

Chemical Safety Data Sheet MSDS / SDS

Ozone

Revision Date:2024-03-16 Revision Number:1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Product name : Ozone
CBnumber : CB6851738
CAS : 10028-15-6
EINECS Number : 233-069-2
Synonyms : ozone

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses : For R&D use only. Not for medicinal, household or other use.
Uses advised against : none

Company Identification

Company : Chemicalbook
Address : Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing
Telephone : 400-158-6606

SECTION 2: Hazards identification

Classification of the substance or mixture

Oxidizing gases, Category 1
Skin corrosion, Sub-category 1B
Serious eye damage, Category 1
Acute toxicity - Category 1, Inhalation
Specific target organ toxicity – repeated exposure, Category 1
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

Label elements**Pictogram(s)**

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Signal word : Danger

Hazard statement(s)

H270 May cause or intensify fire; oxidizer
H314 Causes severe skin burns and eye damage

H330 Fatal if inhaled

H372 Causes damage to organs through prolonged or repeated exposure

H400 Very toxic to aquatic life

H410 Very toxic to aquatic life with long lasting effects

Precautionary statement(s)

Prevention

P220 Keep away from clothing and other combustible materials.

P244 Keep valves and fittings free from oil and grease.

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

P264 Wash ... thoroughly after handling.

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

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

P284 [In case of inadequate ventilation] wear respiratory protection.

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

P273 Avoid release to the environment.

Response

P370+P376 In case of fire: Stop leak if safe to do so.

P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P363 Wash contaminated clothing before reuse.

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

P316 Get emergency medical help immediately.

P321 Specific treatment (see ... on this label).

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P305+P354+P338 IF IN EYES: Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P317 Get medical help.

P320 Specific treatment is urgent (see ... on this label).

P319 Get medical help if you feel unwell.

P391 Collect spillage.

Storage

P403 Store in a well-ventilated place.

P405 Store locked up.

P403+P233 Store in a well-ventilated place. Keep container tightly closed.

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.

Other hazards

no data available

SECTION 3: Composition/information on ingredients

Substance

Product name	: Ozone
Synonyms	: ozone
CAS	: 10028-15-6
EC number	: 233-069-2
MF	: O3
MW	: 47.9982

SECTION 4: First aid measures

Description of first aid measures

If inhaled

Fresh air, rest. Half-upright position. Refer for medical attention.

Following skin contact

ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention .

Following eye contact

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

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.

Most important symptoms and effects, both acute and delayed

Ozone is highly toxic via inhalation or by contact of liquid to skin, eyes, or mucous membranes. It is capable of causing acute to chronic lung damage, burns, and death or permanent injury. Ozone can be toxic at a concentration of 100 ppm for 1 minute. Ozone is capable of causing death from pulmonary edema. It increases sensitivity of the lungs to bronchoconstrictors and allergens, increases susceptibility to and severity of lung bacterial and viral infections. (EPA, 1998)

Indication of any immediate medical attention and special treatment needed

Treatment is supportive, similar to that for smoke inhalation and chlorine

SECTION 5: Firefighting measures

Extinguishing media

In case of fire: keep cylinder cool by spraying water. (EPA, 1998)

Specific Hazards Arising from the Chemical

Severe explosion hazard when shocked, exposed to heat or flame, or by chemical reaction with organic substances, especially reducing agents. Ozone is a powerful oxidizing agent. Incompatible with alkenes; aromatic compounds; benzene, rubber; bromine; dicyanogen; diethyl ether; dinitrogen tetroxide; hydrogen bromide; 4-hydroxy-4-methyl-1,6-heptadiene; nitrogen trichloride; stibine; tetrafluorohydrazine. Avoid contact with organic materials. (EPA, 1998)

Advice for firefighters

In case of fire in the surroundings, use appropriate extinguishing media. Combat fire from a sheltered position.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: chemical protection suit including self-contained breathing apparatus. Ventilation.

Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: chemical protection suit including self-contained breathing apparatus. Ventilation.

Methods and materials for containment and cleaning up

Collect and arrange disposal. Keep the chemical in suitable and closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames, NO sparks and NO smoking. NO contact with combustible substances. Closed system, ventilation, explosion-proof electrical equipment and lighting. 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.

Conditions for safe storage, including any incompatibilities

Fireproof if in building. Separated from all substances. Cool. CYLINDERS OF DISSOLVED OZONE SHOULD BE STORED IN REFRIGERATED AREAS & AWAY FROM ALL REDUCING AGENTS, FLAMMABLE MATERIALS & SUBSTANCES SUCH AS IRON, COPPER OR CHROMIUM THAT MAY CATALYZE DECOMP.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

TLV: (light work): 0.1 ppm as TWA; (moderate work): 0.08 ppm as TWA; (heavy work): 0.05 ppm as TWA. TLV: (less than 2 hours work): 0.2 ppm as TWA. TLV: A4 (not classifiable as a human carcinogen). MAK: carcinogen category: 3B

Biological limit values

no data available

Exposure controls

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

Individual protection measures

Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

Skin protection

Cold-insulating gloves.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties

Information on basic physicochemical properties

Physical state	blue gas
Colour	Blue or violet-black solid or unstable colorless gas or dark-blue liquid
Odour	CHARACTERISTIC ODOR IN CONCEN LESS THAN 2 PPM
Melting point/freezing point	-192.7°C
Boiling point or initial boiling point and boiling range	-111.9°C
Flammability	Nonflammable Gas, but a powerful oxidizer.
Lower and upper explosion limit/flammability limit	no data available
Flash point	no data available
Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	3e-05 g/100 g at 68° F (NTP, 1992)
Partition coefficient n-octanol/water	no data available
Vapour pressure	41257 mm Hg at 10.4° F (EPA, 1998)
Density and/or relative density	1.48g/cm ³
Relative vapour density	1.7 (EPA, 1998) (Relative to Air)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

Reactivity

Decomposes on warming. This produces oxygen. This generates fire and explosion hazard. Reacts violently with inorganic and organic compounds. This generates fire and explosion hazard. Attacks rubber.

Chemical stability

Unstable gas ... @ normal temp decomp to biatomic oxygen. ... in liq or solid phase particularly unstable.

Possibility of hazardous reactions

POWERFUL OXIDIZING AGENT ... EVOLVES MORE HEAT AND USUALLY STARTS AT A LOWER TEMPERATURE THAN OXIDATION WITH BIATOMIC OXYGEN. The gas is heavier than air. OZONE is a propellant; ignites upon contact with alcohols, amines, ammonia, beryllium alkyls, boranes, dicyanogen, hydrazines, hydrocarbons, hydrogen, nitroalkanes, powdered metals, silanes, or thiols [Bretherick 1979. p.174]. Aniline in a atmosphere of ozone produces a white gelatinous explosive ozobenzene [Mellor 1:911. 1946-47]. A mixture of ether and ozone forms aldehyde and acetic acid and a heavy liquid, ethyl peroxide, an explosive [Mellor 1:911. 1946-47]. Severe explosions occur attempting to form tribromic octaoxide from bromine and ozone [Mellor 2, Supp. 1:748. 1956]. Mixtures of ozone and dinitrogen pentaoxide are flammable or explosive [Mellor 8, Supp. 2:276. 1967]. Ozone and ethylene react explosively [Berichte 38:3837]. Nitrogen dioxide and ozone react with the evolution of light, and often explode [J. Chem. Phys. 18:366 1920]. Contact of very cold liquefied gas with water may result in vigorous or violent boiling of the product and extremely rapid vaporization due to the large temperature differences involved. If the water is hot, there is the possibility that a liquid "superheat" explosion may occur. Pressures may build to dangerous levels if liquid gas contacts water in a closed container, [Handling Chemicals Safely 1980].

Conditions to avoid

no data available

Incompatible materials

All oxidizable materials (both organic and inorganic).

Hazardous decomposition products

no data available

SECTION 11: Toxicological information

Acute toxicity

- Oral: no data available
- 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

A4; Not classifiable as a human carcinogen. /Heavy work, moderate work, light work, or heavy, moderate, or light workloads (</=2 hours)/

Reproductive toxicity

no data available

STOT-single exposure

The substance is irritating to the eyes and respiratory tract. The substance may cause effects on the central nervous system. This may result in impaired vigilance and performance. Inhalation of the gas may cause lung oedema. See Notes. The effects may be delayed. The liquid may cause frostbite.

STOT-repeated exposure

Repeated or prolonged inhalation of the gas may cause effects on the lungs.

Aspiration hazard

A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: no data available

Toxicity to daphnia and other aquatic invertebrates: no data available

Toxicity to algae: no data available

Toxicity to microorganisms: no data available

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

Other adverse effects

no data available

SECTION 13: Disposal considerations

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.

SECTION 14: Transport information

UN Number

ADR/RID: no data available

IMDG: no data available

IATA: no data available

UN Proper Shipping Name

ADR/RID: no data available

IMDG: no data available

IATA: no data available

Transport hazard class(es)

ADR/RID: 6.1 (For reference only, please check.)

IMDG: 6.1 (For reference only, please check.)

IATA: 6.1 (For reference only, please check.)

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.)

Environmental hazards

ADR/RID: Yes

IMDG: Yes

IATA: Yes

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

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

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.

PICCS

Not Listed.

Vietnam National Chemical Inventory

Listed.

IECSC

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 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/>

Other Information

The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Immediate administration of an appropriate inhalation therapy by a doctor, or by an authorized person, should be considered.

Disclaimer:

The information in this MSDS is only applicable to the specified product, unless otherwise specified, it is not applicable to the mixture of this product and other substances. This MSDS only provides information on the safety of the product for those who have received the appropriate professional training for the user of the product. Users of this MSDS must make independent judgments on the applicability of this SDS. The authors of this MSDS will not be held responsible for any harm caused by the use of this MSDS.