1. PRODUCT AND COMPANY IDENTIFICATION

Product name: ASTRO® INSECTICIDE
Formula code: 1547-A
Active Ingredient(s): Permethrin
Synonyms: FMC 33297; 3-phenoxybenzyl (1RS,3RS;1RS,3SR)-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate; (3-phenoxyphenyl)methyl 3-(2,2-dichloroethyl)-2,2-dimethylcyclopropanecarboxylate
Chemical Family: Pyrethroid Pesticide
Recommended use: Insecticide
Manufacturer: FMC Corporation
Address: Agricultural Products Group
1735 Market Street
Philadelphia, PA 19103
General Information: Phone: (215) 299-6000
E-Mail: msdsinfo@fmc.com

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

Appearance: amber liquid
Physical state: Liquid
Odor: Faint hydrocarbon

Physical or Chemical Hazards
Flammable properties: Combustible liquid

Potential health effects
Acute effects
Eyes: May cause slight irritation.
Skin: Irritating to skin.
Inhalation
Inhalation of vapors in high concentration may cause irritation of respiratory system. May cause
drowsiness and dizziness.

Ingestion
Harmful if swallowed. Potential for aspiration if swallowed. May cause drowsiness and dizziness.
Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Chronic effects
May cause adverse kidney effects. May cause adverse liver 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>Permethrin</td>
<td>52645-53-1</td>
<td>36.8</td>
</tr>
<tr>
<td>1,1′- Biphenyl, bis(1-methylethyl)-</td>
<td>69009-90-1</td>
<td>20-30</td>
</tr>
<tr>
<td>Petroleum distillates, hydrotreated light</td>
<td>64742-47-8</td>
<td>10-20</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
Immediately call a poison control center or doctor. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give any liquid to the person. Do not induce vomiting or give anything by mouth to an unconscious person.

Notes to physician
Contains petroleum distillate. Vomiting may cause aspiration pneumonia. This product is a pyrethroid. If large amounts have been ingested, the stomach and intestines should be evacuated. Treatment is symptomatic and supportive. Digestible fats, oils, or alcohol may increase absorption and so should be avoided.

5. FIRE-FIGHTING MEASURES

Flammable properties
Combustible liquid

Flash Point
66-68 °C / 151-154 °F

Method
Tag Closed Cup

Sensitivity to Mechanical Impact
Not applicable

Sensitivity to Static Discharge
Not applicable

Suitable extinguishing media
Foam. Carbon dioxide (CO₂). 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

<table>
<thead>
<tr>
<th>Health Hazard</th>
<th>Flammability</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Isolate and post spill area. 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 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 only.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure guidelines

<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>Petroleum distillates, hydrotreated light 64742-47-8</td>
<td>TWA: 200 mg/m³ Skin</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 full-face elastomeric half mask respirator with appropriate cartridges and/or filters, which is approved for pesticides (U.S. NIOSH/MSHA, EU CEN or comparable certification organization).

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

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>amber liquid</td>
</tr>
<tr>
<td>Color</td>
<td>amber</td>
</tr>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>Faint hydrocarbon</td>
</tr>
<tr>
<td>pH</td>
<td>4 @ 25 °C (5% solution)</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>66-68 - 68 °C / 151-154 °F Tag Closed Cup</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammable properties</td>
<td>Combustible liquid</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>8.61 lb/gal</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.033 @ 201 °C</td>
</tr>
<tr>
<td>Water solubility</td>
<td>Emulsifies</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
Excessive heat, Extreme risk of explosion by shock, friction, fire or other sources of ignition

Hazardous decomposition products
Chlorine, Hydrogen chloride, Carbon oxides, Aldehydes.

Hazardous polymerization
Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute effects

Eye contact
May cause slight irritation

Skin contact
Irritating to skin

Ingestion
Large toxic doses of the formulated product, administered to laboratory animals, have produced central nervous system effects with symptoms that include hypersensitivity to touch and sound, tremors, and clonic convulsions. Vomiting after ingestion of this product may cause aspiration of aromatic hydrocarbons into the lungs, which may result in fatal pulmonary edema.

Inhalation
In animals overexposure has produced symptoms such as squinting eyes, irregular and rattling breathing, and ataxia. Inhalation of hydrocarbon vapors may cause headaches, dizziness, disturbances in vision, drowsiness, respiratory irritation, anesthesia, unconsciousness, and other central nervous system effects.

LD50 Dermal
> 2,000 mg/kg (rabbit)

LD50 Oral
998 mg/kg (Rat)

LC50 Inhalation:
> 4.3 mg/L 4 hr (Rat)

Sensitization
May cause sensitization of susceptible persons.
Chronic effects

Chronic Toxicity  May cause adverse kidney effects. May cause adverse liver effects.

Carcinogenicity  Not recognized as carcinogenic by Research Agencies (IARC, NTP, OSHA, ACGIH).

Mutagenicity  Permethrin: Did not show mutagenic effects in animal experiments.

Reproductive toxicity  Permethrin: No toxicity to reproduction.

Neurological Effects  Permethrin: Clinical signs of neurotoxicity include altered motor activity and FOB effects, with no signs of histopathology

Developmental Toxicity  Permethrin: Not teratogenic in animal studies

Target Organ Effects  Permethrin: Long-term feeding studies in animals resulted in increased liver and kidney weights, induction of the liver microsomal drug metabolizing enzyme system and histopathological changes in the lungs and liver.

Chronic Toxicity - Other Ingredient(s)  Chronic exposure to aromatic hydrocarbons may cause headaches, dizziness, loss of sensations or feelings (such as numbness), and liver and kidney damage.

12. ECOLOGICAL INFORMATION

Ecotoxicity

<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>Permethrin (52645-53-1)</td>
<td>LC50</td>
<td>aquatic arthropods</td>
<td>0.02 - 7.6</td>
<td>µg/L</td>
</tr>
<tr>
<td>Permethrin</td>
<td>LC50</td>
<td>Fish</td>
<td>0.05 - 315</td>
<td>µg/L</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Bobwhite quail</td>
<td>&gt;5200</td>
<td>mg/kg</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Mallard duck</td>
<td>&gt;5200</td>
<td>mg/kg</td>
</tr>
<tr>
<td></td>
<td>LD50</td>
<td>Bee</td>
<td>0.026 - 0.17</td>
<td>µg/bee</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Toxicity to algae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permethrin</td>
<td>LC50= 0.008 - 0.03 mg/L Pimephales promelas 96 h LC50= 0.001 - 0.009 mg/L Pimephales promelas 96 h LC50= 0.015 mg/L Cyprinus carpio 96 h LC50= 0.0052 - 0.0077 mg/L Cyprinus carpio 96 h LC50= 0.00079 mg/L Lepomis macrochirus 96 h LC50= 0.0108 mg/L Lepomis macrochirus 96 h LC50= 0.00188 - 0.00336 mg/L Lepomis macrochirus 96 h LC50= 0.00049 - 0.00097 mg/L Oncorhynchus mykiss 96 h LC50= 0.0017 - 0.0048 mg/L Oncorhynchus mykiss 96 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Toxicity to fish</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50= 45 mg/L Pimephales promelas 96 h LC50= 2.2 mg/L Lepomis macrochirus 96 h LC50= 2.4 mg/L Oncorhynchus mykiss 96 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Toxicity to microorganisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 = 4720 mg/L 96 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Toxicity to daphnia and other aquatic invertebrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 = 4720 mg/L 96 h</td>
</tr>
</tbody>
</table>

Environmental Fate
### 13. DISPOSAL CONSIDERATIONS

**Waste disposal methods**

Pesticide wastes are toxic. 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**

Not regulated for transportation if shipped in Non Bulk packaging. The classification below pertains to the shipment in Bulk packaging.

- **Packaging Type**: Bulk
- **Proper shipping name**: Combustible liquid, n.o.s.
- **UN/ID No**: NA1993
- **Hazard Class**: Combustible
- **Packing group**: III
- **Description**: NA1993, Combustible liquid, n.o.s. (Aromatic hydrocarbons), III

**TDG**

The “Marine Pollutant” marking is only applicable when shipped by vessel or air, and is not applicable when shipped only by road or rail in Canada.

- **UN/ID No**: UN3082
- **Proper shipping name**: Environmentally hazardous substance, liquid, n.o.s.
- **Hazard Class**: 9
- **Packing group**: III
- **Marine pollutant**: Permethrin
- **Description**: UN3082, Environmentally hazardous substance liquid n.o.s. (Permethrin), 9, III

**ICAO/IATA**

- **UN/ID No**: UN3082
- **Proper shipping name**: Environmentally hazardous substance, liquid, n.o.s.
- **Hazard Class**: 9
- **Packing group**: III
- **Marine pollutant**: Permethrin
- **Description**: UN3082, Environmentally hazardous substance liquid n.o.s. (Permethrin), 9, III
- **Limited quantity**: 914 / 450 L

**IMDG/IMO**

- **UN/ID No**: UN3082
- **Proper shipping name**: Environmentally hazardous substance, liquid, n.o.s.
- **Hazard Class**: 9
- **Packing group**: III
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>Permethrin</td>
<td>52645-53-1</td>
<td>38.85</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazard Categories

- Acute Health Hazard: yes
- Chronic Health Hazard: yes
- Fire Hazard: yes
- Sudden Release of Pressure Hazard: no
- Reactive Hazard: no

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>U.S. - TSCA (Toxic Substances Control Act) - Section 8(d) - 716.120(a) - Health and Safety Reporting - List of Substances</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1'-Biphenyl, bis(1-methylethyl)-</td>
<td></td>
<td>06/28/1984</td>
</tr>
</tbody>
</table>

International Regulations

- Mexico - Grade: No information available.
- 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: 2013-09-30
Reason for revision: No information available.

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Prepared By

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End of Material Safety Data Sheet