1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Solitare™ Herbicide
Formula code: 6515-A
Active Ingredient(s): Sulfentrazone, Quinclorac
Synonyms: 3,7-dichloroquinoline-8-carboxylic acid; 3,7-dichloro-8-quinolinecarboxylic acid; FMC 97285; 2',4'-dichloro-5'-(4-difluoromethyl-4,5-dihydro-3-methyl-5-oxo-1H-1,2,4-triazol-1-yl)methanesulfonanilide; N-[2,4-dichloro-5-{4-(difluoromethyl)-4,5-dihydro-3-methyl-5-oxo-1H-1,2,4-triazol-1-yl[phenyl] methanesulfonamide
Chemical Family: Triazolinones;
Recommended use: Herbicide

Manufacturer: FMC Corporation
Agricultural Products Group
1735 Market Street
Philadelphia, PA 19103
General Information: Phone: (215) 299-6000
E-Mail: msdsinfo@fmc.com

Emergency telephone number
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)
Medical Emergencies:
1 800 / 331-3148 (PROSAR - U.S.A. & Canada)
1 651 / 632-6793 (PROSAR - All Other Countries - Collect)

2. HAZARDS IDENTIFICATION

Appearance: granules
Physical state: solid
Odor: No information available.
Flammable properties: Finely dispersed particles can form explosive mixtures in air.

Potential health effects:
Principle Routes of Exposure: Eye contact, Skin contact, Inhalation, Ingestion.
Acute effects
Eyes: Moderately irritating to skin.
Skin: Substance may cause slight skin irritation.
Inhalation: May cause irritation of respiratory tract. May be harmful if inhaled. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination.
Solitare™ Herbicide

Ingestion
May be harmful if swallowed. May cause additional effects as listed under "Inhalation". Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Chronic effects
Prolonged exposure may cause chronic effects.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

#### Hazardous ingredients

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quinclorac</td>
<td>84087-01-4</td>
<td>55-65</td>
</tr>
<tr>
<td>Sulfentrazone</td>
<td>122836-35-5</td>
<td>15-25</td>
</tr>
<tr>
<td>Kaolin</td>
<td>1332-58-7</td>
<td>1-5</td>
</tr>
<tr>
<td>Sodium N-methyl-N-oleoyltaurine</td>
<td>137-20-2</td>
<td>1-5</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>1-5</td>
</tr>
</tbody>
</table>

### 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 (within the U.S. and Canada) 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 induce vomiting or give anything by mouth to an unconscious person.

### 5. FIRE-FIGHTING MEASURES

**Flammable properties**
Finely dispersed particles can form explosive mixtures in air.

**Sensitivity to Mechanical Impact**
Not applicable

**Sensitivity to Static Discharge**
Not applicable

**Suitable extinguishing media**

**Protective equipment and precautions for firefighters**
Wear self-contained breathing apparatus and protective suit.

**NFPA**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Hazard</td>
<td>1</td>
</tr>
<tr>
<td>Flammability</td>
<td>1</td>
</tr>
<tr>
<td>Stability</td>
<td>0</td>
</tr>
<tr>
<td>Special Hazards</td>
<td>-</td>
</tr>
</tbody>
</table>
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
Use a wet sweeping compound or water to prevent dust formation.

Methods for cleaning up
Sweep up and shovel into suitable containers for disposal. 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.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure guidelines

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaolin 1332-58-7</td>
<td>TWA: 2 mg/m³</td>
<td>TWA: 15 mg/m³ TWA: 5 mg/m³</td>
<td>TWA: 10 mg/m³ TWA: 5 mg/m³</td>
<td>Mexico: S* Mexico: TWA 50 ppm Mexico: TWA 188 mg/m³</td>
</tr>
<tr>
<td>Toluene 108-88-3</td>
<td>TWA: 20 ppm</td>
<td>TWA: 200 ppm Ceiling: 300 ppm</td>
<td>IDLH: 500 ppm TWA: 100 ppm TWA: 375 mg/m³ STEL: 150 ppm STEL: 560 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>British Columbia</th>
<th>Quebec</th>
<th>Ontario TWAEV</th>
<th>Alberta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaolin 1332-58-7</td>
<td>TWA: 2 mg/m³</td>
<td>TWA: 5 mg/m³</td>
<td>TWA: 2 mg/m³</td>
<td>TWA: 2 mg/m³</td>
</tr>
<tr>
<td>Toluene 108-88-3</td>
<td>TWA: 20 ppm</td>
<td>TWA: 50 ppm TWA: 188 mg/m³ Skin</td>
<td>TWA: 20 ppm</td>
<td>TWA: 50 ppm TWA: 188 mg/m³ Skin</td>
</tr>
</tbody>
</table>

Occupational exposure controls

Engineering measures
Apply technical measures to comply with the occupational exposure limits. 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
Solitare™ Herbicide  

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

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>granules</td>
</tr>
<tr>
<td>Physical state</td>
<td>solid</td>
</tr>
<tr>
<td>Odor</td>
<td>No information available.</td>
</tr>
<tr>
<td>pH</td>
<td>4.3</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>No information available.</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No information available.</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammable properties</td>
<td>Finely dispersed particles can form explosive mixtures in air.</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No information available</td>
</tr>
<tr>
<td>Vapor density</td>
<td>No information available</td>
</tr>
<tr>
<td>Density</td>
<td>32 - 35.4 lb/cu ft</td>
</tr>
<tr>
<td>Water solubility</td>
<td>No information available</td>
</tr>
<tr>
<td>Percent volatile</td>
<td>No information available</td>
</tr>
<tr>
<td>Partition coefficient:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No information available</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability  
Stable.

Conditions to avoid  
None known

Hazardous decomposition products  
Carbon oxides, nitrogen oxides (NOx), Sulfur oxides, Hydrogen chloride, Hydrogen fluoride.

Hazardous polymerization  
Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute effects

Acute Toxicity  
Signs of toxicity in laboratory animals, with sulfentrazone, included clonic convulsions, ataxia, hypersensitivitiy to touch, chromorhinorrhea, abdominogenital staining, decreased locomotion, lacrimation, nasal discharge, and squinting eyes.

Eye contact  
Moderately irritating to skin.

Skin contact  
Slightly or non-irritating (rabbit).

LD50 Dermal  
> 5000 mg/kg (Rat)

LD50 Oral  
3110 mg/kg (Rat)

LC50 Inhalation:  
> 2.06 mg/L (Rat)

Sensitization  
Non-sensitizing

Chronic effects

Chronic Toxicity  
Prolonged exposure may cause chronic effects.

Carcinogenicity  
Quinclorac, Sulfentrazone: Not carcinogenic.

Mutagenicity  
Quinclorac, Sulfentrazone: Not mutagenic.
Solitare™ Herbicide

Reproductive toxicity
Quinclorac: No effects on reproduction in rats; In rabbits effects only at maternally toxic levels. Offspring Toxicity (sulfentrazone): LOAEL = 33 mg/kg/day for males; 40 mg/kg/day for females.

Developmental Toxicity
Quinclorac: Not teratogenic in animal studies. Sulfentrazone: NOAEL of 10 mg/kg/day in the developmental toxicity study in rat. NOAEL of 14 mg/kg/day in a 2-generation reproduction study.

Target Organ Effects

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
<th>NIOSH - Target Organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaolin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>respiratory system, stomach</td>
</tr>
<tr>
<td>Toluene</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CNS, eyes, kidneys, liver, respiratory system, skin</td>
</tr>
</tbody>
</table>

12. ECOLOGICAL INFORMATION

Ecotoxicity

### Quinclorac (84087-01-4)

<table>
<thead>
<tr>
<th>Active Ingredient(s)</th>
<th>Duration</th>
<th>Species</th>
<th>Value</th>
<th>Units:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quinclorac</td>
<td>48 h EC50</td>
<td>Daphnia</td>
<td>&gt;100</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>96 h LC50</td>
<td>Algae</td>
<td>&gt;100</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>LC50</td>
<td>Fish</td>
<td>&gt;100</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>LD50</td>
<td>Mallard duck</td>
<td>&gt;5000</td>
<td>ppm</td>
</tr>
<tr>
<td></td>
<td>LD50</td>
<td>Bobwhite quail</td>
<td>&gt;2000</td>
<td>mg/kg</td>
</tr>
<tr>
<td></td>
<td>LD50</td>
<td>Bee</td>
<td>&gt;100</td>
<td>µg/bee</td>
</tr>
</tbody>
</table>

### Sulfentrazone (122836-35-5)

<table>
<thead>
<tr>
<th>Active Ingredient(s)</th>
<th>Duration</th>
<th>Species</th>
<th>Value</th>
<th>Units:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfentrazone</td>
<td>120 h LC50</td>
<td>Algae</td>
<td>31</td>
<td>µg/L</td>
</tr>
<tr>
<td></td>
<td>48 h LC50</td>
<td>Aquatic organisms</td>
<td>60.4</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>96 h LC50</td>
<td>Fish</td>
<td>94</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Bobwhite quail</td>
<td>&gt;2250</td>
<td>mg/kg</td>
</tr>
<tr>
<td></td>
<td>LD50 Dietary</td>
<td>Mallard duck</td>
<td>&gt;5620</td>
<td>ppm</td>
</tr>
</tbody>
</table>

### Chemical Name

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Toxicity to algae</th>
<th>Toxicity to fish</th>
<th>Toxicity to microorganisms</th>
<th>Toxicity to daphnia and other aquatic invertebrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>433 mg/L EC50 96 h (Pseudokirchneriella subcapitata) 12.5 mg/L EC50 72 h (Pseudokirchneriella subcapitata)</td>
<td>LC50 15.22 - 19.05 mg/L Pimephales promelas 96 h LC50= 12.6 mg/L Pimephales promelas 96 h LC50 5.89 - 7.81 mg/L Oncorhynchus mykiss 96 h LC50 14.1 - 17.16 mg/L Oncorhynchus mykiss 96 h LC50= 5.8 mg/L Oncorhynchus mykiss 96 h LC50 11.0 - 15.0 mg/L Lepomis macrochirus 96 h LC50= 54 mg/L Oryzias latipes 96 h LC50= 28.2 mg/L Poecilia reticulata 96 h LC50 50.87 - 70.34 mg/L Poecilia reticulata 96 h</td>
<td></td>
<td>EC50 5.46 - 9.83 mg/L 48 h EC50 = 11.5 mg/L 48 h</td>
</tr>
</tbody>
</table>

Environmental Fate

<table>
<thead>
<tr>
<th>Quinclorac (84087-01-4)</th>
<th>Type of Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quinclorac</td>
<td>Half-life in soil</td>
<td>10-40 days</td>
</tr>
<tr>
<td></td>
<td>Stability in water</td>
<td>Stable in water</td>
</tr>
</tbody>
</table>

Page 5 / 8
Solitare™ Herbicide

Mobility in soil
Variable depending on soil type.

Sulfentrazone (122836-35-5)

<table>
<thead>
<tr>
<th>Active Ingredient(s)</th>
<th>Type of Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfentrazone</td>
<td>Bioconcentration factor (BCF)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Half-life in soil</td>
<td>2-18 months</td>
</tr>
<tr>
<td></td>
<td>log Pow</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>Mobility in soil</td>
<td>Potential to reach groundwater</td>
</tr>
<tr>
<td></td>
<td>Stability in water</td>
<td>Stable to hydrolysis over a wide range of pH values.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>log Pow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>2.65</td>
</tr>
</tbody>
</table>

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.

Packaging Type
Non-Bulk, Bulk

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

UN/ID No
UN3077

Hazard Class
9

Packing group
III

Marine pollutant
Sulfentrazone

Description
UN3077, Environmentally hazardous substance, solid, n.o.s. (sulfentrazone), 9, PGIII, Marine Pollutant

ICAO/IATA

UN/ID No
UN3077

Hazard Class
9

Packing group
III

Marine pollutant
Sulfentrazone

Description
UN3077, Environmentally hazardous substance, solid, n.o.s. (sulfentrazone), 9, PGIII, Marine Pollutant

IMDG/IMO

UN/ID No
UN3077

Hazard Class
9

Packing group
III

EmS No.
F-A, S-F

Marine pollutant
Sulfentrazone

Description
UN3077, Environmentally hazardous substance, solid, n.o.s. (sulfentrazone), 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:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>1-5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazard Categories
- Acute Health Hazard: yes
- Chronic Health Hazard: yes
- Fire Hazard: no
- Sudden Release of Pressure Hazard: no
- Reactive Hazard: no

CERCLA

TSCA Inventory (United States of America)

<table>
<thead>
<tr>
<th>Component</th>
<th>U.S. - TSCA (Toxic Substances Control Act) - Section 4 - Chemical Test Rules (40 CFR 799)</th>
<th>U.S. - TSCA (Toxic Substances Control Act) - Section 5(a)(2) - Chemicals with Significant New Use Rules (SNURs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>40 CFR 799.5087</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Hazardous Substances RQs</th>
<th>Extremely Hazardous Substances RQs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>1000 lb 1 lb</td>
<td></td>
</tr>
</tbody>
</table>

International Regulations

Mexico - Grade
Slight risk, Grade 1

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Carcinogen Status</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td></td>
<td>Mexico: S*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mexico: TWA 50 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mexico: TWA 188 mg/m³</td>
</tr>
</tbody>
</table>

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
D2B Toxic materials
16. OTHER INFORMATION

Revision Date: 2012-03-25
Reason for revision: Initial Release.

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Prepared By

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End of Material Safety Data Sheet