

# Safety Data Sheet

## Cadusafos 200CS

SDS # : 6044-1-A  
Revision Date: 2014-01-08  
Version 2



### 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 (CO<sub>2</sub>). 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 <sup>3</sup> STEL: 10 mg/m <sup>3</sup>	
Phosphoric acid 7664-38-2	OEL: 1 mg/m <sup>3</sup>	STEL 3 mg/m <sup>3</sup> TWA: 1 mg/m <sup>3</sup>	TWA: 1 mg/m <sup>3</sup> STEL: 3 mg/m <sup>3</sup>	STEL: 3 mg/m <sup>3</sup> TWA: 1 mg/m <sup>3</sup>
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 <sup>3</sup>	TWA 1 mg/m <sup>3</sup> S* STEL 3 mg/m <sup>3</sup>	STEL 3 mg/m <sup>3</sup> TWA 1 mg/m <sup>3</sup>	TWA 1 mg/m <sup>3</sup> STEL 3 mg/m <sup>3</sup>

**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**

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

**10. STABILITY AND REACTIVITY**

<b>Stability</b>	Stable.
<b>Conditions to avoid</b>	Keep away from open flames, hot surfaces and sources of ignition.
<b>Hazardous decomposition products</b>	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.

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

**Chronic Toxicity**

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

Chemical Name	IARC
Methylene diphenyl diisocyanate (polymeric)	Group 3

**12. ECOLOGICAL INFORMATION****Ecotoxicity**

<b>Cadusafos (95465-99-9)</b>				
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: 2014-01-08  
Reason for revision: (M)SDS sections updated.

### Disclaimer

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### Prepared By

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**End of Material Safety Data Sheet**