

Safety Data Sheet

Cadusafos 200CS

SDS # : 6044-1-A
Revision Date: 2014-05-22
Version 2.01



1. PRODUCT AND COMPANY IDENTIFICATION

Product name Cadusafos 200CS
Active Ingredient(s) Cadusafos
Chemical Family Organophosphate Pesticide
Synonyms CADUSAFOS: S,S-di-sec-butyl O-ethyl phosphorodithioate; O-ethyl S,S-bis(1-methylpropyl) phosphorodithioate

Manufacturer
FMC Corporation
Agricultural Solutions
1735 Market Street
Philadelphia, PA 19103
General Information:
Phone: (215) 299-6000
E-Mail: msdsinfo@fmc.com

Emergency telephone number

Medical Emergencies:
1 800 / 331-3148 (PROSAR - U.S.A. & Canada)
1 651 / 632-6793 (PROSAR - All Other Countries - Collect)
For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)

2. HAZARDS IDENTIFICATION

Classification of the chemical

Acute oral toxicity	Category 4
Acute inhalation toxicity - dust/mist	Category 4
Specific target organ systemic toxicity (single exposure)	Category 1
Specific target organ systemic toxicity (repeated exposure)	Category 1
Acute aquatic toxicity	Category 1
Chronic aquatic toxicity	Category 1
Flammable liquids	Category 4

Labeling

Symbol(s)



Signal Word:

Danger

Hazard statements

H227 - Combustible liquid
H302 - Harmful if swallowed
H332 - Harmful if inhaled
H370 - Causes damage to organs
H372 - Causes damage to organs through prolonged or repeated exposure
H410 - Very toxic to aquatic life with long lasting effects

Precautionary Statements

P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
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
P273 - Avoid release to the environment
P307 + P311 - IF exposed: Call a POISON CENTER or doctor/ physician
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell
P304 + P340 - IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing
P370 + P378 - In case of fire: Use of foam, carbon dioxide, water spray, or dry powder for extinction.
P403 + P235 - Store in a well-ventilated place. Keep cool
P405 - Store locked up
P501 - Dispose of contents/ container to an approved incineration plant

Hazards Not Otherwise Classified**General Hazards**

Cadusafos is a cholinesterase-inhibiting pesticide, which elicits symptoms in humans typical of cholinesterase inhibition including headaches, 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 can result in death. Reduction of blood acetylcholinesterase levels can occur without symptoms of toxicity.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Weight %	ENCS (Japan)	ISHL No.	CAS-No
1,6-hexanediamine (70%)	1-5	X		124-09-4
Urea	5-10	X		57-13-6
Phosphoric acid	1-5	X		7664-38-2
Methylene diphenyl diisocyanate (polymeric)	5-10	X		9016-87-9
Naphthalene sulfonic acid-formaldehyde condensate, sodium salt	1-5	X		9084-06-4
Cadusafos	19.3			95465-99-9

4. FIRST AID MEASURES**Eye contact**

Hold eye 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 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 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.

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 insure 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**Flammable properties**

Combustible liquid.

Suitable extinguishing media

Foam. Carbon dioxide (CO₂). Dry powder. Water spray.

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.

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 bleach 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.

Other

For further clean-up instructions call FMC Emergency Hotline number listed in Section 1 "Product and Company Identification" above.

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. Store in original container only.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Exposure guidelines**

Chemical Name	Japan	ACGIH TLV	China	Korea
1,6-hexanediamine (70%) 124-09-4		TWA: 0.5 ppm		
Urea 57-13-6			TWA: 5 mg/m ³ STEL: 10 mg/m ³	
Phosphoric acid 7664-38-2	OEL: 1 mg/m ³	STEL 3 mg/m ³ TWA: 1 mg/m ³	TWA: 1 mg/m ³ STEL: 3 mg/m ³	STEL: 3 mg/m ³ TWA: 1 mg/m ³
Chemical Name	Taiwan	Indonesia	Australia	India

1,6-hexanediamine (70%) 124-09-4		TWA 0.5 ppm		
Phosphoric acid 7664-38-2	STEL 2 mg/m ³	TWA 1 mg/m ³ S* STEL 3 mg/m ³	STEL 3 mg/m ³ TWA 1 mg/m ³	TWA 1 mg/m ³ STEL 3 mg/m ³

Occupational exposure 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.

Personal Protective Equipment**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.

Respiratory protection

For dust, splash, mist or spray exposures wear a filtering mask.

Eye/face protection

For dust, splash, mist or spray exposure, wear chemical protective goggles or a face-shield.

Skin and body protection

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

Hand protection

Protective gloves

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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	suspension	
Odor	Slight mercaptan	
Physical state	Liquid	
pH	7.4-7.9	
Flash Point	89-92 °C / 192-198 °F Tag Closed Cup	
Autoignition Temperature	No data available	
Boiling Point/Range	No data available	
Melting Point/Range	No data available	
Flammability Limits in Air	upper No data available	lower No data available
Explosion limits	upper No data available	lower No data available
Explosive properties	No information available.	
Oxidizing properties	No information available.	
Evaporation rate	No data available	
Vapor density	No data available	
Specific Gravity	1.05 - 1.07	
Bulk density	8.75 - 8.91 lb/gal	
Solubility	No information available.	
Partition coefficient	No data available	
Viscosity, dynamic	No information available.	

10. STABILITY AND REACTIVITY

Stability	Stable.
Conditions to avoid	Keep away from open flames, hot surfaces and sources of ignition.
Hazardous decomposition products	Carbon oxides, Phosphorous oxides, Sulfur dioxide.

11. TOXICOLOGICAL INFORMATION**Acute Toxicity**

Cadusafos is a cholinesterase-inhibiting pesticide, which elicits symptoms in humans typical of cholinesterase inhibition including headaches, 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 can result in death. Reduction of blood acetylcholinesterase levels can occur without symptoms of toxicity.

Skin contact	Slightly or non-irritating (rabbit).
Eye contact	Slightly or non-irritating (rabbit).
LD50 Dermal	> 5000 mg/kg (Rat)
LD50 Oral	1,097 mg/kg (Rat)
LC50 Inhalation	> 3.87 mg/L 4 hr (Rat)
Sensitization	Non-sensitizer

Chronic Toxicity

Chronic Toxicity	Prolonged exposure caused inhibition of red blood cell and brain cholinesterase, and decreased motor activity.
Neurological Effects	Cadusafos: Chronic exposure to animals caused decreased motor activity and decreased cholinesterase activity in brain, red blood cells and plasma.
Target Organ Effects	Central nervous system (CNS). Peripheral Nervous System (PNS). Acetylcholinesterase Inhibition.
Carcinogenicity	Cadusafos: No evidence of carcinogenicity from animal studies.
Mutagenicity	Cadusafos: Not genotoxic in animal studies
Reproductive toxicity	Cadusafos: No toxicity to reproduction in animal studies.
Developmental Toxicity	Cadusafos: Not teratogenic in animal studies.

Chemical Name	IARC
Methylene diphenyl diisocyanate (polymeric)	Group 3

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

Chemical Name	Toxicity to algae	Toxicity to fish	Toxicity to microorganisms	Toxicity to daphnia and other aquatic invertebrates
1,6-hexanediamine (70%) 124-09-4	72 h EC50: 15 mg/L (EC50) 96 h EC50: 14.8 mg/L (EC50)	96 h LC50: > 56 mg/L (Lepomis macrochirus) 96 h LC50: = 1825 mg/L (Pimephales promelas)		48 h EC50: 23.4 mg/L (Daphnia magna)
Urea 57-13-6		96 h LC50: 16200 - 18300 mg/L (Poecilia reticulata)		48 h EC50: 3910 mg/L (Daphnia magna)

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.

Chemical Name	log Pow
1,6-hexanediamine (70%) 124-09-4	0.02
Urea 57-13-6	-1.59

Other adverse effects No information available

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

Packaging Type Bulk

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 NA1993
Proper shipping name Combustible liquid, n.o.s.
Hazard Class Combustible
Packing group III
Description NA1993, Combustible liquid, n.o.s. (aromatic hydrocarbons), PGIII

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, PG 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
Marine pollutant Cadusafos
EmS No. F-A, S-F
Description UN3082 Environmentally hazardous substance, liquid, n.o.s. (Cadusafos), 9, PG 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
Marine pollutant Cadusafos
Description UN3082 Environmentally hazardous substance, liquid, n.o.s. (Cadusafos), 9, PG III, Marine Pollutant

15. REGULATORY INFORMATION

International Inventories

Chemical Name	TSCA Inventory (United States of America)	DSL (Canada)	EINECS/ELI NCS (Europe)	ENCS (Japan)	IECSC (China)	KECL (Korea)	PICCS (Philippines)	AICS (Australia)	NZIoC (New Zealand)
1,6-hexanediamine (70%) 124-09-4	X	X	X	X	X	X	X	X	X
Urea 57-13-6	X	X	X	X	X	X	X	X	X
Phosphoric acid 7664-38-2	X	X	X	X	X	X	X	X	X
Methylene diphenyl diisocyanate (polymeric) 9016-87-9	X	X	-	X	X	X	X	X	X
Naphthalene sulfonic acid-formaldehyde condensate, sodium salt 9084-06-4	X	X	-	X	X	X	X	X	X
Cadusafos 95465-99-9	-	-	-	-	-	X	-	-	-

ENCS - Japan Existing and New Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AICS - Australian Inventory of Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

Japan

Japan

Chemical Name	Dangerous Substances	organic solvents	Harmful Substances Whose Names Are to be Indicated on the Label	Pollution Release and Transfer Registry (Class II):	Pollution Release and Transfer Registry (Class I):	Poisonous and Deleterious Substances Control Law
1,6-hexanediamine (70%)	>0.1 %	Not applicable	Not applicable		390	Deleterious -X
Phosphoric acid	>1 %	Not applicable	Not applicable			
Cadusafos	Not applicable	Not applicable	Not applicable		331	Poisonous-X Deleterious -X
Chemical Name	ISHA - Harmful Substances Prohibited for Manufacturing, Importing, Transferring, or Supplying	ISHA - Harmful Substances Requiring Permission	ISHA - Toxic Chemicals Control Law	Toxic Release Inventory Chemicals - Group 1	Toxic Release Inventory Chemicals - Group 2	
Cadusafos	Not applicable	Not applicable	97-1-249 *	Not applicable	Not applicable	

16. OTHER INFORMATION

Revision Date: 2014-05-22

Reason for revision: (M)SDS sections updated.

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End of Material Safety Data Sheet