



Material Safety Data Sheet

PUMA® 1EC HERBICIDE

MSDS Number: 102000000828

MSDS Version 3.0

Revision Date: 02/04/2010

SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product name PUMA® 1EC HERBICIDE
MSDS Number 102000000828
EPA Registration No. 264-666

Bayer CropScience
 2 T.W. Alexander Drive
 Research Triangle PK, NC 27709
 USA

For MEDICAL, TRANSPORTATION or other EMERGENCY call: 1-800-334-7577 (24 hours/day)
 For Product Information call: 1-866-99BAYER (1-866-992-2937)

SECTION 2. HAZARDS IDENTIFICATION

NOTE: Please refer to Section 11 for detailed toxicological information.

Emergency Overview Warning! Causes substantial but temporary eye injury. Harmful if swallowed. Do not get in eyes, on skin, or on clothing. Wash thoroughly with soap and water after handling.

Physical State liquid
Odor aromatic
Appearance yellowish
Exposure routes Eye contact, Skin contact, Inhalation, Ingestion

Immediate Effects
Eye Severe eye irritation Do not get in eyes.
Skin Severe skin irritation Do not get on skin or clothing.
Ingestion Harmful if swallowed. Do not take internally.
Inhalation Do not breathe vapours or spray mist.

Chronic or Delayed Long-Term This product or its components may have target organ effects. This product is not listed by NTP, IARC or regulated as a carcinogen by OSHA.

Potential Environmental Effect Toxic to fish and aquatic organisms.



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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Hazardous Component Name</u>	<u>CAS-No.</u>	<u>Average % by Weight</u>
Fenoxaprop-P-ethyl	71283-80-2	11.53
Mefenpyr-diethyl	135590-91-9	3.39
Naphthalene	91-20-3	7.37

SECTION 4. FIRST AID MEASURES

General	When possible, have the product container or label with you when calling a poison control center or doctor or going for treatment.
Eye	Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a physician or poison control center immediately.
Skin	Take off contaminated clothing and shoes immediately. Wash off immediately with plenty of water for at least 15 minutes. Call a physician or poison control center immediately.
Ingestion	Call a physician or poison control center immediately. Rinse out mouth and give water in small sips to drink. DO NOT induce vomiting unless directed to do so by a physician or poison control center. Never give anything by mouth to an unconscious person. Do not leave victim unattended.
Inhalation	Move to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a physician or poison control center immediately.
Notes to physician	
Signs and Symptoms	Local Irritation Systemic: Gastrointestinal disturbance
Hazards	Risk of pneumonia.
Treatment	There is no specific antidote. Appropriate supportive and symptomatic treatment as indicated by the patient's condition is recommended.

SECTION 5. FIRE FIGHTING MEASURES

Flash point	108 °C / 226 °F
Explosiveness	Not explosive



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Fire and Explosion Hazards	In the event of fire the following may be released: Carbon monoxide (CO) nitrogen oxides (NOx) Sulphur oxides Hydrogen chloride (HCl)
Suitable extinguishing media	Water spray, Alcohol-resistant foam, Carbon dioxide (CO2), Dry powder
Fire Fighting Instructions	Evacuate personnel to safe areas. Avoid contact with spilled product or contaminated surfaces. Keep out of smoke. Fight fire from upwind position. Cool closed containers exposed to fire with water spray. Do not allow run-off from fire fighting to enter drains or water courses. Firefighters should wear NIOSH approved self-contained breathing apparatus and full protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	Keep unauthorized people away. Evacuate and isolate spill area. Avoid contact with spilled product or contaminated surfaces. Use personal protective equipment. Remove all sources of ignition.
Methods for cleaning up	Dike area to prevent runoff. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Collect and transfer the product into a properly labelled and tightly closed container. Contaminated soil may have to be removed and disposed. Clean contaminated floors and objects thoroughly, observing environmental regulations.
Additional advice	Information regarding safe handling, see section 7. Information regarding personal protective equipment, see section 8. Information regarding waste disposal, see section 13. Do not allow to enter soil, waterways or waste water canal. Do not allow product to contact vegetation.

SECTION 7. HANDLING AND STORAGE

Handling procedures	Handle and open container in a manner as to prevent spillage. Use only in area provided with appropriate exhaust ventilation. Maintain exposure levels below the exposure limit through the use of general and local exhaust ventilation. Keep away from heat and sources of ignition.
Storing Procedures	Store in original container. Keep away from direct sunlight. Keep containers tightly closed in a dry, cool and well-ventilated place.



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Protect from freezing.

Keep away from food, drink and animal feedingstuffs.

Work/Hygienic Procedures

Handle in accordance with good industrial hygiene and safety practice. Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, using the toilet or applying cosmetics.

Remove soiled clothing immediately and clean thoroughly before using again. Wash thoroughly and put on clean clothing.

Min/Max Storage Temperatures

Recommended minimum transport/storage temperature: 0 °C / 32 °F

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General Protection

Follow all label instructions. Train employees in safe use of the product.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and warm/tepid water. Keep and wash PPE separately from other laundry.

Eye/Face Protection

Wear goggles conforming to EN166 (Field of Use 5 or equivalent).

Hand protection

Chemical resistant nitrile rubber gloves

Body Protection

Wear long-sleeved shirt and long pants and shoes plus socks.

Respiratory protection

When respirators are required, select NIOSH approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standards and/or industry recommendations.

Exposure Limits

Fenoxaprop-P-ethyl 2-Methylpropan-1-ol	71283-80-2 78-83-1	OES BCS*	TWA	2.6 mg/m3
		ACGIH	TWA	50 ppm
		NIOSH	REL	50 ppm
		OSHA Z1	PEL	100 ppm
		OSHA Z1A	TWA	50 ppm
		US CA OEL	TWA PEL	50 ppm
		TX ESL	ST ESL	500 ppm
Naphthalene	91-20-3	TX ESL	AN ESL	50 ppm
		ACGIH	TWA	10 ppm
		ACGIH	STEL	15 ppm
		NIOSH	REL	10 ppm
		NIOSH	STEL	15 ppm
		OSHA Z1	PEL	10 ppm
OSHA Z1A	TWA	10 ppm		



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OSHA Z1A	STEL	15 ppm
US CA OEL	TWA PEL	10 ppm
US CA OEL	STEL	15 ppm
TX ESL	ST ESL	440 ug/m3
TX ESL	AN ESL	44 ug/m3
OES BCS*	TWA	10 ppm

*OES BCS: Internal Bayer CropScience "Occupational Exposure Standard"

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	yellowish
Physical State	liquid
Odor	aromatic
pH	6.7 (1 %) emulsion in water
Density	1.03 g/cm ³ at 20 °C
Water solubility	emulsifiable
Decomposition temperature	no data available

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	freezing Heat, flames and sparks.
Incompatibility	no data available
Hazardous Decomposition Products	no data available
Hazardous reactions	No hazardous reactions known.
Chemical Stability	Stable under recommended storage conditions.

SECTION 11. TOXICOLOGICAL INFORMATION

Only acute toxicity studies have been performed in the formulated product. The non-acute information pertains to the technical-grade active ingredient, fenoxaprop-p ethyl, as well as. the herbicide safener, mefenpyr-diethyl.



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Acute oral toxicity rat: LD50: 3,254 mg/kg
Test conducted with a similar formulation.

Acute dermal toxicity rat: LD50: > 5,000 mg/kg
Test conducted with a similar formulation.

Acute inhalation toxicity rat: LC50: > 5.4 mg/l
Exposure time: 4 h
Determined in the form of liquid aerosol.

rat: LC50: > 21.6 mg/l
Exposure time: 1 h
Determined in the form of liquid aerosol.
Extrapolated from the 4 hr LC50.

Skin irritation rabbit: Severe skin irritation

Eye irritation rabbit: Severe eye irritation

Sensitisation guinea pig: Non-sensitizing. Test conducted with a similar formulation.

Chronic toxicity Fenoxaprop-p-ethyl caused liver and/or adrenal effects in long-term dietary studies in rats, mice and dogs.

Mefenpyr-diethyl affected the liver and/or red blood cells in chronic dietary studies in rats and dogs.

Assessment Carcinogenicity

Fenoxaprop-p-ethyl caused liver and adrenal gland tumors at the highest dose tested in mice. However, there was no evidence of carcinogenicity in a combined chronic/carcinogenicity study in rats treated with fenoxaprop-p-ethyl.

Mefenpyr-diethyl was not carcinogenic in lifetime feeding studies in rats and mice.

ACGIH

Naphthalene 91-20-3 Group A4

NTP

Naphthalene 91-20-3

IARC

Naphthalene 91-20-3 Overall evaluation: 2B

OSHA

None.

Reproductive toxicity REPRODUCTION
Fenoxaprop-p-ethyl was not a reproductive toxicant in a two-generation study in rats.

Mefenpyr-diethyl was not a reproductive toxicant at non-maternally toxic dose levels in a two-generation study in rats.



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DEVELOPMENTAL TOXICITY

Fenoxaprop-p-ethyl is not a primary developmental toxicant in rats and rabbits. Developmental effects were observed in both species but were considered secondary to maternal toxicity.

Mefenpyr-diethyl was not a primary developmental toxicant in rats and rabbits. Developmental effects were observed in rabbits but were considered secondary to maternal toxicity.

Neurotoxicity

Fenoxaprop-p-ethyl neurotoxicity studies are not required at this time.

Mefenpyr-diethyl neurotoxicity studies are not required at this time.

Mutagenicity

Fenoxaprop-p-ethyl was not mutagenic or genotoxic in a battery of in vitro and in vivo tests.

Mefenpyr-diethyl was not mutagenic or genotoxic in a battery of in vitro and in vivo tests.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity to fish

Rainbow trout (*Oncorhynchus mykiss*)
LC50: 1.9 mg/l
Exposure time: 96 h
Test conducted with a similar formulation.

Lepomis macrochirus (Bluegill sunfish)
LC50: 1.9 mg/l
Exposure time: 96 h

Toxicity to Aquatic Plants

Pseudokirchneriella subcapitata
EC50: 1.47 mg/l
Exposure time: 72 h
Test conducted with a similar formulation.

Acute Toxicity to Aquatic Invertebrates

Water flea (*Daphnia magna*)
EC50: 4.2 mg/l
Exposure time: 48 h
Test conducted with a similar formulation.

Environmental precautions

Drift or runoff from treated areas may adversely affect non-target plants. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water.



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harm.

US State Right-To-Know Ingredients

Naphthalene 91-20-3 CA, CT, IL, MN, NJ, PA, RI
None.

Canadian Regulations

Canadian Domestic Substance List

Naphthalene 91-20-3

Environmental

CERCLA

Naphthalene 91-20-3 100 lbs

Clean Water Section 307 Priority Pollutants

None.

Safe Drinking Water Act Maximum Contaminant Levels

None.

International Regulations

European Inventory of Existing Commercial Substances (EINECS)

Naphthalene 91-20-3

SECTION 16. OTHER INFORMATION

NFPA 704 (National Fire Protection Association):

Health - 2 Flammability - 1 Reactivity - 0 Others - none

0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard

Reason to Revise: Updated for general editorial purposes.

Revision Date: 02/04/2010

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