SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name: Dissolvine® E-MN-13  
Chemical Name: Ethylenediaminetetraacetic acid, manganese disodium salt  
Synonym: Manganese disodium EDTA  
C.A.S. Registry No.: 15375-84-5  
Chemical Formula: C_{10}H_{12}N_{2}O_{8}MnNa_{2} / [(COO-CH_{2})_{2}-N-CH_{2}-CH_{2}-N-(CH_{2}-COO)] . MnNa_{2}  
Product Use: Sequestering agent, plant nutrient

Supplier
Akzo Nobel Functional Chemicals LLC  
525 West Van Buren St., Chicago, IL, USA 60607-3823  
Tel. 1-800-906-7979 (Product/Technical Information)

Emergency Telephone Numbers
TRANSPORTATION EMERGENCIES: 1-800-424-9300 [USA – Chemtrec]  
1-613-996-6666 [Canada – Canutec]  
MEDICAL / HANDLING EMERGENCIES: 1-914-693-6946 [Akzo Nobel - USA]

Date of First Issue: September 27, 1994  
Revision Date: July 4, 2005  
Revision No.: 8.1  
Changes: Sections 2, 11, 15

SECTION 2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

This material is considered hazardous by the OSHA Hazard Communication Standard [29 CFR 1910.1200].

WARNING !
- May cause mild eye and respiratory tract irritation.
- Contains a small amount of impurity (NTA) which has been shown to cause kidney damage as well as being a possible carcinogenic substance (based on animal data).
- Iron deficiency and liver dysfunction are risk factors associated with the excessive accumulation of manganese (see Section 11).
- Avoid contact with eyes, skin and clothing.
- Wear appropriate personal protective equipment (see section 8 for additional information).

Appearance and odor: off white to light beige, odorless, micro-granular powder.

POTENTIAL HEALTH EFFECTS [See section 11 for additional information]
Primary Route(s) of Exposure: Skin contact, eye contact and inhalation.

Inhalation: Inhalation of dust may cause discomfort and/or irritation of the respiratory system.

Skin Contact: This product is not irritating to rabbit skin.

Eye Contact: This product may cause mild physical irritation.

Ingestion: This product has a low order of acute toxicity.

Chronic Effects: EDTA and its sodium salts have been reported to cause birth defects in some animal studies in the presence of maternal toxicity.
SECTION 2. HAZARDS IDENTIFICATION (CONTINUED)

Carcinogenicity: IARC, NTP, ACGIH and OSHA do not classify this material as a carcinogen or suspect carcinogen. However, nitrilotriacetic acid (NTA) and its salts were determined to be "possibly carcinogenic to humans" (Group 2B) by IARC, a compound which "may reasonably be anticipated to be a human carcinogen" by NTP and a "select carcinogen" by OSHA.

Medical conditions aggravated: There are no data available that address medical conditions that are generally recognized as being aggravated by exposure to this product.

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
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<tr>
<th>INGREDIENTS</th>
<th>% (w/w)</th>
<th>CAS Number</th>
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<tr>
<td>Manganese disodium EDTA</td>
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<td>Disodium EDTA</td>
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<td>Nitrilotriacetic acid (NTA)</td>
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<td>139-13-9</td>
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<tr>
<td>Water</td>
<td>0 – 10 (balance)</td>
<td>7732-18-5</td>
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</table>

SECTION 4. FIRST AID MEASURES

Inhalation: Remove victim to fresh air. If breathing becomes difficult, oxygen may be given, preferably under physician’s advice. If breathing has stopped, give artificial respiration. Get medical attention.

Skin Contact: Remove contaminated clothing, shoes and equipment. Wash all affected areas with soap and plenty of water for at least 15 minutes. Do not attempt to neutralize with chemical agents. Wash contaminated clothing and shoes before reuse. Get medical attention if irritation occurs or persists.

Eye Contact: Flush eyes with large quantities of running water for a minimum of 15 minutes. If the victim is wearing contact lenses, remove them. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eye and lids with water. Do not let victim rub eye(s). Do not attempt to neutralize with chemical agents. Oils or ointments should not be used at this time. Get medical attention if eye irritation occurs.

Ingestion: Call a physician immediately. ONLY induce vomiting at the instructions of a physician. If victim is conscious, rinse mouth and give water to drink. Never give anything by mouth to an unconscious person.

Note to Physician: Attending physician should treat exposed patients symptomatically.

SECTION 5. FIRE FIGHTING MEASURES

Conditions of Flammability: not flammable or combustible
Flash Point (Method): not applicable
Upper Flammable Limit (% by volume): not determined
Lower Flammable Limit (% by volume): not determined
Auto-Ignition Temperature: > 500°F (260°C)

Extinguishing Media: This product is not flammable or combustible. If involved in a fire, use water fog or spray, dry chemical, foam or carbon dioxide extinguishing agents.

Fire Fighting Procedures: As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Evacuate all non-essential personnel from the fire area. Fire fighters should wear full-face, self-contained breathing apparatus and impervious protective clothing.

Fire & Explosion Hazards: This product is not defined as flammable or combustible and should not be a fire hazard. Under fire conditions, it does not contribute any unusual hazards.
SECTION 5. FIRE FIGHTING MEASURES (CONTINUED)

Hazardous Combustion Products: Thermal decomposition products may release toxic and/or hazardous fumes and gases, including nitrogen oxides and carbon oxides.

NPFA Hazard Rating – Health: 1  Fire: 0  Reactivity: 0  Other: None

[0 – Minimal  1 - Slight  2 - Moderate  3 - High  4 - Extreme]

SECTION 6. ACCIDENTAL RELEASE MEASURES

Spill/Leak: Wear appropriate personal protective equipment. Safely stop source of spill. Dike area to prevent spill from spreading. Restrict non-essential personnel from area.

Cleanup: Sweep up spilled solid material, being careful not to create dust. Return sweepings to stock or, if contaminated, place into a chemical waste container for disposal according to regulations.

SECTION 7. HANDLING AND STORAGE

Handling: Avoid inhalation and prolonged and/or repeated skin and eye contact. Avoid dust generation.

Storage: Keep containers closed and dry as product is hygroscopic. This material is suitable for any general chemical storage area. Isolate from strong oxidizers. Store in PVC, PE, stainless steel or bituminized tanks. Avoid contact with aluminum, copper, copper alloys and nickel.

Maximum Storage Temperature: Store in a cool and dry place at ambient temperature (below 25°C / 77°F).

General Comments: Containers should not be opened until ready for use. It is recommended to re-test the product after three years in storage.

SECTION 8. EXPOSURE CONTROL / PERSONAL PROTECTION

Applicable Exposure Limits: In addition to any exposure limits displayed below, exposures to this product should be controlled below limits established for "Particulates Not Otherwise Classified (PNOC)" :
- ACGIH – 10 mg/m$^3$ (inhalable particles) ; 3 mg/m$^3$ (respirable particles)
- OSHA – 15 mg/m$^3$ (total dust) ; 5 mg/m$^3$ (respirable fraction)

### Chemical Name

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>OSHA – PELs (mg / m$^3$)</th>
<th>ACGIH – TLVs (mg / m$^3$)</th>
<th>NIOSH – RELs (mg / m$^3$)</th>
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<td>TWA</td>
<td>STEL / CEIL(C)</td>
<td>TWA</td>
<td>STEL / CEIL(C)</td>
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<td>N/D</td>
<td>N/D</td>
<td>N/D</td>
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<td>N/D</td>
<td>N/D</td>
<td>N/D</td>
</tr>
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<td>N/D</td>
<td>N/D</td>
<td>N/D</td>
<td>N/D</td>
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<tr>
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<td>N/D</td>
<td>N/D</td>
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</table>


Legend:
- CEIL: Ceiling Exposure Limit
- PEL: Permissible Exposure Limit
- STEL: Short Term Exposure Limit
- TLV: Threshold Limit Value
- TWA: Time-Weighted Average
- REL: Recommended Exposure Limit
- N/D: Not Determined

Engineering Controls - Ventilation: Special ventilation is usually not required under normal use conditions. However, ensure that existing ventilation is sufficient to prevent the circulation and/or accumulation of vapor in the air.

Issue date: 4-Jul-05  Expiry date: 4-Jul-08
SECTION 8. EXPOSURE CONTROL / PERSONAL PROTECTION (CONTINUED)

Personal Protective Equipment (PPE)

• **Respiratory Protection:** If handling operations generate dust, wear a NIOSH-approved half-mask, air purifying respirator with dust, mist and fume filters to reduce potential for inhalation exposure. When using respirator cartridges or canisters, they must be changed frequently (following each use or at the end of the work shift) to assure breakthrough exposure does not occur.

• **Skin Protection:** Skin contact with the product should be minimized or prevented through the use of suitable protective clothing, gloves and footwear selected according to use condition exposure potential.

• **Eye Protection:** Dust-tight goggles should be worn when handling this product.

Other Protection - General Hygiene Considerations: All food and smoking materials should be kept in a separate area away from the storage/use location. Eating, drinking and smoking should be prohibited in areas where there is a potential for significant exposure to this material. Before eating, drinking and smoking, hands and face should be thoroughly washed.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

**Physical State / Appearance / Odor:** off white to light beige, odorless, micro-granular powder

**Boiling Point:** not applicable

**Bulk Density:** 675 – 775 kg/m\(^3\) (untapped)

**Cloud Point:** not determined

**Evaporation Rate (Butyl Acetate=1):** not determined

**Melting Point:** decomposes without melting

**Odor Threshold:** not determined

**pH:** ≈ 6.5 (1% solution)

**Partition Coefficient (n-octanol/water):** not determined

**Pour Point:** not determined

**Solubility in water:** 800 g/L (68°F / 20°C) ; 1200 g/L (176°F / 80°C)

**Solubility in other solvents:** not determined

**Specific Gravity (H\(_2\)O = 1):** not determined

**Vapor Density (Air = 1):** not applicable

**Vapor Pressure:** not applicable

**Viscosity:** not determined

**Volatile (% by weight):** not determined

**Other – Decomposition temperature:** > 500°F (260°C)

**Conditions of Flammability:** not flammable or combustible

**Flash Point (Method):** not applicable

**Upper Flammable Limit (% by volume):** not applicable

**Lower Flammable Limit (% by volume):** not applicable

**Auto-Ignition Temperature:** > 500°F (260°C)

< : less than  > : greater than  = : approximately

SECTION 10. STABILITY AND REACTIVITY

**Stability:** This product is stable at ambient temperatures and atmospheric pressures. It is not self-reactive and is not sensitive to physical impact.

**Incompatibilities / Conditions to avoid:** This product is incompatible with strong oxidizers. Avoid contact with aluminum, copper, copper alloys and nickel. Avoid prolonged storage at elevated temperatures. Avoid humid conditions as product is hygroscopic.

**Polymerization:** Hazardous polymerization is not expected to occur under normal temperatures and pressures.

**Decomposition Products:** Under fire conditions the product may support combustion and decomposes to give off carbon oxides fumes (CO, CO\(_2\)), nitrogen oxides and water vapor.
SECTION 11. TOXICOLOGICAL INFORMATION

INHALATION
Acute exposure: The acute LC₅₀ for this product is not available. Inhalation of dust may cause discomfort and/or irritation of the respiratory system.
Chronic exposure: No known effects for the mixture.

SKIN
Acute contact: Dermal toxicity for this product is not available. However, it is not considered to be irritating to skin based on tests with chemically similar products.
Chronic contact: No known effects for the mixture.

EYES: While this product has not been tested, it is expected that it would be minimally irritating to eyes based on tests with similar products.

INGESTION
Acute exposure: The oral LD₅₀ for this product is expected to be greater than 2000 mg/kg in rats based on data from chemically similar products.
Chronic exposure: No known effects for the mixture. Chronic ingestion of NTA has been shown to cause kidney toxicity.

SENSITIZATION: No known effects for the mixture.

CARCINOGENICITY: IARC, NTP ACGIH and OSHA do not classify this material as a carcinogen or suspect carcinogen. However, nitrilotriacetic acid (NTA) and its salts were determined to be "possibly carcinogenic to humans" (Group 2B) by IARC, a compound which "may reasonably be anticipated to be a human carcinogen" by NTP and a "select carcinogen" by OSHA.

MUTAGENICITY: No data available for the mixture. NTA and its sodium salts were not genotoxic in experimental systems in vivo. Neither the acid nor its salts were genotoxic in mammalian cells in vitro and they were not mutagenic to bacteria.

REPRODUCTIVE TOXICITY: No data available for the mixture. EDTA and its sodium salts have been reported, in some studies, to cause birth defects in laboratory animals only at exaggerated doses that were toxic to the mother. These effects are likely associated with zinc deficiency due to chelation. Exposures having no effect on the mother should have no effect on the fetus. NTA is not teratogenic and did not induce reproductive toxicity.

OTHER TOXICOLOGICAL EFFECTS: This product contains the metal manganese. Excessive exposure to manganese by ingestion or inhalation can lead to manganese accumulation in specific portions of the brain and a central nervous syndrome called “manganism”, which has clinical signs similar to those of Parkinson's disease.

TARGET ORGANS: Eyes, kidney and bladder.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity: No data available on the mixture.

Chemical Fate: The substance is not expected to enter the atmosphere significantly due to its high water solubility.

Biodegradation: This product is not expected to be readily biodegradable based on tests with structurally related products.
**SECTION 13. DISPOSAL CONSIDERATIONS**

**Waste Disposal:** In its unused condition, this product is not considered to be a RCRA-defined hazardous waste by characteristics or listings. It is the responsibility of the waste generator to evaluate whether his wastes are hazardous by characteristic or listing. Dispose in accordance with all local, state and federal regulations. 

**NOTE** – State and local regulations may be more stringent than federal regulations.

**Container Disposal:** Containers should be cleaned of residual product before disposal or return. Since emptied containers retain product residue, follow label warnings even after container is emptied. Empty containers should be disposed of or shipped in accordance with all applicable laws and regulations.

**SECTION 14. TRANSPORT INFORMATION**

**Shipping Information:** Not regulated for transport.

**Required Labels:** No transport label required

**Environmentally Hazardous Substances [49 CFR 172.101, Appendix A]:** None

**SECTION 15. REGULATORY INFORMATION**

**Regulatory Lists:** The components are subject to the following regulatory lists and inventories:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAA</th>
<th>CERCLA</th>
<th>IARC</th>
<th>US STATE RIGHT-TO-KNOW LISTS</th>
<th>PROP 65</th>
<th>SARA</th>
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1 The manganese compound in this product is subject to SARA Title III, Section 313 supplier notification/release reporting requirements under the “Manganese Compounds” category.

**National Chemical Inventories Status:**

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>US TSCA</th>
<th>Canada DSL</th>
<th>Canada NDSL</th>
<th>EU EINECS</th>
<th>Australia AICS</th>
<th>Japan ENCS</th>
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</tbody>
</table>

N/R = Non Regulated  X = Listed / Regulated

**Legend**

AICS = Australian Inventory of Chemical Substances  
CA List = California – Directors List of Hazardous Substances  
CAA = Clean Air Act, Section 112  
CERCLA = CERCLA Hazardous Substances  
DSL = Domestic Substances List – Canada  
EINECS = European Inventory of Existing Commercial Chemical Substances  
ENCS = Japan Existing and New Chemical Substances  
FL List = Florida – Substance List  
IARC = International Agency for Research on Cancer – Carcinogens – Groups 1, 2A or 2B
SECTION 15. REGULATORY INFORMATION (CONTINUED)

KECL  Korea Existing and Evaluated Chemical Substances
MA List  Massachusetts – R-T-K Substance List
MN List  Minnesota – Hazardous Substance List
NDSL  Non-Domestic Substances List – Canada
NJ R-T-K  New Jersey – R-T-K Hazard List
PA List  Pennsylvania Hazardous Substance List
PICCS  Philippines Inventory of Chemicals and Chemical Substances
Prop 65  California Proposition 65
RI List  Rhode Island – Hazardous Substance List
SARA  SARA Title III, Section 302 / 313
TSCA  Toxic Substances Control Act – USA

WHMIS (CANADA):  D-2A
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.

Other Regulatory Information: California Proposition 65: WARNING / This product contains Nitrilotriacetic acid which is known to the State of California to cause cancer.

HMIS RATING – Health: 1* Flammability: 1 Reactivity: 0 Other: none
[ 0 – Minimal 1 - Slight 2 - Moderate 3 - High 4 - Extreme * - Chronic Health Hazard (see Section 11)]

SECTION 16. OTHER INFORMATION

Other Information:  Dissolvine® is a registered trademark of Akzo Nobel Chemicals Inc.

Prepared by:  ANCI Regulatory Toxicology Dept. [M. Morin – Tel. (613) 273-8095]

Changes: Sections 2, 11, 15

The information in this Material Safety Data Sheet should be provided to all who will use, handle, store, transport or otherwise be exposed to this product. All information concerning this product and/or all suggestions for handling and use contained herein are offered in good faith and are believed to be reliable as of the date of publication. Akzo Nobel Functional Chemicals LLC, however, makes no warranty as to the accuracy of and/or sufficiency of such information and/or suggestions, as to the product’s merchantability or fitness for any particular purpose, or that any suggested use will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent. Buyer shall determine for himself, by preliminary tests or otherwise, the suitability of this product for his purposes, including mixing with other products. The information contained herein supersedes all previously issued bulletins on the subject matter covered. If the date of this document is more than three years old, please call to ensure that this sheet is current.