

Safety Data Sheet

1. Product and company identification

Product name : 2-Butanone
 Name of manufacturer : KANTO CHEMICAL CO., INC.
 Address : 2-1, Nihonbashi, Muromachi 2-Chome, Chuo-Ku, Tokyo, 103-0022, Japan
 Name of section : Electronic materials division technical department
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 Mail address : el-info@gms.kanto.co.jp
 SDS No. : GE00002

2. Summary of danger and Hazard

GHS classification

Physical and chemical hazard

Flammable liquids : Category 2
 Pyrophoric liquids : Out of category

Human health hazard

Acute toxicity(oral) : Out of category
 Acute toxicity(dermal) : Out of category

Acute toxicity(inhalation:vapors) : Category 4

Skin corrosion • Irritation : Category 2

Serious eye damage • Eye irritation : Category 2A

Specific target organ systemic toxicity(single exposure) : Category 2, Category 3 (respiratory tract irritation) 、 Category 3 (anesthetic action)

Specific target organ systemic toxicity(repeated exposure) : Category 1

Environmental hazard

Hazardous to the aquatic environment-acute hazard : Out of category

Hazardous to the aquatic environment-chronic hazard : Out of category

Pictogram or symbol



Signal word : Danger

Hazard statement : Highly flammable liquid and vapor

Harmful if inhaled
Causes skin irritation
Causes serious eye irritation
May cause damage to organs (kidney)
May cause respiratory irritation
May cause drowsiness and dizziness
Causes damage to organs (nervous system) through prolonged or repeated exposure

Cautions

- Safety measurements : Keep away from ignition sources such as heat, sparks, or open flame.
Keep containers tightly closed.
Ground container and receiving equipment in case of transport and stirring.
Use explosion-proof apparatus.
Use only non-sparking tools.
Do not breathe dust, mist, and vapor.
Use only in a well-ventilated area.
Do not eat, drink or smoke when using this product.
Wear appropriate protective gloves, glasses, clothing, face shield, or mask.
Wash protective equipment thoroughly after use.
Wash hands thoroughly after handling.
- First-aid measures : If inhaled : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical treatment if you feel unwell.

If in eyes : Rinse cautiously with water for several minutes. Get medical treatment.
If on skin : Remove contaminated clothing and the substance. Get medical treatment, if you feel unwell.
Wash hands thoroughly after handling.
If exposed, get medical treatment.
Get medical treatment, if you feel unwell.
- Storage : Tightly container closed and store in a well-ventilated area.
Store locked up.
- Disposal : Dispose of contents and containers appropriately in accordance with related regulations.

3. Composition/Information on ingredients

- Substance/Mixture : Substance
Chemical name or commercial name : 2-Butanone
Synonyms : Ethyl methyl ketone, Methyl ethyl ketone
Ingredients and composition : 2-Butanone min. 99.9%
Chemical formula : C₂H₅COCH₃
CAS No. : 78-93-3

TSCA Inventory : Registered
EINECS No. : 2011590
Dangerous and hazardous ingredients
: 2-Butanone

4. First aid measures

Inhalation : Remove the victim to fresh air, and make him blow his nose and gargle.
Skin contact : Wash the affected areas under running water.
Eye contact : Wash the affected areas under running water for at least 15 minutes.
Get medical treatment.
Ingestion : Do not induce vomiting because the chemical has high volatility and may increase the risk of aspiration of it into the lungs. Get medical treatment.

Anticipated acute and delayed symptoms

: Overexposure may cause anesthetic action, headache, dizziness, tunnel vision, nausea, or unconsciousness.

Protection for first aid person

: Savers wear proper protective equipment like rubber gloves, goggles.

5. Fire fighting measures

Extinguishing media : Dry chemical powder, carbon dioxide, dry sand, foam

Prohibited extinguishing media

: Water spray

Particular fire fighting : Move containers from fire area if it can be done without risk, if not possible, apply water from a safe distance to cool and protect surrounding area.

Keep personnel removed from and unwind of fire.

Dry chemical powder, carbon dioxide or dry sand should be used for small fires. Foam extinguisher is effective for a large scale fire.

Protection for firefighters

: Firefighters should wear protective equipment.

6. Accidental release measures

Cautions for personnel : Wear proper equipment and avoid contact with skin and inhalation of vapor. Keep personnel removed from and upwind of fire. Shut off all sources of ignition. Keep away personnel except for authorized ones from spillage area by stretching ropes.

Cautions for environment : Attention should be given not to cause damage to the environment by flowing of spillage to rivers.

Removal measure : Absorb spill with inert material (e.g., diatomaceous earth, sand) and flush residual area with copious amounts of water.

Prevention of second accident

: Remove nearby sources of ignition and prepare extinguishing media.

7. Cautions of handling and storage

Handling

Engineering measures : Wear proper protective equipment not to contact with skin or inhale the vapor. Pay attention to fire.

Cautions for safety handling

: Use with an enclosed system or a local exhaust ventilation.

Storage

Adequate storage condition

: Store in a dark, cool place and tightly closed.

Safety adequate container materials

: Glass, fluorine resin, stainless steel

Do not use vinyl chloride resin, acrylic resin, polystyrene etc.

8. Exposure control/Personal protection

Engineering measures : Use only with adequate ventilation and in closed systems.

Control parameters

ACGIH(2009) : 200ppm(TLV-TWA)
300ppm (TLV-STEL)

Protective equipment

Respiration protective equipment

: If necessary, wear chemical cartridge respirator with an organic vapor cartage

Hands protective equipment

: Organic solvents resistant gloves

Eyes protective equipment

: Safety goggles

Skin and body protective equipment

: Protective clothing, protective boots

9. Physical and chemical properties

Appearance : Liquid

Color : Colorless

Odor : Acetone like odor

Boiling point : 79.6°C

Melting point : -86.7°C

Flash point : -7.2°C

Auto-ignition point : 516°C

Explosion characteristics

Explosion limit : upper : 11.5vol% lower : 1.18vol%

Vapor pressure : 105hPa(20°C)

Vapor density : 2.5

Specific gravity : 0.80g/cm³ (20°C)

Solubility

Solubility in solvents : Water ; 21.1%(20°C)

Miscible with many kinds of organic solvents.

log Pow : 0.29

Other data : Viscosity : 0.423cP(15°C)

10. Stability and reactivity

Stability : Stable under normal usage.
Reactivity : May react with oxidizing substances.
Incompatible conditions : Light, heat
Incompatible materials : Oxidizing substances
Hazardous decomposition products
: Carbon monoxide

11. Toxicological information

Acute toxicity : Oral : Out of category
Dermal : Out of category
Harmful if inhaled(vapor) (category 4)
Inhalation(dust, mist) : Not possible to classify because of insufficient data.
rat oral LD50>2000mg/kg
rat inhalation LC50=11700ppm/4H
rabbit skin LD50>5000mg/kg

Skin corrosiveness : Causes skin irritation(category 2)
Based on the description that mild to moderate irritation was observed in the skin application examination on rabbits, it was classified into category 2.

Irritation to skin, eyes : Causes serious eye irritation(category 2A)
Result of this material was applied to the eye of the rabbit, there is a report that severe irritation was observed, and bleeding of corneal disorder and sclera, edema of the eyelids, chemical burns were observed. In addition, the average value of the mark in 24 hours, was corneal cloudings was 2.5 and the conjunctival redness was 2 in the eye irritation examination using a rabbit, but it had recovered mostly within seven days, so, it was classified into category 2A.

Respiratory sensitization or Skin sensitization

: Respiratory sensitization : Not possible to classify because of insufficient data.
Skin sensitization : Not possible to classify because of insufficient data.

Mutagenicity : Not possible to classify because of insufficient data.

Carcinogenic effects : Not possible to classify because of insufficient data

Effects on the reproductive system

: Not possible to classify because of insufficient data.

There are descriptions that fetal malformations were observed in teratogenicity studies of inhalation exposures in rats. In a retest, however, malformations are not observed, although delayed ossification and mutations were observed. Furthermore, malformation is not observed, although lower weight levels of offsprings and mutations were also observed in teratogenicity studies of inhalation exposure to mice. Therefore, all were judged to be minimum influence. However, since there is no report of the test related to fertility, it was not possible to classify.

Specific target organ systemic toxicity single exposure

: May cause damage to organs (kidney) (category 2)

May cause respiratory irritation (category 3) • May cause drowsiness and dizziness (category 3)

In humans, in the inhalation exposure, there is the report that causes headache, dizziness, nausea, vomiting, ataxia, eye blurred vision, lightheadedness, hyperventilation, dizziness, lethargy, central nervous system depressant action, metabolic acidosis, loss of consciousness. In the oral administration, there is the report of loss of consciousness. In experimental animals, anesthetic action, mild renal tubular necrosis of the kidneys were recognized in the oral administration 1,080 mg/kg in rats. Effects on the kidneys of the rats was observed at doses ranging from Category 2. This material is considered to have effects on the kidney, and respiratory tract irritation, the anesthetic action.

From the above, it was classified into category 2 ((kidney), category 3 (respiratory tract irritation, narcotic effects)).

Specific target organ systemic toxicity repeated exposure

: Cause damage to organs (nervous system) through prolonged or repeated exposure (category 1)

There is the description that numbness of the hands and arms were observed in human occupational exposure cases. And since there is the description that disorders of central nervous system are suggested in occupational exposure example, target organ is considered nervous system, it was classified into category 1 (nervous system).

Aspiration hazard

: Not possible to classify because of insufficient data.

Since being ketone composed of carbon atoms ($n \geq 13$), and the dynamic viscosity is 0.50 mm²/sec (25°C).

12. Ecological information

Ecotoxicity

Fish toxicity

: Acute aquatic toxicity : Out of category

Chronic aquatic toxicity : Out of category

Red killifish LC50 > 100 mg/l/96H

Rediability and degradability

: Not available

Ecorediability

: Not available

13. Disposal consideration

Residual disposal

: Burn in a chemical incinerator equipped with an afterburner and a scrubber. Or entrust approved waste disposal companies with the disposal.

Containers

: In case of disposal of empty bottles, dispose bottles after removing the content thoroughly.

14. Transport information

UN class : Class 3(Flammable liquids) P. G. II

UN number : 1193

Marine regulation information

UN No. : 1193

Proper shipping name : ETHYL METHYL KETONE

Class : 3

Sub risk : -

Packing group : II

Marine pollutant : Not applicable

Aviation regulation information

UN No. : 1193

Proper shipping name : Ethyl methyl ketone

Class : 3

Sub risk : -

Packing group : II

15. Regulatory information

Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

16. Other information

References

Dictionary of Organic Compounds, The society of Synthetic Organic Chemistry, Kodansha Ltd. (1985)

Solvents Handbook, T, Asahara et al, Kodansha Scientific Ltd. (1976)

Dangerous Properties of Industrial Materials, 6th ed. N. I. Sax Van Nostrand Reinhold Company (1984)

Handbook of 15710 Chemical Products, The Chemical Daily Co. (2010)

The information contained herein is based on several references and the present state of our knowledge. However the SDS does not always cover all information about the product, handle the product carefully. The information is intended to ordinary usage, in case of particular handlings, conduct appropriate safety measurements. The information herein is only provision of information, and it does not represent a guarantee the properties of the product. The Safety Data Sheet (SDS) is prepared based on JIS Z7253, and it has the same required elements on the Material Safety Data Sheet (MSDS) which is prepared based on JIS Z7250:2010.