



**Signal Herbicide
Safety Data Sheet**
{Reserved}

Issue Date: 2017-12-21

Supersedes Date: 2017-05-17

1. Identification

Product Name: Signal Herbicide

PCP Registration No.: 29172

Refer to the approved product label for handling and use instructions.

Product Type: Herbicide

Supplier: Nufarm Agriculture Inc.
Suite 350, 2618 Hopewell Place NE
Calgary, Alberta, T1Y 7J7, Canada
1-800-868-5444

Telephone Numbers: 24 Hour Emergency Response Number, Chemtrec, 1-800-424-9300.
For medical emergencies, ProPharma Group, 1-877-325-1840.
For product and use information, Nufarm Agriculture Inc.,
1-800-868-5444.

2. Hazard Identification

Classified according to UN GHS Version 5.

Physical Hazards:

Flammable liquid Category 4

Health Hazards:

Eye irritation Category 2B

Skin irritation Category 2

Skin sensitizer Category 1B

Acute toxicity (Oral) Category 5

Acute toxicity (Dermal) Category 5

Acute toxicity (Inhalation) Category 4

Environmental Hazards:

Hazardous to aquatic environment, acute Category 1

Signal Word:

WARNING

Hazard Statements:

Combustible liquid. Causes eye irritation. Causes skin irritation. May cause an allergic skin reaction. May be harmful if swallowed. May be harmful in contact with skin. Harmful if inhaled. Very toxic to aquatic life.

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Precautionary Statements:

Keep away from flames and hot surfaces.

Causes skin and eye irritation. Avoid contact with skin, eyes and clothing. Wear goggles or face shield during mixing/loading. Wear coveralls or long-sleeved shirt and long pants, socks, shoes and chemical-resistant gloves. Rinse gloves before removal. After use, wash hands and other exposed skin. Remove and wash contaminated clothing before reuse.

Avoid breathing spray mist. Use only outdoors or in a well-ventilated area.

May be harmful if swallowed. Do not eat, drink or smoke when using this product.

This product contains an active ingredient and petroleum distillates which are toxic to aquatic organisms.

3. Composition / Information on Ingredients
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Hazardous Components	CAS No.	Wt. %
Solvent naphtha (petroleum), heavy aromatic, naphthalene depleted	64742-94-5	48-51
Clodinafop-propargyl	105512-06-9	23-25
Chemical Synonyms: 2-propynyl (2R)-2-[4-[(5-chloro-3-fluoro-2-pyridinyl)oxy]phenoxy]propanoate; propanoic acid, 2-[4-[(5-chloro-3-fluoro-2-pyridinyl)oxy]phenoxy]-2-propynyl ester		
1-methyl-2-pyrrolidinone	872-50-4	9-10
Chemical Synonyms: NMP; N-Methylpyrrolidone; N-Methylpyrrolidinone		
Cloquintocet-mexyl	99607-70-2	6-7
Chemical Synonyms: 1-methylhexyl 2-[(5-chloro-8-quinolinyl)oxy]acetate; 1-methylhexyl (5-chloroquinolin-8-yloxy)acetate		

Other ingredients are considered non-hazardous.

Content as Expressed on Product Label
Clodinafop-propargyl ... 240 g/L
Cloquintocet-mexyl ... 65 g/L

4. First Aid Measures

If swallowed, call a poison control centre or doctor immediately for treatment advice. Do not induce vomiting unless told to do so by a poison control centre or doctor. Do not give **any** liquid to the person. Do not give anything by mouth to an unconscious person.

If on skin or clothing, take off contaminated clothing. Rinse skin immediately with plenty of water for 15–20 minutes. Call a poison control centre or doctor for treatment advice.

If in eyes, hold eye open and rinse slowly and gently with water for 15–20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control centre or doctor for treatment advice.

If inhaled, move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control centre or doctor for further treatment advice.

Take container, label or product name and Pest Control Product Registration Number with you, when seeking medical attention.

This product contains petroleum distillates. Do not induce vomiting. Vomiting may cause aspiration pneumonia. Treat symptomatically for ingestion and/or skin and eye contact.

5. Fire-fighting Measures

Extinguishing Media: Water fog, alcohol foam, carbon dioxide, dry chemical.

Special Firefighting Procedures: Firefighters should wear self-contained breathing apparatus and full protective clothing when fighting chemical fires. Minimize and contain water runoff.

Flash Point:..... 69 C

Conditions of Flammability: Combustible liquid. May burn under fire conditions.

Hazardous Decomposition Products: ... Under fire conditions, may produce gases such as hydrogen chloride, nitrogen oxides and carbon oxides.

National Fire Protection Association (NFPA) Hazard Rating:

Rating for this product: Health: 1	Flammability: 2	Reactivity: 0
Hazards Scale: 0 = Minimal 1 = Slight	2 = Moderate 3 = Serious	4 = Severe

6. Accidental Release Measures

Use safety equipment and procedures appropriate to the size of the spill. Keep unnecessary people away. Avoid runoff to natural waters and sewers. Surround and absorb spills with inert material such as perlite, sawdust, clay granules, vermiculite, sand or dirt. Contain all affected material in a closed, labeled container for proper disposal. Isolate from other waste materials. Clean contaminated area such as hard surfaces with detergent and water, collecting cleaning solution for proper disposal. Large spills to soil or similar surfaces may necessitate removal of top soil.

7. Handling and Storage

Handling: Avoid contact with skin, eyes and clothing. Wear goggles or face shield during mixing/loading. Wear coveralls or long-sleeved shirt and long pants, socks, shoes and chemical-resistant gloves. Rinse gloves before removal. After use, wash hands and other exposed skin. Remove and wash contaminated clothing before reuse. Avoid breathing spray mist. Do not eat, drink or smoke when using this product.

Storage: Store the container tightly closed away from seeds, fertilizer, plants and foodstuffs. May be stored at any temperature. Shake well before using.

8. Exposure Controls / Personal Protection

Engineering Controls: Use only outdoors or in a well-ventilated area.

Personal Protective Equipment: Goggles or face shield, coveralls, or long-sleeved shirt and long pants, socks, shoes and chemical-resistant gloves. Rinse gloves before removal.

Exposure Guidelines:

Component	TWA*	STEL**	Reference/Note
Solvent naphtha (petroleum), heavy aromatic, naphthalene depleted	50 mg/m ³	N/E	Supplier recommendation
Clodinafop-propargyl	1 mg/m ³	N/E	Supplier recommendation
1-methyl-2-pyrrolidinone	10 ppm	N/E	AIHA recommendation
Cloquintocet-mexyl	10 mg/m ³	N/E	Supplier recommendation

*Time-weighted Average, 8-hour unless otherwise noted.

**Short Term Exposure Limit

NE = Not Established

Refer to approved product label for additional exposure control guidance.

9. Physical and Chemical Properties
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NOTE: Physical data are typical values, but may vary from sample to sample. A typical value should not be construed as a guaranteed analysis or as a specification. If no value is determined for the formulation, the value listed is the most relevant value of the predominant ingredient(s).

Appearance (physical state, colour, etc.)	clear amber liquid
Odour	aromatic solvent
Odour threshold	not available
pH	6.91 (1% w/w dilution)
Melting point / Freezing point	not available
Initial boiling point and boiling range	not available
Flash point	69C
Evaporation rate	<0.01 (n-butyl acetate = 1) (solvent)
Flammability (solids, gases)	not applicable
Upper / Lower flammability or explosive limits ...	LEL = 0.7, UEL = 5.6 vol. % in air (solvent)
Vapour pressure	4.0 Pa @ 20C (solvent)
Vapour density	5.6 @ 101 kPa (air = 1) (solvent)
Relative density	1.014 @ 20C
Solubility(ies)	negligible in water, emulsifiable highly soluble in organic solvents
Partition coefficient: n-octanol/water	logP = 3.9 @ 25C (clodinafop-propargyl) logP = 5.03 @ 25C (cloquintocet-mexyl)
Autoignition temperature	not available
Decomposition temperature	not available

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Viscosity 12.2 cP @ 20C

10. Stability and Reactivity

Reactivity: Not reactive.

Chemical Stability: Stable under normal handling and storage conditions.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Excessive heat. Do not store near heat or flame.

Incompatible Materials: Avoid contact with strong acidic, basic or oxidizing agents.

Hazardous Decomposition Products: Under fire conditions, may produce gases such as hydrogen chloride, nitrogen oxides and carbon oxides.

11. Toxicological Information

Likely routes of exposure: Inhalation, ingestion, skin and eye contact.

Eye contact: Causes eye irritation.

Skin contact: Causes skin irritation. May cause an allergic skin reaction.

Ingestion: May be harmful if swallowed.

Inhalation: Harmful if inhaled.

Medical Conditions Aggravated by Exposure: Skin exposure may aggravate preexisting skin conditions. Inhalation of mist may aggravate preexisting respiratory conditions.

Toxicological Data:

Data are from laboratory studies conducted on similar products.

Acute oral LD₅₀ (mg/kg) >2200 (Rat)

Acute dermal LD₅₀ (mg/kg) >4000 (Rat)

Acute inhalation LC₅₀ (mg/l) >3.5 (Rat, 4-hour exposure)

Skin corrosion/irritation Considered as moderately irritating to skin (Rabbit)

Serious eye damage/irritation Considered as moderately irritating to the eye (Rabbit)

Respiratory or skin sensitization ... Considered as a contact dermal sensitizer (Guinea pig)

Germ cell mutagenicity Clodinafop-propargyl and cloquintocet-mexyl are considered non-genotoxic. Products similar to the hydrocarbon component are not considered to be mutagenic.

Carcinogenicity In animal studies, clodinafop-propargyl was associated with increased incidence of benign tumors in mice (liver) and rats (ovary, prostate).

Cloquintocet-mexyl is not considered as carcinogenic. Products similar to the hydrocarbon component are not considered to be mutagenic and are unlikely to cause tumors.

Reproductive toxicity Clodinafop-propargyl and cloquintocet-mexyl are not considered reproductive toxins.

12. Ecological Information

Ecotoxicity:

Data are for clodinafop-propargyl, from published sources.

Aquatic Invertebrate: 48-Hour EC₅₀ (mg/L) >60 (*Daphnia*)

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Fish: 96-Hour LC₅₀ (mg/L) 0.39 (Rainbow Trout), 0.24 (Bluegill Sunfish), 0.46 (Carp)

Algae: 96 to 120-Hour EC₅₀ (mg/L) >3.9 (*Selenastrum*), 7.39 (*Navicula*)

Birds: 8-Day Dietary LD₅₀ (mg/kg) >2000 (Mallard Duck), 1455 (Bobwhite Quail)

Bees: Oral and Contact LD₅₀ >100 µg/bee

Data are for cloquintocet-mexyl, from published sources.

Aquatic Invertebrate: 48-Hour EC₅₀ (mg/L) >100 (*Daphnia*)

Fish: 96-Hour LC₅₀ (mg/L) >76 (Rainbow Trout), >38 (Bluegill Sunfish), >76 (Carp)

Algae: 96 to 120-Hour EC₅₀ (mg/L) 0.63 (*Scenedesmus*), 1.7 (*Navicula*)

Birds: Oral LD₅₀ (mg/kg) >2000 (Mallard Duck, Bobwhite Quail)

Bees: Oral and Contact LD₅₀ >100 µg/bee

Persistence and Degradability: Clodinafop-propargyl is rapidly degraded to the free acid, which is further degraded to simpler molecules which are bound to soil and mineralized, with representative half-lives for clodinafop-propargyl and acid of 2 to 20 days. Cloquintocet-mexyl is rapidly degraded to the free acid in soil; DT₅₀ <3 days. Further degradation and mineralization of the acid occurs within weeks to a few months.

Mobility in Soil: Clodinafop has moderate to high mobility potential, but rapidly degraded.

Cloquintocet has low mobility potential.

Bioaccumulation Potential: Negligible.

13. Disposal Considerations

For information on disposal of unused, unwanted product, contact the manufacturer or the provincial regulatory agency. Disposal should be made in accordance with federal, provincial and local regulations.

Do not reuse container for any purpose. If applicable, return container in accordance with return program. If a recyclable container, dispose of at a container collection site. Contact local distributor, dealer or municipality for the location of the nearest collection site. Before taking the container to the collection site, triple or pressure rinse the empty container adding rinsings to spray tank, and make container unsuitable for further use. If there is no container collection site in your area, dispose of the container in accordance with provincial requirements.

14. Transport Information

Canadian TDG Description (Road & Rail):

UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (clodinafop-propargyl), Class 9, PG III

Marine pollutant.

Section 1.45.1 of the TDG Regulations provides an exemption from documentation and safety marks only for this product and only when transported by a road or railway vehicle.

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United States DOT Description:

< 119 gallons per complete package

Non Regulated – See 49 CFR 173.132(b)(3) & 172.101 Appendix A

≥ 119 gallons per complete package

NA 1993, Combustible, liquid, n.o.s.

(naphthalene), 3, III, Marine Pollutant

IMDG

UN 3082, Environmentally hazardous substance, liquid, n.o.s.

(clodinafop-propargyl), 9, III, Marine Pollutant

IATA

UN 3082, Environmentally hazardous substance, liquid, n.o.s.

(clodinafop-propargyl), 9, III, Marine Pollutant

15. Regulatory Information

Pest Control Products Act Registration Number: 29172

Read the approved label, authorized under the *Pest Control Products Act*, prior to using or handling the pest control product.

This chemical is a pest control product registered by Health Canada Pest Management Regulatory Agency and is subject to certain labelling requirements under the *Pest Control Products Act*. These requirements differ from the classification criteria and hazard information required for GHS-consistent safety data sheets. Following is the hazard information required on the pest control product label:



CAUTION POISON

WARNING: EYE AND SKIN IRRITANT

Warning, contains the allergen epoxidized soybean oil

WHMIS exempt.

16. Other Information

This Safety Data Sheet (SDS) is designed to comply with the Globally Harmonized System (GHS) of classification, and the *Hazardous Products Regulations*.

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This SDS 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. The product labeling provides that information specifically for product use as intended.

Company and published information is used in the development of this SDS. The information herein is presented in good faith and believed accurate at the date of publication. However, no warranty, expressed or implied, is given.

Revisions to the last issue: Addition of PMRA guidance info to Section 15.

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