SAFETY DATA SHEET

According to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Sixth revised edition

Version: 1.0

Creation Date: Aug 20, 2018

Revision Date: Aug 20, 2018

1.Identification

1.1 GHS Product identifier

Product name benzaldehyde

1.2 Other means of identification

Product number ABR0011

Other names Benzoylhydride

1.3 Recommended use of the chemical and restrictions on use

Identified uses For industry use only. Food additives -> Flavoring Agents

Uses advised against no data available

1.4 Supplier's details

Company Acros PharmaTech Limited

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2.Hazard identification

2.1 Classification of the substance or mixture

Acute toxicity - Oral, Category 4

2.2 GHS label elements, including precautionary statements

Pictogram(s)

Signal word Warning

Hazard statement(s) H302 Harmful if swallowed

Precautionary statement(s)

Prevention

P264 Wash ... thoroughly after handling.

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

Response

P301+P312 IF SWALLOWED: Call a POISON CENTER/doctor/…if you feel unwell.

P330 Rinse mouth.

Storage none

Disposal P501 Dispose of contents/container to ...

2.3 Other hazards which do not result in classification

none

3.Composition/information on ingredients

3.1 Substances

Chemical name Common names and synonyms CAS number EC number Concentration

benzaldehyde	benzaldehyde	100-52-7	none	⩾98%

4.First-aid measures

4.1 Description of necessary first-aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

Fresh air, rest.

In case of skin contact

Remove contaminated clothes. Rinse skin with plenty of water or shower.

In case of eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

If swallowed

Rinse mouth. Rest.

4.2 Most important symptoms/effects, acute and delayed

Inhalation of concentrated vapor may irritate eyes, nose and throat. Liquid is irritating to the eyes. Prolonged contact with the skin may cause irritation. (USCG, 1999)

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 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.

5.Fire-fighting measures

5.1 Extinguishing media

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

Excerpt from ERG Guide 129 [Flammable Liquids (Water-Miscible / Noxious)]: HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks). Vapor explosion hazard indoors, outdoors or in sewers. Those substances designated with a (P) may polymerize explosively when heated or involved in a fire. Runoff to sewer may create fire or explosion hazard. Containers may explode when heated. Many liquids are lighter than water. (ERG, 2016)

5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

6.Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

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. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low 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: Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations. Keep in suitable, closed containers for disposal.

7.Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use.Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Separated from incompatible materials. See Chemical Dangers. Well closed. Ventilation along the floor. Cool. Store in an area without drain or sewer access. Keep in the dark.Store under nitrogen. 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. Air, light, and moisture sensitive.

8.Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

no data available

Biological limit values

no data available

8.2 Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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

Eye/face protection

Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique(without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. 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

Wear dust mask when handling large quantities.

Thermal hazards

no data available

9.Physical and chemical properties

Physical state	colorless liquid
Colour	Strongly refractive liquid, becoming yellowish on keeping
Odour	Characteristic odor or volatile oil of almond
Melting point/ freezing point	-56°C(lit.)
Boiling point or initial boiling point and boiling range	179°C(lit.)
Flammability	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.
Lower and upper explosion limit / flammability limit	Lower: 1.4% by vol
Flash point	62°C(lit.)
Auto-ignition temperature	192.22°C (USCG, 1999)
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	1.321 cp at 25°C
Solubility	less than 0.1 mg/mL at 19.5°C
Partition coefficient n-octanol/water (log value)	log Kow = 1.48
Vapour pressure	4 mm Hg (45 °C)
Density and/or relative density	1.045
Relative vapour density	3.7 (vs air)
Particle characteristics	no data available

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

Combustible liquid.A nontoxic, combustible liquid, reacts with oxidizing reagents. BENZALDEHYDE must be blanketed with an inert gas at all times since it is oxidized readily by air to benzoic acid [Kirk-Othmer, 3rd ed., Vol. 3, 1978, p. 736]. In contact with strong acids or bases it will undergo an exothermic condensation reaction [Sax, 9th ed., 1996, p. 327]. A violent reaction was observed on contact with peroxyacids (peroxyformic acid) [D'Ans, J. et al., Ber., 1915, 48, p. 1136]. An explosion occurred when pyrrolidine, benzaldehyde, and propionic acid were heated to form porphyrins.

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Incompatible materials: Strong oxidizing agents, strong reducing agents, strong bases, alkali metals, aluminum, iron, phenols, oxygen.

10.6 Hazardous decomposition products

Combustion may produce irritants and toxic gases.

11.Toxicological information

Acute toxicity

- Oral: LD50 Guinea pig oral 1000 mg/kg
- Inhalation: LC50 Rat inhalation 1.0-5 mg/L/4 hr
- 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

12.Ecological information

12.1 Toxicity

- Toxicity to fish: LC50; Species: Pimephales promelas (Fathead minnow); Concentration: 35 mg/L for 24 hr /Conditions of bioassay not specified in source examined

- Toxicity to daphnia and other aquatic invertebrates: LC50; Species: Daphnia magna (Water flea); Concentration: 50 mg/L for 24 hr /Conditions of bioassay not specified in source examined
- Toxicity to algae: EC50; Species: Anabaena cylindrica (Blue-Green Algae) 65000 cells/mL; Conditions: freshwater, static, 20°C; Concentration: >100000 ug/L for 3 hr; Effect: population, decreased photosynthesis />95% purity
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

AEROBIC: Benzaldehyde had a 5 day theoretical BOD of 36% using the AFNOR T test and inoculum from 3 polluted surface waters(1). Using a sewage inocula and standard dilution water, benzaldehyde had a 10-day theoretical BOD of 62%(2). Theoretical BODs of 41-70% were observed (at 500 ppm concentration) in Warburg respirometers using 3 different activated sludge seeds and 6 days of inubation(3). Theoretical BOD of 13% was observed (at 500 ppm concentration) in a Warburg respirometer using a digester sludge seed acclimated to benzene and 6 hr incubation(4). Theoretical BODs of 30-38% were observed (at 250 ppm concentration) in Warburg respirometers using activated sludge seeds acclimated to phenol, benzyl alcohol or anthranilic acid and 12 hr incubation(5). About 99% of initial benzaldehyde was removed (based upon COD) in 5 days of incubation using an activated sludge inocula that had been acclimated to benzaldehyde for 20 days(6). Five-day theoretical BODs of 77.2% and 63.5% were measured using the standard dilution method and seawater dilution method, respectively(7). Benzaldehyde, present at 100 mg/L, reached 66% of its theoretical BOD in 2 weeks using an activated sludge inoculum at 30 mg/L and the Japanese MITI test which classified the compound as readily biodegradable(8).

12.3 Bioaccumulative potential

An estimated BCF of 4.4 was calculated in fish for benzaldehyde(SRC), using a log Kow of 1.48(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low.

12.4 Mobility in soil

Using a structure estimation method based on molecular connectivity indices(1), the Koc of benzaldehyde can be estimated to be 11(SRC). According to a classification scheme(2), this estimated Koc value suggests that benzaldehyde is expected to have very high mobility in soil.

12.5 Other adverse effects

no data available

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.

14.Transport information

14.1 UN Number

ADR/RID: UN1990 IMDG: UN1990 IATA: UN1990

14.2 UN Proper Shipping Name

ADR/RID: BENZALDEHYDE

IMDG: BENZALDEHYDE
IATA: BENZALDEHYDE

14.3 Transport hazard class(es)

ADR/RID: 9 IMDG: 9 IATA: 9

14.4 Packing group, if applicable

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: no IMDG: no IATA: no

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

no data available

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
benzaldehyde	benzaldehyde	100-52-7	none
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			Not Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.

16.Other information

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
- 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/

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