

SAFETY DATA SHEETS

According to the UN GHS revision 9

Version: 1.2
Creation Date: July 15, 2019
Revision Date: August 08, 2025

SECTION 1: Identification

1.1 GHS Product identifier

Product name Carbofuran (Furadan) Solution Reference Material in Methanol

1.2 Other means of identification

Product number CPRM3866
Other names 2,3-dihydro-2,2-dimethylbenzofuran-7-yl methylcarbamate; Carbofuran; 2,2-dimethyl-2,3-dihydro-1-benzofuran-7-yl methylcarbamate

1.3 Recommended use of the chemical and restrictions on use

Identified uses For laboratory and Industrial use only.
Uses advised against no data available

1.4 Supplier's details

Company CATO Research Chemicals Inc.
Address 3/F,Building B,No.179 BASIGO, Guangpu Rd East,Huangpu Dist,Guangzhou
Telephone +86-20-81960175

1.5 Emergency phone number

Emergency phone number +86-20-81960175
Service hours 'Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture

Acute toxicity - Category 2, Oral
Acute toxicity - Category 2, Inhalation
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word

Danger

Hazard statement(s)

H300 Fatal if swallowed
H330 Fatal if inhaled
H410 Very 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.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P271 Use only outdoors or in a well-ventilated area.
P284 [In case of inadequate ventilation] wear respiratory protection.
P273 Avoid release to the environment.
P301+P316 IF SWALLOWED: Get emergency medical help immediately.
P321 Specific treatment (see ... on this label).
P330 Rinse mouth.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P316 Get emergency medical help immediately.
P320 Specific treatment is urgent (see ... on this label).
P391 Collect spillage.

Response

Storage

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.

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
Carbofuran (Furadan) Solution Reference Material in Methanol	Carbofuran	1563-66-2	216-353-0	100%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest. Artificial respiration may be needed. Refer for medical attention. See Notes.

Following skin contact

Remove contaminated clothes. Rinse and then wash skin with water and soap.

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

Give a slurry of activated charcoal in water to drink. Refer for medical attention . See Notes.

4.2 Most important symptoms/effects, acute and delayed

This material is extremely poisonous. May be fatal if swallowed, inhaled, or absorbed through skin. Contact may burn skin or eyes. Probable lethal oral dose to humans 5 to 50 mg/kg or 7 drops to 1 teaspoon for 150 lb. person. (EPA, 1998)

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 as 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. Carbamates and related compounds

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

If material on fire or involved in fire: Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible. Solid streams of water may be ineffective. Use foam, dry chemical or carbon dioxide. Carbofuran (Carbamate pesticides, liquid, toxic)

5.2 Specific hazards arising from the chemical

May release nitrogen oxides. Containers may explode in heat of fire. Avoid alkalis. Stable under neutral or acid conditions. (EPA, 1998)

5.3 Special protective actions for fire-fighters

In case of fire in the surroundings, use appropriate extinguishing media.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal protection: self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

6.2 Environmental precautions

Personal protection: self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

6.3 Methods and materials for containment and cleaning up

Treatment techniques which may be effective in removing carbofuran from drinking water: include adsorption on granular activated carbon (GAC) or powdered activated carbon (PAC), reverse osmosis (RO), and oxidation by ozone, or ozone/ultraviolet.

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

Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. Keep in a well-ventilated room. Separated from food and feedstuffs. Keep in a well-ventilated room.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

TLV: 0.1 mg/m³, as TWA; A4 (not classifiable as a human carcinogen); BEI issued

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 safety spectacles or eye protection in combination with breathing protection.

Skin protection

Protective gloves.

Respiratory protection

Use ventilation (not if powder), local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Carbofuran is an odorless white crystalline solid. Contact with skin may burn skin and eyes. When exposed to heat or flames it may emit toxic oxides of nitrogen. It is toxic by inhalation, skin contact, and/ or ingestion. It is used as a pesticide.
Colour	White, crystalline solid
Odour	Odorless
Melting point/freezing point	153-154°C
Boiling point or initial boiling point and boiling range	200°C
Flammability	Noncombustible Solid
Lower and upper explosion limit/flammability limit	no data available
Flash point	143.3°C
Auto-ignition temperature	no data available
Decomposition temperature	150°C
pH	no data available
Kinematic viscosity	no data available
Solubility	0.07 % at 77° F (NIOSH, 2016)
Partition coefficient n-octanol/water	log K _{ow} = 2.32
Vapour pressure	0.000502 mmHg at 25°C
Density and/or relative density	1.18
Relative vapour density	no data available
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Decomposes on heating. This produces toxic fumes including nitrogen oxides.

10.2 Chemical stability

Stable under neutral or acid conditions, unstable in alkaline media

10.3 Possibility of hazardous reactions

CARBOFURAN is a carbamate ester. Carbamates are chemically similar to, but more reactive than amides. Like amides they form polymers such as polyurethane resins. Carbamates are incompatible with strong acids and bases, and especially incompatible with strong reducing agents such as hydrides. Flammable gaseous hydrogen is produced by the combination of active metals or nitrides with carbamates. Strongly oxidizing acids, peroxides, and hydroperoxides are incompatible with carbamates. This compound is unstable in an alkaline media. (NTP, 1992).

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Alkaline substances, acid, strong oxidizers (e.g., perchlorates, peroxides, chlorates, nitrates, permanganates).

10.6 Hazardous decomposition products

When heated to decomposition it emits toxic fumes of /nitrogen oxides/.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 Guinea pig oral 9.18 mg/kg
- Inhalation: LC50 Guinea pig inhalation 43 mg/cu m/4 Hr
- Dermal: LD50 Rabbit percutaneous 2550 mg/kg Active ingredient as wettable powder

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

Cancer Classification: Not Likely to be Carcinogenic to Humans

Reproductive toxicity

no data available

STOT-single exposure

The substance may cause effects on the nervous system. This may result in convulsions and respiratory depression. Cholinesterase inhibition. The effects may be delayed. Exposure could cause death. Medical observation is indicated.

STOT-repeated exposure

Cholinesterase inhibition. Cumulative effects are possible. See Acute Hazards/Symptoms.

Aspiration hazard

Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying or when dispersed, especially if powdered.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: LC50; Species: *Salmo trutta* (Brown trout) weight 0.5 g; Conditions: static bioassay, 12 deg C; Concentration: 560 ug/L for 96 hr (95% confidence limit 475-660 ug/L) /Technical material, 99%
- Toxicity to daphnia and other aquatic invertebrates: EC50; Species: *Daphnia magna* (water flea); Condition: static; Concentration: 29 ug/L for 48 hr; Effect: immobilization
- Toxicity to algae: EC50; Species: *Microcystis aeruginosa* (Blue-Green Algae) grown in HGZ media; Conditions: freshwater, static, 24 deg C; Concentration: 4649.7 ug/L for 96 hr; Effect: decreased population biomass /98% purity
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

AEROBIC: Under laboratory conditions and 8 weeks of incubation, 77% of applied carbofuran remained in sterile muck while only 25% remained in non-sterile muck; 50% remained in sterile loam while none remained in non-sterile loam(1). The rate of CO₂ release two weeks after incubating a vineyard soil with carbofuran was 40 times greater than when the soil had been autoclaved(2). Carbofuran was rapidly lost from cornfield soils both with and without a history of carbofuran use, but virtually no loss was observed when the soil was autoclaved(3). The main metabolite of carbofuran in soil is 3-ketocarbofuran; small amounts of 3-hydroxycarbofuran, carbofuran phenol, and 3-ketocarbofuran phenol were also present(4). The dominant fate of the carbonyl group of carbofuran, once added to non-history soils, is hydrolysis of the carbamate bond followed by rapid mineralization of the methylamine(5). Non-sterile samples exhibited a lag phase followed by a period of rapid hydrolysis; the reaction is essentially complete after 14 days with CO₂ production from 77.6-100% of the added labeled carbofuran(5). A half-life of 8-10 days was determined for carbofuran in paddy soils. In pond water, a biodegradation half-life of 2 days was reported for early rice and 5-6 days for late rice treated with carbofuran(6). Carbofuran dissipation from paddy water

was rapid with an estimated dissipation time for 50% initial concentration (DT50) of 3 days and a DT95 of 13 days; the DT50 from paddy soil was about 10 days and the DT95 was 42 days; dissipation was due to both hydrolysis and biodegradation(7).

12.3 Bioaccumulative potential

A BCF for carbofuran of 117 was measured using *Tilapia nilotica* which were exposed over a 30-day period(1). According to a classification scheme(2), this BCF suggests bioconcentration in aquatic organisms is high(SRC), provided the compound is not metabolized by the organism(SRC).

12.4 Mobility in soil

The Koc of carbofuran was studied in 43 surface soils (0-15 cm) from Sri Lanka, 28 soils were from the wet zone, 15 from the dry zone, Koc values ranged from 7.3 to 120.6 with a mean and median of 41.65 and 36.1, respectively(1). The Koc range of 8 European soils was determined to be 48.6 to 110.0(2). Carbofuran had an average Koc of 105 measured in three soils with an organic content ranging from 0.68 to 2.01%(3). A mean Koc value of 29.4 was determined for 5 different soils(4). Based on measured Rf values, carbofuran was found to be mobile to very mobile in sandy soil, sandy loam, silty clay, and silty loam soil, moderately mobile in silty clay and silty clay loam soil, and only slightly mobile in muck soil(5). Koc values ranging from 24 to 123 were determined for sand, sandy loam, creek sediment, and an organic soil(6). According to a recommended classification scheme(7), these measured Koc values indicate that carbofuran has very high to high mobility in soil(SRC). Laboratory studies found carbofuran leached through soil, but tests in a corn field found that carbofuran traveled only to a depth of 7.5 cm over 22 weeks which included periods of heavy rain; the formulated product was found to leach less than the technical product(8). Carbofuran adsorbed more strongly to red loam soil than sandy loam soil with adsorption due to organic matter and clay content of the soil(9). Carbofuran was detected in agricultural drain water from a rice growing area at a total of 1.72-11.03% during a 54-80 day period after flooding(10).

12.5 Other adverse effects

no data available

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.

SECTION 14: Transport information

14.1 UN Number

ADR/RID: UN2992 (For reference only, please check.) IMDG: UN2992 (For reference only, please check.) IATA: UN2992 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: CARBAMATE PESTICIDE, LIQUID, TOXIC (For reference only, please check.) IMDG: CARBAMATE PESTICIDE, LIQUID, TOXIC (For reference only, please check.) IATA: CARBAMATE PESTICIDE, LIQUID, TOXIC (For reference only, please check.)

14.3 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.)

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

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
Carbofuran	Carbofuran	1563-66-2	216-353-0

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)	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.
Korea Existing Chemicals List (KECL)	Listed.

SECTION 16: Other information

Information on revision

Creation Date July 15, 2019
Revision Date August 08, 2025

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

Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available. Do NOT take working clothes home. Carrier solvents used in commercial formulations may change physical and toxicological properties. If the substance is formulated with solvents also consult the ICSCs of these materials.

Any questions regarding this SDS, Please send your inquiry to info@cato-chem.com

Disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. We as supplier shall not be held liable for any damage resulting from handling or from contact with the above product.