

SAFETY DATA SHEET
Carbosulfan Technical

SDS # : 003700-A
Revision date: 2019-07-17
Format: NA
Version 1.03



1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name Carbosulfan Technical

Other means of identification

Product Code(s) 003700-A

Synonyms CARBOSULFAN (FMC 35001): 2,3-dihydro-2,2-dimethyl-7-benzofuranyl [(dibutylamino)thio]methylcarbamate (CAS name); 2,3-dihydro-2,2-dimethylbenzofuran-7-yl (dibutylaminothio)methylcarbamate (IUPAC name)

Active Ingredient(s) Carbosulfan

Chemical Family Carbamate Pesticide

Alternate Commercial Name Marshal®

Recommended use of the chemical and restrictions on use

Recommended Use: Insecticide

Restrictions on Use: Use as recommended by the label.

Supplier Address

FMC Corporation
2929 Walnut Street
Philadelphia, PA 19104
(215) 299-6000 (General Information)
msdsinfo@fmc.com (E-Mail General Information)

Manufacturer Address

FMC Corporation
2929 Walnut Street
Philadelphia, PA 19104
(215) 299-6000 (General Information)
msdsinfo@fmc.com (E-Mail General Information)

Emergency telephone number

Medical Emergencies :
1 800 / 331-3148 (U.S.A. & Canada)
1 651 / 632-6793 (All Other Countries - Collect)

For leak, fire, spill or accident emergencies, call:
1 800 / 424-9300 (CHEMTREC - U.S.A.)
1 703 / 741-5970 (CHEMTREC - International)
1 703 / 527-3887 (CHEMTREC - Alternate)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Oral	Category 3
Acute toxicity - Inhalation (Dusts/Mists)	Category 3
Specific target organ toxicity (single exposure)	Category 1
Specific target organ toxicity (repeated exposure)	Category 1

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Danger

Hazard Statements

H301 - Toxic if swallowed
H331 - Toxic if inhaled
H370 - Causes damage to organs
H372 - Causes damage to organs through prolonged or repeated exposure



Precautionary Statements - Prevention

P264 - Wash face, hands and any exposed skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P260 - Do not breathe dust/fume/gas/mist/vapors/spray

Precautionary Statements - Response

P308 + P311 - If exposed or concerned: Call a POISON CENTER or doctor
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P311 - Call a POISON CENTER or doctor
P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor
P330 - Rinse mouth

Precautionary Statements - Storage

P405 - Store locked up
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed

Precautionary Statements - Disposal

P501 - Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

No hazards not otherwise classified were identified.

Other Information

Very toxic to aquatic life with long lasting effects.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Family Carbamate Pesticide.

Chemical name	CAS-No	Weight %
Carbosulfan	55285-14-8	65 - 100
Carbofuran	1563-66-2	1 - 15

Synonyms are provided in Section 1.

4. FIRST AID MEASURES

Eye Contact	Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. Call a poison control center or doctor for further treatment advice.
Skin Contact	Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for further treatment advice.
Inhalation	Move to fresh air. If person is not breathing, contact emergency medical services, then give artificial respiration, preferably mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.
Ingestion	Call a poison control center or doctor immediately for treatment advice. Drink 2 glasses of water and induce vomiting by touching back of throat with finger. Induce vomiting, but only if victim is fully conscious. Do not give anything by mouth to an unconscious person.
Most important symptoms and effects, both acute and delayed	Symptoms of exposure may include headache, light-headedness, weakness, abdominal cramps, nausea, excessive salivation, perspiration, blurred vision, tearing, pin-point pupils, excessive respiratory secretions, cyanosis, convulsions, generalized tremor and coma.
Indication of immediate medical attention and special treatment needed, if necessary	This product contains a reversible cholinesterase inhibitor Atropine sulfate is antidotal Support respiration as needed with removal of secretions, maintenance of a patent airway and, if necessary, artificial ventilation If cyanosis is absent: Adults - start treatment by giving 2 mg atropine intravenously or intramuscularly, if necessary, and repeat with 0.4 - 2.0 mg atropine at 15 minute intervals until atropinization occurs (tachycardia, flushed skin, dry mouth, mydriasis); Children under 12 - initial dose = 0.05 mg/kg body weight and repeat dose = 0.02 - 0.05 mg/kg body weight Use of oximes such as 2-PAM is controversial Observe patient to ensure that these symptoms do not recur as atropinization wears off If in eyes, instill one drop of homatropine Treatment is otherwise controlled removal of exposure followed by symptomatic and supportive care

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media	Foam. Carbon dioxide (CO ₂). Dry chemical. Soft stream or water fog only if necessary. Cool containers / tanks with water spray.
Specific Hazards Arising from the Chemical	Thermal decomposition can lead to release of irritating and toxic gases and vapors
Explosion data	
Sensitivity to Mechanical Impact	No information available.
Sensitivity to Static Discharge	No information available.
Protective equipment and precautions for firefighters	As in any fire, wear self-contained breathing apparatus and full protective gear. Isolate fire area. Evaluate upwind.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Isolate and post spill area. Remove all sources of ignition. Wear suitable protective clothing, gloves and eye/face protection. For personal protection see section 8. Heat, flames and sparks. Ensure adequate ventilation.
Other	For further clean-up instructions, call FMC Emergency Hotline number listed in Section 1 "Product and Company Identification" above.
Environmental Precautions	Keep people and animals away from and upwind of spill/leak. Keep material out of lakes, streams, ponds, and sewer drains.
Methods for Containment	Dike to prevent runoff. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.

Methods for cleaning up

Clean and neutralize spill area, tools and equipment for a minimum contact of one hour with vinegar-alcohol solution, then by bleach, soap, and water. Absorb rinsate and add to the collected waste. Waste must be classified and labeled prior to recycling or disposal. Dispose of waste as indicated in Section 13.

7. HANDLING AND STORAGE

Handling

Do not contaminate other pesticides, fertilizers, water, food, or feed by storage or disposal.

Storage

Keep in a dry, cool and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition. Keep out of reach of children and animals. Keep/store only in original container.

Incompatible products

Acids

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Chemical name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
Carbofuran (1563-66-2)	TWA: 0.1 mg/m ³	-	TWA: 0.1 mg/m ³	Mexico: TWA 0.1 mg/m ³
Chemical name	British Columbia	Quebec	Ontario TWAEV	Alberta
Carbofuran (1563-66-2)	TWA: 0.1 mg/m ³	TWA: 0.1 mg/m ³	TWA: 0.1 mg/m ³ inhalable fraction and vapor	TWA: 0.1 mg/m ³

Appropriate engineering controls**Engineering measures**

Apply technical measures to comply with the occupational exposure limits. When working in confined spaces (tanks, containers, etc.), ensure that there is a supply of air suitable for breathing and wear the recommended equipment.

Individual protection measures, such as personal protective equipment**Eye/Face Protection**

For dust, splash, mist or spray exposure, wear chemical protective goggles.

Skin and Body Protection

Wear long-sleeved shirt, long pants, socks, and shoes.

Hand Protection

Use protective gloves made of chemical materials such as nitrile or neoprene. Wash the outside of gloves with soap and water before reuse. Check regularly for leaks.

Respiratory Protection

For dust, splash, mist or spray exposures, wear elastomeric full-face or half mask respirator with appropriate cartridges and/or filters, which is approved for pesticides (U.S. NIOSH/MSHA, EU CEN or comparable certification organization).

Hygiene measures

Clean water should be available for washing in case of eye or skin contamination. Wash skin prior to eating, drinking, chewing gum or using tobacco. Shower or bathe at the end of working. Remove and wash contaminated clothing before re-use. Launder work clothing separately from regular household laundry.

General information

If the product is used in mixtures, it is recommended that you contact the appropriate protective equipment suppliers. These recommendations apply to the product as supplied.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties**Appearance**

Clear orange Viscous Liquid

Physical State

Liquid

Color	Clear, orange
Odor	Phenolic
Odor threshold	No information available
pH	No information available
Melting point/freezing point	Not applicable
Boiling Point/Range	
Flash point	96 °C Closed cup
Evaporation Rate	No information available
Flammability (solid, gas)	No information available
Flammability Limit in Air	
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor pressure	0.31 x 10 ⁻⁶ mmHg @ 25°C (carbosulfan)
Vapor density	No information available
Relative density	8.74 lb/gal
Specific gravity	1.056 @ 20°C
Water solubility	0.3 % @ 25 °C
Solubility in other solvents	No information available
Partition coefficient	No information available
Autoignition temperature	No information available
Decomposition temperature	No information available
Viscosity, kinematic	No information available
Viscosity, dynamic	No information available
Explosive properties	No information available
Oxidizing properties	No information available
Molecular weight	No information available
Bulk density	No information available

10. STABILITY AND REACTIVITY

Reactivity	None under normal use conditions
Chemical Stability	Potential self-heating thermal decomposition above 100°C (212°F). Above 200°C (391°F), decomposition will result in rapid gas generation.
Possibility of Hazardous Reactions	Contact with aqueous acids may produce carbofuran.
Hazardous polymerization	Hazardous polymerization does not occur.
Conditions to avoid	Excessive heat. Keep away from open flames, hot surfaces and sources of ignition.
Incompatible materials	Acids.
Hazardous Decomposition Products	Burning produces obnoxious and toxic fumes. Carbon oxides (COx). Sulfur oxides. Nitrogen oxides (NOx). Thermal decomposition can lead to release of toxic/corrosive gases and vapors. Carbon dioxide (CO ₂). carbonyl sulfide.

11. TOXICOLOGICAL INFORMATION

Product Information

LD50 Oral	185 mg/kg (rat)
LD50 Dermal	> 2000 mg/kg (rat)
LC50 Inhalation	0.15 mg/L 4 hr (rat), Estimated; 0.61 mg/L 1 hr (rat)
Serious eye damage/eye irritation	Minimally irritating (rabbit).
Skin corrosion/irritation	May cause slight irritation. With dermal exposure to carbofuran, conditions of increased temperature and humidity facilitate skin absorption and, therefore, promote increased toxicity.
Sensitization	Non-sensitizing

Information on toxicological effects

Symptoms	This substance is a reversible cholinesterase-inhibiting pesticide, which elicits symptoms in humans typical of cholinesterase inhibition including headache, light-headedness, weakness, abdominal cramps, nausea, excessive salivation, perspiration and blurred vision.
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More severe signs of cholinesterase inhibition include tearing, pin-point pupils, excessive respiratory secretions, cyanosis, convulsions, generalized tremor and coma. Excessive cholinesterase inhibition may result in death.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic toxicity	Effects are expected to be similar to those that are seen with acute toxicity.
Mutagenicity	Carbosulfan: Not genotoxic in laboratory studies.
Carcinogenicity	Carbosulfan: No evidence of carcinogenicity from animal studies.
Neurological effects	Carbosulfan: Chronic exposure of laboratory animals caused decreased cholinesterase activity (erythrocyte, plasma, and/or brain).
Reproductive toxicity	Carbosulfan: No toxicity to reproduction in animal studies.
Developmental toxicity	Carbosulfan: Caused fetal incomplete ossification and major vessel variations in animal studies.
STOT - single exposure	Causes damage to organs. See listed target organs below.
STOT - repeated exposure	Causes damage to organs through prolonged or repeated exposure. See listed target organs below.
Target organ effects	Nervous system, Bladder, Gastrointestinal tract, Red blood cells, Acetylcholinesterase Inhibition
Neurological effects	Carbosulfan: Chronic exposure of laboratory animals caused decreased cholinesterase activity (erythrocyte, plasma, and/or brain).
Aspiration hazard	No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Carbosulfan (55285-14-8)				
Active Ingredient(s)	Duration	Species	Value	Units
Carbosulfan	48 h EC50	Crustacea	1.5	µg/L
	72 h EC50	Algae	47	mg/L
	96 h LC50	Fish	0.015	mg/L
	21 d NOEC	Crustacea	3.2	µg/L
	21 d NOEC	Fish	3.0	µg/L

Carbofuran (1563-66-2)				
Active Ingredient(s)	Duration	Species	Value	Units
Carbofuran	48 h EC50	Crustacea	0.75	mg/L
	72 h EC50	Algae	19	mg/L
	96 h LC50	Fish	0.18	mg/L
	21 d NOEC	Crustacea	0.23	µg/L
	96 h NOEC	Algae	3.2	mg/L
	21 d NOEC	Fish	5.22	µg/L

Persistence and degradability	Carbosulfan: Non-persistent. Readily hydrolyzed. Not readily biodegradable. Carbofuran: Non-persistent. Does not readily hydrolyze. Not readily biodegradable.
Bioaccumulation	Carbosulfan: The substance has a potential for bioconcentration. Carbofuran: The substance does not have a potential for bioconcentration.
Mobility	Carbosulfan: Slightly mobile; not expected to reach groundwater. Carbofuran: Moderately

mobile; expected to reach groundwater.

13. DISPOSAL CONSIDERATIONS

Waste disposal methods	Improper disposal of excess pesticide, spray mixture, or rinsate is prohibited. If these wastes cannot be disposed of by use according to label instructions, contact appropriate disposal authorities for guidance. Proper personal protective equipment, as described in Sections 7 and 8, must be worn while handling materials for waste disposal.
Contaminated Packaging	Containers must be disposed of in accordance with local, state and federal regulations. Refer to the product label for container disposal instructions.

14. TRANSPORT INFORMATION

DOT

UN/ID no	Non-Bulk: UN2992 Bulk: UN3184
Proper Shipping Name	Non-Bulk: Carbamate pesticide, liquid, toxic Bulk: Self-heating liquid, toxic, organic, n.o.s.
Hazard class	Non-Bulk: 6.1 Bulk: 4.2
Subsidiary class	Bulk: 6.1
Packing Group	III
Reportable Quantity (RQ)	Carbofuran is in an "RQ" quantity when this material meets or exceeds 555.55 pounds (63.56 gallons) per package.
Marine Pollutant Description	Carbosulfan. Non-Bulk: UN2992, Carbamate pesticides, liquid, toxic, n.o.s. (carbosulfan, carbofuran), 6.1, PG III Bulk: UN3184, Self-heating liquid, toxic, organic, n.o.s. (carbosulfan, carbofuran), 4.2 (6.1), PG III, Marine Pollutant, RQ

TDG

	Classification pertains to Non-Bulk shipments. See above for Bulk classification. The "Marine Pollutant" marking is only applicable when shipped by vessel, and is not applicable when shipped only by road or rail in Canada.
UN/ID no	UN2992
Proper Shipping Name	Carbamate pesticides, liquid, toxic, n.o.s.
Hazard class	6.1
Packing Group	III
Marine Pollutant Description	Carbosulfan, Carbofuran. UN2992, Carbamate pesticides, liquid, toxic, n.o.s. (carbosulfan, carbofuran), 6.1, PG III, Marine Pollutant

ICAO/IATA

	Classification pertains to Non-Bulk shipments. See above for Bulk shipments.
UN/ID no	UN2992
Proper Shipping Name	Carbamate pesticides, liquid, toxic, n.o.s.
Hazard class	6.1
Packing Group	III
Description	UN2992, Carbamate pesticides, liquid, toxic, n.o.s. (carbosulfan, carbofuran), 6.1, PG III, Marine Pollutant

IMDG/IMO

	Classification pertains to Non-Bulk shipments. See above for Bulk classification.
UN/ID no	UN2992
Proper Shipping Name	Carbamate pesticides, liquid, toxic, n.o.s.
Hazard class	6.1
Packing Group	III
EmS No.	F-A, S-A
Marine Pollutant Description	Carbosulfan, Carbofuran UN2992, Carbamate pesticides, liquid, toxic, n.o.s. (carbosulfan, carbofuran), 6.1, PG III, Marine Pollutant

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical name	CAS-No	Weight %	SARA 313 - Threshold Values %
Carbofuran - 1563-66-2	1563-66-2	1 - 15	1.0

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic health hazard	Yes
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

Clean Water Act

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Carbofuran 1563-66-2	10 lb			X

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302):

Chemical name	Hazardous Substances RQs	Extremely Hazardous Substances RQs
Carbofuran 1563-66-2	10 lb 4.54 kg	10 lb
Carbosulfan 55285-14-8	1000 lb 454 kg	

FIFRA Information

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

WARNING

May be fatal if swallowed or inhaled. Harmful if absorbed through skin.

This product is highly toxic to bees. This product is toxic to fish, birds, and aquatic invertebrates.

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Carbosulfan	X		

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55285-14-8			
Carbofuran 1563-66-2	X	X	X

International Inventories

Chemical name	TSCA (United States)	DSL (Canada)	EINECS/ELINC S (Europe)	ENCS (Japan)	China (IECSC)	KECL (Korea)	PICCS (Philippines)	AICS (Australia)
Carbosulfan 55285-14-8			X			X		
Carbofuran 1563-66-2	X	X	X	X	X	X	X	X

Mexico - Grade

Serious risk, Grade 3

Chemical name	Carcinogen Status	Mexico
Carbofuran		Mexico: TWA 0.1 mg/m ³

WHMIS Statement

This product has been classified in accordance with the Hazardous Products Regulations (HPR) and the SDS contains all the information required by the HPR.

WHMIS Hazard Class

D1A - Very toxic materials

D2A - Very toxic materials

**16. OTHER INFORMATION**

NFPA	Health Hazards 4	Flammability 1	Instability 0	Special Hazards -
HMIS	Health Hazards 3*	Flammability 1	Physical hazard 0	Personal Protection X

*Indicates a chronic health hazard.

NFPA/HMIS Ratings Legend

Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0

Revision date:

2019-07-17

Reason for revision:

SDS sections updated

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End of Safety Data Sheet