PERSONAL PROTECTION

Body protection

Wear an apron or a lab coat.

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 P2, colour code white.

Eye protection

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.

The following materials are suitable for protective gloves:

Natural rubber/Natural latex - NR

Polychloroprene - CR

Polyvinyl chloride - PVC

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.

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:

Do not put/place waste into sink or dust bin.

Collect in container for solid organic residues.

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 water:

Distinct hazard to waters. Prevent penetration into water, drainage, sewer, or the ground. Inform the responsible authorities about penetration of larger quantities.

FIRE FIGHTING MEASURES

Classes of fires

B liquid or melting
substances

Suitable extinguishing media

Water (spray - not splash)

Dry extinguishing powder

Foam

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.

Do not allow runoff to get into the sewage system.

Special protective equipment

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

Nitrous gases (nitric oxides)

Carbon monoxide and carbon dioxide

Wear self-contained breathing apparatus and special tightly sealed suit.

REGULATIONS

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

EUROPEAN GHS CLASSIFICATION AND LABELLING

Classification

Acute toxicity, Category 4, inhalation; H332

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



Signal Word "Warning"

Hazard Statement - H-phrases

H332: Harmful if inhaled.

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

----- Affected organs: respiratory system

----- Route of exposure: Inhalative

Precautionary Statement - P-phrases

P260: Do not breathe dust/fume/gas/mist/vapours/spray.

P271: Use only outdoors or in a well-ventilated area.

P304+P340+P312: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

P314: Get medical advice/attention if you feel unwell.

P501: Dispose of contents/ container to an approved waste disposal plant.

Manufacturer's specification by Sigma-Aldrich

Reference: [01221](#)

State: 2022

Checked: 2022

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: 104

WGK 2 - distinct hazard 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

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: [01221](#)

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

[OECD Screening Information DataSet \(SIDS\)](#)

[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: 00022

G. Hommel

"Handbuch der gefährlichen Güter" Loseblattsammlung mit Ergänzungslieferungen

"Handbook of dangerous goods " loose-leaf collection with supplement deliveries

Springer-Verlag, Heidelberg

Quelle: 00454

Hazardous Substances Data Bank (HSDB)

Quelle: 01221

GHS-Sicherheitsdatenblatt, Sigma-Aldrich

GHS Material Safety Data Sheet, Sigma-Aldrich

Quelle: 01271

GHS-Sicherheitsdatenblatt, BASF

GHS Material Safety Data Sheet, BASF

Quelle: 02001

International Chemical Safety Cards (ICSC)

Quelle: 02050

European Union "Risk Assessment Report" European Chemicals Bureau

Quelle: 02071

Toxicological Data, compiled by the National Institute of Health (NIH), USA, selected and distributed by Technical Database Services (TDS), New York, 2009

Quelle: 05300

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

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: 07714

H. P. Fiedler "Lexikon der Hilfsstoffe für Pharmazie, Kosmetik und angrenzende Gebiete" 3. überarbeitete und ergänzte Auflage

Quelle: 07906

G. Heinemeyer, U. Fabian (Hrsg.) "Der Vergiftungs- und Drogennotfall. Allgemeine und spezielle Maßnahmen im ärztlichen Not- und Rettungsdienst" 3. Auflage, Ullstein Mosby, Berlin/Wiesbaden 1997

Quelle: 07922

BUA Stoffbericht 168: Ethylendiamintetraessigsäure / Tetranatriumethylendiamintetraacetat, 05/95

Quelle: 08088

Reinhard Ludewig, Ralf Regenthal "Akute Vergiftungen und Arzneimittelüberdosierungen" 10. Auflage, Wissenschaftliche Verlagsgesellschaft Stuttgart, 2007

Quelle: 99983

Liste arbeitsmedizinisch-toxikologischer Standardwerke (2)

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

Quelle: 99996

Projektgebundene arbeitsmedizinisch-toxikologische Literatur (2)

Project related bibliographical references regarding occupational health and toxicology (2)

Quelle: 99999

Angabe des Bearbeiters

Indication of the editor

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