

Material Safety Data Sheet
RUGBY® 10 G (GR) NEMATICIDE/INSECTICIDE (BIODAC™)

MSDS #: 1489-A
Revision Date: 2013-07-08
Version 1.03



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

Product name	RUGBY® 10 G (GR) NEMATICIDE/INSECTICIDE (BIODAC™)
Formula code	1489
Active Ingredient(s)	Cadusafos
Alternate Commercial Name	Apache® 10 G Nematicide/Insecticide
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: 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

Appearance	granules
Physical state	solid
Odor	musty
Flammable properties	Finely dispersed particles can form explosive mixtures in air.
Potential health effects Principle Routes of Exposure Acute effects	Eye contact, Skin contact, Inhalation, Ingestion.
Eyes	May cause slight irritation.
Skin	Very toxic in contact with skin. May cause sensitization by skin contact.
Inhalation	May be very toxic by inhalation.
Ingestion	Very toxic 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 %
Trade Secret	Proprietary	80-90
Cadusafos	95465-99-9	10

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. 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.

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 Finely dispersed particles can form explosive mixtures in air.

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

Suitable extinguishing media Foam. Carbon dioxide (CO₂). Dry powder. Water spray.

Specific hazards arising from the chemical Slightly combustible. May support combustion at elevated temperatures.

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

NFPA

Health Hazard	3
Flammability	1
Stability	0
Special Hazards	-

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	Isolate and post spill area. 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 cleaning up	Sweep up and shovel into suitable containers for disposal. 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 CONTROL / PERSONAL PROTECTION

Exposure guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
Trade Secret	TWA: 10 mg/m ³	TWA: 15 mg/m ³ TWA: 5 mg/m ³	TWA: 10 mg/m ³ TWA: 5 mg/m ³	
Chemical Name	British Columbia	Quebec	Ontario TWAEV	Alberta
Trade Secret	TWA: 10 mg/m ³ TWA: 3 mg/m ³	TWA: 10 mg/m ³	TWA: 10 mg/m ³	TWA: 10 mg/m ³

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 full-face elastomeric half mask respirator with appropriate cartridges and/or filters, which is approved for pesticides (U.S. NIOSH/MSHA, EU CEN or comparable certification organization).
Eye/face protection	For dust, splash, mist or spray exposure, wear chemical protective goggles or a face-shield.
Skin and body protection	Chemical resistant suit, footwear, gloves and headgear should be worn.

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

Information on basic physical and chemical properties

Appearance	granules
Color	gray, dark gray
Physical state	solid
Odor	musty
pH	6.8
Melting Point/Range	No information available.
Freezing point	No information available.
Boiling Point/Range	not applicable
Flash Point	not applicable
Evaporation rate	not applicable
Flammable properties	Finely dispersed particles can form explosive mixtures in air.
vapor pressure	No information available.
Vapor density	No information available.
Specific Gravity	0.81-0.89
Bulk density	45 - 55 lb/cu ft
Water solubility	248 ppm
Percent volatile	No information available.
Partition coefficient:	not applicable
Viscosity	No information available.

10. STABILITY AND REACTIVITY

Stability	Stable.
Conditions to avoid	Excessive heat, 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 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).

**RUGBY® 10 G (GR) NEMATICIDE/INSECTICIDE
(BIODAC™)**

MSDS #: 1489-A

Revision Date: 2013-07-08

Version 1.03

LD50 Dermal > 2000 mg/kg (rabbit)
LD50 Oral 598 mg/kg (Rat)
LC50 Inhalation: Cadusafos: 0.026 mg/L 4 hr (Rat)

Sensitization 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 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
Trade Secret					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
Trade Secret		96-hour LC50 > 100%, saturated solution, NOEC = 100% (rainbow trout)		48-hour LC50 > 100%, saturated solution, NOEC = 100% (daphnia)

Environmental Fate

Cadusafos (95465-99-9)		
Active Ingredient(s)	Type of Test	Result
Cadusafos	Bioconcentration factor (BCF) Bluefill sunfish (<i>Lepomis macrochirus</i>)	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.

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 not a hazardous material as defined by U.S. Department of Transportation at 49 CFR Parts 100 through 185.

Packaging Type Bulk, Non-Bulk

TDG The "Marine Pollutant" marking is only applicable when shipped by vessel or air, and is not applicable when shipped only by road or rail in Canada.

UN/ID No UN3077
Hazard Class 9
Packing group III
Marine pollutant Cadusafos.
Description UN3077, Environmentally hazardous substance, solid, n.o.s. (Cadusafos), 9, PGIII, Marine Pollutant

ICAO/IATA
UN/ID No UN3077
Hazard Class 9
Packing group III
Marine pollutant Cadusafos
Description UN3077, Environmentally hazardous substance, solid, n.o.s. (Cadusafos), 9, PGIII, Marine Pollutant

IMDG/IMO
UN/ID No UN3077
Hazard Class 9
Marine pollutant Cadusafos
Description UN3077, Environmentally hazardous substance, solid, n.o.s. (Cadusafos), 9, PGIII, 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 does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

Acute Health Hazard	yes
Chronic Health Hazard	yes
Fire Hazard	no
Sudden Release of Pressure Hazard	no
Reactive Hazard	no

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

International Regulations

Mexico - Grade

Serious risk, Grade 3

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

D1B Toxic materials
D2A Very toxic materials



16. OTHER INFORMATION

Revision Date: 2013-07-08
Reason for revision: (M)SDS sections updated.

Disclaimer

FMC Corporation believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specified product designated and may not be applicable where such product is used in combination with any other materials or in any process. Use of this product is regulated by the U.S. Environmental Protection Agency (EPA). It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Further, since the conditions and methods of use are beyond the control of FMC Corporation, FMC corporation expressly disclaims any and all liability as to any results obtained or arising from any use of the products or reliance on such information.

Prepared By

FMC Corporation
FMC Logo and Rugby - Trademarks of FMC Corporation

© 2013 FMC Corporation. All Rights Reserved.

End of Material Safety Data Sheet