1. PRODUCT AND COMPANY IDENTIFICATION

Product Name Methyl Isobutyl Ketone
Cat No. M213-1; M213-4; M213-20; M213-200
Synonyms Hexone; Isobutyl methyl ketone; Isopropylacetone; 4-Methyl-2-pentanone (Certified ACS)
Recommended Use Laboratory chemicals

Company Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

2. HAZARDS IDENTIFICATION

DANGER!

Emergency Overview
Flammable liquid and vapor. May form explosive peroxides. Harmful by inhalation. Irritating to eyes, respiratory system and skin. May cause central nervous system effects. Repeated exposure may cause skin dryness or cracking. Aspiration hazard if swallowed - can enter lungs and cause damage.

Appearance Clear
Physical State Liquid
odor sweet

Target Organs Central nervous system (CNS), Eyes, Respiratory system, Skin, Kidney, Liver, Heart, spleen, Blood

Potential Health Effects

Acute Effects
Principle Routes of Exposure

- Eyes
  - Irritating to eyes.
- Skin
  - Irritating to skin. May be harmful in contact with skin. Repeated exposure may cause skin dryness or cracking.
- Inhalation
  - Harmful by inhalation. Irritating to respiratory system. Inhalation may cause central nervous system effects.
- Ingestion
  - Aspiration hazard. May be harmful if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Chronic Effects

Tumorigenic effects have been reported in experimental animals. Experiments have shown reproductive toxicity effects on laboratory animals. May cause adverse liver effects. May cause adverse kidney effects. Repeated exposure may cause skin dryness or cracking.

See Section 11 for additional Toxicological information.

Aggravated Medical Conditions


3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Haz/Non-haz</th>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Methylisobutyl Ketone</td>
<td>108-10-1</td>
<td>&gt; 98.5</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Eye Contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact

Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation

Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Immediate medical attention is required.

Ingestion

Do not induce vomiting. Call a physician or Poison Control Center immediately.

Notes to Physician

Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash Point

14°C / 57.2°F

Method

No information available.

Autoignition Temperature

448°C / 838.4°F

Explosion Limits

Upper

8.0% @ 93°C

Lower

1.2% @ 93°C

Suitable Extinguishing Media

CO₂, dry chemical, dry sand, alcohol-resistant foam.

Unsuitable Extinguishing Media

Water may be ineffective

Hazardous Combustion Products

No information available.

Sensitivity to mechanical impact

No information available.

Sensitivity to static discharge

No information available.

Specific Hazards Arising from the Chemical

Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated. May form explosive peroxides.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health</th>
<th>Flammability</th>
<th>Instability</th>
<th>Physical hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>N/A</td>
</tr>
</tbody>
</table>

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Use personal protective equipment. Remove all sources of ignition. Take precautionary measures against static discharges. Do not get in eyes, on skin, or on clothing.

Environmental Precautions
Should not be released into the environment.

Methods for Containment and Clean Up
Remove all sources of ignition. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Take precautionary measures against static discharges.

7. HANDLING AND STORAGE

Handling
Use only under a chemical fume hood. Use explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition. Wear personal protective equipment. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing. Take precautionary measures against static discharges. If peroxide formation is suspected, do not open or move container.

Storage
Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Flammables area. May form explosive peroxides. Containers should be dated when opened and tested periodically for the presence of peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals.
8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures
Use only under a chemical fume hood. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

Exposure Guidelines

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylisobutyl ketone</td>
<td>TWA: 20 ppm</td>
<td>(Vacated) TWA: 50 ppm</td>
<td>IDLH: 500 ppm</td>
</tr>
<tr>
<td></td>
<td>STEL: 75 ppm</td>
<td>(Vacated) TWA: 205 mg/m³</td>
<td>TWA: 50 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Vacated) STEL: 75 ppm</td>
<td>TWA: 205 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Vacated) STEL: 300 mg/m³</td>
<td>STEL: 75 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 100 ppm</td>
<td>STEL: 300 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 410 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Quebec</th>
<th>Mexico OEL (TWA)</th>
<th>Ontario TWAEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylisobutyl ketone</td>
<td>TWA: 50 ppm</td>
<td>TWA: 50 ppm</td>
<td>TWA: 50 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA: 205 mg/m³</td>
<td>TWA: 205 mg/m³</td>
<td>TWA: 205 ppm</td>
</tr>
<tr>
<td></td>
<td>STEL: 75 ppm</td>
<td>STEL: 75 ppm</td>
<td>STEL: 75 ppm</td>
</tr>
<tr>
<td></td>
<td>STEL: 307 mg/m³</td>
<td>STEL: 307 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

NIOSH IDLH: Immediately Dangerous to Life or Health

Personal Protective Equipment

**Eye/face Protection**
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166

**Skin and body protection**
Wear appropriate protective gloves and clothing to prevent skin exposure

**Respiratory Protection**
Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Physical State</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear</td>
</tr>
<tr>
<td>odor</td>
<td>sweet</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available.</td>
</tr>
<tr>
<td>pH</td>
<td>No information available.</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>19.9 mmHg @ 25 °C</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>(Air = 1.0)</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No information available.</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>117°C / 242.6°F @ 760 mmHg</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>-84°C / -119.2°F</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No information available.</td>
</tr>
<tr>
<td>Flash Point</td>
<td>14°C / 57.2°F</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>1.6 (Butyl Acetate = 1.0)</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.80</td>
</tr>
<tr>
<td>Solubility</td>
<td>Soluble in water</td>
</tr>
<tr>
<td>log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>100.16</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>C6H12O</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY
10. STABILITY AND REACTIVITY

Stability
Unstable if heated. May form explosive peroxides.

Conditions to Avoid
Incompatible products. Heat, flames and sparks.

Incompatible Materials
Strong oxidizing agents, Strong reducing agents, Strong bases

Hazardous Decomposition Products
Carbon monoxide (CO), Carbon dioxide (CO₂), peroxides

Hazardous Polymerization
Hazardous polymerization does not occur

Hazardous Reactions
May form explosive peroxides

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Component Information

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation (Dust)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylisobutyl ketone</td>
<td>2080 mg/kg (Rat)</td>
<td>16000 mg/kg (Rabbit)</td>
<td>8.2 mg/L (Rat) 4 h</td>
</tr>
</tbody>
</table>

Irritation
Irritating to eyes, respiratory system and skin

Toxicologically Synergistic Products
No information available.

Chronic Toxicity

Carcinogenicity
The table below indicates whether each agency has listed any ingredient as a carcinogen.

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylisobutyl ketone</td>
<td>A3</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

Sensitization
No information available.

Mutagenic Effects
No information available.

Reproductive Effects
Experiments have shown reproductive toxicity effects on laboratory animals.

Developmental Effects
Developmental effects have occurred in experimental animals.

Teratogenicity
Teratogenic effects have occurred in experimental animals.

Other Adverse Effects
Tumorigenic effects have been reported in experimental animals. See actual entry in RTECS for complete information.

Endocrine Disruptor Information
No information available
12. ECOLOGICAL INFORMATION

Ecotoxicity

Do not empty into drains.

<table>
<thead>
<tr>
<th>Component</th>
<th>Freshwater Algae EC50: 400 mg/L/96h</th>
<th>Freshwater Fish LC50 96 h 496-514 mg/L</th>
<th>Microtox EC50 = 79.6 mg/L 5 min</th>
<th>Water Flea EC50: 4280.0 mg/L/24h EC50: 170 mg/L/48h EC50: 4280.0 mg/L/24h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylisobutyl ketone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Persistence and Degradability

No information available

Bioaccumulation/ Accumulation

No information available

Mobility

<table>
<thead>
<tr>
<th>Component</th>
<th>log Pow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylisobutyl ketone</td>
<td>1.19</td>
</tr>
</tbody>
</table>

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification

<table>
<thead>
<tr>
<th>Component</th>
<th>RCRA - U Series Wastes</th>
<th>RCRA - P Series Wastes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylisobutyl ketone - 108-10-1</td>
<td>U161</td>
<td>-</td>
</tr>
</tbody>
</table>

14. TRANSPORT INFORMATION

DOT

UN-No UN1245
Proper Shipping Name METHYL ISOBUTYL KETONE
Hazard Class 3
Packing Group II

TDG

UN-No UN1245
Proper Shipping Name METHYL ISOBUTYL KETONE
Hazard Class 3
Packing Group II

IATA

UN-No UN1245
Proper Shipping Name METHYL ISOBUTYL KETONE
Hazard Class 3
Packing Group II
14. TRANSPORT INFORMATION

IMDG/IMO

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN1245</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>METHYL ISOBUTYL KETONE</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>3</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>

15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>NLP</th>
<th>PICCS</th>
<th>ENCS</th>
<th>AICS</th>
<th>CHINA</th>
<th>KECL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylisobutyl ketone</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>203-550-1</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Legend:

- X - Listed
- E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
- F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
- N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
- P - Indicates a commenced PMN substance
- R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
- S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
- T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
- XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).
- Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
- Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylisobutyl ketone</td>
<td>108-10-1</td>
<td>&gt; 98.5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazardous Categorization

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

Clean Water Act

Not applicable
Clean Air Act

<table>
<thead>
<tr>
<th>Component</th>
<th>HAPS Data</th>
<th>Class 1 Ozone Depleters</th>
<th>Class 2 Ozone Depleters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylisobutyl ketone</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OSHA
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

<table>
<thead>
<tr>
<th>Component</th>
<th>Hazardous Substances RQs</th>
<th>CERCLA EHS RQs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylisobutyl ketone</td>
<td>5000 lb</td>
<td>-</td>
</tr>
</tbody>
</table>

California Proposition 65
This product does not contain any Proposition 65 chemicals.

State Right-to-Know

<table>
<thead>
<tr>
<th>Component</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylisobutyl ketone</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

U.S. Department of Transportation
Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations
Mexico - Grade
Serious risk, Grade 3

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
B2 Flammable liquid
D2A Very toxic materials
16. OTHER INFORMATION

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date
09-Feb-2010

Print Date
01-Nov-2012

Revision Summary
"***", and red text indicates revision

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of MSDS