

**SAFETY DATA SHEET**  
**Rugby® 200 CS**

**SDS # : 6044-A**  
**Revision date: 2018-04-12**  
**Format: NA**  
**Version 1.05**



**1. PRODUCT AND COMPANY IDENTIFICATION**

**Product Identifier**

**Product Name** Rugby® 200 CS

**Other means of identification**

**Product Code(s)** 6044-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<sub>10</sub>H<sub>23</sub>O<sub>2</sub>PS<sub>2</sub> (Cadusafos)

**Chemical Family** Organophosphate Pesticide

**Alternate Commercial Name** Apache 200 CS

**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**

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)

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

**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
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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

<b>Eye Contact</b>	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.
<b>Skin Contact</b>	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.
<b>Inhalation</b>	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.
<b>Ingestion</b>	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.
<b>Most important symptoms and effects, both acute and delayed</b>	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.
<b>Indication of immediate medical attention and special treatment needed, if necessary</b>	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

<b>Suitable Extinguishing Media</b>	Foam. Carbon dioxide (CO <sub>2</sub> ). Dry powder. Water spray.
<b>Specific Hazards Arising from the Chemical</b>	Combustible liquid
<b>Hazardous Combustion Products</b>	Carbon oxides (CO <sub>x</sub> ). Phosphorus oxides. Sulfur dioxide.
<b>Explosion data</b>	
<b>Sensitivity to Mechanical Impact</b>	No information available.
<b>Sensitivity to Static Discharge</b>	No information available.
<b>Protective equipment and precautions for firefighters</b>	Wear self-contained breathing apparatus and protective suit. As in any fire, wear self-contained breathing apparatus and full protective gear. Isolate fire area. Evaluate upwind.

#### 6. ACCIDENTAL RELEASE MEASURES

<b>Personal Precautions</b>	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.
<b>Other</b>	For further clean-up instructions, call FMC Emergency Hotline number listed in Section 1

"Product and Company Identification" above.

<b>Environmental Precautions</b>	Keep people and animals away from and upwind of spill/leak. Keep material out of lakes, streams, ponds, and sewer drains.
<b>Methods for Containment</b>	Dike to prevent runoff. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.
<b>Methods for cleaning up</b>	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

<b>Handling</b>	Do not contaminate other pesticides, fertilizers, water, food, or feed by storage or disposal.
<b>Storage</b>	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.
<b>Incompatible products</b>	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 <sup>3</sup>	-	-	-
1,6-hexanediamine (70%) (124-09-4)	TWA: 0.5 ppm	-	-	-
Chemical name	British Columbia	Quebec	Ontario TWAEV	Alberta
Cadusafos (95465-99-9)	Skin	-	-	-
Methylene diphenyl diisocyanate (polymeric) (9016-87-9)	-	-	-	TWA: 0.005 ppm TWA: 0.07 mg/m <sup>3</sup>
1,6-hexanediamine (70%) (124-09-4)	TWA: 0.5 ppm	TWA: 0.5 ppm TWA: 2.3 mg/m <sup>3</sup>	TWA: 0.5 ppm	TWA: 0.5 ppm TWA: 2.4 mg/m <sup>3</sup>

### Appropriate engineering controls

<b>Engineering measures</b>	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.
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### Individual protection measures, such as personal protective equipment

<b>Eye/Face Protection</b>	For exposure to mists or sprays, wear safety goggles or face shield for chemical agents.
<b>Skin and Body Protection</b>	Use coveralls or long-sleeved uniform and head covering. For large exposures as in case of a spill, use barrier suit covering the entire body, such as a waterproof PVC suit. Leather items, including shoes, belts and watchbands, that have been contaminated should be removed and destroyed. Wash all work clothing before reuse (separately from clothing commonly used).
<b>Hand Protection</b>	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.
<b>Respiratory Protection</b>	For splash, spray or mist exposure wear, as a minimum, a properly fitted half-face or

full-face respirator with dust/mists/fume cartridges (approved by U.S. NIOSH/MSHA, EU CEN or comparably certified organization). Respirator use and selection must be based on airborne concentrations.

**Hygiene measures**

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

<b>Appearance</b>	Suspension
<b>Physical State</b>	Liquid
<b>Color</b>	Green
<b>Odor</b>	Slight mercaptan
<b>Odor threshold</b>	No information available
<b>pH</b>	7.4-7.9
<b>Melting point/freezing point</b>	Not applicable
<b>Boiling Point/Range</b>	No information available
<b>Flash point</b>	89-92 °C / 192-198 °F Tag Closed Cup
<b>Evaporation Rate</b>	No information available
<b>Flammability (solid, gas)</b>	No information available
<b>Flammability Limit in Air</b>	
<b>Upper flammability limit:</b>	No information available
<b>Lower flammability limit:</b>	No information available
<b>Vapor pressure</b>	No information available
<b>Vapor density</b>	No information available
<b>Density</b>	No information available
<b>Specific gravity</b>	1.05-1.07
<b>Water solubility</b>	No information available
<b>Solubility in other solvents</b>	No information available
<b>Partition coefficient</b>	No information available
<b>Autoignition temperature</b>	No information available
<b>Decomposition temperature</b>	No information available
<b>Viscosity, kinematic</b>	No information available
<b>Viscosity, dynamic</b>	No information available
<b>Explosive properties</b>	No information available
<b>Oxidizing properties</b>	No information available
<b>Molecular weight</b>	No information available
<b>Bulk density</b>	1.06 g/cm <sup>3</sup>

## 10. STABILITY AND REACTIVITY

<b>Reactivity</b>	Not applicable
<b>Chemical Stability</b>	Stable.
<b>Possibility of Hazardous Reactions</b>	None under normal processing.
<b>Hazardous polymerization</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Keep away from open flames, hot surfaces and sources of ignition.
<b>Incompatible materials</b>	None known.
<b>Hazardous Decomposition Products</b>	Carbon oxides (COx), Phosphorous oxides, Sulfur dioxide.

## 11. TOXICOLOGICAL INFORMATION

**Product Information**

<b>LD50 Oral</b>	1,097 mg/kg (rat)
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LD50 Dermal	> 5000 mg/kg (rat)
LC50 Inhalation	> 3.87 mg/L 4 hr (rat)
Serious eye damage/eye irritation	Minimally irritating (rabbit).
Skin corrosion/irritation	Non-irritating.
Sensitization	Non-sensitizing

**Information on toxicological effects**

<b>Symptoms</b>	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.
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**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

<b>Chronic toxicity</b>	Cadusafos: Prolonged exposure caused inhibition of red blood cell and brain cholinesterase, and decreased motor activity.
<b>Mutagenicity</b>	Cadusafos: Not genotoxic in laboratory studies.
<b>Carcinogenicity</b>	Cadusafos: No evidence of carcinogenicity from animal studies.
<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>Reproductive toxicity</b>	Cadusafos: No toxicity to reproduction in animal studies.
<b>Developmental toxicity</b>	Cadusafos: Not teratogenic in animal studies.
<b>STOT - single exposure</b>	Causes damage to organs. See listed target organs below.
<b>STOT - repeated exposure</b>	Causes damage to organs through prolonged or repeated exposure. See listed target organs below.
<b>Target organ effects</b>	Central Nervous System (CNS), Peripheral Nervous System (PNS)
<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>Aspiration hazard</b>	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**

<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

<b>Persistence and degradability</b>	Cadusafos: Moderately persistent. Does not readily hydrolyze. Not readily biodegradable.
<b>Bioaccumulation</b>	Cadusafos: The substance does not have a potential for bioconcentration.
<b>Mobility</b>	Cadusafos: Moderately mobile; Has some potential to reach groundwater.

### 13. DISPOSAL CONSIDERATIONS

<b>Waste disposal methods</b>	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.
<b>Contaminated Packaging</b>	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

<b>DOT</b>	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).
<b>UN/ID no</b>	UN3082
<b>Proper Shipping Name</b>	Environmentally hazardous substance, liquid, n.o.s.
<b>Hazard class</b>	Combustible
<b>Packing Group</b>	III
<b>Description</b>	UN3082, Combustible liquid, n.o.s. (aromatic hydrocarbons), PGIII
<b>TDG</b>	The "Marine Pollutant" marking is only applicable when shipped by vessel, and is not applicable when shipped only by road or rail in Canada.
<b>UN/ID no</b>	UN3082
<b>Proper Shipping Name</b>	Environmentally hazardous substance, liquid, n.o.s.
<b>Hazard class</b>	9
<b>Packing Group</b>	III
<b>Marine Pollutant</b>	Cadusafos.
<b>Description</b>	UN3082 Environmentally hazardous substance, liquid, n.o.s. (Cadusafos), 9, III, Marine Pollutant
<b>ICAO/IATA</b>	
<b>UN/ID no</b>	UN3082
<b>Proper Shipping Name</b>	Environmentally hazardous substance, liquid, n.o.s.
<b>Hazard class</b>	9
<b>Packing Group</b>	III
<b>Description</b>	UN3082 Environmentally hazardous substance, liquid, n.o.s. (Cadusafos), 9, III, Marine Pollutant
<b>IMDG/IMO</b>	
<b>UN/ID no</b>	UN3082
<b>Proper Shipping Name</b>	Environmentally hazardous substance, liquid, n.o.s.
<b>Hazard class</b>	9
<b>Packing Group</b>	III
<b>EmS No.</b>	F-A, S-F
<b>Marine Pollutant</b>	Cadusafos
<b>Description</b>	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**

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
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/ELINCS (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

Moderate risk, Grade 2

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  
 D2A - Very toxic materials



## 16. OTHER INFORMATION

NFPA	Health Hazards 2	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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**End of Safety Data Sheet**