Material Safety Data Sheet

Rugby® 200 CS

SDS # : 6044-A
Revision Date: 2013-04-10
Version 1.01

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

1. PRODUCT AND COMPANY IDENTIFICATION

Product name Rugby® 200 CS

Formula code 6044

Active Ingredient(s) Cadusafos

Alternate Commercial Name Apache®

Synonyms FMC 67825; S,S-di-sec-butyl O-ethyl phosphorodithioate; O-ethyl S,S-bis(1-methylpropyl) phosphorodithioate

Chemical Family Organophosphate Pesticide

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

Emergency telephone number

Medical Emergencies:
(800) 331-3148 (U.S.A. & Canada)
+1 (651) 632-6793 (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

Appearance suspension

Physical state Liquid

Odor Slight mercaptan

Flammable properties Combustible liquid

Potential health effects

Principle Routes of Exposure Eye contact, Skin contact, Inhalation, Ingestion.

Acute effects

- **Eyes** May cause slight irritation.
- **Skin** Substance may cause slight skin irritation.
- **Inhalation** 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 %
Cadusafos	95465-99-9	19.3
Methylene diphenyl diisocyanate (polymeric)	9016-87-9	5-10
Urea	57-13-6	5-10
1,6-hexanediamine (70%)	124-09-4	1-5
Phosphoric acid	7664-38-2	1-5
Naphthalene sulfonic acid-formaldehyde condensate, sodium salt	9084-06-4	1-5

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
Method Tag Closed Cup

Sensitivity to Mechanical Impact not applicable
Sensitivity to Static Discharge not applicable

Suitable extinguishing media Foam. Carbon dioxide (CO_2). Dry powder. Water spray.

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

NFPA

Health Hazard	1
Flammability	1
Stability	0
Special Hazards	-

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	ACGIH TLV	OSHA PEL	NIOSH	Mexico
1,6-hexanediamine (70%) 124-09-4	TWA: 0.5 ppm			
Phosphoric acid 7664-38-2	STEL 3 mg/m³ TWA: 1 mg/m³	TWA: 1 mg/m³	IDLH: 1000 mg/m³ TWA: 1 mg/m³ STEL: 3 mg/m³	
Chemical Name	**British Columbia**	**Quebec**	**Ontario TWAEV**	**Alberta**
Methylene diphenyl diisocyanate (polymeric) 9016-87-9				TWA: 0.005 ppm TWA: 0.07 mg/m³
1,6-hexanediamine (70%) 124-09-4	TWA: 0.5 ppm	TWA: 0.5 ppm TWA: 2.3 mg/m³	TWA: 0.5 ppm	TWA: 0.5 ppm TWA: 2.4 mg/m³
Phosphoric acid 7664-38-2	TWA: 1 mg/m³ STEL: 3 mg/m³	TWA: 1 mg/m³ STEL: 3 mg/m³	TWA: 1 mg/m³ STEL: 3 mg/m³	TWA: 1 mg/m³ STEL: 3 mg/m³

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

9.1 Information on basic physical and chemical properties

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

9.2 Other information

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.
Hazardous polymerization	Hazardous polymerization does not occur.

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.

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 Toxicity - Other Ingredient(s)

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 No toxicity to reproduction.

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 LC50	Aquatic organisms	1.6	µg/L
	96 h LC50	Fish	130	µg/L
	LD50 Oral	Bobwhite quail	16	mg/kg
	LD50 Oral	Mallard duck	230	mg/kg
	LD50	Bee	1.86 - 2.07	µg/bee

Chemical Name	Toxicity to algae	Toxicity to fish	Toxicity to microorganisms	Toxicity to daphnia and other aquatic invertebrates

Urea		LC50 16200-18300 mg/L Poecilia reticulata 96 h		EC50 > >10000 mg/L 24 h EC50 3910 mg/L 48 h
1,6-hexanediamine (70%)	15 mg/L EC50 72 h (Pseudokirchneriella subcapitata) 14.8 mg/L EC50 96 h (Pseudokirchneriella subcapitata)	LC50> >56 mg/L Lepomis macrochirus 96 h LC50 62 mg/L Leuciscus idus 96 h LC50 1825 mg/L Pimephales promelas 96 h		EC50 23.4 mg/L 48 h
Phosphoric acid		LC50 3 - 3.5 mg/L Gambusia affinis 96 h		EC50 4.6 mg/L 12 h

Environmental Fate

Cadusafos (95465-99-9)

Active Ingredient(s)	Type of Test	Result
Cadusafos	Bioconcentration factor (BCF) Bluefill sunfish (Lepomis macrochirus)	220
	log Pow	3.9
	Mobility in soil	Potential to contaminate groundwater in high sandy soils, with lower mobility in heavier textured soils.
	Stability in water	Stable to hydrolysis over a wide range of pH values.

Chemical Name	**log Pow**
Urea	-1.59
1,6-hexanediamine (70%)	0.02

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 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 Bulk
Proper shipping name Combustible liquid, n.o.s.
UN/ID No NA1993
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.

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

IMDG/IMO

UN/ID No	UN3082
Proper shipping name	Environmentally hazardous substance, liquid, n.o.s.
Hazard Class	9
Packing group	III
EmS No.	F-A, S-F
Marine pollutant	Cadusafos

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

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs
Phosphoric acid	5000 lb	

TSCA Inventory (United States of America)

Chemical Name	U.S. - TSCA (Toxic Substances Control Act) - Section 8(d) - 716.120(a) - Health and Safety Reporting - List of Substances
Methylene diphenyl diisocyanate (polymeric)	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

Component	NPRI
Phosphoric acid 7664-38-2 (1-5)	X

16. Other information

Revision Date: 2013-04-10
Reason for revision: (M)SDS sections updated.

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End of Material Safety Data Sheet