



FMC "Planting Life Together"
MATERIAL SAFETY DATA SHEET

MSDS #: 6044-A

Revision date: 2016-06-01

Version 1.01

Rugby® 200 CS

Recommended Use: Insecticide, Nematicide

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	Rugby® 200 CS
Formula code	6044
Active Ingredient(s)	Cadusafos
Synonyms	CADUSAFOS: S,S-di-sec-butyl O-ethyl phosphorodithioate (IUPAC name); O-ethyl S,S-bis(1-methylpropyl) phosphorodithioate (CAS Name)
Formula	C ₁₀ H ₂₃ O ₂ PS ₂ (Cadusafos)
Chemical Family	Organophosphate Pesticide
Registrant	FMC Agroquímica de México, S. de R.L. de C.V. Av. Vallarta No. 6503, Local A1-6, Col. Cd. Granja, 45010 Zapopan, Jalisco, México. Telephone number: 01 800 FMC AGRO (362 2476)
Distributor	FMC Agroquímica de México, S. de R.L. de C.V.
Emergency telephone number	In case of intoxication call emergency numbers SINTOX (poison control center): 01-800-00-928-00; 01 (55) 5611 2634 and 01 (55) 5598 6659, 24 hour service 365 days a year.
Federal Transport Police	062
Fire brigade	068
Red Cross	065
Civil Protection	01 800 004 1300
PROFEPA = Attorney General for Environmental Protection	01 800 776 3372
SETIQ [Emergency Transportation System for the Chemical Industry]	From anywhere in the Mexican Republic: 01 800 002 1400 (24 hour) In Mexico City and the Metropolitan area: 01 (55) 5559 1588
In case of spills call COTRA (Committee on Transport and Storage):	045 55 4194 0157
Green Angels (if there are injured people)	078

2. HAZARDS IDENTIFICATION

<u>Appearance</u>	Suspension
<u>Physical State</u>	Liquid
<u>Odor</u>	Slight mercaptan
<u>Flash point</u>	89 - 92 °C / 192-198 °F
<u>Flammable properties</u>	Combustible liquid
<u>Acute Effects</u>	

Eyes
Skin
Inhalation
Ingestion

May cause slight irritation.
 Substance may cause slight skin irritation.
 May cause irritation of respiratory tract.
 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

See Section 11 for additional Toxicological Information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous ingredients

Chemical name	CAS-No	Weight %
Cadusafos	95465-99-9	20.6
Methylene diphenyl diisocyanate (polymeric)	9016-87-9	5-10
1,6-hexanediamine (70%)	124-09-4	1-5
Naphtha (petroleum), heavy aromatic	64742-94-5	1-5
Phosphoric acid	7664-38-2	1-5
1-Methylnaphthalene	90-12-0	1-5

Exposure Guidelines

See Section 8 "Exposure Controls/Personal Protection" for specific details.

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 further treatment advice.
Inhalation	Move person from contaminated area to fresh air. Seek medical attention immediately. If person is not breathing, give artificial respiration, preferably by mouth-to-mouth, if possible.
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	In case of intoxication call emergency numbers SINTOX (poison control center): 01-800-00-928-00; 01 (55) 5611 2634 and 01 (55) 5598 6659, 24 hour service 365 days a year.

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.
Hazardous Decomposition Products	Carbon oxides (COx), Phosphorous oxides, Sulfur dioxide
Protective equipment and precautions for firefighters	Wear self-contained breathing apparatus and protective suit

NFPA	
Health Hazards	2
Flammability	2
Stability	0
Special Hazards	-

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Identify the substance from a safe place. Do not inhale, do not touch and do not walk through spilled material. Isolate the area to ensure sufficient breadth to individuals and to facilitate the work control and cleaning. Keep away from unauthorized personnel. Call the emergency phones COTRA (Committee on Transport and Storage) 045 55 4194 0157 and wait for help. Stay upwind and out of low areas. Always have a fire extinguisher available, preferably dry chemical (PQS).
Environmental Precautions	Keep people and animals away and upstream of the spill / leak. Keep the material out of lakes, streams, ponds and drains.
Methods for Containment	Wear the full Personal Protection Equipment, avoiding inhalation or contact with skin or eyes. Dike to contain spill with inert material which is absorbent and non-combustible (clay, sand or soil). Then soak up with absorbent material inward from the edges.
Methods for cleaning up	Transfer spilled material to plastic bags with a shovel or dustpan and broom using non-sparking tools, if possible. Clean and neutralize spill area, tools and equipment with a solution of caustic soda and detergent or an appropriate alcohol (e.g., methanol, ethanol or isopropanol). Continue washing with a strong solution of soap and water, using the least amount possible. Absorb rinsate and add it to the waste collected. Repeat if necessary. Then place the bags in a plastic container. Waste container must be classified and labeled prior to disposal. Before re-entering the area where the spill occurred, ventilate closed spaces at least 15 minutes. For waste disposal, see indications in Section 13.
Other	For further cleaning instructions call COTRA (COMMITTEE ON TRANSPORT AND STORAGE) 045 55 4194 0157.

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. Keep/store only in original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
1,6-hexanediamine (70%)	TWA: 0.5 ppm			
Phosphoric acid	STEL 3 mg/m ³ TWA: 1 mg/m ³	TWA: 1 mg/m ³	IDLH: 1000 mg/m ³ TWA: 1 mg/m ³ STEL: 3 mg/m ³	Mexico: TWA 1 mg/m ³ Mexico: STEL 3 mg/m ³
1-Methylnaphthalene	TWA: 0.5 ppm			
Chemical name	British Columbia	Quebec	Ontario TWA EV	Alberta
Methylene diphenyl diisocyanate (polymeric)				TWA: 0.005 ppm TWA: 0.07 mg/m ³
1,6-hexanediamine (70%)	TWA: 0.5 ppm	TWA: 0.5 ppm TWA: 2.3 mg/m ³	TWA: 0.5 ppm	TWA: 0.5 ppm TWA: 2.4 mg/m ³
Phosphoric acid	TWA: 1 mg/m ³ STEL: 3 mg/m ³	TWA: 1 mg/m ³ STEL: 3 mg/m ³	TWA: 1 mg/m ³ STEL: 3 mg/m ³	TWA: 1 mg/m ³ STEL: 3 mg/m ³

1-Methylnaphthalene	TWA: 0.5 ppm Skin		TWA: 0.5 ppm Skin	
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Occupational exposure controls**Engineering measures**

Apply technical measures to comply with the occupational exposure limits (if listed above). When working in confined spaces (tanks, containers, etc.), Make sure there is an adequate source of air for breathing and wear the recommended equipment. Ventilate all transport vehicles prior to discharge.

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 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.

Eye/Face Protection

For exposure to mists or sprays, wear safety goggles or face shield for chemical agents.

Skin and Body Protection

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).

Hand Protection

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.

Hygiene measures

Must have clean water available for washing in case of eye or skin contamination. Wash skin before eating, drinking, chewing gum, or using snuff. Shower after work. Remove contaminated clothing and wash before reuse. Wash all work clothing separately; do not mix with household laundry.

9. PHYSICAL AND CHEMICAL PROPERTIES

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	Not applicable
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	Not applicable
Vapor density	Not applicable
Specific gravity	1.06
Bulk Density	1.06 g/cm ³
Water solubility	Not applicable
Percent Volatile	Not applicable
Partition coefficient	Not applicable
Viscosity	434-446 cP @ 6 rpm

10. STABILITY AND REACTIVITY

Stability	Stable.
Conditions to Avoid	Keep away from open flames, hot surfaces and sources of ignition.
Materials to avoid	None known.
Hazardous Decomposition Products	Carbon oxides (COx), Phosphorous oxides, Sulfur dioxide.
Hazardous polymerization	Hazardous polymerization does not occur.
Hazardous reactions	None under normal processing.

11. TOXICOLOGICAL INFORMATION

Acute Effects

Principal Routes of Exposure Eye Contact, Skin Contact, Inhalation, Ingestion.

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 Minimally irritating (rabbit)
Skin Contact 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-sensitizing

Chronic Effects

Chronic toxicity Cadusafos: Prolonged exposure caused inhibition of red blood cell and brain cholinesterase, and decreased motor activity.

Carcinogenicity Cadusafos: No evidence of carcinogenicity from animal studies.

Mutagenicity Cadusafos: Not genotoxic in laboratory studies.

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

Neurological effects Cadusafos: Chronic exposure to animals caused decreased motor activity and decreased cholinesterase activity in brain, red blood cells and plasma.

Developmental toxicity Cadusafos: Not teratogenic in animal studies.

Target organ effects Central Nervous System (CNS), Peripheral Nervous System (PNS)

Chemical name	ACGIH	IARC	NTP	OSHA	NIOSH - Target Organs
Silica, amorphous, fumed		Group 3			
Sodium Hydroxide					eyes, respiratory system, skin
Copper naphthenate		Group 2A			
FD & C Blue No.1		Group 3			
Methyl alcohol					eyes, CNS, skin, GI tract, respiratory system

Phosphoric acid					eyes, respiratory system, skin
Methyl acetate					eyes, CNS, respiratory system, skin
Polyvinyl Alcohol		Group 3			
Methylene diphenyl diisocyanate (polymeric)		Group 3			
Naphthalene	A3	Group 2B	Reasonably Anticipated	X	eyes, blood, liver, kidneys, skin, CNS
Cadusafos		Group 2A			

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 Cadusafos: Moderately persistent. Does not readily hydrolyze. Not readily biodegradable.

Bioaccumulation Cadusafos: The substance does not have a potential for bioconcentration.

Mobility Cadusafos: Moderately mobile; Has some potential 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 Containers should be disposed of in accordance with local, state and federal regulations. For removal of the package see the instructions on the label. Handle empty containers and waste product as established in the General Law for the Prevention and Management of Waste Regulations or Management Plan Pesticides Empty Containers, Registered by SEMARNAT. For further information on the Management plan, visit <http://campolimpio.org.mx/>.

14. TRANSPORT INFORMATION

Packaging Type	Bulk
Proper Shipping Name	Environmentally hazardous substance, liquid, n.o.s.
UN/ID no	UN3082
Hazard class	9
Packing Group	III
Marine Pollutant	Cadusafos
Description	UN3082, Environmentally hazardous substance, liquid, n.o.s. (Cadusafos), 9, PGIII, Marine

Pollutant

15. REGULATORY INFORMATION

The document consists of 16 points which cover the 12 points of the official Mexican Regulation NOM-018-STPS-2000 system for the identification and communication of hazards and risks of dangerous chemical substances, which found in the workplace 271000.

COFEPRIS [Federal Commission for the Protection Against Sanitary Risks] Register:
RSCO-NEMA-0904-306-064-021

16. OTHER INFORMATION

Revision date: 2016-06-01
Reason for revision: (M)SDS sections updated.

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End of Safety Data Sheet