1. Product and Company Identification

Material name: IODINE

Version #: 01

Revision date: 12-22-2010

CAS #: 7553-56-2

Product Codes:
- J.T.Baker: 2208, 2211
- Mallinckrodt: 0969, 0975, 0984, 0990, 1008, 3831, 72145

Synonym(s):
- Iodine crystals; iodine sublimed

Manufacturer:
Avantor Performance Materials, Inc.
Address:
222 Red School Lane
Phillipsburg, NJ 08865
US

Customer Service:
800-582-2537

24 Hour Emergency:
908-859-2151

Chemtrec:
800-424-9300

2. Hazards Identification

Emergency overview:
DANGER

Corrosive. May cause severe irritation or burns to the eyes, skin, gastrointestinal tract, and respiratory system. Strong oxidizer - contact with other material may cause fire. Causes central nervous system effects. May cause an allergic skin reaction.

OSHA regulatory status:
This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

Potential health effects:

Inhalation:
Vapors irritate the respiratory system, and may cause coughing and difficulties in breathing. Inhalation of vapor or mist may cause lung edema. Do not breathe dust/fume/gas/mist/vapors/spray.

Ingestion:
Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract. Ingestion of this product may cause nausea, vomiting and diarrhea. May cause central nervous system depression. Circulatory collapse. Probable lethal dose is 2 to 4 grams of free iodine. Do not ingest.

Target organs:

Chronic effects:
Causes central nervous system effects. May cause damage to the liver and kidneys. May cause reproductive effects. This product may cause an allergic skin reaction.

Signs and symptoms:
Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Irritation of eyes and mucous membranes. Irritation of nose and throat. Corrosive effects. Prolonged exposure may cause chronic effects.

Potential environmental effects:
May cause long-term adverse effects in the environment.

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>IODINE</td>
<td>7553-56-2</td>
<td>99 - 100</td>
</tr>
</tbody>
</table>
4. First Aid Measures

First aid procedures

**Eye contact**
Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

**Skin contact**
Take off immediately all contaminated clothing. Immediately flush skin with plenty of water. Get medical attention immediately. Wash clothing separately before reuse.

**Inhalation**
Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician or poison control center immediately.

**Ingestion**
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do not induce vomiting without advice from poison control center. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Rinse mouth thoroughly.

**Notes to physician**
Oxygen, if needed. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

**General advice**
Immediate medical attention is required. Take off contaminated clothing and shoes immediately. Show this safety data sheet to the doctor in attendance. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire Fighting Measures

**Flammable properties**
The product is not flammable. Strong oxidizer - avoid contact with reducing agents. Contact with combustible material may cause fire.

**Extinguishing media**
Suitable extinguishing media
Water.

**Protection of firefighters**
Specific hazards arising from the chemical
Fire may produce irritating, corrosive and/or toxic gases.

Protective equipment and precautions for firefighters
Move containers from fire area if you can do so without risk. Cool containers exposed to flames with water until well after the fire is out.

Special protective equipment for firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. Accidental Release Measures

**Personal precautions**
Ensure adequate ventilation. Keep unnecessary personnel away. Keep upwind. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Do not get this material in contact with skin or eyes. Do not inhale vapor, fumes, or dust from the spilled material. Wear appropriate protective equipment and clothing during clean-up.

**Environmental precautions**
Prevent further leakage or spillage if safe to do so. Runoff from fire control or dilution water may cause pollution. Do not contaminate water.

**Methods for cleaning up**
Avoid dust formation. Should not be released into the environment.

Large Spills: Use clean non-sparking tools to collect absorbed material. Following product recovery, flush area with water. Prevent product from entering drains. Do not allow material to contaminate ground water system.

Small Dry Spills: With clean shovel place material into clean, dry container and cover loosely; move containers from spill area. Clean surface thoroughly to remove residual contamination. Clean up in accordance with all applicable regulations. For waste disposal, see section 13 of the MSDS.
7. Handling and Storage

Handling
Handle and open container with care. Do not use in areas without adequate ventilation. Take any precaution to avoid mixing with combustibles. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get this material in contact with eyes. Do not get this material in contact with skin. Avoid prolonged exposure. Wash thoroughly after handling. Avoid release to the environment.

Storage
Keep containers tightly closed in a dry, cool and well-ventilated place. Protect against direct sunlight. Store in a closed container away from incompatible materials. Do not store near combustible materials. Keep out of the reach of children. Keep away from food, drink and animal feedingstuffs. Store in accordance with local/regional/national/international regulation.

8. Exposure Controls / Personal Protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>ACGIH Material</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>IODINE (7553-56-2)</td>
<td>STEL</td>
<td>0.1000 ppm</td>
<td>Vapor and aerosol.</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.0100 ppm</td>
<td>Inhalable fraction and vapor.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>U.S. - OSHA Material</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IODINE (7553-56-2)</td>
<td>Ceiling</td>
<td>0.1000 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.0000 mg/m3</td>
</tr>
</tbody>
</table>

Engineering controls
Ensure adequate ventilation, especially in confined areas. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal protective equipment

Eye / face protection
Chemical goggles are recommended. Face-shield. Provide eyewash station and safety shower. Do not get in eyes.

Skin protection
Wear appropriate chemical resistant clothing. Chemical resistant gloves. Do not get this material in contact with skin.

Respiratory protection
If airborne concentrations are above the applicable exposure limits, use NIOSH approved respiratory protection. Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.

General hygiene considerations
Do not get this material in your eyes, on your skin, or on your clothing. Do not breathe dust/fume/gas/mist/vapors/spray. When using, do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product. Contaminated work clothing should not be allowed out of the workplace. Handle in accordance with good industrial hygiene and safety practice.

9. Physical & Chemical Properties

Appearance
Crystals.

Color
Blue to Black. Metallic.

Odor
Not available.

Odor threshold
Not available.

Physical state
Solid.

Form
Solid.

pH
5.4 (saturated solution)

Melting point
237.2 °F (113.7 °C)
Freezing point: 237.2 °F (113.7 °C)
Boiling point: 363.2 °F (184.4 °C)
Flash point: Not available.
Evaporation rate: Not available.
Flammability limits in air, upper, % by volume: Not available.
Flammability limits in air, lower, % by volume: Not available.
Vapor pressure: 0.031 kPa at 25°C
Specific gravity: 4.93
Relative density: Not available.
Solubility (water): 0.1 g/l
Partition coefficient (n-octanol/water): 2.49
Auto-ignition temperature: Not available.
Decomposition temperature: Not available.
Molecular weight: 253.81 g/mol
Molecular formula: I₂

10. Chemical Stability & Reactivity Information

Chemical stability: Material is stable under normal conditions.
Conditions to avoid: Sunlight. Strong oxidizer - avoid contact with reducing agents. Contact with combustibles.
Hazardous decomposition products: Irritating and/or toxic fumes and gases may be emitted upon the products decomposition.
Possibility of hazardous reactions: Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

<table>
<thead>
<tr>
<th>Product</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>IODINE (7553-56-2)</td>
<td>Acute Oral LD50 Rat: 14 g/kg</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

Sensitization: May cause sensitization by skin contact.
Local effects: Causes skin and eye burns. Ingestion causes burns of the upper digestive and respiratory tracts. Irritating to respiratory system.
Chronic effects: Hazardous by OSHA criteria. Causes central nervous system effects. May cause damage to the liver and kidneys. Lung edema. May cause allergic skin reaction. Prolonged exposure may cause chronic effects.
Carcinogenicity: This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

ACGIH Carcinogens

IODINE (CAS 7553-56-2) A4 Not classifiable as a human carcinogen.

Skin corrosion/irritation: Hazardous by OSHA criteria. Corrosive effects.
Epidemiology: No epidemiological data is available for this product.
Mutagenicity: No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Neurological effects: Hazardous by OSHA criteria.
Reproductive effects: Possible reproductive hazard.
Further information
Symptoms may be delayed.

12. Ecological Information

<table>
<thead>
<tr>
<th>Ecotoxicological data</th>
<th>Product</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>IODINE (7553-56-2)</td>
<td></td>
<td>LC50 Rainbow trout,donaldson trout (Oncorhynchus mykiss): &gt; 0.01 mg/l 96.00 hours</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

Ecotoxicity
Contains a substance which causes risk of hazardous effects to the environment.

Environmental effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Aquatic toxicity
May cause long-term adverse effects in the aquatic environment.

Persistence and degradability
No data is available on the degradability of this product.

Partition coefficient (n-octanol/water)

2.49

13. Disposal Considerations

Disposal instructions
This product, in its present state, when discarded or disposed of, is not a hazardous waste according to Federal regulations (40 CFR 261.4 (b)(4)). Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste. Dispose of contents/container in accordance with local/regional/national/international regulations.

Contaminated packaging
Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport Information

DOT
Not regulated as dangerous goods.

IATA
Basic shipping requirements:

<table>
<thead>
<tr>
<th>UN number</th>
<th>Proper shipping name</th>
<th>Hazard class</th>
<th>Subsidiary hazard class</th>
<th>Packing group</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN3495</td>
<td>Iodine</td>
<td>8</td>
<td>6.1</td>
<td>III</td>
</tr>
</tbody>
</table>

IMDG
Basic shipping requirements:

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<th>UN number</th>
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<th>Subsidiary hazard class</th>
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<td>IODINE</td>
<td>8</td>
<td>6.1</td>
<td>III</td>
</tr>
</tbody>
</table>
15. Regulatory Information

US federal regulations
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.

CERCLA/SARA Hazardous Substances - Not applicable.

CERCLA (Superfund) reportable quantity
None

Supervision Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

Section 311 hazardous chemical
Yes

Inventory status

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European List of Notified Chemical Substances (ELINCS)</td>
<td>No</td>
</tr>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>No</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>Yes</td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations
This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - Pennsylvania RTK - Hazardous Substances: Listed substance
IODINE (CAS 7553-56-2) Listed.

Saf-T-Data
Health: 3 - Severe (Life)
Flammability: 0 - None
Reactivity: 3 - Severe (Oxidizer)
Contact: 3 - Severe (Corrosive)
Lab Protective Equip: D - GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: W - White (Corrosive)

16. Labeling Info

Label Hazard Warning
DANGER

Corrosive. May cause severe irritation or burns to the eyes, skin, gastrointestinal tract, and respiratory system. Strong oxidizer - contact with other material may cause fire. Causes central nervous system effects. May cause an allergic skin reaction.
Label Precautions
Do not get in eyes, on skin, or on clothing. Do not breathe dust/fume/gas/mist/vapors/spray. Container must be kept tightly closed. Do not store near combustible materials. Use only with adequate ventilation. Wash thoroughly after handling.

Label First Aid
Immediately flush eyes with plenty of water for at least 15 minutes. Immediately flush skin with plenty of water. If gas/fume/vapor/dust/mist from the material is inhaled, remove the affected person immediately to fresh air. Oxygen or artificial respiration if needed. Get medical attention immediately. IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do not induce vomiting without advice from poison control center. Do not use mouth-to-mouth method if victim ingested the substance. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

17. Other Information

NFPA ratings
Health: 3
Flammability: 0
Instability: 1
Special hazards: OX

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