



### Define™ SC Herbicide

MSDS Version: 1.2

#### SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

<b>Product Name</b>	Define™ SC Herbicide
<b>Chemical Name</b>	
<b>Common Name</b>	
<b>MSDS Number</b>	1872
<b>Chemical Family</b>	Heteroaryloxyacetamide
<b>Chemical Formulation</b>	
<b>EPA Registration No.</b>	264-819
<b>Product Use</b>	Herbicide used for control of certain grass and broadleaf weeds in corn and other crops. The maximum use rate is approximately 1.9 lbs of the product per acre (0.77 lbs active per acre).

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. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Hazardous Component Name</u>	<u>CAS No.</u>	<u>Concentration % by Weight</u>	
		<u>Minimum</u>	<u>Maximum</u>
Flufenacet Technical	142459-58-3	39.7000	42.2000

#### SECTION 3. HAZARDS IDENTIFICATION

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

<b><u>Emergency Overview</u></b>	Caution! Harmful if swallowed or absorbed through skin. Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing before re-use.
<b>Physical State</b>	Liquid Suspension
<b>Odor</b>	Slight Characteristic
<b>Appearance</b>	Off-white
<b>Routes of Exposure</b>	Ingestion, Skin contact, Skin Absorption
<b>Immediate Effects</b>	
<b>Skin</b>	Harmful if absorbed through skin. Avoid contact with skin and clothing.

# Material Safety Data Sheet

MSDS Number: 000000001872

## Define™ SC Herbicide

MSDS Version 1.2

**Ingestion** Harmful if swallowed. Do not take internally.

### SECTION 4. FIRST AID MEASURES

**General** Have the product container or label with you when calling a poison control center or doctor or going for treatment.

**Skin** Take off all contaminated clothing immediately. Rinse immediately with plenty of water for at least 15 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 directed to do so by a physician or poison control center. Never give anything by mouth to an unconscious person.

#### Notes to Physician

**Treatment** Treat symptomatically. There is no antidote.

### SECTION 5. FIRE FIGHTING MEASURES

**Flash Point** > 100 °C / > 212 °F  
The product is not flammable.

**Autoignition Temperature** 425 °C / 797 °F

**Suitable Extinguishing Media** Water spray, Dry powder, Foam, Carbon dioxide (CO<sub>2</sub>), Dry sand

**Fire Fighting Instructions** Keep out of smoke. Fight fire from upwind position. Dike area to prevent runoff and contamination of water sources. Equipment or materials involved in pesticide fires may become contaminated.

Wear self-contained breathing apparatus and protective suit.

### SECTION 6. ACCIDENTAL RELEASE MEASURES

**General and Disposal** Keep unauthorized people away. Isolate hazard area. Avoid contact with spilled product or contaminated surfaces.

**Land Spill or Leaks** Avoid contact with skin, eyes and clothing. Use personal protective equipment. Dike contaminated area with absorbent granules, soil, sand, etc. Carefully sweep up absorbed spilled material. Place in covered container for reuse or disposal. Scrub contaminated area with soap and water. Rinse with water. 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 or contact vegetation.

# Material Safety Data Sheet

Define™ SC Herbicide

MSDS Number: 000000001872

MSDS Version 1.2

## SECTION 7. HANDLING AND STORAGE

**Storing Procedures** Keep in a dry, cool place. Do not freeze. Keep away from food, drink and animal feedstuffs.

**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.

Remove Personal Protective Equipment (PPE) immediately after handling this product. Before removing gloves clean them with soap and water. As soon as practical, wash thoroughly and change into clean clothing.

**Min/Max Storage Temperatures** Do not transport or store below -10 °C / 14 °F  
Do not transport or store above 40 °C / 104 °F

## SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Eye/Face Protection** Tightly fitting safety goggles.

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

**Body Protection** Wear long-sleeved shirt and long pants and shoes plus socks.

**General Protection** Follow all label instructions. Educate and 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 hot water. Keep and wash PPE separately from other laundry.

**Exposure Limits** None Established

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance** Off-white

**Physical State** Liquid Suspension

**Odor** Slight Characteristic

**pH** 5.5 - 7.0

**Density** 1.2 g/cm<sup>3</sup> at 20 °C

**Water Solubility** Dispersible

**Viscosity** 600 - 1,200 mPa.s 20 °C

# Material Safety Data Sheet

Define™ SC Herbicide

MSDS Number: 000000001872  
MSDS Version 1.2

## SECTION 10. STABILITY AND REACTIVITY

<b>Chemical Stability</b>	Stable under normal conditions.
<b>Conditions to Avoid</b>	Temperatures above 70 C. Unstable under basic conditions.
<b>Incompatibility</b>	Bases

## SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity studies have not been performed on this product as formulated. The acute toxicology information provided above is from a similar formulation, Tiara SC 500, containing a higher percentage of the active ingredient, flufenacet. The non-acute information pertains to flufenacet technical.

**Acute Oral Toxicity** Rat: LD50: 500 - 1,000 mg/kg

**Acute Dermal Toxicity** Rat: LD50: > 4,000 mg/kg

**Acute Inhalation Toxicity** Male/Female Rat: LC50: > 2,172 mg/l  
Exposure time: 4 h  
Maximum attainable concentration.  
No deaths

Male/Female Rat: LC50: > 8,688 mg/l  
Exposure time: 1 h

**Skin Irritation** Rabbit: non-irritant

**Eye Irritation** Rabbit: non-irritant

**Sensitization** Guinea pig: non-sensitizing

**Subchronic Toxicity** In 3 month feeding studies in mice, rats, and dogs, the main target organs affected by exposure to flufenacet 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 hemtocrit 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 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.

# Material Safety Data Sheet

MSDS Number: 000000001872

## Define™ SC Herbicide

MSDS Version 1.2

### Chronic Toxicity

Dogs were administered flufenacet at dietary concentrations of 40, 800 or 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 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-, hematologic/spleen-, and thyroid-related endpoints. Eye effects were also observed and included cataracts and ocular scleral mineralization. The NOEL was 25 ppm.

### Assessment Carcinogenicity

Flufenacet was investigated for carcinogenicity in chronic feeding studies using mice and rats at maximum levels of 400 and 800 ppm, respectively. There was no evidence of a carcinogenic potential observed in either species.

#### ACGIH

None

#### NTP

None

#### IARC

None

#### OSHA

None

### Reproductive & Developmental Toxicity

In a developmental toxicity study, rats were administered flufenacet 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 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.

In a reproduction study using rats, flufenacet was administered at dietary concentrations of 20, 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 20 and 500 ppm, respectively.

### Neurotoxicity

In an acute neurotoxicity screening study using rats, flufenacet was administered as a single oral dose at 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 three 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). The overall NOEL was 75 mg/kg for males and <75 mg/kg for females. In a subsequent study, an overall NOEL of 50 mg/kg was established for females.

In a 13 week neurotoxicity screening study, flufenacet was administered to rats at dietary concentrations of 120, 600, or 3000 ppm. Effects observed at the high-dose included reduced body weights, reduced forelimb grip strength, slightly

# Material Safety Data Sheet

MSDS Number: 000000001872  
MSDS Version 1.2

## Define™ SC Herbicide

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.

In a one generation developmental neurotoxicity study, flufenacet technical was administered to rats at dietary concentrations of 20, 100, or 500 ppm during gestation and postnatal development. Maternal toxicity observed included decreased body weights and feed consumption. Effects observed in the offspring included decreased body weights, delayed development (eye opening and preputial separation) and changes in feed consumption. Flufenacet did not cause any specific neurobehavioral effects in the offspring. The overall NOEL for both maternal and F1 offspring toxicity was 20 ppm.

### Mutagenicity

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

## SECTION 12. ECOLOGICAL INFORMATION

**Acute and Prolonged Toxicity to Fish** Rainbow trout  
LC50: 5.84 mg/l

Bluegill sunfish  
LC50: 2.13 mg/l

**Toxicity to Aquatic Plants** Algae  
EC50: 0.031 mg/l

**Acute Toxicity to Aquatic Invertebrates** Daphnia  
EC50: 30.9 mg/l

**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 contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water. Do not apply when weather conditions favor runoff or drift. Do not allow sprays to drift onto adjacent desirable plants.

**Ecological Information** Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

## SECTION 13. DISPOSAL CONSIDERATIONS

**General Disposal Guidance** Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

**Container Disposal** Triple rinse containers. Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or incineration, or if allowed by State and Local authorities, by burning. If burned, stay out of smoke.

**RCRA Classification** Not Regulated under this Statute

# Material Safety Data Sheet

MSDS Number: 000000001872

## Define™ SC Herbicide

MSDS Version 1.2

### SECTION 14. TRANSPORT INFORMATION

#### TRANSPORTATION 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

### SECTION 15. REGULATORY INFORMATION

**EPA Registration No.** 264-819

#### US Federal Regulations

##### TSCA list

None

##### US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D)

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 does not contain any substances known to the State of California to cause cancer.

This product does not contain any substances known to the State of California to cause reproductive harm.

#### US State right-to-know ingredients

None

#### Canadian Regulations

##### Canadian Domestic Substance List

None

#### Environmental

##### CERCLA

None

##### Clean Water Section 307 Priority Pollutants

None

##### Safe Drinking Water Act Maximum Contaminant Levels

None

#### International Regulations

##### EU Classification

Flufenacet Technical

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

# Material Safety Data Sheet

MSDS Number: 000000001872  
MSDS Version 1.2

## Define™ SC Herbicide

S-phrase(s)

aquatic environment.  
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 environment. Refer to special instructions/safety data sheets.

### European Inventory of Existing Commercial Substances (EINECS)

None

## 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

MSDS REVISION INDICATOR: Update name in Section 1; updated other sections as needed.

Approval Date: 11/24/2004

This information is provided in good faith but without express or implied warranty. Buyer assumes all responsibility for safety and use not in accordance with label instructions. The product names are registered trademarks of Bayer AG. Bayer CropScience