
Halosulfuron-methyl

HERBICIDE FACT SHEET

U.S. DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION

This fact sheet is one of a series issued by the Bonneville Power Administration for their workers and the general public. It provides information on forest and land management uses, environmental and human health effects, and safety precautions. A list of definitions is included in Section VIII of this fact sheet.

I. BASIC INFORMATION

COMMON NAME: halosulfuron-methyl

CHEMICAL NAME: Methyl 5-[[[(4,6-dimethoxy-2pyrimidinyl)amino]carbonylamino]sulfonyl]-3-chloro-1-methyl-1H-pyrazole-4-carboxylate

CAS No. 100784-20-1

CHEMICAL TYPE: Sulfonyl Urea

PESTICIDE CLASSIFICATION: Herbicide

REGISTERED USE STATUS: "General Use."

FORMULATIONS: Commercial herbicide products generally contain one or more ingredients. An inert ingredient is anything added to the product other than an active ingredient. Because of concern for human health and the environment, EPA announced its policy on toxic inert ingredients in the Federal Register on April 22, 1987 (52FR13305). This policy focuses on the regulation of inert ingredients. EPA's strategy for implementing this policy included the development of four lists of inerts, based on toxicological concerns. Inerts of toxicological concern were placed on List 1. Potentially toxic inerts/high priority for testing were placed on List 2. Inerts of unknown toxicity were placed on List 3, and inerts of minimal concern were placed on List 4.

The inert ingredients of the Manage[®] formulation are not classified by the USEPA as inert ingredients of toxicological concerns to humans or the environment.

The contents of the halosulfuron-methyl formulation is listed below:

Manage [®] Turf Herbicide	
Halosulfuron-methyl	75%
Inert	25%

RESIDUE ANALYTICAL METHODS: Analytical Method AG-500B

II. HERBICIDE USES

REGISTERED FORESTRY, RANGELAND AND RIGHT-OF-WAY USES: Manage[®] is registered for commercial and non-commercial application to established lawns, ornamental turfgrass, and established woody ornamentals in numerous places, including public areas.

OPERATIONAL DETAILS:

TARGET PLANTS: Halosulfuron-methyl is a selective herbicide for post-emergence control of sedges and other weeds in turf.

MODE OF ACTION: Halosulfuron-methyl interferes with acetolactate synthase enzyme, resulting in a rapid cessation of cell division and plant growth in both roots and shoots.

METHOD OF APPLICATION: Halosulfuron-methyl (as Manage[®]) is applied (ground methods only) to established turf grasses, etc., at an application rate of 0.66 to 1.66 ounces per acre. A second treatment may be necessary.

SPECIAL PRECAUTIONS:

TIMING OF APPLICATION: Halosulfuron-methyl is a post-emergence weed herbicide and is applied after emergence of target weeds.

DRIFT CONTROL: Halosulfuron-methyl is applied mixed with water/surfactant. Care should be exercised not to overspray or apply the herbicide to adjacent non-target areas. Drift control is achieved by following label and sprayer instructions.

RESTRICTIONS/WARNINGS/LIMITATIONS: Groundwater advisory. Do not apply within 4 hours of precipitation. Do not apply through any irrigation system. Do not apply by air.

III. ENVIRONMENTAL EFFECTS/FATE

SOIL:

RESIDUAL SOIL ACTIVITY: The half-life of halosulfuron-methyl is 55 days.

ADSORPTION: The K(oc) of halosulfuron-methyl is 75.

PERSISTENCE AND AGENTS OF DEGRADATION: The manufacturer has not conducted environmental toxicity studies with this product.

METABOLITES/DEGRADATION PRODUCTS AND POTENTIAL ENVIRONMENTAL EFFECTS: The manufacturer has not conducted environmental toxicity studies with this product.

WATER:

SOLUBILITY: 15 ppm at pH 5; 1630 ppm at pH 7

POTENTIAL FOR LEACHING INTO SURFACE AND GROUND WATER: The product has high potential to leach into surface and ground water when applied to normal to basic soils (greater than pH 7).

AIR:

VOLATILIZATION: Halosulfuron-methyl is slightly volatile.

POTENTIAL FOR BYPRODUCTS FROM BURNING OF TREATED VEGETATION: No information is available.

IV. ECOLOGICAL TOXICITY EFFECTS ON NON-TARGET SPECIES

MICROORGANISMS:

ACUTE CONTACT TOXICITY: LD₅₀ (honey bee contact) >100 µg/bee

OVERALL TOXICITY: Practically Non-Toxic

PLANTS: Contact will injure or kill target and non-target plants.

AQUATIC VERTEBRATES:

ACUTE TOXICITY: LC₅₀ (rainbow trout 96-hour) >131 mg/l

ACUTE TOXICITY: LC₅₀ (bluegill sunfish 96-hour) >118 mg/l

OVERALL TOXICITY: Practically Non-Toxic

AQUATIC FRESHWATER INVERTEBRATES:

ACUTE TOXICITY: LC₅₀ (*Daphnia magna* 48-hour) >107 mg/l

OVERALL TOXICITY: Practically Non-Toxic

AQUATIC ESTUARINE/MARINE INVERTEBRATES:

ACUTE TOXICITY: EC₅₀ (Eastern oyster larvae 48-hour)

ACUTE TOXICITY: LC₅₀ (grass shrimp 96-hour)

OVERALL TOXICITY:

TERRESTRIAL ANIMALS:

AVIAN ACUTE ORAL TOXICITY: LD₅₀ (bobwhite quail)

AVIAN ACUTE ORAL TOXICITY: LD₅₀ (mallard duck)

AVIAN SUBACUTE DIETARY TOXICITY: LC₅₀ (bobwhite quail)

AVIAN SUBACUTE DIETARY TOXICITY: LC₅₀ (mallard duck)

MAMMAL ACUTE ORAL TOXICITY: LD₅₀ (rat) 1287 mg/kg

OVERALL TOXICITY: Slightly Toxic

BIOACCUMULATION POTENTIAL: Slight Potential

THREATENED AND ENDANGERED SPECIES: Federally listed terrestrial and aquatic plants may be adversely affected if the product is applied directly to the plants, or indirectly as the result of drift or leaching.

V. TOXICOLOGICAL DATA

ACUTE TOXICITY:

ACUTE ORAL TOXICITY: LD₅₀ (rat) >1287 mg/kg

ACUTE DERMAL TOXICITY: LD₅₀ (rat) >5000 mg/kg

PRIMARY SKIN IRRITATION: Rabbit – Slightly Irritating

PRIMARY EYE IRRITATION: Rabbit – Moderately Irritating

ACUTE INHALATION: LC₅₀ (rat 4 hour) >5.7 mg/l.

OVERALL TOXICITY: Category III – Caution – Slightly Toxic

CHRONIC TOXICITY:

CARCINOGENICITY: No effects.

DEVELOPMENTAL: Slight developmental toxicity.

REPRODUCTIVE: No effects.

MUTAGENICITY: No effects.

HAZARD: EPA has concluded that potential levels of halosulfuron-methyl or metabolites in soil and water do not appear to have significant toxicological effects on humans or animals and presents a negligible risk [63FR29401].

VI. HUMAN HEALTH EFFECTS

ACUTE TOXICITY (POISONING):

REPORTED EFFECTS: In sulfite-sensitive individuals, skin reactions have been reported following dermal exposure.

CHRONIC TOXICITY:

REPORTED EFFECTS: None reported.

POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM CONTACTING OR CONSUMING TREATED VEGETATION, WATER OR ANIMALS: None reported.

POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM INERT INGREDIENTS CONTAINED IN THE FORMULATED PRODUCTS: Inhalation of both silica gel and kaolin dust may cause coughing, sneezing and nasal irritation.

HEALTH EFFECTS OF EXPOSURE TO FORMULATED PRODUCTS: There have been no reported effects on workers manufacturing the products.

HEALTH EFFECTS ASSOCIATED WITH CONTAMINANTS: None reported.

HEALTH EFFECTS ASSOCIATED WITH OTHER FORMULATIONS: None reported.

HEALTH RISK MANAGEMENT PROCEDURES: See Section VII.

VII. SAFETY PRECAUTIONS

SIGNAL WORD AND DEFINITION:

HALOSULFURON-METHYL - **CAUTION** – AVOID CONTACT WITH EYES AND CLOTHING. HARMFUL IF SWALLOWED.

PROTECTIVE PRECAUTIONS FOR WORKERS: Wear eye protection. Wear long-sleeved shirt, long pants, shoes and socks.

MEDICAL TREATMENT PROCEDURES (ANTIDOTES):

EYES: Flush eyes with water; call physician.

SKIN: Wash all exposed areas with soap and water. Wash all contaminated clothing prior to reuse. Call a physician if irritation develops.

INGESTION: Remove visible particles from mouth and rinse with water. Swallow water to dilute. Immediately transport to a medical care facility.

INHALATION: Remove individual to fresh air. If breathing difficulty occurs, provide CPR assistance and seek immediate medical attention.

HANDLING, STORAGE AND DISPOSAL: Keep dry (below 120° F) and store away from food, feed or other material to be used or consumed by humans or animals. Do not contaminate water. Dispose of only in accordance with local, state, and federal regulations.

EMERGENCY SPILL PROCEDURES AND HAZARDS: Contain and sweep up material of small spills and dispose as waste. Large spills should be reported to CHEMTREC (800-424-9300) for assistance. Prevent runoff. Do not contaminate water, food, or feed by storage or disposal.

VIII. DEFINITIONS

adsorption – the process of attaching to a surface

avian – of, or related to, birds

CAEPA – California Environmental Protection Agency

carcinogenicity – ability to cause cancer

CHEMTREC – Chemical Transportation Emergency Center

dermal – of, or related to, the skin

EC₅₀ - median effective concentration during a bioassay

ecotoxicological – related to the effects of environmental toxicants on populations of organisms originating, being produced, growing or living naturally in a particular region or environment

FIFRA – Federal Insecticide, Fungicide and Rodenticide Act

formulation – the form in which the pesticide is supplied by the manufacturer for use

half-life – the time required for half the amount of a substance to be reduced by natural processes

herbicide – a substance used to destroy plants or to slow down their growth

Hg – chemical symbol for mercury

IARC – International Agency for Research on Cancer
K(oc) – the tendency of a chemical to be adsorbed by soil, expressed as: $K(oc) = \text{conc. adsorbed}/\text{conc. dissolved}/\% \text{ organic carbon in soil}$
LC₅₀ – the concentration in air, water, or food that will kill approximately 50% of the subjects
LD₅₀ – the dose that will kill approximately 50% of the subjects
leach – to dissolve out by the action of water
mg/kg – weight ratio expressed as milligrams per kilogram
mg/l – weight-to-liquid ratio expressed as milligrams per liter
microorganisms – living things too small to be seen without a microscope
mPa – milli-Pascal (unit of pressure)
mutagenicity – ability to cause genetic changes
NFPA – National Fire Protection Association
NIOSH - National Institute for Occupational Safety and Health
NOEL - no observable effect level
non-target – animals or plants other than the ones that the pesticide is intended to kill or control
OSHA - Occupational Safety and Health Administration
Pa – Pascal (unit of pressure)
persistence – tendency of a pesticide to remain to remain in the environment after it is applied
pesticides – substances including herbicides, insecticides, rodenticides, fumigants, repellents, growth regulators, etc., regulated under FIFRA
PPE – personal protective equipment
ppm – weight ratio expressed as parts per million
residual activity – the remaining amount of activity as a pesticide
T&E – Threatened and Endangered Species (from the Endangered Species Act)
µg – micrograms
volatility – the tendency to become a vapor at standard temperatures and pressures

IX. INFORMATION SOURCES

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, <http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm>

Monsanto, Manage[®] Herbicide, Specimen Product Label, 39002W6-2/CG, January 2000.

Monsanto, Manage[®] Herbicide Material Safety Data Sheet No. S00012679, May 26, 1999

Oregon State University, et al., Pacific Northwest Weed Control Handbook, 1998

Spray Drift Task Force, A Summary of Ground Application Studies, 1997
<http://www.agdrift.com/publications/Body.htm>

USEPA, Notice, Monsanto Company; Pesticide Tolerance Petitions Filing, 63FR29401, May 29, 1998

X. TOXICITY CATEGORY TABLES

TABLE I: HUMAN HAZARDS

Category	Signal Word	Route of Administration			Hazard	
		Acute Oral LD ₅₀ (mg/kg)	Acute Dermal LD ₅₀ (mg/kg)	Acute Inhalation LC ₅₀ (mg/l)	Eye irritation	Skin irritation
I (Highly Toxic)	DANGER (poison)	0-50	0-200	0-0.2	corrosive: corneal opacity not reversible within 7 days	corrosive
II (Moderately Toxic)	WARNING	>50-500	>200-2000	>0.2-2	corneal opacity reversible within 7 days; irritation persisting for 7 days	severe irritation at 72 hours
III (Slightly Toxic)	CAUTION	>500-5000	>2000-20.000	>2-20	no corneal opacity; irritation reversible within 7 days	moderate irritation at 72 hours
IV (Practically Non-toxic)	NONE	>5000	>20,000	>20	no irritation	moderate irritation at 72 hours

After *Pesticide User's Guide*, Ohio State University, Extension Bull. No. 745, 1998.

TABLE II: ECOTOXICOLOGICAL RISKS TO WILDLIFE (TERRESTRIAL AND AQUATIC)

Risk Category	Mammals (Acute Oral LD ₅₀ mg/kg)	Avian (Acute Oral LD ₅₀ mg/kg)	Avian LC ₅₀ (mg/kg)	Fish or Aquatic Invertebrates LC ₅₀ (mg/l)
Very Highly Toxic	<10	<10	<50	<0.1
Highly Toxic	10-50	10-50	50-500	0.1 – 1
Moderately Toxic	51-500	51-500	501-1,000	>1 – 10
Slightly Toxic	501-2,000	501-2,000	1,001-5,000	>10 – 100
Practically Non-toxic	>2,000	>2,000	>5,000	>100

Table II created from information contained in *Pesticides and Wildlife*, Whitford, Fred, et al., Purdue University Cooperative Extension Service PPP-30, 1998.

Disclaimers and Other Legal Information:

Mention of a trademark, vendor, technique, or proprietary product does not imply or constitute an endorsement of the product by the United States Department of Energy - Bonneville Power Administration (USDOE-BPA), its employees, and its contractors, and does not imply or endorse any product to the exclusion of others. In all cases, the user is required by law to follow all pesticide label instructions and restrictions.

This document is copyrighted by the USDOE-BPA. USDOE-BPA retains all rights under all conventions, but permits free reproduction by all providing that full credit is given to USDOE-BPA in citing this publication, sources and date of publication, and, that such reproduction is not distributed or redistributed for profit.

This fact sheet was prepared by USDOE-Bonneville Power Administration, March 2000.