



DEFINE™ DF HERBICIDE

MSDS Version 1.3

SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name DEFINE™ DF HERBICIDE
Chemical Name
Synonym
MSDS Number 585
Chemical Family
Chemical Formulation
EPA Registration No. 264-765
Canadian Registrat. No.

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

For Product Use Information: (866)-992-2937 Monday through Friday(CRLF) 8:00AM-4:30PM(CRLF) For Medical Emergency contact DART: (800) 334-7577 24 Hours/Day(CRLF) For Transportation Emergency CHEMTREC: (800) 424-9300 24 Hours/Day

Product Use Description For control of certain grass and broadleaf weeds in corn and soybeans.

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Component Name</u>	<u>CAS No.</u>	<u>Concentration % by Weight</u>	
		<u>Minimum</u>	<u>Maximum</u>
Flufenacet	142459-58-3	58.2000	61.8000
Crystalline Silica (Quartz)	14808-60-7		1.1100

SECTION 3. HAZARDS IDENTIFICATION

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

Emergency Overview Warning! May be fatal if swallowed. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Avoid contact with skin, eyes and clothing.

Physical State Solid granules

Odor Disinfectant-like

Appearance Tan to Brown

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Routes of Exposure Inhalation, skin contact, skin absorption, eye contact.

Immediate Effects General

CARCINOGENICITY: This product is not listed as a carcinogen by NTP or IARC, or regulated as a carcinogen by OSHA. However, it may contain crystalline silica (quartz), a substance which is classified by NTP as a Group 2 carcinogen and by IARC as a Group I carcinogen. Crystalline silica is a naturally-occurring mineral component of many sands and clays. Although controversial, the carcinogenic potential of crystalline silica must be considered if it is inhaled under excessive exposure conditions. However, the respirable portion of the silica which may be contained in this product is small, such that excessive inhalation exposure during normal conditions of use is unlikely.

NTP: Crystalline silica is classified as an NTP Anticipated Human Carcinogen - "Substances or groups of substances that may reasonably be anticipated to be carcinogens."

IARC: IARC has classified crystalline silica as a Group I carcinogen. "There is sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica (quartz) from occupational sources."

OSHA: Not regulated.

Eye May cause mild irritation to eyes.

Skin May cause slight irritation.

Chronic or Delayed Long-Term

Based on animal studies, no adverse effects or symptoms would be expected from chronic exposure to this material. This product contains respirable crystalline silica. Excessive long-term exposure to respirable crystalline silica may cause silicosis, a form of progressive pulmonary fibrosis. Severe and permanent lung damage may result.

Medical Conditions Aggravated by Exposure

No specific medical conditions are known which may be aggravated by exposure to this product. Pulmonary and respiratory diseases may be aggravated by exposure to respirable crystalline silica.

SECTION 4. FIRST AID MEASURES

Eye Flush eyes with plenty of water for at least 15 minutes. Seek medical attention if irritation develops or persists.

Skin 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.

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.

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Inhalation Move person to fresh air. Call a poison control center or doctor for further treatment advice.

Note to Physician Treat symptomatically. No specific antidote available.

SECTION 5. FIRE FIGHTING MEASURES

Flash Point Not applicable

Suitable Extinguishing Media Water, Carbon dioxide (CO₂), Dry chemical, Foam

Fire Fighting Instructions Keep out of smoke. Cool exposed containers with water spray. Fight fire from upwind position. Use self-contained breathing equipment. Contain runoff to prevent entry into sewers or waterways. Equipment or materials involved in pesticide fires may become contaminated.

SECTION 6. ACCIDENTAL RELEASE MEASURES

General and Disposal Keep unnecessary people away, isolate hazard area and deny entry. Do not walk through spilled material.

Land Spill or Leaks Avoid breathing dusts and skin contact. Avoid generating dust (a fine water spray mist, plastic film cover, or floor sweeping compound may be used if necessary). Use recommended protective equipment while carefully sweeping up spilled material. Place in covered container for reuse or disposal. Use dry absorbent material such as clay granules to absorb and collect wash solution for proper disposal. Contaminated soil may have to be removed and disposed. Do not allow material to enter streams, sewers, or other waterways.

SECTION 7. HANDLING AND STORAGE

Handling Procedures Do not ingest. Do not get in eyes, on skin, or on clothing.

Storing Procedures Do not contaminate water, food, or feed by storage or disposal.

Store in a cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food, and feed. Store in original container and out of the reach of children, preferably in a locked storage area.

Work/Hygienic Procedures Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

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Remove Personal Protective Equipment (PPE) immediately after handling this product. Wash the outside of gloves before removing. As soon as practical, wash thoroughly and change into clean clothing.

Min/Max Storage Temperatures Do not transport or store below -18 °C
Do not transport or store above 38 °C

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Maintain exposure levels below the exposure limit through the use of general and local exhaust ventilation.

Eye/Face Protection Protective eyewear

Hand Protection Chemical resistant gloves made of any waterproof material such as polyethylene or polyvinyl chloride.

Body Protection Coveralls
Long-sleeved shirt and long pants
Shoes plus socks

Respiratory Protection A dust/mist filtering respirator (MSHA/NIOSH approval number prefix TC-21C) or a NIOSH approved respirator with any N, R, P or HE filter.

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

Exposure Limits

Crystalline Silica (Quartz)	14808-60-7	NIOSH	REL	0.05 mg/m3
		Form of Exposure	Respirable dust.	
		OSHA Z1A	TWA	0.1 mg/m3
		Form of Exposure	Respirable dust.	
		US CA OEL	TWA PEL	0.1 mg/m3
		Form of Exposure	Respirable dust.	
		US CA OEL	TWA PEL	0.3 mg/m3
Form of Exposure	Total dust.			
ACGIH	TWA	0.05 mg/m3		

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SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Tan to Brown
Physical State	Solid granules
Odor	Disinfectant-like
pH	4 - 5 at 20 °C 10% slurry in distilled H2O
Vapor Pressure	1.5E10(-7) mm Hg as Flufenacet N-Isomer at 20 °C
Bulk Density	32-33 lbs/cu. ft.
Boiling Point	Decomposes
Solubility (in water)	Dispersible

SECTION 10. STABILITY AND REACTIVITY

Chemical Stability	This is a stable material.
Conditions to Avoid	Unstable under basic conditions. Temperatures above 70 C.
Incompatibility	Bases
Hazardous Products of Decomposition	Flufenacet N-isomer Others unknown

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Hazardous Polymerization (Conditions to avoid) Will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Oral Toxicity	Male Rat: LD50: 1,365 mg/kg Female Rat: LD50: 371 mg/kg
Acute Dermal Toxicity	Male/Female Combined Rat: LD50: > 5,000 mg/kg
Acute Inhalation Toxicity	Male/Female Combined Rat: LC50: > 5.23 mg/l 4 h (analytical) Rat: 1-hr exposure (extrapolated from 4-hr LC50): > 20.92 mg/l (analytical)
Skin Irritation	Rabbit: A slight skin irritant.
Eye Irritation	Rabbit: Minimal irritation to the conjunctiva was observed with all irritation cleared within 4 days post-treatment.
Sensitization	Guinea pig: Sensitizing

The above acute studies have been performed on this product as formulated. The following non-acute data pertains to the active ingredient, Flufenacet Technical.

Sub-Chronic Toxicity In 3 month feeding studies in mice, rats, and dogs, the main target organs affected by exposure to the active ingredient, Flufenacet technical, were brain, thyroid, liver, kidney, and spleen as indicated by changes in clinical chemistries, organ weights and/or histopathological findings. Alterations in circulating serum thyroid hormones (thyroxine and triiodothyronine) were observed in each species and were considered indicative of hepatic interference. Primary hematological parameters affected by treatment in each species included changes in erythrocytes, platelets, hemoglobin, and hematocrit concentrations. Histopathological findings generally correlated with alterations in organ weights. A decrease in body weight gain was observed in mice and rats.

In a subacute dermal toxicity study, rats were treated with Flufenacet technical at doses of 20, 150 or 1000 mg/kg. Animals were treated for 6 hours/day such that males received 17 applications and females received 18 applications in a period of 21-and 22-days, respectively. An additional control and high-dose group were treated and maintained for a period of two weeks so as to ascertain the extent of recovery. Effects observed included decreased levels for thyroxine (T4) and free thyroxine (FT4), increased liver weights, and centrilobular hepatocytomegaly. The additional animals treated with 1000 mg/kg demonstrated a complete recovery. The no-observed-effect-level (NOEL) was 20 mg/kg.

Chronic Toxicity Dogs were administered Flufenacet technical at dietary concentrations of 40,

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800 and 1600 ppm for 1 year. Effects observed included decreased terminal body weights, head tilt, computerized electrocardiography findings, quantitative electroencephalography findings, clinical neurological findings, organ weight differences, and changes in clinical chemistry and hematology parameters. Micropathological observations were noted in the liver, kidney, eye, brain, spinal cord and sciatic nerve. The NOEL was 40 ppm.

In a 2 year feeding study, rats were administered Flufenacet technical at dietary concentrations of 25, 400 or 800 ppm. The toxicological response of the rat could be broadly characterized as involving structural and/or functional alterations in liver-, kidney-, hematologica/spleen-, and thyroid- related endpoints. Eye effects were observed and included cataracts and ocular scleral mineralization. The NOEL was 25 ppm.

Assessment Carcinogenicity

Flufenacet technical was investigated for carcinogenicity in chronic feeding studies using mice and rats at maximum levels of 400 and 00 ppm, respectively. There was no evidence of a carcinogenic potential observed in either species.

ACGIH

Crystalline Silica (Quartz)

14808-60-7

Group A2

NTP

Crystalline Silica (Quartz)

14808-60-7

IARC

OSHA

None

Reproductive & Developmental Toxicity

REPRODUCTION: In a reproduction study using rats, Flufenacet technical was administered at dietary concentrations of 25, 100, or 500 ppm for 2 generations. There were no compound-related effects on the adult reproductive or pup parameters. The NOELs for parental and reproductive toxicity were 25 and 500 ppm, respectively.

DEVELOPMENTAL TOXICITY: In a developmental toxicity study, rats were administered Flufenacet technical by oral gavage during gestation at doses of 5, 25, or 125 mg/kg. The NOEL for both maternal and developmental toxicity was 25 mg/kg. In a developmental toxicity study using rabbits, Flufenacet technical was administered by oral gavage during gestation at doses of 5, 25, 125 or 200 mg/kg. The NOELs for maternal and developmental toxicity were 5 and 25 mg/kg, respectively.

Neurotoxicity

In an acute neurotoxicity study using rats, Flufenacet technical was administered as a single oral dose of doses of 75, 200, or 450 mg/kg for males and 75, 150, or 300 mg/kg for females. Compound-related deaths occurred at the high dose for both sexes with all-high dose females dying within 3 days following treatment. All clinical signs and neurobehavioral effects observed were ascribed to acute systemic toxicity. Based on these results, the NOEL for neurotoxicity was 450 mg/kg for males and 150 mg/kg for females (the highest doses with survivors).

In a 13 week neurotoxicity study, Flufenacet technical was administered to rats

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at dietary concentrations of 120, 600 or 3000 ppm. Effects observed at the high-dose included reduced body weights, reduced forelimb grip strength, slightly uncoordinated righting response, decreased body temperature, increased hindlimb footsplay, increased activity, and increased relative brain weight. Microscopic examinations revealed an increased incidence of axonal swelling in the brain and spinal cord tissues at the mid-and high-dose levels. The NOEL for subchronic neurotoxicity was 120 ppm based on microscopic lesions.

Mutagenicity

In vivo and in vitro mutagenicity studies conducted on Flufenacet technical have all been negative. Thus Flufenacet technical is not mutagenic.

SECTION 12. ECOLOGICAL INFORMATION

Environmental Precautions

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 apply when weather conditions favor drift from treated areas. Do not contaminate water when disposing of equipment washwaters. Drift or runoff may adversely affect non-target plants.

SECTION 13. DISPOSAL CONSIDERATIONS

General Disposal Guidance

Pesticide Disposal: Wastes resulting from use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal

Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities. If burned, stay out of smoke.

RCRA Classification

Not Regulated under this Statute

SECTION 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:

Not regulated for transportation

FREIGHT CLASSIFICATION:

Compounds, Tree or Weedkilling, N.O.I., other than poison, having a density of 20 LBS. or greater per cubic foot

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SECTION 15. REGULATORY INFORMATION

US Federal Regulations

EPA Registration No. 264-765

TSCA list

Crystalline Silica (Quartz) 14808-60-7

TSCA 12b export notification

None

SARA Title III - section 302 - notification and information

None

SARA Title III - section 313 - toxic chemical release reporting

None

US States Regulatory Reporting

CA Prop65

This product contains a chemical known to the state of California to cause cancer. Crystalline Silica (Quartz) 14808-60-7

US State right-to-know ingredients

Crystalline Silica (Quartz) 14808-60-7 IL, MA, MN, PA

Canadian Regulations

Canadian Registrat. No.

Canadian Domestic Substance List

Crystalline Silica (Quartz) 14808-60-7

Environmental

CERCLA

None

Clean Water Section 307 Priority Pollutants

None

Safe Drinking Water Act Maximum Contaminant Levels

None

International Regulations

EU Classification

Flufenacet 142459-58-3 Harmful Dangerous for the environment

R Phrases Harmful if swallowed. May cause sensitization by skin contact. Harmful: danger of serious damage to health by prolonged exposure if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S Phrases Keep out of the reach of children. Keep away from food, drink and animal feedingstuffs. Avoid contact with the skin. Wear suitable gloves. This material and its container must be disposed of as hazardous waste. Avoid release to the

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environment. Refer to special instructions/safety data sheets.

European Inventory of Existing Commercial Substances (EINECS)

Crystalline Silica (Quartz)

14808-60-7

SECTION 16. OTHER INFORMATION

	Health	Flammability	Reactivity	Others
NFPA	2	1	1	

MSDS REVISION INDICATOR: Update Sections: 2 (Composition/Information on Ingredients); 3 (Hazards Identification); 4 (First Aid Measures); 6 (Accidental Release Measures); 7 (Handling and Storage); 8 (Exposure Control/Personal Protection); 9 (Physical and Chemical Properties); 12 (Ecological Information); 13 (Disposal Considerations)

Print Date: 09/23/2003

Supersedes MSDS, which is older than: 09/23/2003

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