SAFETY DATA SHEET

1. Identification

Product identifier: Brandt Manganese Sulfate - Granular

Other means of identification:

- Product code: 33016BRN
- Synonyms: MANGANESE(II) SULFATE MONOHYDRATE
- Recommended use: Agriculture / Horticulture - Micronutrient - Refer to product label
- Recommended restrictions: None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer:

- Company name: Brandt Consolidated, Inc.
- Address: 2935 South Koke Mill Road
  Springfield, IL 62711
  United States
- Telephone: Corporate Office 1-217-547-5800
- Website: www.brandt.co
- E-mail: msds@brandt.co
- Contact person: EH&S / Regulatory Department
- Emergency phone number: CHEMTREC (24 hours):
  USA, Canada, Puerto Rico 1-800-424-3900
  Virgin Islands 1-800-424-3900
  International Maritime +1 (703) 527-3887

2. Hazard(s) identification

Physical hazards: Not classified.

Health hazards:

- Serious eye damage/eye irritation Category 1
- Specific target organ toxicity, repeated exposure Category 2

Environmental hazards:

- Hazardous to the aquatic environment, long-term hazard Category 2

OSHA defined hazards: Not classified.

Label elements:

- Signal word: Danger
- Hazard statement: Causes serious eye damage. May cause damage to organs through prolonged or repeated exposure. Toxic to aquatic life with long lasting effects.
- Precautionary statement:
  - Response: If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Collect spillage.
  - Storage: Store away from incompatible materials.
  - Disposal: Dispose of contents/container in accordance with local/regional/national/international regulations.
- Hazard(s) not otherwise classified (HNOC): None known.
- Supplemental information: None.
3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Substances</th>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Manganese Sulfate, monohydrate</td>
<td>90 - 100</td>
<td>10034-96-5</td>
<td></td>
</tr>
</tbody>
</table>

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

**Inhalation**  
Move to fresh air. Call a physician if symptoms develop or persist.

**Skin contact**  
Wash off with soap and water. Get medical attention if irritation develops and persists.

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

**Ingestion**  
Rinse mouth. Get medical attention if symptoms occur.

**Most important symptoms/effects, acute and delayed**  
Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Severe eye irritation. Permanent eye damage including blindness could result. Prolonged exposure may cause chronic effects.

**Indication of immediate medical attention and special treatment needed**  
Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

**General information**  
If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

**Suitable extinguishing media**  
Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

**Unsuitable extinguishing media**  
Do not use water jet as an extinguisher, as this will spread the fire.

**Specific hazards arising from the chemical**  
During fire, gases hazardous to health may be formed.

**Special protective equipment and precautions for firefighters**  
Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**Fire-fighting equipment/instructions**  
Use water spray to cool unopened containers.

**Specific methods**  
Use standard firefighting procedures and consider the hazards of other involved materials.

**General fire hazards**  
No unusual fire or explosion hazards noted.

6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures**  
Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

**Methods and materials for containment and cleaning up**  
Stop the flow of material, if this is without risk. Dike far ahead of spill for later disposal. Following product recovery, flush area with water. Prevent entry into waterways, sewer, basements or confined areas. For waste disposal, see section 13 of the SDS.

**Environmental precautions**  
Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Contact local authorities in case of spillage to drain/aquatic environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

**Precautions for safe handling**  
Do not get this material in contact with eyes. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Avoid release to the environment. Observe good industrial hygiene practices.

**Conditions for safe storage, including any incompatibilities**  
Store in original tightly closed container. Keep container tightly closed. Store away from incompatible materials (see Section 10 of the SDS).
8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandt Manganese Sulfate - Granular Components</td>
<td>Ceiling</td>
<td>5 mg/m³</td>
</tr>
<tr>
<td>Manganese Sulfate, monohydrate (CAS 10034-96-5)</td>
<td>Ceiling</td>
<td>5 mg/m³</td>
</tr>
</tbody>
</table>

US. ACGIH Threshold Limit Values

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandt Manganese Sulfate - Granular Components</td>
<td>TWA</td>
<td>0.1 mg/m³</td>
<td>Inhalable fraction.</td>
</tr>
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US. NIOSH: Pocket Guide to Chemical Hazards

<table>
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<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Brandt Manganese Sulfate - Granular Components</td>
<td>STEL</td>
<td>3 mg/m³</td>
<td>Fume.</td>
</tr>
<tr>
<td>Manganese Sulfate, monohydrate (CAS 10034-96-5)</td>
<td>TWA</td>
<td>1 mg/m³</td>
<td>Fume.</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>3 mg/m³</td>
<td>Fume.</td>
</tr>
</tbody>
</table>

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls

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. Provide eyewash station.

Individual protection measures, such as personal protective equipment

Eye/face protection
Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection
Hand protection
Wear appropriate chemical resistant gloves.

Other
Wear suitable protective clothing. Use of an impervious apron is recommended.

Respiratory protection
In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards
Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations
Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance
Physical state
Solid.
Form
Solid. Granular.
Color
Light pink.
Odor
Not available.
Odor threshold
Not available.
P H
Not available.
Salt-Out / Crystallization Temp  Not available.
Melting point/freezing point  1292 °F (700 °C)  1292 °F (700 °C) estimated
Initial boiling point and boiling range  1562 °F (850 °C)  1562 °F (850 °C) estimated
Flash point  Not available.
Evaporation rate  Not available.
Flammability (solid, gas)  Not available.
Upper/lower flammability or explosive limits
  Flammability limit - lower (%)  Not available.
  Flammability limit - upper (%)  Not available.
  Explosive limit - lower (%)  Not available.
  Explosive limit - upper (%)  Not available.
Vapor pressure  < 0.0000001 kPa at 25 °C  0.00001 hPa estimated
Vapor density  Not available.
Relative density  Not available.
Solubility(ies)
  Solubility (water)  Not available.
Partition coefficient (n-octanol/water)  Not available.
Auto-ignition temperature  Not available.
Decomposition temperature  Not available.
Viscosity  Not available.
Other information
  Bulk density  84 - 88 lb/ft³
  Molecular formula  Mn-O4-S
  Molecular weight  151 g/mol
  pH in aqueous solution  7.3 - 7.6 (5% Solution)

10. Stability and reactivity
Reactivity The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability Material is stable under normal conditions.
Possibility of hazardous reactions No dangerous reaction known under conditions of normal use.
Conditions to avoid Contact with incompatible materials.
Incompatible materials Strong oxidizing agents.
Hazardous decomposition products No hazardous decomposition products are known.

11. Toxicological information
Information on likely routes of exposure
  Ingestion Expected to be a low ingestion hazard.
  Inhalation Prolonged inhalation may be harmful.
  Skin contact No adverse effects due to skin contact are expected.
  Eye contact Causes serious eye damage.
Symptoms related to the physical, chemical and toxicological characteristics
Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Severe eye irritation. Permanent eye damage including blindness could result.

Information on toxicological effects
Acute toxicity

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<tr>
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<th>Species</th>
<th>Test Results</th>
</tr>
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<td><strong>Oral</strong></td>
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<tr>
<td>LD100 Mouse</td>
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* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation

Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation

Causes serious eye damage.

Respiratory or skin sensitization

**Respiratory sensitization**

Not available.

**Skin sensitization**

This product is not expected to cause skin sensitization.

Germ cell mutagenicity

No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity

This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity

This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure

Not classified.

Specific target organ toxicity - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard

Not available.

Chronic effects

Prolonged inhalation may be harmful. May cause damage to organs through prolonged or repeated exposure.

12. Ecological information

Ecotoxicity

Toxic to aquatic life with long lasting effects.

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</tr>
<tr>
<td>Crustacea</td>
<td>EC50</td>
<td>Water flea (Daphnia magna) 7.09 - 9.36 mg/l, 48 hours</td>
</tr>
<tr>
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<td>LC50</td>
<td>Fathead minnow (Pimephales promelas) 24.3 - 38.9 mg/l, 96 hours</td>
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<tr>
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<td>LC50</td>
<td>Fathead minnow (Pimephales promelas) 29.7 - 52.7 mg/l, 192 hours</td>
</tr>
</tbody>
</table>
Components Test Results

Species

Test Results 24.3 - 38.9 mg/l, 96 hours

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

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

Bioaccumulative potential
Not available.

Mobility in soil
No data available.

Other adverse effects
No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions
Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations
Dispose in accordance with all applicable regulations.

Hazardous waste code
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products
Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging
Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

General
IMDG Regulated Marine Pollutant.

DOT
Not regulated as dangerous goods.

IATA
UN number UN3077

UN proper shipping name Environmentally hazardous substances, solid, n.o.s. (Manganese Sulfate, monohydrate)

Transport hazard class(es)
Class 9
Subsidiary risk -
Label(s) 9

Packing group III

Environmental hazards yes

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

Other information
Passenger and cargo aircraft Forbidden.

Cargo aircraft only Forbidden.

IMDG

UN number UN3077

UN proper shipping name Environmentally hazardous substances, solid, n.o.s. (Manganese Sulfate, monohydrate)

Transport hazard class(es)
Class 9
Subsidiary risk -
Label(s) 9

Packing group III

Environmental hazards

Marine pollutant Yes

EmS Not available.

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

General information IMDG Regulated Marine Pollutant.
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.

This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**

Not regulated.

**CERCLA Hazardous Substance List (40 CFR 302.4)**

Manganese Sulfate, monohydrate (CAS 10034-96-5) Listed.


Not listed.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

Hazard categories

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

**SARA 302 Extremely hazardous substance**

Not listed.

**SARA 311/312 Hazardous chemical**

Yes

**SARA 313 (TRI reporting)**

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>% by wt.</th>
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<td>90 - 100</td>
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</table>

**Other federal regulations**

**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Manganese Sulfate, monohydrate (CAS 10034-96-5)

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Safe Drinking Water Act (SDWA)**

Not regulated.

**Food and Drug Administration (FDA)**

Total food additive

Direct food additive

GRAS food additive
US state regulations

**US. Massachusetts RTK - Substance List**
Not regulated.

**US. New Jersey Worker and Community Right-to-Know Act**
Manganese Sulfate, monohydrate (CAS 10034-96-5)

**US. Pennsylvania Worker and Community Right-to-Know Law**
Not listed.

**US. Rhode Island RTK**
Manganese Sulfate, monohydrate (CAS 10034-96-5)

**US. California Proposition 65**
WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

**International Inventories**

<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>Yes</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).
  A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

**Issue date**
02-26-2014

**Revision date**
06-30-2015

**Version #**
04

**Disclaimer**
Brandt Consolidated, Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user’s responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. While the information contained herein are presented in good faith and believed to be accurate, it is provided for your guidance only. Because many factors may affect processing or application, we recommend that you make tests to determine the suitability of a product for your particular purpose prior to use. No warranties of any kind, either expressed or implied, including warranties of merchantability or fitness for a particular purpose, are made regarding products described or information set forth, or that the products, or information may be used without infringing the intellectual property rights of others. In no case shall the information provided be considered a part of our terms and conditions of sale. Further, you expressly understand and agree that the information furnished by our company hereunder are given gratis and we assume no obligation or liability for the information given or results obtained, all such being given and accepted at your risk.

**Revision Information**
Physical & Chemical Properties: Multiple Properties
GHS: Classification