

# Material Safety Data Sheet

## Rugby® 200 CS

MSDS #: 6044-2-A  
Revision Date: 2014-05-21  
Version 1



This MSDS has been prepared to meet U.S. OSHA Hazard Communication Standard 29 CFR 1910.1200 And Canadian Workplace Hazardous Materials Information System (WHMIS) requirements.

### 1. PRODUCT AND COMPANY IDENTIFICATION

<b>Product name</b>	Rugby® 200 CS
<b>Formula code</b>	6044
<b>Active Ingredient(s)</b>	Cadusafos
<b>Alternate Commercial Name</b>	Apache®
<b>Synonyms</b>	CADUSAFOS: S,S-di-sec-butyl O-ethyl phosphorodithioate; O-ethyl S,S-bis(1-methylpropyl) phosphorodithioate
<b>Chemical Family</b>	Organophosphate Pesticide
<b><u>Manufacturer</u></b>	<b><u>Emergency telephone number</u></b>
FMC Corporation Agricultural Solutions 1735 Market Street Philadelphia, PA 19103 General Information: Phone: (215) 299-6000 E-Mail: msdsinfo@fmc.com	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)  South Africa emergency contact: Bateleur: 083 123 3912 (24 hr) Philagro SA (Pty) Ltd.: 012 348 8808 (office hours)

### 2. HAZARDS IDENTIFICATION

<b><u>Appearance</u></b>	suspension
<b><u>Physical state</u></b>	Liquid
<b><u>Odor</u></b>	Slight mercaptan
<b>Flammable properties</b>	Combustible liquid
<b><u>Potential health effects</u></b>	
<b>Principal Routes of Exposure</b>	Eye contact, Skin contact, Inhalation, Ingestion.
<b>Acute effects</b>	
<b>Eyes</b>	May cause slight irritation.
<b>Skin</b>	Substance may cause slight skin irritation.
<b>Inhalation</b>	May cause irritation of respiratory tract.

**Ingestion**

Harmful if swallowed. Expected to produce cholinesterase inhibition including headache, lightheadedness, 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.

**Chronic effects**

Possible risks of irreversible effects. Effects are expected to be similar to those that are seen with acute toxicity.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

**Hazardous ingredients**

Chemical Name	CAS-No	Weight %
1,6-hexanediamine (70%)	124-09-4	1-5
Urea	57-13-6	5-10
Solvent Blend	64742-88-7	0.1472
Methylene diphenyl diisocyanate (polymeric)	9016-87-9	5-10
Naphthalene sulfonic acid-formaldehyde condensate, sodium salt	9084-06-4	1-5
Cadusafos	95465-99-9	19.3

### 4. FIRST AID MEASURES

**Eye contact**

Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. 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 treatment advice.

**Inhalation**

Move to fresh air. If person is not breathing, call 911 (within the U.S. and Canada) or an ambulance, then give artificial respiration, preferably by 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. 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.

**Notes to physician**

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

**Flash Point**

89 - 92 °C / 192-198 °F

<b>Method</b>	Tag Closed Cup
<b>Sensitivity to Mechanical Impact</b>	Not applicable
<b>Sensitivity to Static Discharge</b>	Not applicable
<b>Suitable extinguishing media</b>	Foam. Carbon dioxide (CO <sub>2</sub> ). Dry powder. Water spray.
<b>Protective equipment and precautions for firefighters</b>	Wear self-contained breathing apparatus and protective suit.
<b>NFPA</b>	
Health Hazard	1
Flammability	1
Stability	0
Special Hazards	-

## 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>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 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.
<b>Other</b>	For further clean-up instructions call FMC Emergency Hotline number listed in Section 1 "Product and Company Identification" above.

## 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. Store in original container only.

## 8. EXPOSURE CONTROL / PERSONAL PROTECTION

### Exposure guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
1,6-hexanediamine (70%) 124-09-4	TWA: 0.5 ppm			
Chemical Name	British Columbia	Quebec	Ontario TWAEV	Alberta
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>
Methylene diphenyl diisocyanate (polymeric) 9016-87-9				TWA: 0.005 ppm TWA: 0.07 mg/m <sup>3</sup>

### Occupational exposure 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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**Personal Protective Equipment**

<b>General Information</b>	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.
<b>Respiratory protection</b>	For dust, splash, mist or spray exposures wear a filtering mask.
<b>Eye/face protection</b>	For dust, splash, mist or spray exposure, wear chemical protective goggles or a face-shield.
<b>Skin and body protection</b>	Wear long-sleeved shirt, long pants, socks, shoes, and gloves.
<b>Hand protection</b>	Protective gloves
<b>Hygiene measures</b>	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****Information on basic physical and chemical properties**

<b>Appearance</b>	suspension
<b>Color</b>	green
<b>Physical state</b>	Liquid
<b>Odor</b>	Slight mercaptan
<b>pH</b>	7.4-7.9
<b>Melting Point/Range</b>	No information available.
<b>Freezing point</b>	No information available
<b>Boiling Point/Range</b>	Not applicable
<b>Flash Point</b>	89 - 92 °C / 192-198 °F Tag Closed Cup
<b>Evaporation rate</b>	Not applicable
<b>Flammable properties</b>	Combustible liquid
<b>Vapor pressure</b>	No information available
<b>Vapor density</b>	No information available
<b>Specific Gravity</b>	1.05 - 1.07
<b>Bulk density</b>	8.75 - 8.91 lb/gal
<b>Water solubility</b>	No information available
<b>Percent volatile</b>	No information available
<b>Partition coefficient</b>	Not applicable
<b>Viscosity</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.
<b>Hazardous polymerization</b>	Hazardous polymerization does not occur.

**11. TOXICOLOGICAL INFORMATION****Acute effects****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.

**Eye contact** Slightly or non-irritating (rabbit).  
**Skin 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 effects

**Chronic Toxicity** Possible risks of irreversible effects. Effects are expected to be similar to those that are seen with acute toxicity.

**Carcinogenicity** Cadusafos: Did not show carcinogenic effects in animal experiments. Not recognized as carcinogenic by Research Agencies (IARC, NTP, OSHA, ACGIH).

**Mutagenicity** Cadusafos: Not mutagenic. Possibly genotoxic.

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

**Neurological Effects** Cadusafos: Chronic exposure to animals has caused decreased cholinesterase activity (erythrocyte, plasma, and/or brain).

**Developmental Toxicity** Cadusafos: Not teratogenic in animal studies.

**Target Organ Effects** Central nervous system (CNS), Peripheral Nervous System (PNS), Acetylcholinesterase Inhibition.

Chemical Name	ACGIH	IARC	NTP	OSHA	NIOSH - Target Organs
Phosphoric acid					eyes, respiratory system, skin

## 12. ECOLOGICAL INFORMATION

#### Ecotoxicity

**Ecotoxicity effects** Very toxic to aquatic organisms.

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

#### Environmental Fate

**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. Not 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.

**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).

**Packaging Type**  
**Proper shipping name**  
**UN/ID No**  
**Hazard Class**  
**Packing group**  
**Description**

Bulk  
Combustible liquid, n.o.s.  
NA1993  
Combustible  
III  
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**  
**Proper shipping name**  
**Hazard Class**  
**Packing group**  
**Marine pollutant**  
**Description**

UN3082  
Environmentally hazardous substance, liquid, n.o.s.  
9  
III  
Cadusafos.  
UN3082 Environmentally hazardous substance, liquid, n.o.s. (Cadusafos), 9, PG III, Marine Pollutant

**ICAO/IATA**

**UN/ID No**  
**Proper shipping name**  
**Hazard Class**  
**Packing group**  
**Marine pollutant**  
**Description**

UN3082  
Environmentally hazardous substance, liquid, n.o.s.  
9  
III  
Cadusafos  
UN3082 Environmentally hazardous substance, liquid, n.o.s. (Cadusafos), 9, PG III, Marine Pollutant

**IMDG/IMO**

**UN/ID No**  
**Proper shipping name**  
**Hazard Class**  
**Packing group**  
**EmS No.**  
**Marine pollutant**  
**Description**

UN3082  
Environmentally hazardous substance, liquid, n.o.s.  
9  
III  
F-A, S-F  
Cadusafos  
UN3082 Environmentally hazardous substance, liquid, n.o.s. (Cadusafos), 9, 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 %
Methylene diphenyl diisocyanate (polymeric)	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

**CERCLA****TSCA Inventory (United States of America)**

Component	U.S. - TSCA (Toxic Substances Control Act) - Section 8(d) - 716.120(a) - Health and Safety Reporting - List of Substances
Methylene diphenyl diisocyanate (polymeric) 9016-87-9 ( 5-10 )	06/01/1987

**International Regulations****Mexico - Grade**

Slight risk, Grade 1

**Canada**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

**WHMIS Hazard Class**

B3 Combustible liquid

**16. OTHER INFORMATION**

Revision Date: 2014-05-21  
Reason for revision: (M)SDS sections updated.

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**End of Material Safety Data Sheet**