### 1. PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>NFPA</th>
<th>PPE</th>
</tr>
</thead>
<tbody>
<tr>
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<td><img src="image5" alt="Gloves" /> <img src="image6" alt="Eye Protection" /> <img src="image7" alt="Hood" /></td>
</tr>
</tbody>
</table>

**Issued Date** 17-Sep-2010  
**Revision Date** 08-Dec-2010  
**Revision Number:** 4

#### UPI
630 Freedom Business Center  
Suite 402  
King of Prussia, PA 19406

#### Emergency Telephone Number
Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887  
Medical: Rocky Mountain Poison Control Center  
(866) 673-6671 (24hrs)

<table>
<thead>
<tr>
<th>Company Information</th>
<th>Contact Information</th>
<th>Phone Number</th>
<th>Available Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Customer Service</td>
<td>1-800-438-6071</td>
<td>8:00 am to 5:00 pm EST</td>
</tr>
<tr>
<td></td>
<td>R&amp;D Technical Service</td>
<td>610-878-6100</td>
<td>8:00 am - 5:00 pm (EST)</td>
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</tbody>
</table>

**Product Name**: Manzate Flowable  
**EPA Reg #**: 70506-236  
**Recommended Use**: fungicide  
**Product Code**: 12-371D
2. HAZARDS IDENTIFICATION

Emergency Overview
May cause allergic skin reaction
Harmful if absorbed through skin
May cause thyroid damage after repeated exposure based on animal data.

CAUTION
Appearance Pale, Yellow.  
Physical State Liquid.  
Odor Slight. Rotten egg-like.

Potential Health Effects
- Inhalation
- Skin contact
- Repeated or long-term exposure may cause adverse effects on the thyroid.
  - Eyes: May cause slight irritation.
  - Skin: Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.
  - Inhalation: May cause irritation of respiratory tract.
  - Ingestion: May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients Name</th>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>OSHA PEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mancozeb</td>
<td>8018-01-7</td>
<td>37</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Ethylene thiourea</td>
<td>96-45-7</td>
<td>&lt;1.0</td>
<td>N/A</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Eye Contact
Hold eye open and rinse slowly and gently with water for 15 - 20 minutes. Remove contact lenses, if present, after 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

Skin Contact
Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call 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. Call a poison control center or doctor for further treatment advice.

Ingestion
Call a physician or Poison Control Center immediately. 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. Never give anything by mouth to an unconscious person.

Notes to Physician
No information available.
5. FIRE-FIGHTING MEASURES

Flammable Explosive Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash Point</td>
<td>Not available</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>Not available</td>
</tr>
</tbody>
</table>

Flammability Limits in Air      Not available

Extinguishing Media

Use: Carbon dioxide (CO2) Foam Dry chemical

Fire/Explosion Hazard

Firefighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear and self-contained breathing apparatus. Fire fighting equipment should be thoroughly decontaminated after use.

Hazardous Combustion Products

Carbon disulfide, ethylene thiourea (ETU), Sulfur oxides, Oxides of nitrogen, Oxides of carbon.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions

Avoid contact with skin, eyes and clothing. Use personal protective equipment.

Environmental Precautions

Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits. Do not flush into surface water or sanitary sewer system.

Methods for Clean-up

Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Handling

Keep out of reach of children. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation. Keep away from heat, sparks and open flame. - No smoking.

Storage

Store in an area where cross-contamination with pesticides, fertilizers, food or feed could not occur. If allowed to become wet the product will deteriorate and represent a fire hazard.
8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Engineering Controls
Investigate engineering techniques to reduce exposures. Local mechanical exhaust ventilation is preferred. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

PESTICIDE APPLICATORS & WORKERS. THESE WORKERS MUST REFER TO PRODUCT LABELING AND DIRECTIONS FOR USE IN ACCORDANCE WITH EPA WORKER PROTECTION STANDARD 40 CFR PART 170.

Personal Protective Equipment

Eye/face Protection
Avoid contact with eyes. Goggles.

Skin Protection

Respiratory Protection
Where airborne exposure is likely, use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. If exposures cannot be kept at a minimum with engineering controls, consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure, use an approved full face positive-pressure, self-contained breathing apparatus. Respiratory protection programs must comply with 29 CFR 1910.134.

Mixers & loaders:
A NIOSH approved dust mist filtering respirator with MSA/NIOSH approval number prefix TC-21C or a NIOSH approved respirator with any N, R, P, or HE filter.

General Hygiene Considerations
Handle in accordance with good industrial hygiene and safety practice

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Pale Yellow</td>
</tr>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>212°F</td>
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<tr>
<td>Specific Gravity</td>
<td>1.29-1.31 g/cm³</td>
</tr>
<tr>
<td>Evaporation Rate</td>
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<tr>
<td>Vapor Density</td>
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<tr>
<td>Viscosity</td>
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</tr>
<tr>
<td>Bulk Density</td>
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<tr>
<td>Percent Volatiles</td>
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<tr>
<td>Odor</td>
<td>Slight Rotten egg-like</td>
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<tr>
<td>pH</td>
<td>(20°C)7.5</td>
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<tr>
<td>Melting Point/Range</td>
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<tr>
<td>Solubility</td>
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<tr>
<td>Vapor Pressure</td>
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<tr>
<td>VOC Content</td>
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</tr>
<tr>
<td>Molecular Weight</td>
<td>No data available</td>
</tr>
<tr>
<td>Percent Solids</td>
<td>Not available</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability
Stable under recommended storage conditions

Conditions to Avoid
To avoid thermal decomposition, do not overheat. Keep away from children. Avoid temperatures above 49 C.

Incompatible Materials
Strong oxidizing agents. Acids.

Hazardous Decomposition Products
carbon disulfide, ethylene thiourea. Hydrogen sulfide.
11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information

Manzate Flowable:
- Oral LD50 rat = >5,000 mg/kg
- Dermal LD50 rabbit = >2,000 mg/kg
- Inhalation LC50 rat = >4.8 mg/L
- Slight skin irritant. Not a skin sensitizer
- Moderate eye irritant

Chronic Toxicity

Mancozeb:
The effects in animals from repeated high inhalation dose of mancozeb dust equivalent to 150 - 250 times the AEL include reduced body weight, inflammation of the lungs, and abnormal thyroid function.

Carcinogenicity

Toxic effects in animals from repeated ingestion of high doses of Mancozeb include reduced body weight and thyroid effects. In a different study, repeated dosing caused toxic and neuropathological effects in male and female rats which included compound-related mortality, decreased body weight, impaired hind limb motor activity and histopathological evidence of nerve damage. The no-observable effect level was 125 ppm.

Increased incidences of thyroid tumors and ocular lesions were observed in rats administered 750 ppm (equivalent to approximately 35 mg/kg/day) of mancozeb in their diet for two years. Mancozeb is considered to show weak carcinogenic activity. Tests in some animals indicate that mancozeb may produce embryonic and fetal toxicity, but only at maternally toxic doses. Multi-generation studies in animals demonstrate no reproductive toxicity.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene thiourea</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IARC: (International Agency for Research on Cancer)
A trace contaminant, Ethylene thiourea (ETU) a breakdown product of Maneb, has been categorized as a probable human carcinogen by NTP.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Toxic to aquatic organisms. Mancozeb:
- Aquatic toxicity:
  - 96 hour LC50 = rainbow trout 0.73 mg/L
  - 96 hour LC50 = fathead minnows 0.57 mg/L
  - 96 hour LC50 = Bluegill sunfish 0.84 mg/L

  72 hour EC50 = freshwater algae = 0.43 mg/L.
13. DISPOSAL CONSIDERATIONS

Waste Disposal Method
Dispose of in accordance with local regulations. Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide or rinsate is a violation of Federal law. If the wastes cannot be disposed of by use or according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Contaminated Packaging
Refer to product label.

14. TRANSPORT INFORMATION

DOT
Not regulated when shipped by highway in non-buk containers as per 49 CFR 171.4
When shipped in bulk, by vessel, or internationally use the following shipping description:

- **Proper Shipping Name**: Environmentally hazardous substance, liquid, n.o.s (Mancozeb)
- **Hazard Class**: 9
- **UN-No**: UN3082
- **Packing Group**: PG III
- **Marine Pollutant**: Yes.

ICAO

- **UN-No**: UN3082
- **Proper Shipping Name**: Environmentally hazardous substance, liquid, n.o.s (Mancozeb)
- **Hazard Class**: 9
- **Packing Group**: PG III

IATA

- **UN-No**: 3082
- **Proper Shipping Name**: Environmentally hazardous substances, liquid, n.o.s. (Mancozeb)
- **Hazard Class**: 99
- **Packing Group**: PG III

IMDG/IMO

- **Proper Shipping Name**: Environmentally hazardous substances, liquid, n.o.s. (Mancozeb)
- **Hazard Class**: 9
- **UN-No**: 3082
- **Packing Group**: PG III
- **Marine Pollutant**: This product contains a chemical which is listed as a marine pollutant according to IMDG/IMO

15. REGULATORY INFORMATION

International Inventories

- **Mancozeb**
  - **ENCS**: Listed
  - **CHINA**: Listed
  - **KECL**: Listed
12-371D - Manzate Flowable

Mancozeb
Ethylene thiourea

---

### Chemicals:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>HAPS data</th>
<th>VOC Chemicals</th>
<th>Class 1 Ozone Depletors</th>
<th>Class 2 Ozone Depletors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mancozeb</td>
<td>8018-01-7</td>
<td>37</td>
<td>Listed</td>
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</tr>
<tr>
<td>Ethylene thiourea</td>
<td>96-45-7</td>
<td>&lt;1.0</td>
<td>Listed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SARA 311/312 Hazardous Categorization

- **Chronic Health Hazard**: Yes
- **Acute Health Hazard**: Yes
- **Fire Hazard**: No
- **Sudden Release of Pressure Hazard**: No
- **Reactive Hazard**: No

### Clean Water Act

### Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product contains the following HAPs:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>HAPS data</th>
<th>VOC Chemicals</th>
<th>Class 1 Ozone Depletors</th>
<th>Class 2 Ozone Depletors</th>
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<tr>
<td>Mancozeb</td>
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### CERCLA

<table>
<thead>
<tr>
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<tr>
<td>Mancozeb</td>
<td>Listed</td>
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<tr>
<td>Ethylene thiourea</td>
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</table>

### RCRA

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>RCRA - D Series Wastes</th>
<th>RCRA - P Series Wastes</th>
<th>RCRA - U Series Wastes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene thiourea</td>
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<td>U116</td>
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### Pesticide Information

### California Proposition 65

This product contains the following Proposition 65 chemicals:

<table>
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<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Category</th>
<th>California Prop. 65</th>
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### Chemical Name

<table>
<thead>
<tr>
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<th>CAS-No</th>
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<tr>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Listed: January 1, 1990</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Carcinogenic.</td>
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<td>Listed.</td>
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<tr>
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<td></td>
<td></td>
<td>Listed: January 1, 1988</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Carcinogenic.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Listed: January 1, 1993</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Developmental toxin.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20 ug/day</td>
</tr>
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</table>

### State Right-to-Know

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<tr>
<th>Chemical Name</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
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<tbody>
<tr>
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<td>Listed.</td>
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<tr>
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<td>Substance no. 2371 Listed.</td>
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<tr>
<td></td>
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<td>Substance no. 2372 Listed.</td>
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<tr>
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<td>Substance no. 2324 Listed.</td>
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<tr>
<td></td>
<td></td>
<td>Special hazard.</td>
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### International Regulations

**Mexico - Grade**

Not 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**

Not determined

### NPRI

<table>
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<th>Chemical Name</th>
<th>NPRI</th>
</tr>
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<tbody>
<tr>
<td>Mancozeb</td>
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<tr>
<td>Ethylene thiourea</td>
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</table>

### 16. OTHER INFORMATION

**Revision Date**

08-Dec-2010

**Revision Summary**

Update section 14