

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.

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.

5. FIRE FIGHTING MEASURES

Flash point

Not applicable.

Extinguishing media

Recommended: Water, dry chemical, carbon dioxide (CO₂), foam

Unusual fire and explosion hazards

None.

Hazardous products of combustion

Carbon monoxide (CO), nitrogen oxides (NO_x), oxides of silica, sulphur oxides (SO_x), 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 ³ ; respirable fraction, containing no asbestos and <1% crystalline silica PEL (OSHA); 15 mg/m ³ ; total dust, PNOR (Particulates Not Otherwise Regulated) PEL (OSHA); 5 mg/m ³ ; respirable fraction, PNOR (Particulates Not Otherwise Regulated)
Silica, amorphous, precipitated	TLV (ACGIH); 10 mg/m ³ PEL (OSHA); 80 mg/m ³ / % SiO ₂
Crystalline silica	TLV (ACGIH); 0.05 mg/m ³ ; respirable fraction

	PEL (OSHA); 30 mg/m ³ / % SiO ₂ + 2; total dust PEL (OSHA); 10 mg/m ³ / % SiO ₂ + 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/ft ³
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.

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.

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.

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.

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.

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)

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