

MATERIAL SAFETY DATA SHEET

RUGBY® 200 CS INSECTICIDE / NEMATICIDE



MSDS Ref. No.: 95465-99-9-6

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This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200. The information contained herein is for the concentrate as packaged, unless otherwise noted.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: RUGBY® 200 CS INSECTICIDE / NEMATICIDE
PRODUCT CODE: 6044
ACTIVE INGREDIENT(S): Cadusafos
CHEMICAL FAMILY: Organophosphate Pesticide
MOLECULAR FORMULA: $C_{10}H_{23}O_2PS_2$ (cadusafos)
SYNONYMS: FMC 67825; O-ethyl S,S-di-sec-butyl phosphorodithioate; IUPAC: S,S-di-sec-butyl O-ethyl phosphorodithioate
ALTERNATE PRODUCT NAME(S): Apache® 200 CS

MANUFACTURER

FMC CORPORATION
Agricultural Products Group
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EMERGENCY TELEPHONE NUMBERS

(800) 331-3148 (Medical - U.S.A. & Canada)
(651) 632-6793 (Medical - Collect - All Other Countries)

For leak, fire, spill, or accident emergencies, call:
(800) 424-9300 (CHEMTREC - U.S.A. & Canada)
(703) 527-3887 (CHEMTREC - Collect - All Other Countries)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- Milky green liquid with a slight mercaptan odor.
- Moderately combustible. May support combustion if heated above the product's flash point (see Section 9, "Physical and Chemical Properties" below).
- Thermal decomposition and burning may form toxic by-products.
- For large exposures or fire, wear personal protective equipment.
- Highly toxic to fish and aquatic organisms. Keep out of drains and water courses.
- Harmful if swallowed.

POTENTIAL HEALTH EFFECTS: Effects from overexposure result from absorption through the skin or eyes. Symptoms of overexposure include headache, light-headedness, weakness, abdominal cramps, nausea, excessive salivation, perspiration, blurred vision, tearing, pin-point pupils, blue skin color, convulsions, tremor and coma.

MEDICAL CONDITIONS AGGRAVATED: See "Notes to Medical Doctor" in Section 4 below.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt. %	EC No.	EC Class
Cadusafos	95465-99-9	19.3	None	T+, N; R25-26/27-50/53
Aromatic Hydrocarbons	64742-94-5	<9	265-198-5	Xn; R65
Urea	57-13-6	<5.3	224-929-8	Not classified

4. FIRST AID MEASURES

EYES: Flush with water for at least 15 minutes. If irritation occurs and persists, obtain medical attention.

SKIN: Wash with plenty of soap and water.

INGESTION: Do not induce vomiting and do not give liquids of any kind to the person. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: This product has low oral, dermal and inhalation toxicity. It is minimally irritating to the eyes and non-irritating to the skin. 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 (Protopam®, Ayerst®) 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. Contains aromatic hydrocarbons that may produce a severe pneumonitis if aspirated during vomiting. Consideration should be given to gastric lavage with an endotracheal tube in place. Treatment is otherwise

controlled removal of exposure followed by symptomatic and supportive care. Some individuals have a genetically determined low level of plasma pseudocholinesterase. These persons are particularly vulnerable to the action of the muscle-paralyzing drug succinylcholine, often administered to surgical patients. They may be unusually sensitive to organophosphate toxicity; this has not yet been proven. Patients with advanced liver disease, malnutrition, chronic alcoholism and dermatomyositis exhibit low plasma cholinesterase activities. Some cholinesterase depression may occur during early stages of pregnancy or with use of birth control pills.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Foam, CO₂ or dry chemical. Soft stream water fog only if necessary. Contain all runoff.

FIRE / EXPLOSION HAZARDS: Moderately combustible. When heated above the flash point, this material releases vapors which, when mixed with air, can burn or be explosive.

FIRE FIGHTING PROCEDURES: Isolate fire area. Evacuate downwind. Wear full protective clothing and self-contained breathing apparatus. Do not breathe smoke, gases or vapors generated.

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Isolate and post spill area. Wear protective clothing and personal protective equipment as prescribed in Section 8, "Exposure Controls/Personal Protection". Keep unprotected persons and animals out of the area.

Keep material out of lakes, streams, ponds and sewer drains. Dike to confine spill and absorb with a non-combustible absorbent such as clay, sand or soil. Vacuum, shovel or pump waste into a drum and label contents for disposal.

To clean and neutralize spill area, tools and equipment, wash with a suitable solution (i.e., bleach or caustic/soda ash and either ethylene glycol or an appropriate alcohol, i.e., methanol, ethanol or isopropanol). Follow this by washing with a strong soap and water solution. Absorb as above, any excess liquid and add to the drums of waste already collected. Repeat if necessary. Dispose of drummed waste according to the method outlined in Section 13, "Disposal Considerations".

7. HANDLING AND STORAGE

HANDLING AND STORAGE: Store in a cool, dry, well-ventilated place. Do not use or store near heat, open flame or hot surfaces. Store in original containers only. Keep out of reach of children and animals. Do not contaminate other pesticides, fertilizers, water, food or feed by storage or disposal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Aromatic Hydrocarbons			18 ppm

ENGINEERING CONTROLS: Use local exhaust at all process locations where vapor or mist may be emitted. Ventilate all transport vehicles prior to unloading.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: For splash, mist or spray exposure, wear chemical protective goggles or a face shield.

RESPIRATORY: For splash, mist or spray exposures wear, as a minimum, a properly fitted half-face or full-face air-purifying respirator which is approved for pesticides (U.S. NIOSH/MSHA, EU CEN or comparable certification organization). Respirator use and selection must be based on airborne concentrations.

PROTECTIVE CLOTHING: Depending upon concentrations encountered, wear coveralls or long-sleeved uniform and head covering. For larger exposures as in the case of spills, wear full body cover barrier suit, such as a PVC suit. Leather items - such as shoes, belts and watchbands - that become contaminated should be removed and destroyed. Launder all work clothing before reuse (separately from household laundry).

GLOVES: Wear chemical protective gloves made of materials such as nitrile, Viton® brand or PVA materials. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks

WORK HYGIENIC PRACTICES: 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 at the end of the workday.

COMMENTS:

Personal protective recommendations for mixing or applying this product are prescribed on the product label. Information stated above provides useful, additional guidance for individuals whose use or handling of this product is not guided by the product label.

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	Slight mercaptan
APPEARANCE:	Milky green liquid
DENSITY / WEIGHT PER VOLUME:	1.05 - 1.07 @ 21°C 8.75 - 8.91 lb/gal. (1050 - 1070 g/L)
FLASH POINT:	89 - 92°C (192 - 198°F) (TCC)
MOLECULAR WEIGHT:	270.4 (cadusafos)
pH:	7.4 - 7.9 @ 21°C (aqueous dispersion)

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Excessive heat and fire.
STABILITY:	Stable
POLYMERIZATION:	Will not occur
HAZARDOUS DECOMPOSITION PRODUCTS:	Carbon monoxide, carbon dioxide, sulfur dioxide and phosphorus pentoxide.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Minimally irritating

SKIN EFFECTS: Non-irritating

DERMAL LD₅₀: > 5,000 mg/kg (rat)

ORAL LD₅₀: 1,097 mg/kg (rat)

INHALATION LC₅₀: > 3.87 mg/l (4 h) (rat) Maximum attainable concentration

ACUTE EFFECTS FROM OVEREXPOSURE: This product has low oral, dermal and inhalation toxicity. It is minimally irritating to the eyes and non-irritating to the skin. 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. Inhalation of aromatic hydrocarbon vapors may cause dizziness, disturbances in vision, drowsiness, respiratory irritation, and eye, skin and mucous membrane irritation.

Vomiting after ingestion of this product may cause aspiration of aromatic hydrocarbons into the lungs, which may result in fatal pulmonary edema.

CHRONIC EFFECTS FROM OVEREXPOSURE: No data available for the formulation. In studies with laboratory animals, cadusafos did not cause reproductive toxicity, teratogenicity or carcinogenicity. Chronic exposure of laboratory animals to cadusafos caused decreased erythrocyte and plasma cholinesterase activity levels. An overall absence of genotoxicity has been demonstrated in mutagenicity testing with cadusafos, although it did cause a positive response in the cell transformation assay, but only in the presence of metabolic activation. Chronic exposure to aromatic hydrocarbons may cause headaches, dizziness, loss of sensations or feelings (such as numbness), and liver and kidney damage. Chronic exposure to high concentrations of urea may result in damage to the eyes. Urea is irritating to bodily tissues and may cause pain and necrosis, including thrombosis.

CARCINOGENICITY:

NTP:	Not listed
IARC:	Not listed
OSHA:	Not listed
OTHER:	Not Listed (ACGIH)

12. ECOLOGICAL INFORMATION

Unless otherwise indicated, the data presented below are for the active ingredient(s).

ENVIRONMENTAL DATA: Cadusafos has a half-life in soil of approximately 45 days, which varies somewhat by soil type. The hydrolysis half-life of cadusafos is between 29 to 35 days in the pH region of 5 to 9. It is moderately mobile in soil and has a Log Pow of 3.9. This value, in association with a bioconcentration factor of 220, suggests that there will be little potential for bioaccumulation in the environment.

ECOTOXICOLOGICAL INFORMATION: With LC₅₀ values of 1.6 µg/L to 170 µg/L to fish and aquatic arthropods in the laboratory, cadusafos is considered highly toxic. The aquatic arthropods are more sensitive than the fish. Care should be taken to avoid contamination of the aquatic environment. Cadusafos is also considered highly toxic to upland game birds (oral LD₅₀ = 16.4 mg/kg, bobwhite quail) and moderately toxic to waterfowl (oral LD₅₀ = 230 mg/kg, mallard).

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Open dumping or burning of this material or its packaging is prohibited. If spilled material cannot be disposed of by use according to label instructions, an acceptable method of disposal is to incinerate in accordance with local, state and national environmental laws, rules, standards and regulations. However, because acceptable methods of disposal may vary by location and regulatory requirements may change, the appropriate agencies should be contacted prior to disposal.

EMPTY CONTAINER: Non-returnable containers that held this material should be cleaned, prior to disposal, by triple rinsing. Containers which held this material may be cleaned by being triple-rinsed, and recycled, with the rinsate being incinerated. Do not cut or weld metal containers. Vapors that form may create an explosion hazard.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PACKAGING TYPE:	Non-Bulk
U. S. SURFACE FREIGHT CLASS:	Insecticides, NOI, other than Class A Poison. NMFC Item 102120.
ADDITIONAL INFORMATION:	This product is not a hazardous material when shipped in non-bulk packages within the U.S.A.

PACKAGING TYPE:	Bulk
PROPER SHIPPING NAME:	Combustible liquid, n.o.s.
TECHNICAL NAME(S):	Aromatic hydrocarbons
PRIMARY HAZARD CLASS / DIVISION:	3
UN/NA NUMBER:	NA 1993
PACKING GROUP:	III
MARINE POLLUTANT:	Cadusafos
PLACARD(S):	Combustible
MARKING(S):	NA 1993, Marine Pollutant

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PROPER SHIPPING NAME:	Environmentally hazardous substance, liquid, n.o.s.
TECHNICAL NAME(S):	Cadusafos
PRIMARY HAZARD CLASS / DIVISION:	9
UN/NA NUMBER:	UN 3082
PACKING GROUP:	III
MARINE POLLUTANT:	Cadusafos
LABEL(S):	9
PLACARD(S):	9

MARKING(S): Environmentally hazardous substance,
liquid, n.o.s., (Cadusafos), UN 3082 +
Marine Pollutant

ADDITIONAL INFORMATION: EmS Number: F-A, S-F

ADR - EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD

PROPER SHIPPING NAME: Environmentally hazardous substance,
liquid, n.o.s.

TECHNICAL NAME(S): Cadusafos

PRIMARY HAZARD CLASS / DIVISION: 9

CLASSIFICATION CODE: M6

UN/NA NUMBER: UN3082

PACKING GROUP: III

HAZARD IDENTIFICATION NUMBER: 90

MARINE POLLUTANT: Cadusafos

LABEL(S): 9

PLACARD(S): 9

MARKING(S): UN 3082 + Marine Pollutant

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

ADDITIONAL INFORMATION: Not regulated as a hazardous material

OTHER INFORMATION:

HARMONIZED SYSTEM:
Import to the U.S.A.: 3808.91.5000
Export from the U.S.A.: 3808.91.0000

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):

Not listed

SECTION 311 HAZARD CATEGORIES (40 CFR 370):

Immediate, Delayed, Fire

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):

The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.:
None

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):

There are no ingredients in this product, which are subject to Section 313 reporting requirements.

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)**CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):**

Not listed

HAZARD AND RISK PHRASE DESCRIPTIONS:

EC Symbols:	T+	(Very Toxic)
	N	(Dangerous for the environment)
EC Risk Phrases:	R25	(Toxic if swallowed.)
	R26/27	(Very toxic by inhalation and in contact with skin)
	R50/53	(Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.)
	R65	(Harmful: may cause lung damage if swallowed.)

Product Classification:

EC Symbols:	Xn	(Harmful)
	N	(Dangerous for the environment)
EC Risk Phrases:	R22	(Harmful if swallowed.)
	R50/53	(Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.)
	R66	(Repeated exposure may cause skin dryness or cracking.)
EC Safety Phrases:	S2	(Keep out of the reach of children.)
	S24	(Avoid contact with skin.)
	S29	(Do not empty into drains.)

16. OTHER INFORMATION

NFPA

Health	1
Flammability	2
Reactivity	0
Special	None

No special requirements

NFPA (National Fire Protection Association)

Degree of Hazard Code:

4 = Extreme

3 = High

2 = Moderate

1 = Slight

0 = Insignificant

REVISION SUMMARY:

This MSDS replaces Revision #4, dated May 1, 2006.

Changes in information are as follows:

Section 1 (Product and Company Identification)

Section 14 (Transport Information)

Section 15 (Regulatory Information)

Section 16 (Other Information)

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