IFA
Institut für Arbeitsschutz der
Deutschen Gesetzlichen Unfallversicherung

GESTIS Substance Database

Glycerol

IDENTIFICATION

Glycerol
Glycerine
Glycerene
Glyceritol
Glycylalcohol
Propane-1,2,3-triol
1,2,3-Propanetriol
Trihydroxypropane
Glycerin synthetic

ZVG number: 11980
CAS number: 56-81-5
EC number: 200-289-5

CHARACTERISATION

SUBSTANCE GROUP CODE
142200 Alcohols

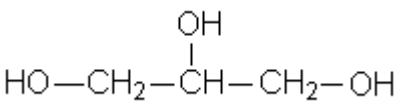
STATE OF AGGREGATION
The substance is liquid.

PROPERTIES
Form: oily fluid
Colour: colourless
Odour: nearly odourless

CHEMICAL CHARACTERISATION
Combustible liquid.
Mixable with water.
Hygroscopic.

FORMULA

$C_3H_8O_3$



Molar mass: 92,09 g/mol
Conversion factor at 1013 mbar / 20 °C:

1 ml/m³ = 3,83 mg/m³

TOXICOLOGY / ECOTOXICOLOGY

TOXICOLOGICAL DATA

LD50 oral rat

Value: 12600 mg/kg

Reference: Federation Proceedings, Federation of American Societies for Experimental Biology. Vol. 4, Pg. 142, 1945.

LD50 dermal

Species: Rabbit

Value: > 10000 mg/kg

Reference: BIOFAX Industrial Bio-Test Laboratories, Inc., Data Sheets. Vol. 9-4/1970,

Source: 02071

ECOTOXICOLOGICAL DATA

LC50 Fish (96 hours)

Minimum: 68100 mg/l

Maximum: 68100 mg/l

Median: 68100 mg/l

Study number: 1

Reference: Mayer, F.L.Jr., and M.R. Ellersieck 1986. Manual of Acute Toxicity: Interpretation and Data Base for 410 Chemicals and 66 Species of Freshwater Animals. Resour.Publ.No.160, U.S.Dep.Interior, Fish Wildl.Serv., Washington, DC :505 p. (USGS Data File)

Source: 02072

PHYSICAL AND CHEMICAL PROPERTIES

MELTING POINT

Melting point: 18 °C

BOILING POINT

The substance decomposes when heated (see decomposition temperature).

DENSITY

DENSITY

Value: 1,26 g/cm³

at room temperature

RELATIVE VAPOUR DENSITY

Ratio of the density to dry air at the same temperature and pressure

Value: 3,17

RELATIVE DENSITY OF THE VAPOUR-AIR-MIXTURE

Ratio of the density to dry air at 20 °C and standard p ressure

Value: 1,00

VAPOUR PRESSURE

Vapour pressure:	0,00121 mbar
Temperature:	40 °C
Vapour pressure:	0,00337 mbar
Temperature:	50 °C

FLASH POINT

Flash point:	191 °C

Closed cup

IGNITION TEMPERATURE

Ignition temperature:	400 °C

DIN 51794

Temperature class:	T2

EXPLOSION LIMITS

Lower explosion limit:
2,6 vol. %
99 g/m³
Upper explosion limit:
11,3 vol. %
435 g/m³

SOLUBILITY IN WATER

entirely mixable

pH-VALUE

pH-value:	ca. 5
Temperature:	20 °C
Concentration:	100 g/l

PARTITION COEFFICIENT (octanol/water)

log Kow:	-1,76

Recommended value of LOG KOW Databank.

VISCOSITY

Dynamic Viscosity:	1412 mPa*s
Kinematic Viscosity:	1120 mm2/s
Temperature:	20 °C

Conversion: Viscosity(kin) = Viscosity(dyn) / density

HAZARDOUS REACTIONS

Decomposition temperature: 290 °C

Decompositon products:
Irritant vapours and gases.
In the reaction with strong dehydrating substances and at elevated temperatures poisonous acrolein will be generated.

Hazardous chemical reactions:

Risk of explosion in contact with:
chlorine
strong oxidizing agents
hydrogen peroxide
halogens; peroxy compounds; perchloric acid/lead oxide; perchlorates; nitriles; perchloryl nitrile; nitric acid/conc. sulphuric acid

The substance can react dangerously with:
aniline/nitrocompounds; calcium hypochlorite; chromium trioxide; acetic anhydride + phosphorous oxychloride; fluorine/ lead dioxide; potassium permanganate; halogen oxides; hydrides; phosphorus pentoxide/heat; phosphorous triiodide

FURTHER INFORMATION

Conductivity : ca. 0,6 * 10 Exp -05 S/m
Temperature : 25 Grad C

OCCUPATIONAL HEALTH AND FIRST AID

TOXIC EFFECTS

Annotation:

At present time the occupational health information for this substance is only available in german. Please consult our database in german.

FIRST AID

Annotation:

At present time the first aid information for this substance is only available in German. Please consult our database in German.

HANDLING AND USAGE

USAGE

The substance is used as:
- solvent
- thermal liquid and cooling liquid (only small amounts)
- plasticizing agent for caoutchouc products
- brightening agent and conserving agent for microscope preparations
- antifogging agents and antifreezing agents

The substance is used for the production of:
- plastics, colorants, pharmaceutical products, lubricants and sealing agents

The substance is used for:
- extracting flower scents

The substance is used in:
- the food industry as wetting agent or stabilizing agent

TECHNICAL MEASURES - HANDLING

Workplace:

Select ventilation measures according to the other used substances.
If there is a chance that aerosols may be released, then the work room must provide adequate ventilation.
The floor must be solvent resistant.
Washing facility at the workplace required.

Equipment:
Exhaust especially required at higher temperatures.
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.
Use solvent resistant utensils.

TECHNICAL MEASURES - STORAGE

Storage:
Do not use any food containers - risk of mistake.
Keep container tightly closed.
Recommended storage at room temperature.
Store in a dry place.
Protect from overheating/heating up.

Conditions of collocated storage:
Storage class 10 (Combustible liquids as far as not in storage class 3)
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.
- 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):
- Other explosive substances of storage class 4.1A.
- Spontaneously flammable 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.

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.

Precaution on handling:
Keep away from open flames.
Keep away from hot surfaces.
Welding only under supervision.

PERSONAL PROTECTION

Body protection:
Wear an apron or a lab coat.

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: Gas filter A, Colour code brown.
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:
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 (Permeation time >= 8 hours):
Natural rubber/Natural latex - NR (0,5 mm) (use non-powdered and allergen free products)
Polychloroprene - CR (0,5 mm)
Nitrile rubber/Nitrile latex - NBR (0,35 mm)
Butyl rubber - Butyl (0,5 mm)
Fluoro carbon rubber - FKM (0,4 mm)
Polyvinyl chloride - PVC (0,5 mm)

The times listed are suggested by measurements taken at 22 °C and constant contact. Temperatures raised by warmed substances, body heat, etc. and a weakening of the effective layer thickness caused by expansion can lead to a significantly shorter breakthrough time. In case of doubt contact the gloves' manufacturer. A 1.5-times increase / decrease in the layer thickness doubles / halves the breakthrough time. This data only applies to the pure substance. Transferred to mixtures of substances, these figures should only be taken as an aid to orientation.

Industrial hygiene:
Take heed of usual occupational hygiene measures when handling chemical substances, espacially 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 vapour or mist.

DISPOSAL CONSIDERATIONS

Non-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:
Place in a collection container for halogen-free organic solvents and solutions of halogen-free organic substances.
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

Absorb any spilt liquid with an absorbent (e.g. diatomite, vermiculite, sand) and dispose of according to regulations.
Pump off larger quantities.
Afterwards ventilate area and wash spill site.
Dilute small amounts with water and flush.

Endangerment of watert:
Low hazard to waters. Inform the responsible authorities when very large quantities get into water, drainage, sewer, or the ground.

FIRE FIGHTING MEASURES

Suitable extinguishing media:
Water (spray - not splash)
Dry extinguishing powder
Carbon dioxide
Fight large fire with alcohol resistant foam or water spray.

Instructions:
Cool surrounding containers with water spray.
If possible, take container out of dangerous zone.
Shut off sources of ignition.

Special protective equipment:
Attention! Hazardous decomposition products may occur.
Wear self-contained breathing apparatus.

REGULATIONS

Not a dangerous substance according to GHS.
Manufacturer's specification by Merck
Source: 01211

GERMAN WATER HAZARD CLASS

Substance No: 116
WGK 1 - low hazard to waters
Classification according to the Administrative Regulation of Substances Hazardous to Water (VwVwS)

TECHNICAL INSTRUCTIONS ON AIR QUALITY CONTROL (TA LUFT)

Chapter 5.2.5 Organic Substances, except dusts.
The following values, specified as overall carbon, are in all not allowed to be exceeded in exhaust gas:
Mass flow: 0,50 kg/hr
or
Mass concentration: 50 mg/m³
At old units with an annual mass flow till 1,5 Mg/a, specified as total carbon, the emissions in exhaust gas are not allowed to exceed 1,5 kg/h.

TRANSPORT REGULATIONS

Not subject to transport regulations.

RECOMMENDATIONS OF MAK-COMMISSION

This data is recommended by scientific experience and is not established law.
50 mg/m³
with reference to the inhalable fraction
Limitation of exposure peaks:
Excursion factor 2
Duration 15 min, mean; 4 times per shift; interval 1 hour
Pregnancy: Group C
There is no reason to fear a risk of damage to the developing embryo or foetus when MAK and BAT values are adhered to.
Source: 08097

FURTHER REGULATIONS

TRGS 500
Schutzmaßnahmen; Ausgabe Januar 2008, ergänzt Mai 2008

TRGS 510
Lagerung von Gefahrstoffen in ortsbeweglichen Behältern; Ausgabe Oktober 2010