

## SECTION 1: Identification

### 1.1 GHS Product identifier

**Product name** Heptadecafluorooctane-1-sulphonic acid

### 1.2 Other means of identification

**Product number** -

**Other names** 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-Heptadecafluorooctane-1-sulfonic acid; Heptadecafluorooctanesulfonic acid; 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctane-1-sulfonic acid

### 1.3 Recommended use of the chemical and restrictions on use

**Identified uses** Industrial and scientific research uses.

**Uses advised against** no data available

## SECTION 2: Hazard identification

### 2.1 Classification of the substance or mixture

Acute toxicity - Category 4, Oral

Acute toxicity - Category 4, Inhalation

Carcinogenicity, Category 2

Reproductive toxicity, Additional category for effects on or via lactation

Specific target organ toxicity "repeated exposure, Category 1

Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 2

Reproductive toxicity, Category 1B

### 2.2 GHS label elements, including precautionary statements

**Pictogram(s)**



**Signal word**

Danger

**Hazard statement(s)**

H302 Harmful if swallowed

H332 Harmful if inhaled

H351 Suspected of causing cancer

H362 May cause harm to breast-fed children

H372 Causes damage to organs through prolonged or repeated exposure

H411 Toxic to aquatic life with long lasting effects

**Precautionary statement(s)**

**Prevention**

P264 Wash ... thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

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

P203 Obtain, read and follow all safety instructions before use.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...

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

P263 Avoid contact during pregnancy and while nursing.

P273 Avoid release to the environment.

**Response**

P301+P317 IF SWALLOWED: Get medical help.

P330 Rinse mouth.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P317 Get medical help.

P318 IF exposed or concerned, get medical advice.

P319 Get medical help if you feel unwell.

P391 Collect spillage.

**Storage**

P405 Store locked up.

**Disposal**

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

### 2.3 Other hazards which do not result in classification

no data available

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
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Heptadecafluorooctane-1-sulphonic acid	Heptadecafluorooctane-1-sulphonic acid	1763-23-1	217-179-8	100%
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## SECTION 4: First-aid measures

### 4.1 Description of necessary first-aid measures

#### If inhaled

Move the victim into fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration and consult a doctor immediately. Do not use mouth to mouth resuscitation if the victim ingested or inhaled the chemical.

#### Following skin contact

Take off contaminated clothing immediately. Wash off with soap and plenty of water. Consult a doctor.

#### Following eye contact

Rinse with pure water for at least 15 minutes. Consult a doctor.

#### Following ingestion

Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control Center immediately.

### 4.2 Most important symptoms/effects, acute and delayed

no data available

### 4.3 Indication of immediate medical attention and special treatment needed, if necessary

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR if necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on the left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. Poisons A and B

## SECTION 5: Fire-fighting measures

### 5.1 Suitable extinguishing media

Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

### 5.2 Specific hazards arising from the chemical

no data available

### 5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing mist, gas or vapours. Avoid contacting with skin and eye. Use personal protective equipment. Wear chemical impermeable gloves. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

### 6.2 Environmental precautions

Prevent further spillage or leakage if it is safe to do so. Do not let the chemical enter drains. Discharge into the environment must be avoided.

### 6.3 Methods and materials for containment and cleaning up

ACCIDENTAL RELEASE MEASURES: Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas; Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided; Methods and materials for containment and cleaning up: Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

### 7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

## SECTION 8: Exposure controls/personal protection

## 8.1 Control parameters

### Occupational Exposure limit values

Component	Heptadecafluorooctane-1-sulphonic acid			
CAS No.	1763-23-1			
	Limit value - Eight hours		Limit value - Short term	
	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Germany (AGS)		0,01 inhalable aerosol		0,08 inhalable aerosol (1)
Germany (DFG)		0,01 inhalable aerosol		0,08 inhalable aerosol (1)
Sweden	200	900	300 (1)	1400 (1)
Switzerland		0,01 inhalable aerosol		0,08 inhalable aerosol
	Remarks			
Germany (AGS)	(1) 15 minutes average value			
Germany (DFG)	(1) 15 minutes average value			
Sweden	(1) Short-term value, 15 minutes average value			

### Biological limit values

no data available

## 8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

## 8.3 Individual protection measures, such as personal protective equipment (PPE)

### Eye/face protection

Wear tightly fitting safety goggles with side-shields conforming to EN 166(EU) or NIOSH (US).

### Skin protection

Wear fire/flame resistant and impervious clothing. Handle with gloves. Gloves must be inspected prior to use. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

### Respiratory protection

If the exposure limits are exceeded, irritation or other symptoms are experienced, use a full-face respirator.

### Thermal hazards

no data available

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## SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Solid
Colour	Liquid
Odour	no data available
Melting point/freezing point	90Â°C
Boiling point or initial boiling point and boiling range	260Â°C
Flammability	no data available
Lower and upper explosion limit/flammability limit	Lower flammable limit: 6% by volume; Upper flammable limit: 36% by volume
Flash point	11Â°C
Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	In water, 3.2X10-3 mg/L at 25 deg C (est)
Partition coefficient n-octanol/water	log Kow = 4.49 (est)
Vapour pressure	2.0X10-3 mm Hg at 25 deg C /estimated by extrapolation of the boiling pt and two reduced pressure boiling pts (6 mm Hg at 133 deg C and 10 mm Hg at 145 deg C) via Antoine method fit/
Density and/or relative density	1.837 g/cm3
Relative vapour density	no data available
Particle characteristics	no data available

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## SECTION 10: Stability and reactivity

### 10.1 Reactivity

no data available

## 10.2 Chemical stability

Stable under recommended storage conditions.

## 10.3 Possibility of hazardous reactions

no data available

## 10.4 Conditions to avoid

no data available

## 10.5 Incompatible materials

Incompatible materials: Strong oxidizing agents

## 10.6 Hazardous decomposition products

When heated to decomposition it emits toxic vapors of /sulfur oxides/ and /fluorine/.

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# SECTION 11: Toxicological information

### Acute toxicity

- Oral: LD50 Rat oral 251 mg/kg
- Inhalation: no data available
- Dermal: no data available

### Skin corrosion/irritation

no data available

### Serious eye damage/irritation

no data available

### Respiratory or skin sensitization

no data available

### Germ cell mutagenicity

no data available

### Carcinogenicity

no data available

### Reproductive toxicity

no data available

### STOT-single exposure

no data available

### STOT-repeated exposure

no data available

### Aspiration hazard

no data available

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# SECTION 12: Ecological information

## 12.1 Toxicity

- Toxicity to fish: LC50; Species: Pimephales promelas (Fathead minnow); Conditions: static; Concentration: 9.5 mg/L for 96 hr /Perfluorooctane sulfonate, potassium salt
- Toxicity to daphnia and other aquatic invertebrates: LC50; Species: Daphnia magna (Water Flea) age <24 hr neonate; Conditions: freshwater, renewal, 25 deg C; Concentration: 76820 ug/L for 24 hr (95% confidence interval: 62090-91560 ug/L) /formulation
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

## 12.2 Persistence and degradability

AEROBIC: Perfluorooctane sulfonic acid is resistant to biodegradation(1) and does not biodegrade under typical environmental conditions(2). Perfluorooctane sulfonic acid, present at 100 mg/L, reached 0% of its theoretical BOD in 4 weeks using an activated sludge inoculum at 30 mg/L in the Japanese MITI test(3). Using an activated sludge inoculum and the manometric respirometry test, perfluorooctane sulfonic acid, present at 100 mg/L in 250 mL of inoculated medium as nominal source of organic carbon and stirred in a closed flask at 22 deg C for up to 28 days, obtained 0% of its theoretical BOD in four weeks(4). Perfluorooctane sulfonic acid was not degraded from an initial concentration of 5 mg/L in aerobic sewage sludge in a laboratory reactor over a 20-week period(1,5).

## 12.3 Bioaccumulative potential

A BCF range of 200-1500 was measured in fish for the potassium salt of perfluorooctane sulfonic acid using carp (Cyprinus carpio)

which were exposed over a 58-day period at concentrations of 2 and 20 ug/L(1). Using bluegill sunfish (*Lepomis macrochirus*) exposed to 86 ug/L of the potassium salt of perfluorooctane sulfonic acid for a 62-day period in a flow-through test, BCF values of 484 and 856 were determined for the edible and whole tissue respectively(2). According to a classification scheme(3), these BCF values suggest the potential for bioconcentration in aquatic organisms is high to very high(SRC). Blackrock fish (*Sebastes schlegeli*) exposed to the potassium salt of perfluorooctane sulfonic acid for 28 days had serum and liver BCF values of 4714-6687 and 950-1475 respectively(4). Field-based BCF values of 830-26000 (whole body) were derived for catfish and largemouth bass collected from the Tennessee River in Alabama, whereas laboratory whole-body BCF values ranged from 700-3000 depending on species and concentration(2). A field-based geometric mean BCF of 10,964 for serum perfluorooctane sulfonate was determined for wild turtles (*Trachemys scripta elegans* and *Chinemys reevesii*) collected in Japan(5).

## 12.4 Mobility in soil

A literature review of Koc values derived from laboratory sorption experiments using a variety of soils and sediments found the average and median log Koc values for perfluorooctane sulfonic acid to be 3.0 and 2.8(1), respectively, which correspond to Koc values of 1000 and 630(SRC); the log Koc range was 2.4 to 4.7 (Koc of 250 to 50,100)(1). Partitioning experiments using three sediments taken from the Tokyo Bay, Bay determined mean log Koc values 3.4 to 3.7 for perfluorooctane sulfonic acid (Koc values of 2510 to 5010)(2). A laboratory-derived mean log Koc of 2.57 for perfluorooctanoic acid on sediments has been reported(3) corresponding to a Koc of 370(SRC). A log Koc of 3.34 (Koc of 2190) was measured for an agricultural soil from an area where municipal biosolids had been applied(4). According to a classification scheme(5), the average and mean Koc values derived in laboratory tests suggest that perfluorooctane sulfonic acid is expected to have low mobility in soil. The range of Koc values (log 2.4-4.7) suggest that perfluorooctane sulfonic acid may have moderate mobility to immobility in soil. The pKa of perfluorooctane sulfonic acid is <1.0(6), indicating that this compound will exist almost entirely in anion form in the environment and anions generally do not adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts(7). The strength of perfluorooctane sulfonic acid sorption to sediment and suspended material in water can vary depending on the nature of the sediment material with respect to pH, organic content, mineral content, salinity and other factors(1,2). Sorption in sediment was found to increase with increasing Ca(2+) and decreasing pH and be affected more by organic carbon than iron oxide content(3). In marine environments where suspended solid concentrations are low, perfluorooctane sulfonic acid may be transported in dissolved phase rather than being adsorbed to suspended solids(2). Perfluorooctane sulfonic acid is thought to adsorb strongly to soil and sediment, based on reported Kd and Freundlich adsorption coefficient values of 18.3 and 25.1, respectively, in clay; 9.72 and 14.0, respectively, in clay loam; 35.3 and 28.2, respectively, in sandy loam; and 7.42 and 8.70, respectively, in river sediment(8). A Koc of 710 was calculated for perfluorooctane sulfonic acid based on Kd values for six soils(9).

## 12.5 Other adverse effects

no data available

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# SECTION 13: Disposal considerations

## 13.1 Disposal methods

### Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

### Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

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# SECTION 14: Transport information

## 14.1 UN Number

ADR/RID: UN2923 (For reference only, please check.)	IMDG: UN2923 (For reference only, please check.)	IATA: UN2923 (For reference only, please check.)
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## 14.2 UN Proper Shipping Name

ADR/RID: CORROSIVE SOLID, TOXIC, N.O.S. (For reference only, please check.)	IMDG: CORROSIVE SOLID, TOXIC, N.O.S. (For reference only, please check.)	IATA: CORROSIVE SOLID, TOXIC, N.O.S. (For reference only, please check.)
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## 14.3 Transport hazard class(es)

ADR/RID: 8 (For reference only, please check.)	IMDG: 8 (For reference only, please check.)	IATA: 8 (For reference only, please check.)
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## 14.4 Packing group, if applicable

ADR/RID: I (For reference only, please check.) IMDG: I (For reference only, please check.) IATA: I (For reference only, please check.)

## 14.5 Environmental hazards

ADR/RID: Yes	IMDG: Yes	IATA: Yes
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## 14.6 Special precautions for user

no data available

## 14.7 Transport in bulk according to IMO instruments

no data available

## SECTION 15: Regulatory information

### 15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
Heptadecafluorooctane-1-sulphonic acid	Heptadecafluorooctane-1-sulphonic acid	1763-23-1	217-179-8
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Not Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Not Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

## SECTION 16: Other information

### Information on revision

Creation Date July 15, 2019

Revision Date July 15, 2019

### Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

### References

- IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>
- HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>
- IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: [http://www.echemportal.org/echemportal/index?pageID=0&request\\_locale=en](http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en)
- CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>
- ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>
- Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>
- ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>