

## MONSANTO COMPANY

### Material Safety Data Sheet Commercial Product

#### 1. PRODUCT AND COMPANY IDENTIFICATION

**Product name**

**MANAGE® Turf Herbicide**

**EPA Reg. No.**

524-465

**Chemical name**

Not applicable

**Synonyms**

None

**Company**

MONSANTO COMPANY, 800 N. Lindbergh Blvd., St. Louis, MO, 63167

Telephone: 800-332-3111, Fax: 314-694-5557

**Emergency numbers**

FOR CHEMICAL EMERGENCY, SPILL LEAK, FIRE, EXPOSURE, OR ACCIDENT Call CHEMTREC - Day or Night: 1-800-424-9300 toll free in the continental U.S., Puerto Rico, Canada, or Virgin Islands. For calls originating elsewhere: 703-527-3887 (collect calls accepted).

FOR MEDICAL EMERGENCY - Day or Night: 314-694-4000 (collect calls accepted).

#### 2. COMPOSITION/INFORMATION ON INGREDIENTS

**Active ingredient**

1H-Pyrazole-4-carboxylic acid,  
3-chloro-5-[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-1-methyl-, methyl ester;  
{Halosulfuron-methyl}

**Composition**

COMPONENT	CAS No.	% by weight (approximate)
Halosulfuron-methyl	100784-20-1	75
Kaolin clay	1332-58-7	>=8 - <=13
Silica, amorphous, precipitated	112926-00-8	<=3
Crystalline silica		<=0.17
Other ingredients		>=10 - <=15

The specific chemical identity is being withheld because it is trade secret information of Monsanto Company.

**OSHA Status**

This product is hazardous according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

#### 3. HAZARDS IDENTIFICATION

**Emergency overview**

**Appearance and odour (colour/form/odour):** Beige / Granules / Vanilla

CAUTION!

CAUSES EYE IRRITATION

HARMFUL IF SWALLOWED

**Potential health effects**

**Likely routes of exposure**

Skin contact, eye contact, inhalation

**Eye contact, short term**

May cause temporary eye irritation.

Dust particles may cause slight eye irritation.

**Skin contact, short term**

Not expected to produce significant adverse effects when recommended use instructions are followed.

**Inhalation, short term**

Not expected to produce significant adverse effects when recommended use instructions are followed.

**Single ingestion**

Harmful if swallowed.

**Medical conditions aggravated by exposure**

A very small percentage of particularly sensitive people may suffer skin or respiratory reactions.

Refer to section 11 for toxicological and section 12 for environmental information.

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## 4. FIRST AID MEASURES

**Eye contact**

Immediately flush with plenty of water.

If easy to do, remove contact lenses.

If there are persistent symptoms, obtain medical advice.

**Skin contact**

Wash affected skin with plenty of water.

Wash clothes before re-use.

**Inhalation**

Remove to fresh air.

**Ingestion**

Rinse mouth thoroughly with water.

Remove particles from mouth.

Immediately offer water to drink.

Do NOT induce vomiting unless directed by medical personnel.

Never give anything by mouth to an unconscious person.

If symptoms occur, get medical attention.

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## 5. FIRE FIGHTING MEASURES

**Flash point**

Not applicable.

**Extinguishing media**

Recommended: Water, dry chemical, carbon dioxide (CO<sub>2</sub>), foam

**Unusual fire and explosion hazards**

None.

**Hazardous products of combustion**

Carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), oxides of silica, sulphur oxides (SO<sub>x</sub>), hydrogen chloride (HCl)

**Fire fighting equipment**

Self-contained breathing apparatus.

Equipment should be thoroughly decontaminated after use.

## 6. ACCIDENTAL RELEASE MEASURES

### Personal precautions

Use personal protection recommended in section 8.

### Environmental precautions

Keep out of drains, sewers, ditches and water ways.  
Do NOT contaminate water when disposing of rinse waters.

### Methods for cleaning up

Collect in containers for reclamation or disposal.  
Flush spill area with water.  
Minimise use of water to prevent environmental contamination.

Refer to section 13 for disposal of spilled material.

## 7. HANDLING AND STORAGE

Good industrial practice in housekeeping and personal hygiene should be followed.

### Handling

Avoid contact with eyes, skin and clothing.  
Wash hands thoroughly after handling or contact.  
Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.  
Wash contaminated clothing before re-use.  
Thoroughly clean equipment after use.  
Do not contaminate drains, sewers and water ways when disposing of equipment rinse water.  
Refer to section 13 for disposal of rinse water.  
Emptied containers retain vapour and product residue.  
Observe all labelled safeguards until container is cleaned, reconditioned or destroyed.

### Storage

Maximum storage temperature: < 120 °C  
Keep out of reach of children.  
Keep away from food, drink and animal feed.  
Keep container tightly closed in a cool, well-ventilated place.  
Keep container dry.  
Keep container off wet floors.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Airborne exposure limits

Components	Exposure Guidelines
Halosulfuron-methyl	No specific occupational exposure limit has been established.
Kaolin clay	TLV (ACGIH); 2 mg/m <sup>3</sup> ; respirable fraction, containing no asbestos and <1% crystalline silica PEL (OSHA); 15 mg/m <sup>3</sup> ; total dust, PNOR (Particulates Not Otherwise Regulated) PEL (OSHA); 5 mg/m <sup>3</sup> ; respirable fraction, PNOR (Particulates Not Otherwise Regulated)
Silica, amorphous, precipitated	TLV (ACGIH); 10 mg/m <sup>3</sup> PEL (OSHA); 80 mg/m <sup>3</sup> / % SiO <sub>2</sub>
Crystalline silica	TLV (ACGIH); 0.05 mg/m <sup>3</sup> ; respirable fraction

	PEL (OSHA); 30 mg/m3 / % SiO2 + 2; total dust PEL (OSHA); 10 mg/m3 / % SiO2 + 2; respirable fraction
Other ingredients	No specific occupational exposure limit has been established.

#### Engineering controls

Provide adequate ventilation to keep airborne concentration below exposure limits.

#### Eye protection

If there is significant potential for contact:

Wear dust goggles.

#### Skin protection

No special requirement when used as recommended.

If repeated or prolonged contact:

Wear chemical resistant gloves.

#### Respiratory protection

No special requirement when used as recommended.

If airborne exposure is excessive:

Wear respirator.

Respiratory protection programs must comply with all local/regional/national regulations.

When recommended, consult manufacturer of personal protective equipment for the appropriate type of equipment for a given application.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

Colour/colour range:	Beige
Form:	Granules
Odour:	Vanilla
Flash point:	Not applicable.
Density:	41 lb/ft3
pH:	6.6 10 g/l

## 10. STABILITY AND REACTIVITY

#### Stability

Stable under normal conditions of handling and storage.

#### Hazardous decomposition

Thermal decomposition: Hazardous products of combustion: see section 5.

## 11. TOXICOLOGICAL INFORMATION

This section is intended for use by toxicologists and other health professionals.

Data obtained on product and components are summarized below.

**Acute oral toxicity**

Rat, LD50: 1,287 mg/kg body weight  
Slightly toxic.  
FIFRA category III.

**Acute dermal toxicity**

Rat, LD50: > 5,000 mg/kg body weight  
Practically non-toxic.  
FIFRA category IV.

**Skin irritation**

Rabbit, 6 animals, OECD 404 test:  
Days to heal: 10  
Primary Irritation Index (PII): 0.9/8.0  
Slight irritation.  
FIFRA category IV.

**Eye irritation**

Rabbit, 6 animals, OECD 405 test:  
Days to heal: 7  
Slight irritation.  
FIFRA category III.

**Acute inhalation toxicity**

Rat, LC50, 4 hours, dust: > 5.7 mg/L  
Practically non-toxic.  
FIFRA category IV.

**Skin sensitization**

Guinea pig, Buehler test:  
Positive incidence: 0 %

**Halosulfuron-methyl**

**Mutagenicity**

In vitro and in vivo mutagenicity test(s):  
Not mutagenic.

**Repeated dose toxicity**

Rat, oral, 13 weeks:  
NOAEL toxicity: 400 mg/kg diet  
Target organs/systems: kidneys, liver  
Other effects: decrease of body weight gain, blood biochemistry effects, histopathologic effects  
Dog, oral, 13 weeks:  
NOEL toxicity: 10 mg/kg body weight/day  
Target organs/systems: kidneys  
Other effects: decrease of body weight gain, organ weight change, blood biochemistry effects, haematological effects  
Rat, dermal, 21 days:  
NOEL toxicity: > 1,000 mg/kg body weight/day  
Target organs/systems: none  
Other effects: none

**Carcinogenicity**

Dog, oral, 1 years:  
NOAEL toxicity: 10 mg/kg body weight/day  
Target organs/systems: none  
Other effects: blood biochemistry effects, haematological effects, decrease of body weight gain  
Mouse, oral, 18 months:  
NOEL tumour: > 7,000 mg/kg diet  
NOAEL toxicity: 3,000 mg/kg diet  
Target organs/systems: epididymis  
Other effects: decrease of body weight gain, histopathologic effects

No tumours.

**Rat, oral, 2 years:**

NOEL tumour: > 2,500 mg/kg diet

NOAEL toxicity: 1,000 mg/kg diet

Target organs/systems: none

Other effects: decrease of body weight gain

No tumours.

**Toxicity to reproduction/fertility**

**Rat, oral, 2 generations:**

NOEL toxicity: 800 mg/kg diet

NOEL reproduction: 800 mg/kg diet

Target organs/systems in parents: none

Other effects in parents: decrease of body weight gain

Target organs/systems in pups: none

Other effects in pups: weight loss

Effects on offspring only observed with maternal toxicity.

**Developmental toxicity/teratogenicity**

**Rat, oral, 6 - 15 days of gestation:**

NOEL toxicity: 250 mg/kg body weight/day

NOEL development: 250 mg/kg body weight/day

Target organs/systems in mother animal: none

Other effects in mother animal: decrease of body weight gain

Developmental effects: external malformations, visceral malformations, skeletal malformations, visceral variations, skeletal variations, weight loss, post-implantation loss

Effects on offspring only observed with maternal toxicity.

**Rabbit, oral, 7 - 19 days of gestation:**

NOEL toxicity: 50 mg/kg body weight/day

NOEL development: 50 mg/kg body weight/day

Target organs/systems in mother animal: none

Other effects in mother animal: decrease of body weight gain, decrease of food consumption

Developmental effects: post-implantation loss

Effects on offspring only observed with maternal toxicity.

**Acute neurotoxicity**

**Rat, oral, , gavage:**

NOEL: 600 mg/kg body weight

Other effects: weight loss

Not neurotoxic.

**Repeated dose neurotoxicity**

**Rat, oral, 13 weeks, dietary:**

NOAEL: 1,000 mg/kg diet

Other effects: decrease of body weight gain

Not neurotoxic.

**Kaolin clay**

**EXPERIENCE WITH HUMAN EXPOSURE**

**Inhalation, excessive, occupational:**

Respiratory effects: cough, irritation

**Inhalation, repeated, occupational:**

Respiratory effects: breathing difficulty

**Silica, amorphous, precipitated**

**EXPERIENCE WITH HUMAN EXPOSURE**

**Inhalation, short term, occupational:**

Respiratory effects: irritation, nosebleed (epistaxis)

#### Crystalline silica

#### Carcinogenicity

##### Various species, inhalation:

Tumours: lung (adenocarcinoma) (squamous cell carcinoma)

Target organs/systems: lung, fibrosis (silicosis)

#### EXPERIENCE WITH HUMAN EXPOSURE

##### Inhalation, excessive, occupational:

Respiratory effects: irritation, cough

##### Inhalation, repeated, occupational:

Respiratory effects: fibrosis (silicosis), (adenocarcinoma), (squamous cell carcinoma)

Note: International Agency for Research on Cancer (IARC) listed carcinogen., National Toxicology Program (NTP) listed carcinogen.

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## 12. ECOLOGICAL INFORMATION

This section is intended for use by ecotoxicologists and other environmental specialists.

Data obtained on active ingredient are summarized below.

#### Halosulfuron-methyl

##### Aquatic toxicity, fish

###### Bluegill sunfish (*Lepomis macrochirus*):

Acute toxicity, 96 hours, flowthrough, LC50: > 118 mg/L

Practically non-toxic.

###### Rainbow trout (*Oncorhynchus mykiss*):

Acute toxicity, 96 hours, flowthrough, LC50: > 131 mg/L

Practically non-toxic.

##### Aquatic toxicity, invertebrates

###### Water flea (*Daphnia magna*):

Acute toxicity, 48 hours, flowthrough, LC50: > 107 mg/L

Practically non-toxic.

##### Aquatic toxicity, algae/aquatic plants

###### Green algae (*Selenastrum capricornutum*):

Acute toxicity, 120 hours, static, EbC50 (biomass): 5.3 µg/L

Very highly toxic.

##### Avian toxicity

###### Mallard duck (*Anas platyrhynchos*):

Dietary toxicity, 5 days, LC50: > 5,620 mg/kg diet

Practically non-toxic.

###### Bobwhite quail (*Colinus virginianus*):

Dietary toxicity, 5 days, LC50: > 5,620 mg/kg diet

Practically non-toxic.

##### Arthropod toxicity

###### Honey bee (*Apis mellifera*):

Contact, 48 hours, LC50: > 100 µg/bee

Practically non-toxic.

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## 13. DISPOSAL CONSIDERATIONS

Product

Keep out of drains, sewers, ditches and water ways.  
Recycle if appropriate facilities/equipment available.  
Burn in proper incinerator.  
Follow all local/regional/national/international regulations.

#### Container

See the individual container label for disposal information.  
Emptied packages retain product residue and dust.  
Observe all labelled safeguards until container is cleaned, reconditioned or destroyed.  
Empty packaging completely.  
Store for collection by approved waste disposal service.  
Ensure packaging cannot be reused.  
Do NOT re-use containers.  
Recycle if appropriate facilities/equipment available.  
Bury in approved landfill.  
Follow all local/regional/national/international regulations.

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## 14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

Not hazardous under the applicable DOT, ICAO/IATA, IMO, TDG and Mexican regulations.

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## 15. REGULATORY INFORMATION

#### TSCA Inventory

All components are on the US EPA's TSCA Inventory

#### OSHA Hazardous Components

Kaolin clay  
Silica, amorphous, precipitated  
Crystalline silica

#### SARA Title III Rules

Section 311/312 Hazard Categories  
Immediate, Delayed  
Section 302 Extremely Hazardous Substances  
Not applicable.  
Section 313 Toxic Chemical(s)  
Not applicable.

#### CERCLA Reportable quantity

Not applicable.

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## 16. OTHER INFORMATION

The information given here is not necessarily exhaustive but is representative of relevant, reliable data.  
Follow all local/regional/national/international regulations.  
Please consult supplier if further information is needed.  
In this document the British spelling was applied.

Full denomination of most frequently used acronyms. BCF (Bioconcentration Factor), BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), EC50 (50% effect concentration), ED50 (50% effect dose), I.M. (intramuscular), I.P. (intraperitoneal), I.V. (intravenous), Koc (Soil adsorption coefficient), LC50 (50% lethality concentration), LD50 (50% lethality dose), LDLo (Lower limit of lethal dosage), LEL (Lower Explosion Limit), LOAEC (Lowest Observed Adverse Effect Concentration), LOAEL (Lowest Observed Adverse Effect Level), LOEC (Lowest Observed Effect Concentration), LOEL (Lowest Observed Effect Level), MEL (Maximum Exposure limit), MTD (Maximum Tolerated Dose),



NOAEC (No Observed Adverse Effect Concentration), NOAEL (No Observed Adverse Effect Level), NOEC (No Observed Effect Concentration), NOEL (No Observed Effect Level), OEL (Occupational Exposure Limit), PEL (Permissible Exposure Limit), PII (Primary Irritation Index), Pow (Partition coefficient n-octanol/water), S.C. (subcutaneous), STEL (Short-Term Exposure Limit), TLV-C (Threshold Limit Value-Ceiling), TLV-TWA (Threshold Limit Value - Time Weighted Average), UEL (Upper Explosion Limit)

This Material Safety Data Sheet (MSDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-APPROVED PRODUCT LABELING (attached to and accompanying the product container). This MSDS provides important health, safety, and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course. Use, storage and disposal of pesticide products are regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling, and all necessary and appropriate precautionary, use, storage, and disposal information is set forth on that labeling. It is a violation of federal law to use a pesticide product in any manner not prescribed on the EPA -approved label.

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