

# Material Safety Data Sheet

## Marvel™ Herbicide

SDS #: 7206-A

Revision Date: 2013-02-19

Version 2.02



This MSDS has been prepared to meet U.S. OSHA Hazard Communication Standard 29 CFR 1910.1200 and Canada's Workplace Hazardous Materials Information System (WHMIS) requirements.

### 1. PRODUCT AND COMPANY IDENTIFICATION

<b>Product name</b>	Marvel™ Herbicide
<b>Active Ingredient(s)</b>	Fomesafen; Fluthiacet-methyl
<b>Synonyms</b>	5-(2-chloro- <i>α,α,α</i> -trifluoro- <i>p</i> -tolylloxy)- <i>N</i> -mesyl-2-nitrobenzamide; Acetic acid, [[2-chloro-4-fluoro-5-[(tetrahydro-3-oxo-1 <i>H</i> ,3 <i>H</i> -[1,3,4] thiadiazolo [3,4- <i>α</i> ] pyridazin-1-ylidene) amino] phenyl] thio]-, methyl ester
<b>Chemical Family</b>	Imine chemicals; Thiadiazoles
<b>Recommended use</b>	Herbicide
<b>Manufacturer</b> FMC Corporation Agricultural Products Group 1735 Market Street Philadelphia, PA 19103 General Information: Phone: (215) 299-6000 E-Mail: msdsinfo@fmc.com	<b>Emergency telephone number</b>  Medical Emergencies: (800) 331-3148 (U.S.A. & Canada) +1 (651) 632-6793 (All Other Countries - Collect) For leak, fire, spill or accident emergencies, call: +1 800 / 424 9300 (CHEMTREC - U.S.A.) +1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)

### 2. Hazards identification

<b>Appearance</b>	White to off-white liquid
<b>Physical state</b>	Liquid
<b>Odor</b>	No information available.
<b>Potential health effects</b>	
<b>Principle Routes of Exposure</b>	Eye contact, Skin contact, Inhalation, Ingestion.
<b>Acute effects</b>	
<b>Eyes</b>	May cause slight irritation.
<b>Skin</b>	Substance may cause slight skin irritation.
<b>Inhalation</b>	May cause irritation of respiratory tract.
<b>Ingestion</b>	May be harmful if swallowed. Ingestion may cause irritation to mucous membranes.
<b>Chronic effects</b>	Prolonged exposure may cause chronic effects. Possible risks of irreversible effects. May cause adverse liver effects.
<b>Environmental hazard</b>	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

### 3. Composition/information on ingredients

**Hazardous ingredients**

Chemical Name	CAS-No	Weight %
Fomesafen	72178-02-0	30.08
Propylene glycol	57-55-6	5-10
n-Butanol	71-36-3	1-5
Fluthiacet-methyl	117337-19-6	1.2

**4. First aid measures**

Eye contact	Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for further treatment advice.
Skin contact	Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
Inhalation	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 center or doctor for further 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 told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

**5. Fire-fighting measures**

Flash Point	> 100 °C / > 212 °F
Sensitivity to Mechanical Impact	not applicable
Sensitivity to Static Discharge	not applicable
Suitable extinguishing media	Foam. Carbon dioxide (CO <sub>2</sub> ). Dry chemical. Water spray or fog.
Protective equipment and precautions for firefighters	As in any fire, wear self-contained breathing apparatus and full protective gear. Isolate fire area. Evaluate downwind.

**NFPA**

Health Hazard	1
Flammability	1
Stability	0
Special Hazards	-

**6. Accidental release measures**

Personal precautions	Isolate and post spill area. Remove all sources of ignition. Wear suitable protective clothing, gloves and eye/face protection. For personal protection see section 8.
Environmental precautions	Keep people and animals away from and upwind of spill/leak. Keep material out of lakes, streams, ponds, and sewer drains.
Methods for containment	Dike to prevent runoff. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.
Methods for cleaning up	Clean and neutralize spill area, tools and equipment by washing with bleach water and soap. Absorb rinsate and add to the collected waste. Waste must be classified and labeled prior to recycling or disposal. Dispose of waste as indicated in Section 13.

**Other**

For further clean-up instructions call FMC Emergency Hotline number listed in Section 1 "Product and Company Identification" above.

**7. Handling and storage****Handling**

Do not contaminate other pesticides, fertilizers, water, food or feed by storage or disposal.

**Storage**

Keep in a dry, cool and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition. Keep out of reach of children and animals. Store in original container only.

**8. Exposure controls/personal protection**Exposure guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
n-Butanol 71-36-3	TWA: 20 ppm	TWA: 100 ppm TWA: 300 mg/m <sup>3</sup>	IDLH: 1400 ppm Ceiling: 50 ppm Ceiling: 150 mg/m <sup>3</sup>	
Chemical Name	British Columbia	Quebec	Ontario TWAEV	Alberta
Propylene glycol 57-55-6			TWA: 10 mg/m <sup>3</sup> TWA: 50 ppm TWA: 155 mg/m <sup>3</sup>	
n-Butanol 71-36-3	TWA: 15 ppm Ceiling: 30 ppm	Ceiling: 50 ppm Ceiling: 152 mg/m <sup>3</sup> Skin	TWA: 20 ppm	TWA: 20 ppm TWA: 60 mg/m <sup>3</sup>

Occupational exposure controls**Engineering measures**

Apply technical measures to comply with the occupational exposure limits. Ensure adequate ventilation, especially in confined areas. When working in confined spaces (tanks, containers, etc.), ensure that there is a supply of air suitable for breathing and wear the recommended equipment.

Personal Protective Equipment**General Information**

If the product is used in mixtures, it is recommended that you contact the appropriate protective equipment suppliers. These recommendations apply to the product as supplied.

**Respiratory protection**

For dust, splash, mist or spray exposures wear a filtering mask.

**Eye/face protection**

For dust, splash, mist or spray exposure, wear chemical protective goggles or a face-shield.

**Skin and body protection**

Wear long-sleeved shirt, long pants, socks, shoes, and gloves.

**Hand protection**

Protective gloves

**Hygiene measures**

Clean water should be available for washing in case of eye or skin contamination. Wash skin prior to eating, drinking, chewing gum or using tobacco. Shower or bathe at the end of working. Remove and wash contaminated clothing before re-use. Launder work clothing separately from regular household laundry.

**9. Physical and chemical properties**9.1 Information on basic physical and chemical properties

<b>Appearance</b>	White to off-white liquid
<b>Color</b>	white to off white
<b>Physical state</b>	Liquid
<b>Odor</b>	No information available.
<b>pH</b>	4.33 ( 1.02 % aqueous dispersion)
<b>Melting Point/Range</b>	No information available.

<b>Freezing point</b>	No information available.
<b>Boiling Point/Range</b>	not applicable
<b>Flash Point</b>	> 100 °C / > 212 °F
<b>Evaporation rate</b>	not applicable
<b>Vapor pressure</b>	No information available.
<b>Vapor density</b>	No information available.
<b>Density</b>	1.15 g/mL (9.63 lb/gal)
<b>Water solubility</b>	No information available
<b>Percent volatile</b>	No information available.
<b>Partition coefficient:</b>	not applicable
<b>Viscosity</b>	1574.8 cSt @ 23.0°C 1303.3 cSt @ 43.0°C

**9.2 Other information****10. Stability and reactivity**

<b>Stability</b>	Stable.
<b>Conditions to avoid</b>	Excessive heat.
<b>Materials to avoid</b>	Alkalis. Oxidizing agents.
<b>Hazardous decomposition products</b>	Carbon oxides.
<b>Hazardous polymerization</b>	Hazardous polymerization does not occur.

**11. Toxicological information**

<b>Eye contact</b>	Slightly or non-irritating (rabbit)
<b>Skin contact</b>	Slightly or non-irritating (rabbit)
<b>LD50 Dermal</b>	> 2000 mg/kg (rat)
<b>LD50 Oral</b>	3129 mg/kg (rat)
<b>LC50 Inhalation</b>	> 2.05 mg/L (rat) (4-hr)
<b>Sensitization</b>	Non-sensitizing.

**Chronic Toxicity - Other Ingredient(s)**

<b>Chronic Toxicity</b>	Prolonged exposure may cause chronic effects. Possible risks of irreversible effects. May cause adverse liver effects.
<b>Carcinogenicity</b>	Fomesafen caused increased rates of malignant liver tumors in rice, but not in rats. Fluthiacet-methyl caused increases in benign tumors of pancreas in male rats at highest dose, along with pancreatic and liver toxicity. Increase in liver tumors at two highest doses in male mouse, along with hepatotoxicity, that could both be secondary to porphyria.
<b>Mutagenicity</b>	Fomesafen: Not mutagenic. Fluthiacet-methyl was positive in in-vitro chromosomal aberration tests and negative in in-vivo tests of mutagenicity, chromosomal aberrations, clastogenicity, DNA damage and dominant lethality.
<b>Reproductive toxicity</b>	Fomesafen: Minor effects on reproductive performance. Fluthiacet-methyl: Reproductive toxin in animal studies only at doses acutely toxic to the maternal animal
<b>Neurological Effects</b>	Fomesafen, Fluthiacet-methyl: Not neurotoxic

**Developmental Toxicity**

Fomesafen: Embryotoxic effects in rats after chronic exposure to high oral doses. Fluthiacet-methyl: A slight delay in fetal development in the rat, with no effects in the rabbit

**Target Organ Effects**

Liver, spleen, Lymphatic System, Hematopoietic System, Pancreas, Bone marrow.

Chemical Name	ACGIH	IARC	NTP	OSHA	NIOSH - Target Organs
n-Butanol					eyes,CNS,respiratory system,skin

**12. Ecological information****Ecotoxicity**

## Fomesafen (72178-02-0)

Active Ingredient(s)	Duration	Species	Value	Units:
Fomesafen	96 h LC50	Rainbow trout	680	ppm
	48 h EC50	Daphnia magna	294	ppm
	14 day LD50	Mallard duck	>5000	mg/kg

## Fluthiacet-methyl (117337-19-6)

Active Ingredient(s)	Duration	Species	Value	Units:
Fluthiacet-methyl	72 h LC50	Algae	0.00251	mg/L
	48 h LC50	Daphnia magna	>2.3	mg/L
	LC50	Bluegill sunfish	0.14	mg/L
	LC50	Rainbow trout	0.43	mg/L
	LD50 Oral	Bobwhite quail	>2250	mg/kg
	LD50 Oral	Mallard duck	>2250	mg/kg

**Other Ingredient(s)**

Chemical Name	Toxicity to algae	Toxicity to fish	Toxicity to microorganisms	Toxicity to daphnia and other aquatic invertebrates
Propylene glycol	19000 mg/L EC50 96 h (Pseudokirchneriella subcapitata)	LC50 51600 mg/L Oncorhynchus mykiss 96 h LC50 41 - 47 mL/L Oncorhynchus mykiss 96 h LC50 51400 mg/L Pimephales promelas 96 h LC50 710 mg/L Pimephales promelas 96 h		EC50 > >10000 mg/L 24 h EC50 > >1000 mg/L 48 h
n-Butanol	500 mg/L EC50 96 h (Desmodesmus subspicatus) 500 mg/L EC50 72 h (Desmodesmus subspicatus)	LC50 1730-1910 mg/L Pimephales promelas 96 h LC50 1740 mg/L Pimephales promelas 96 h LC50 100000-500000 µg/L Lepomis macrochirus 96 h LC50 1910000 µg/L Pimephales promelas 96 h		EC50 1983 mg/L 48 h EC50 1897 - 2072 mg/L 48 h

**Environmental Fate**

## Fomesafen (72178-02-0)

Active Ingredient(s)	Type of Test	Result
Fomesafen	Half-life in soil	Persistent in soil.
	Mobility in soil	Highly mobile in soil. Will leach.
	Stability in water	Stable in water.

## Fluthiacet-methyl (117337-19-6)

Active Ingredient(s)	Type of Test	Result
----------------------	--------------	--------

Fluthiacet-methyl	Bioconcentration factor (BCF) Bluefill sunfish (Lepomis macrochirus)	240
	log Pow	4.1
	Mobility in soil	Not expected to reach groundwater
	Soil degradation	<2 days
	Stability in water	Hydrolysis half-life of 18 days (pH 7); Stable at pH 5 and unstable at pH 9.

<b>Chemical Name</b>	<b>log Pow</b>
n-Butanol	0.785

### 13. Disposal considerations

**Waste disposal methods**                      Improper disposal of excess pesticide, spray mixture, or rinsate is prohibited. If these wastes cannot be disposed of by use according to label instructions, contact appropriate disposal authorities for guidance.

**Contaminated packaging**                      Containers must be disposed of in accordance with local, state and federal regulations. Refer to the product label for container disposal instructions.

### 14. Transport information

**DOT**    This material is not a hazardous material as defined by U.S. Department of Transportation at 49 CFR Parts 100 through 185.

**TDG**    Classification below is only applicable when shipped by vessel and is not applicable when shipped by road or rail only.

**UN/ID No**    UN3082

**Proper shipping name**                              Environmentally hazardous substance, liquid, n.o.s.

**Hazard Class**    9

**Packing group**    III

**Description**    UN 3082, Environmentally hazardous substance, liquid, n.o.s. (Fluthiacet-methyl), 9, PGIII, Marine Pollutant

**ICAO/IATA**

**UN/ID No**    UN3082

**Proper shipping name**                              Environmentally hazardous substance, liquid, n.o.s.

**Hazard Class**    9

**Packing group**    III

**Marine pollutant**                                      Fluthiacet-methyl

**Description**    UN 3082, Environmentally hazardous substance, liquid, n.o.s. (Fluthiacet-methyl), 9, PGIII, Marine Pollutant

**IMDG/IMO**

**UN/ID No**    UN3082

**Proper shipping name**                              Environmentally hazardous substance, liquid, n.o.s.

**Hazard Class**    9

**Packing group**    III

**Marine pollutant**                                      Fluthiacet-methyl

**Description**    UN 3082, Environmentally hazardous substance, liquid, n.o.s. (Fluthiacet-methyl), 9, PGIII, Marine Pollutant

**15. Regulatory information****U.S. Federal Regulations****SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Fomesafen	72178-02-0	30.08	1.0
n-Butanol	71-36-3	1-5	1.0

**SARA 311/312 Hazard Categories**

<b>Acute Health Hazard</b>	no
<b>Chronic Health Hazard</b>	yes
<b>Fire Hazard</b>	no
<b>Sudden Release of Pressure Hazard</b>	no
<b>Reactive Hazard</b>	no

**CERCLA**

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302):

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs
n-Butanol	5000 lb	

**International Regulations****Mexico - Grade**

Slight risk, Grade 1

**Canada**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

**WHMIS Hazard Class**

Non-controlled

**16. Other information**

**Revision Date:** 2013-02-19  
**Reason for revision:** Initial Release.

**Disclaimer**

FMC Corporation believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. **NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN.** The information provided herein relates only to the specified product designated and may not be applicable where such product is used in combination with any other materials or in any process. Use of this product is regulated by the U.S. Environmental Protection Agency (EPA). It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Further, since the conditions and methods of use are beyond the control of FMC Corporation, FMC corporation expressly disclaims any and all liability as to any results obtained or arising from any use of the products or reliance on such information.

**Prepared By**

FMC Corporation  
 FMC Logo and Cadet - Trademarks of FMC Corporation

© 2013 FMC Corporation. All Rights Reserved.

**End of Material Safety Data Sheet**