

SAFETY DATA SHEET

Cadusafos 200CS

SDS # : 6044-1-A
Revision date: 2018-04-12
Format: NA
Version 1.01



1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name Cadusafos 200CS

Other means of identification

Product Code(s) 6044-1-A

Synonyms CADUSAFOS: S,S-di-sec-butyl O-ethyl phosphorodithioate (IUPAC name); O-ethyl S,S-bis(1-methylpropyl) phosphorodithioate (CAS Name)

Active Ingredient(s) Cadusafos

Formula $C_{10}H_{23}O_2PS_2$ (Cadusafos)

Chemical Family Organophosphate Pesticide

Alternate Commercial Name Apache®

Recommended use of the chemical and restrictions on use

Recommended Use: Insecticide, Nematicide

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)

Emergency telephone number

Medical Emergencies:
1 800 / 331-3148 (ProPharma Group - U.S.A. & Canada)
1 651 / 632-6793 (ProPharma Group - 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 4

Acute toxicity - Inhalation (Dusts/Mists)	Category 4
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

H302 - Harmful if swallowed
H332 - Harmful if inhaled
H370 - Causes damage to organs
H372 - Causes damage to organs through prolonged or repeated exposure



Precautionary Statements - Prevention

P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray
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

Precautionary Statements - Response

P321 - Specific treatment (see supplemental first aid instructions on label)
P308 + P311 - If exposed or concerned: Call a POISON CENTER or doctor
P312 - Call a POISON CENTER or doctor if you feel unwell
P314 - Get medical advice/ attention if you feel unwell
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
P330 - Rinse mouth

Precautionary Statements - Storage

P405 - Store locked up

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 Organophosphate Pesticide.

Chemical name	CAS-No	Weight %
2-Methylnaphthalene	91-57-6	1-5
Cadusafos	95465-99-9	20.6
Methylene diphenyl diisocyanate (polymeric)	9016-87-9	5-10
Naphtha (petroleum), heavy aromatic	64742-94-5	1-5

1,6-hexanediamine (70%)	124-09-4	1-5
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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. Do not induce vomiting or give anything by mouth to an unconscious person. If swallowed, do not induce vomiting - seek medical advice. Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. 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. Start 2-PAM at the same time, following manufacturer's recommended dosages and administration. Morphine, reserpine, phenothiazines and theophylline are probably contraindicated. At first sign of pulmonary edema, the patient should be given supplemental oxygen and treated symptomatically. 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. 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. Start 2-PAM at the same time, following manufacturer's recommended dosages and administration. Morphine, reserpine, phenothiazines and theophylline are probably contraindicated. At first sign of pulmonary edema, the patient should be given supplemental oxygen and treated symptomatically. 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 powder. Water spray.
Specific Hazards Arising from the	Combustible liquid

Chemical
Hazardous Combustion Products Carbon oxides (COx). Phosphorus oxides. Sulfur dioxide.

Explosion data
Sensitivity to Mechanical Impact No information available.
Sensitivity to Static Discharge No information available.

Protective equipment and precautions for firefighters Wear self-contained breathing apparatus and protective suit.

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.

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 by washing with water and soap. 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 None known

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Chemical name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
Cadusafos (95465-99-9)	TWA: 0.001 mg/m ³	-	-	-
1,6-hexanediamine (70%) (124-09-4)	TWA: 0.5 ppm	-	-	-
Chemical name	British Columbia	Quebec	Ontario TWA EV	Alberta
Cadusafos (95465-99-9)	Skin	-	-	-
Methylene diphenyl diisocyanate (polymeric) (9016-87-9)	-	-	-	TWA: 0.005 ppm TWA: 0.07 mg/m ³
1,6-hexanediamine (70%) (124-09-4)	TWA: 0.5 ppm	TWA: 0.5 ppm TWA: 2.3 mg/m ³	TWA: 0.5 ppm	TWA: 0.5 ppm TWA: 2.4 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	Protective gloves
Respiratory Protection	For dust, splash, mist or spray exposures wear a filtering mask.
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	Suspension
Physical State	Liquid
Color	Green
Odor	Slight mercaptan
Odor threshold	No information available
pH	7.4-7.9
Melting point/freezing point	Not applicable
Boiling Point/Range	No information available
Flash point	89-92 °C / 192-198 °F Tag 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	No information available
Vapor density	No information available
Density	No information available
Specific gravity	1.05-1.07
Water solubility	No information available
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	8.75 - 8.91 lb/gal

10. STABILITY AND REACTIVITY

Reactivity	Not applicable
Chemical Stability	Stable.
Possibility of Hazardous Reactions	None under normal processing.
Hazardous polymerization	Hazardous polymerization does not occur.
Conditions to avoid	Keep away from open flames, hot surfaces and sources of ignition.

Incompatible materials None known.
Hazardous Decomposition Products Carbon oxides (COx), Phosphorous oxides, Sulfur dioxide.

11. TOXICOLOGICAL INFORMATION

Product Information

LD50 Oral 1,097 mg/kg (rat)
LD50 Dermal > 5000 mg/kg (rat)
LC50 Inhalation > 3.87 mg/L 4 hr (rat)

Serious eye damage/eye irritation Slight irritation (rabbit).
Skin corrosion/irritation Not irritating in animal studies.
Sensitization Non-sensitizer

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. 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. Reduction of blood acetylcholinesterase levels can occur without symptoms of toxicity.

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

Chronic toxicity Prolonged exposure caused inhibition of red blood cell and brain cholinesterase, and decreased motor activity.

Mutagenicity Cadusafos:
Not genotoxic in animal studies

Carcinogenicity Cadusafos: No evidence of carcinogenicity from animal studies

Neurological effects Cadusafos: Chronic exposure to animals caused decreased motor activity and decreased cholinesterase activity in brain, red blood cells and plasma.

Reproductive toxicity Cadusafos: No toxicity to reproduction in animal studies.

Developmental toxicity Cadusafos: Not teratogenic in animal studies.

STOT - single exposure Central Nervous System. Peripheral Nervous System (PNS).

STOT - repeated exposure Central Nervous System. Peripheral Nervous System (PNS).

Target organ effects Central Nervous System (CNS) Peripheral Nervous System (PNS) Acetylcholinesterase Inhibition

Neurological effects Cadusafos: Chronic exposure to animals caused decreased motor activity and decreased cholinesterase activity in brain, red blood cells and plasma.

Aspiration hazard No information available.

Chemical name	ACGIH	IARC	NTP	OSHA
Cadusafos 95465-99-9		Group 2A		
Methylene diphenyl diisocyanate (polymeric) 9016-87-9		Group 3		

Legend:

IARC (International Agency for Research on Cancer)
Group 2A - Probably Carcinogenic to Humans
Group 3 - Not classifiable as to its carcinogenicity to humans

12. ECOLOGICAL INFORMATION

Ecotoxicity

Cadusafos (95465-99-9)

Active Ingredient(s)	Duration	Species	Value	Units
Cadusafos	48 h EC50	Crustacea	1.6	µg/L
	96 h LC50	Fish	0.13	mg/L
	72 h EC50	Algae	4.3	mg/L
	21 d NOEC	Crustacea	0.23	µg/L
	21 d NOEC	Fish	5.2	µg/L
	96 h NOEC	Algae	1.0	mg/L

Persistence and degradability Moderately persistent. Does not readily hydrolyze. Not readily biodegradable.

Bioaccumulation The substance does not have a potential for bioconcentration.

Mobility Moderately mobile. Has some potential 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.

Contaminated Packaging Do not reuse or refill this container. 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 This material is a Combustible liquid and is, therefore, not subject to the hazardous materials regulations when in non-bulk packages shipped within the USA per 49 CFR §173.150(f)(2).

UN/ID no UN3082
Proper Shipping Name Environmentally hazardous substance, liquid, n.o.s.
Hazard class Combustible
Packing Group III
Description UN3082, Combustible liquid, n.o.s. (aromatic hydrocarbons), III

TDG 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 UN3082
Proper Shipping Name Environmentally hazardous substance, liquid, n.o.s.
Hazard class 9
Packing Group III
Marine Pollutant Cadusafos.
Description UN3082 Environmentally hazardous substance, liquid, n.o.s. (Cadusafos), 9, III, Marine Pollutant

ICAO/IATA

UN/ID no UN3082
Proper Shipping Name Environmentally hazardous substance, liquid, n.o.s.
Hazard class 9
Packing Group III
Description UN3082 Environmentally hazardous substance, liquid, n.o.s. (Cadusafos), 9, III, Marine Pollutant

IMDG/IMO

UN/ID no UN3082
Proper Shipping Name Environmentally hazardous substance, liquid, n.o.s.
Hazard class 9
Packing Group III

EmS No.
Marine Pollutant
Description

F-A, S-F
Cadusafos
UN3082 Environmentally hazardous substance, liquid, n.o.s. (Cadusafos), 9, 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 %
Methylene diphenyl diisocyanate (polymeric) - 9016-87-9	9016-87-9	5-10	1.0

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic health hazard	Yes
Fire hazard	Yes
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
Sodium Hydroxide 1310-73-2	1000 lb			X
Phosphoric acid 7664-38-2	5000 lb			X
Naphthalene 91-20-3	100 lb	X	X	X

CERCLA

Chemical name	Hazardous Substances RQs	Extremely Hazardous Substances RQs
Sodium Hydroxide 1310-73-2	1000 lb 454 kg	
Methyl alcohol 67-56-1	5000 lb 2270 kg	
Phosphoric acid 7664-38-2	5000 lb 2270 kg	
Naphthalene 91-20-3	100 lb 45.4 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:

CAUTION

Harmful if swallowed, inhaled or absorbed through the skin. Causes minimal eye irritation.

This product is highly toxic to bees and other pollinating insects. This pesticide is highly toxic to fish, aquatic invertebrates, and birds.

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
Methylene diphenyl diisocyanate (polymeric) 9016-87-9	X		
1,6-hexanediamine (70%) 124-09-4	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)
Cadusafos 95465-99-9						X		
Methylene diphenyl diisocyanate (polymeric) 9016-87-9	X	X		X	X	X	X	X
Naphtha (petroleum), heavy aromatic 64742-94-5	X	X	X		X	X	X	X
1,6-hexanediamine (70%) 124-09-4	X	X	X	X	X	X	X	X

Mexico - Grade

Slight risk, Grade 1

Chemical name	Mexico - Pollutant Release and Transfer Register - Reporting Emissions for Fabrication, Process or Use -Threshold Quantities	Pollutant Release and Transfer Register - Reporting Emissions - Threshold Quantities
Methylene diphenyl diisocyanate (polymeric)	100 5000 kg/yr	100 kg/yr

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

B3 - Combustible liquid



16. OTHER INFORMATION

NFPA	Health Hazards 1	Flammability 2	Instability 0	Special Hazards -
HMIS	Health Hazards 2*	Flammability 2	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: 2018-04-12
Reason for revision: (M)SDS sections updated

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Prepared By:

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End of Safety Data Sheet