SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 90% Dimethyl Sulfoxide / 10% Water - (811)
MSDS Number : 000000013312
Product Use Description : Laboratory Use

Company : Honeywell International Inc.
1953 South Harvey Street
Muskegon, MI 49442

For more information call : 1-800-368-0050
(Monday-Friday, 9:00am-5:00pm)

In case of emergency call :
Medical: 1-800-498-5701
Transportation: 1-800-424-9300 or +1-703-527-3887
(24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Form : liquid
Color : colourless
Odor : garlic/onion

Hazard Summary : May be harmful if absorbed through skin. May irritate eyes. May irritate skin. May cause respiratory tract irritation. May cause irritation of the gastrointestinal tract. Can be absorbed through skin. Skin absorption can transport other toxins into the body. Repeated exposure may cause skin dryness or cracking. May cause allergic skin reaction.

Potential Health Effects

Skin : May be harmful if absorbed through skin. Skin absorption can transport other toxins into the body. May irritate skin. May cause allergic skin reaction. May cause systemic poisoning with symptoms paralleling those of inhalation. May cause systemic poisoning with symptoms paralleling those of ingestion. May cause rash or external ulcers. Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering.
Eyes : May irritate eyes. Signs/symptoms can include redness, swelling, pain, and tearing.

Ingestion : May cause irritation of the gastrointestinal tract. May cause nausea, vomiting, diarrhea, and abdominal discomfort. May cause systemic poisoning with symptoms paralleling those of inhalation.

Inhalation : May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness. Inhalation of high vapour concentrations can cause CNS-depression and narcosis.

Chronic Exposure : Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering. May cause allergic skin reaction. May cause: Blood disorders

Target Organs : Eyes Skin Respiratory system Gastrointestinal tract Central nervous system

Carcinogenicity

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl sulfoxide</td>
<td>67-68-5</td>
<td>90.80</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>9.20</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

Inhalation : Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Use oxygen as required, provided a qualified operator is present. Call a physician.

Skin contact : Wash off immediately with plenty of water for at least 15
minutes. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use. Call a physician if irritation develops or persists.

Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician if irritation develops or persists.

Ingestion : Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Call a physician.

Notes to physician
Treatment : Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Flash point : >93.3 °C (199.9 °F)
closed cup

Ignition temperature : 215 °C (419 °F)
The physical data is that of the main component.

Lower explosion limit : 42 % (V)
The physical data is that of the main component.

Upper explosion limit : 2.6 % (V)
The physical data is that of the main component.

Suitable extinguishing media : Carbon dioxide (CO2)
Dry chemical
Foam
Cool closed containers exposed to fire with water spray.

Extinguishing media which shall not be used for safety reasons : Do not use a solid water stream as it may scatter and spread fire.

Specific hazards during fire fighting : Vapours may form explosive mixtures with air.
Vapours are heavier than air and may spread along floors.
Vapors may travel to areas away from work site before igniting/flashign back to vapor source.
In case of fire hazardous decomposition products may be produced such as:
Formaldehyde
Methyl mercaptan
Sulfur dioxide
Carbon dioxide (CO2)
Carbon monoxide
Special protective equipment for fire-fighters: Wear self-contained breathing apparatus and protective suit.
Additional advice: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Wear personal protective equipment. 
Immediately evacuate personnel to safe areas. 
Keep people away from and upwind of spill/leak. 
Ensure adequate ventilation. 
Remove all sources of ignition. 
Do not swallow. 
Avoid breathing vapors, mist or gas. 
Avoid contact with skin, eyes and clothing.

Environmental precautions: Prevent further leakage or spillage if safe to do so. 
Discharge into the environment must be avoided. 
Do not flush into surface water or sanitary sewer system. 
Prevent product from entering drains. 
Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

Methods for cleaning up: Ventilate the area. 
No sparking tools should be used. 
Use explosion-proof equipment. 
Contain and collect spillage with non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see section 13).

SECTION 7. HANDLING AND STORAGE

Handling

Handling: Wear personal protective equipment. 
Use only in well-ventilated areas. 
Keep container tightly closed. 
Do not smoke. 
Do not swallow. 
Avoid breathing vapors, mist or gas. 
Avoid contact with skin, eyes and clothing.

Advice on protection against fire and explosion: Keep away from fire, sparks and heated surfaces. 
Take precautionary measures against static discharges. 
Ensure all equipment is electrically grounded before beginning transfer operations.
Use explosion-proof equipment.
Keep product and empty container away from heat and sources of ignition.
No sparking tools should be used.
No smoking.

Storage
Requirements for storage areas and containers: Store in area designed for storage of flammable liquids. Protect from physical damage.
Keep containers tightly closed in a dry, cool and well-ventilated place.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep away from heat and sources of ignition.
Keep away from direct sunlight.
Store away from incompatible substances.
Container hazardous when empty.
Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures: Ensure that eyewash stations and safety showers are close to the workstation location.

Engineering measures: Use with local exhaust ventilation.
Prevent vapor buildup by providing adequate ventilation during and after use.

Eye protection: Do not wear contact lenses.
Wear as appropriate:
Safety glasses with side-shields
If splashes are likely to occur, wear:
Goggles or face shield, giving complete protection to eyes

Hand protection: Solvent-resistant gloves
Gloves must be inspected prior to use.
Replace when worn.

Skin and body protection: Wear as appropriate:
Solvent-resistant apron
Flame retardant antistatic protective clothing
If splashes are likely to occur, wear:
protective suit

Respiratory protection: In case of insufficient ventilation wear suitable respiratory equipment.
For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Use NIOSH approved respiratory protection.

**Hygiene measures**
- When using, do not eat, drink or smoke.
- Wash hands before breaks and immediately after handling the product.
- Keep working clothes separately.
- Remove and wash contaminated clothing before re-use.
- Do not swallow.
- Avoid breathing vapors, mist or gas.
- Avoid contact with skin, eyes and clothing.

**Exposure Guidelines**

<table>
<thead>
<tr>
<th>Compound</th>
<th>WEEL</th>
<th>TWA</th>
<th>TX ESL</th>
<th>ST ESL</th>
<th>AN ESL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl sulfoxide 67-68-5</td>
<td>67-68-5</td>
<td>250 ppm</td>
<td>TX ESL</td>
<td>ST ESL</td>
<td>TX ESL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>140 ug/m³</td>
<td></td>
<td>14 ug/m³</td>
</tr>
</tbody>
</table>

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

- **Form**: liquid
- **Color**: colourless
- **Odor**: garlic/onion
- **pH**: 7.0 (as aqueous solution)
- **Freezing point**: not determined
- **Boiling point/boiling range**: 152.8 °C (307.0 °F)
- **Vapor pressure**: 0.61 hPa at 20 °C (68 °F)
  The physical data is that of the main component.
- **Relative vapour density**: 2.7
  The physical data is that of the main component.
- **Density**: 1.1029 g/cm³ at 20 °C (68 °F)
- **Density**: 1.0983 g/cm³ at 25 °C (77 °F)
- **Water solubility**: completely soluble
Partition coefficient:
n-octanol/water: log Pow: -1.35

The physical data is that of the main component.

SECTION 10. STABILITY AND REACTIVITY

Materials to avoid:
- Oxidizing agents
- Strong acids
- Strong reducing agent
- Alkali metals
- Boron compounds
- Plastics
- Metal salts of oxoacids
- Acyl halides
- Aryl halides
- Non metal halides
- Methyl bromide
- Non-metallic chlorides
- Active halogen compounds

Hazardous decomposition products:
- Hazardous decomposition products due to incomplete combustion.
  - Formaldehyde
  - Sulphur dioxide
  - Methyl mercaptan
  - Carbon dioxide (CO2)
  - Carbon monoxide

Hazardous reactions:
- Hazardous polymerisation does not occur.
- Stable under recommended storage conditions.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity:
- LD50 rat
  - Dose: 14,500 mg/kg
  - Test substance: Dimethyl sulfoxide

Acute dermal toxicity:
- LD50 rat
  - Dose: > 40,000 mg/kg
  - Test substance: Dimethyl sulfoxide

Acute inhalation toxicity:
- LC50 rat
  - Dose: > 1.6 mg/l
  - Exposure time: 4 h
  - Test substance: Dimethyl sulfoxide
  - No deaths
### Skin irritation
- guinea pig
- slight irritation
  - Test substance: Dimethyl sulfoxide

### Eye irritation
- rabbit
- slight irritation
  - Test substance: Dimethyl sulfoxide

### Sensitisation
- guinea pig
- non-sensitizing
  - Test substance: Dimethyl sulfoxide

### Repeated dose toxicity
- Inhalation rat 13 week inhalation study:
  - Based on experimental results, may cause adverse health effects on the following:
    - nasal cavity
    - pharynx
  - Test substance: Dimethyl sulfoxide

### Repeated dose toxicity
- Oral gavage bioassay Monkey:
  - Increased mortality, decrease in body weight, nausea, vomiting, LOAEL (Lowest observed adverse effect level)
  - 8,910mg/kg/d
  - Exposure time: 18 Months
  - Test substance: Dimethyl sulfoxide

### Repeated dose toxicity
- Dermal Monkey:
  - No histopathological effects were noted,
  - NOAEL (No observed adverse effect level)
  - 8,910mg/kg/d
  - Exposure time: 18 Months
  - Test substance: Dimethyl sulfoxide

### Repeated dose toxicity
- Inhalation rat 13 week inhalation study:
  - Reproductive toxicity
  - No adverse effects on reproduction.
  - Test substance: Dimethyl sulfoxide

### Repeated dose toxicity
- Inhalation rat Developmental Toxicity:
  - NOAEL (maternal and developmental toxicity)
  - 1,000mg/kg/d
  - Test substance: Dimethyl sulfoxide

### Genotoxicity in vitro
- Mutagenicity (Salmonella typhimurium - reverse mutation assay)
  - negative
  - Test substance: Dimethyl sulfoxide

### Genotoxicity in vitro
- In vitro gene mutation study in yeast
  - negative
  - Test substance: Dimethyl sulfoxide

### Genotoxicity in vitro
- Chromosome aberration test in vitro
  - Chinese Hamster Ovary Cells
  - negative
Test substance: Dimethyl sulfoxide

Genotoxicity in vivo:
Species: mouse
Sex: male
Cell type: Micronucleus
Test substance: Dimethyl sulfoxide negative

Genotoxicity in vivo:
Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)
Species: rat
Test substance: Dimethyl sulfoxide positive

SECTION 12. ECOLOGICAL INFORMATION

Biodegradability:
DOC decrease
Biodegradation: 99 %
Exposure time: 27 d
According to the results of tests of biodegradability this product is considered as being readily biodegradable.

Toxicity to fish:
flow-through test LC50
Species: Pimephales promelas (fathead minnow)
Dose: 34,000 mg/l
Exposure time: 96 h
static test

Toxicity to fish:
static test LC50
Species: Bluegill sunfish
Dose: > 40,000 mg/l
Exposure time: 96 h
static test

Toxicity to fish:
static test LC50
Species: Oncorhynchus mykiss (rainbow trout)
Dose: 33,000 - 37,000 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates:
static test EC50
Species: Daphnia magna (Water flea)
Dose: 24.6 mg/l
Exposure time: 48 h

Toxicity to algae:
Growth inhibition EC50
Species: Algae
Dose: 20.1 g/l
### Exposure time: 10 d

**Toxicity to bacteria**  
(Component)  
Component: 67-68-5 Dimethyl sulfoxide  
\( \text{LC50} \)  
Species: activated sludge  
Dose: \( > 10 \text{ mg/l} \)  
Exposure time: 30 min

**Toxicity to bacteria**  
(Component)  
Component: 67-68-5 Dimethyl sulfoxide  
\( \text{EC10} \)  
Species: Pseudomonas putida  
Dose: 7,100 mg/l  
Exposure time: 16 h

**Additional ecological information**  
Bioaccumulation is unlikely.

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### SECTION 13. DISPOSAL CONSIDERATIONS

Waste Information: Observe all Federal, State, and Local Environmental regulations.

### SECTION 14. TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>DOT</th>
<th>Not dangerous goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDG</td>
<td>Not dangerous goods</td>
</tr>
<tr>
<td>IATA</td>
<td>Not dangerous goods</td>
</tr>
<tr>
<td>IMDG</td>
<td>Not dangerous goods</td>
</tr>
</tbody>
</table>

### SECTION 15. REGULATORY INFORMATION

**Inventories**

<table>
<thead>
<tr>
<th>EU. EINECS</th>
<th>On the inventory, or in compliance with the inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td>US. Toxic Substances Control Act</td>
<td>On TSCA Inventory</td>
</tr>
<tr>
<td>Australia. Industrial Chemical (Notification and Assessment) Act</td>
<td>On the inventory, or in compliance with the inventory</td>
</tr>
<tr>
<td>Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL)</td>
<td>All components of this product are on the Canadian DSL list.</td>
</tr>
</tbody>
</table>

Japan. Kashin-Hou Law List : On the inventory, or in compliance with the inventory

Korea. Toxic Chemical Control Law (TCCL) List : On the inventory, or in compliance with the inventory

Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act : On the inventory, or in compliance with the inventory

China. Inventory of Existing Chemical Substances : On the inventory, or in compliance with the inventory

Switzerland. Consolidated Inventory : On the inventory, or in compliance with the inventory

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand : On the inventory, or in compliance with the inventory

National regulatory information

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

California Prop. 65 : This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

WHMIS Classification : Not Rated

SECTION 16. OTHER INFORMATION
<table>
<thead>
<tr>
<th>HMIS III</th>
<th>NFPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Hazard</td>
<td>2</td>
</tr>
<tr>
<td>Flammability</td>
<td>1</td>
</tr>
<tr>
<td>Physical Hazard</td>
<td>0</td>
</tr>
<tr>
<td>Instability</td>
<td>0</td>
</tr>
</tbody>
</table>