1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier
Product name FERROIN INDICATOR

Other means of identification
Product Code(s) 6410

Recommended use of the chemical and restrictions on use
Recommended Use Use as a laboratory reagent. Laboratory chemicals. Industrial (not for food or food contact use).

Details of the supplier of the safety data sheet
Manufacturer Address
LaMotte Company, Inc.
802 Washington Avenue
P.O. Box 329
Chestertown, MD 21620 USA
T 410-778-3100
F 410-778-9748

Emergency telephone number
24 Hour Emergency Number (CHEM-TEL): USA, Canada, Puerto Rico 1-800-255-3924 Outside North American Continent (Call collect) 813-248-0585

2. HAZARDS IDENTIFICATION

OSHA Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

EMERGENCY OVERVIEW

Hazard statements
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Appearance Clear Red-Orange
Physical state liquid
Odor Odorless

Precautionary Statements - Prevention
Do not handle until all safety precautions have been read and understood. Keep container tightly closed. Keep out of reach of children.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF ON SKIN: Wash with plenty of soap and water.
Take off contaminated clothing and wash before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
IF SWALLOWED, Drink 1 or 2 glasses of water, Call a physician immediately

Precautionary Statements - Storage
Store in a well-ventilated place. Keep cool.

Other Hazards
Harmful to aquatic life with long lasting effects

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS No</th>
<th>Weight-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenanthroline (1,10), monohydrate</td>
<td>5144-89-8</td>
<td>&lt;0.5</td>
</tr>
</tbody>
</table>

### 4. FIRST AID MEASURES

**First Aid Measures**

**General advice**

Do not get in eyes, on skin, or on clothing.

**Eye contact**

Rinse thoroughly with water as necessary. If irritation persists or develops, contact a physician.

**Skin contact**

Wash off with soap and plenty of water removing all contaminated clothes and shoes. If irritation develops or persists, consult physician.

**Inhalation**

Not expected to require first aid measures. Remove to fresh air.

**Ingestion**

Clean mouth with water and drink afterwards plenty of water. If symptoms persist or develop contact physician.

**Self-protection of the first aider**

Use personal protective equipment. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

### 5. FIRE-FIGHTING MEASURES

**Suitable extinguishing media**

Water spray, dry chemical, carbon dioxide (CO₂), or foam.

**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.

### 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions, protective equipment and emergency procedures**

**Personal precautions**

See section 8. Avoid contact with eyes, skin and clothing. Wear protective gloves/clothing and eye/face protection.

**Environmental precautions**

See Section 12 for additional Ecological Information.

**Methods and material for containment and cleaning up**

**Methods for containment**

Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container.

**Methods for cleaning up**

Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see Section 13). After cleaning, flush away traces with water.

### 7. HANDLING AND STORAGE
Precautions for safe handling

Handling
Handle in accordance with good industrial hygiene and safety practice. Prevent contact with skin, eyes, and clothing. Do not taste or swallow. Do not eat, drink, or smoke when using this product.

Conditions for safe storage, including any incompatibilities

Storage
Keep containers tightly closed in a dry, cool and well-ventilated place. Keep from freezing. Keep out of the reach of children.

Incompatible Products
Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure guidelines

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenanthroline (1,10), monohydrate 5144-89-8</td>
<td>-</td>
<td>-</td>
<td>Not Established</td>
</tr>
</tbody>
</table>

Appropriate engineering controls

Engineering Measures
Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/Face Protection
Wear safety glasses with side shields (or goggles).

Skin and body protection
Gloves & Lab Coat.

Hygiene Measures
Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
<th>Remarks • Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>liquid</td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear Red-Orange</td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Melting point / freezing point</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Flash point</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Evaporation rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Flammability Limit in Air</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper flammability limit:</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Lower flammability limit:</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Vapor density</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Specific gravity</td>
<td>ca. 1.0 (g/cm³ at 20°C/68°F)</td>
<td></td>
</tr>
<tr>
<td>Water solubility</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No information available</td>
<td></td>
</tr>
</tbody>
</table>
Explosive properties
No information available

Oxidizing properties
No information available

Other Information

Softening point
No information available
Molecular weight
No information available
VOC Content (%)
No information available
Density
No information available
Bulk density
No information available

10. STABILITY AND REACTIVITY

Stability
Stable under normal conditions of use and storage.

Hazardous Reactions
None under normal processing.

Hazardous polymerization
Hazardous polymerization does not occur.

Conditions to avoid
Do not freeze.

Incompatible materials
Strong oxidizing agents.

Hazardous decomposition products
May produce the following when heated to decomposition: Carbon oxides (COx). Nitrogen oxides (NOx). Sulfur oxides (SOx).

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Component Information

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenanthroline (1,10), monohydrate</td>
<td>= 132 mg/kg (Rat)</td>
<td>Not Established</td>
<td>Not Established</td>
</tr>
<tr>
<td>5144-89-8</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Information on toxicological effects

Carcinogenicity
1,10-Phenanthroline has been investigated a mutagen, reproductive effector. Ferrous sulfate has been investigated a tumorigen, mutagen, reproductive effector.

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>ACGIH</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
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<tbody>
<tr>
<td>Phenanthroline (1,10), monohydrate</td>
<td>Not Established</td>
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<td>Not Established</td>
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<td>5144-89-8</td>
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</tbody>
</table>

ATEmix (oral) 44000

12. ECOLOGICAL INFORMATION

Ecotoxicity

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Toxicity to Algae</th>
<th>Toxicity to Fish</th>
<th>Daphnia Magna (Water Flea)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenanthroline (1,10), monohydrate</td>
<td>Not Established</td>
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<td>Not Established</td>
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<tr>
<td>5144-89-8</td>
<td></td>
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</tr>
</tbody>
</table>

Persistence and degradability
No information available.

Bioaccumulation/Accumulation
No information available.
13. DISPOSAL CONSIDERATIONS

Disposal Methods
Dispose according to federal, state, and local regulations. If permitted, dissolve in large volume of water and rinse to drain with excess water. Dispose of contents/containers in accordance with local regulations.

Contaminated packaging
Do not reuse empty containers.

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>RCRA</th>
<th>RCRA - Basis for Listing</th>
<th>RCRA - D Series Wastes</th>
<th>RCRA - U Series Wastes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenanthroline (1,10), monohydrate 5144-89-8</td>
<td>Not Established</td>
<td>-</td>
<td>Not Established</td>
<td>Not Established</td>
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<thead>
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<td>Not Established</td>
<td>Not Established</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>California Hazardous Waste Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenanthroline (1,10), monohydrate 5144-89-8</td>
<td>-</td>
</tr>
</tbody>
</table>

14. TRANSPORT INFORMATION

DOT
Not regulated

IATA
Not regulated

IMDG/IMO
Not regulated

15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>Inventory</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSCA</td>
<td>Does not comply</td>
</tr>
<tr>
<td>DSL/NDSL</td>
<td>Does not comply</td>
</tr>
<tr>
<td>EINECS/ELINCS</td>
<td>Does not comply</td>
</tr>
<tr>
<td>ENCS</td>
<td>Does not comply</td>
</tr>
<tr>
<td>IECSC</td>
<td>Complies</td>
</tr>
<tr>
<td>KECL</td>
<td>Does not comply</td>
</tr>
<tr>
<td>PICCS</td>
<td>Complies</td>
</tr>
<tr>
<td>AICS</td>
<td>Complies</td>
</tr>
</tbody>
</table>

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations
SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any 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>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenanthroline (1,10), monohydrate 5144-89-8</td>
<td>Not Established</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazard Categories

- Acute health hazard: Yes
- Chronic Health Hazard: No
- Fire hazard: No
- Sudden release of pressure hazard: No
- Reactive Hazard: No

CWA (Clean Water Act)
This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CWA - Reportable Quantities</th>
<th>CWA - Toxic Pollutants</th>
<th>CWA - Priority Pollutants</th>
<th>CWA - Hazardous Substances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenanthroline (1,10), monohydrate 5144-89-8</td>
<td>Not Established</td>
<td>Not Established</td>
<td>Not Established</td>
<td>Not Established</td>
</tr>
</tbody>
</table>

CERCLA

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Hazardous Substances RQs</th>
<th>CERCLA/SARA RQ</th>
<th>RQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenanthroline (1,10), monohydrate 5144-89-8</td>
<td>-</td>
<td>Not Established</td>
<td>-</td>
</tr>
</tbody>
</table>

US State Regulations

California Proposition 65

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>California Proposition 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenanthroline (1,10), monohydrate 5144-89-8</td>
<td>Not Established</td>
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</tbody>
</table>

U.S. State Right-to-Know Regulations

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenanthroline (1,10), monohydrate 5144-89-8</td>
<td>Not Established</td>
<td>Not Established</td>
<td>Not Established</td>
</tr>
</tbody>
</table>

CPSC (Consumer Product Safety Commission) - Specially Regulated Substances

16. OTHER INFORMATION

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health hazard 0</th>
<th>Flammability 0</th>
<th>Instability 0</th>
<th>Physical and Chemical Hazards N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMIS</td>
<td>Health hazard 1</td>
<td>Flammability 0</td>
<td>Stability 0</td>
<td></td>
</tr>
</tbody>
</table>
Prepared by Regulatory Affairs Department
Issuing Date Jun-01-2015
Revision Date Jul-24-2015
Reason for revision New US GHS format

Disclaimer
The information provided on this SDS 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 Material Safety Data Sheet