

1. Identification

| | | |
|---|--|----------------|
| Product identifier | Manni-Plex for Citrus | |
| Other means of identification | | |
| Product code | 28121 | |
| Recommended use | Agriculture / Horticulture - Micronutrient - Refer to Label | |
| Recommended restrictions | Refer to product label. | |
| 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 1-800-424-9300 Virgin Islands 1-800-424-9300 International Maritime +1 (703) 527-3887 | |

2. Hazard(s) identification

| | | |
|------------------------------|--|------------|
| Physical hazards | Not classified. | |
| Health hazards | Reproductive toxicity | Category 2 |
| Environmental hazards | Hazardous to the aquatic environment, acute hazard | Category 3 |
| | Hazardous to the aquatic environment, long-term hazard | Category 3 |
| OSHA defined hazards | Not classified. | |
| Label elements | | |



| | | |
|--|--|--|
| Signal word | Warning | |
| Hazard statement | Suspected of damaging fertility or the unborn child. Harmful to aquatic life. Harmful to aquatic life with long lasting effects. | |
| Precautionary statement | | |
| Prevention | Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection. | |
| Response | If exposed or concerned: Get medical advice/attention. | |
| Storage | Store locked up. | |
| 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**Mixtures**

| Chemical name | Common name and synonyms | CAS number | % |
|--|--------------------------|------------|-----------|
| Manganese Nitrate | | 10377-66-9 | 5 - < 10* |
| Urea | | 57-13-6 | 5 - < 10* |
| Zinc Nitrate | | 7779-88-6 | 5 - < 10* |
| Disodium Octaborate Tetrahydrate | | 12008-41-2 | 1 - < 3* |
| Other components below reportable levels | | | 70 - < 80 |

*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 | Rinse with water. Get medical attention if irritation develops and persists. |
| Ingestion | Rinse mouth. Get medical attention if symptoms occur. |
| Most important symptoms/effects, acute and delayed | Direct contact with eyes may cause temporary irritation. |
| 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 exposed or concerned: Get medical advice/attention. 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. Show this safety data sheet to the doctor in attendance. |

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 | Move containers from fire area if you can do so without risk. |
| 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. Wear appropriate protective equipment and clothing during clean-up. 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 | Prevent product from entering drains. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. |
| Environmental precautions | Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS. Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. 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

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid prolonged exposure. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. 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 locked up. Store in original tightly closed container. 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)

| Components | Type | Value |
|------------------------------------|---------|---------------------|
| Manganese Nitrate (CAS 10377-66-9) | Ceiling | 5 mg/m ³ |

US. ACGIH Threshold Limit Values

| Components | Type | Value | Form |
|---|------|------------------------|----------------------|
| Disodium Octaborate Tetrahydrate (CAS 12008-41-2) | STEL | 6 mg/m ³ | Inhalable fraction. |
| | TWA | 2 mg/m ³ | Inhalable fraction. |
| Manganese Nitrate (CAS 10377-66-9) | TWA | 0.1 mg/m ³ | Inhalable fraction. |
| | | 0.02 mg/m ³ | Respirable fraction. |

US. NIOSH: Pocket Guide to Chemical Hazards

| Components | Type | Value | Form |
|------------------------------------|------|---------------------|-------|
| Manganese Nitrate (CAS 10377-66-9) | STEL | 3 mg/m ³ | Fume. |
| | TWA | 1 mg/m ³ | Fume. |

US. AIHA Workplace Environmental Exposure Level (WEEL) Guides

| Components | Type | Value | Form |
|--------------------|------|----------------------|--------------------|
| Urea (CAS 57-13-6) | TWA | 10 mg/m ³ | Total particulate. |

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.

Individual protection measures, such as personal protective equipment

Eye/face protection Chemical respirator with organic vapor cartridge and full facepiece.

Skin protection

Hand protection

Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

Other

Use of an impervious apron is recommended.

Respiratory protection

Chemical respirator with organic vapor cartridge and full facepiece.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Observe any medical surveillance requirements. 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

Aqueous solution.

Physical state

Liquid.

Form

Liquid.

Color

Amber.

Odor

Slight nitric.

| | |
|---|----------------------------------|
| Odor threshold | Not available. |
| pH | 3 - 5 |
| Melting point/freezing point | Not available. |
| Initial boiling point and boiling range | Not available. |
| Flash point | Not available. |
| Evaporation rate | Not available. |
| Flammability (solid, gas) | Not applicable. |
| 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 | 0.00001 hPa estimated |
| Vapor density | Not available. |
| Relative density | 1.25 g/cm ³ (typical) |
| Solubility(ies) | |
| Solubility (water) | 100 % |
| Partition coefficient (n-octanol/water) | Not available. |
| Auto-ignition temperature | Not available. |
| Decomposition temperature | Not available. |
| Viscosity | Not available. |
| Other information | |
| Density | 1.33 g/cm ³ estimated |
| Explosive properties | Not explosive. |
| Oxidizing properties | Not oxidizing. |
| Percent volatile | 62.98 % estimated |
| pH in aqueous solution | 4 - 6 (10% Solution) |
| Pounds per gallon | 10.47 lb/gal (typical) |
| VOC | 2.77 % estimated |

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 | Hazardous polymerization does not occur. |
| 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

| | |
|---------------------|--|
| Inhalation | Prolonged inhalation may be harmful. |
| Skin contact | No adverse effects due to skin contact are expected. |
| Eye contact | Direct contact with eyes may cause temporary irritation. |
| Ingestion | Expected to be a low ingestion hazard. |

Symptoms related to the physical, chemical and toxicological characteristics

Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity

| Product | Species | Test Results |
|-----------------------|----------------|-----------------------|
| Manni-Plex for Citrus | | |
| Acute | | |
| Dermal | | |
| LD50 | Rabbit | 80645 mg/kg estimated |
| Inhalation | | |
| LD50 | Rat | 161 mg/l estimated |
| Oral | | |
| LD50 | Mouse | 4019 mg/kg estimated |
| | Rat | 20479 mg/kg estimated |

| Components | Species | Test Results |
|---|----------------|---------------------|
| Disodium Octaborate Tetrahydrate (CAS 12008-41-2) | | |
| Acute | | |
| Dermal | | |
| LD50 | Rabbit | > 2000 mg/kg |
| Oral | | |
| LD50 | Guinea pig | 5300 mg/kg |
| | Rat | 2550 mg/kg |
| | | 2 g/kg |
| Urea (CAS 57-13-6) | | |
| Acute | | |
| Oral | | |
| LD50 | Rat | 8471 mg/kg |
| | Sheep | 28500 mg/kg |
| Zinc Nitrate (CAS 7779-88-6) | | |
| Acute | | |
| Oral | | |
| LD50 | Mouse | 241.3 mg/kg |
| | Rat | 1400 mg/kg |

* 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

Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization

Not a respiratory sensitizer.

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.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

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|---|--|
| Reproductive toxicity | Suspected of damaging fertility or the unborn child. |
| Specific target organ toxicity - single exposure | Not classified. |
| Specific target organ toxicity - repeated exposure | Not classified. |
| Aspiration hazard | Not an aspiration hazard. |
| Chronic effects | Prolonged inhalation may be harmful. |

12. Ecological information

Ecotoxicity Harmful to aquatic life with long lasting effects.

| Product | Species | | Test Results |
|---|---------|---|-------------------------------------|
| Manni-Plex for Citrus | | | |
| Aquatic | | | |
| Crustacea | EC50 | Daphnia | 97577.7969 mg/l, 48 hours estimated |
| Fish | LC50 | Fish | 212.8321 mg/l, 96 hours estimated |
| Components | Species | | Test Results |
| Disodium Octaborate Tetrahydrate (CAS 12008-41-2) | | | |
| Aquatic | | | |
| <i>Acute</i> | | | |
| Crustacea | LC50 | Daphnia magna | 619 mg/l |
| Fish | LC50 | Pimephales promelas | 370 mg/l |
| Urea (CAS 57-13-6) | | | |
| Aquatic | | | |
| Crustacea | EC50 | Water flea (Daphnia magna) | 3910 mg/l, 48 hours |
| Fish | LC50 | Carp (Leuciscus idus melanotus) | > 10000 mg/l, 48 hours |
| | | Guppy (Poecilia reticulata) | 16200 - 18300 mg/l, 96 hours |
| | | Harlequinfish, red rasbora (Rasbora heteromorpha) | 12000 mg/l, 96 hours |
| | | Mozambique tilapia (Tilapia mossambica) | 590 - 730 mg/l, 96 hours |
| Zinc Nitrate (CAS 7779-88-6) | | | |
| Aquatic | | | |
| Crustacea | LC50 | Brown mussel (Perna indica) | 1.2858 - 1.5402 mg/l, 96 hours |
| Fish | LC50 | Minnow (Phoxinus phoxinus) | 2.7 - 3.7 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

Partition coefficient n-octanol / water (log Kow)

Urea -2.11

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

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

14. Transport information

DOT

| | |
|-------------------------------------|--|
| UN number | UN3082 |
| UN proper shipping name | Environmentally hazardous substances, liquid, n.o.s. (Zinc Nitrate RQ = 16667 LBS) |
| Transport hazard class(es) | |
| Class | 9 |
| Subsidiary risk | - |
| Label(s) | 9 |
| Packing group | III |
| Special precautions for user | Read safety instructions, SDS and emergency procedures before handling. |
| Special provisions | 8, 146, 335, IB3, T4, TP1, TP29 |
| Packaging exceptions | 155 |
| Packaging non bulk | 203 |
| Packaging bulk | 241 |

Not DOT regulated in domestic (USA ground) transportation in package sizes less than 16,667 lbs (1,592 gallons); 7,560 kg (6,026 liters). The DOT transportation information above is for shipments with package sizes equal to or exceeding this value.

DOT Shipping Notes: 40 CFR 172.504(f)(9) For Class 9, a CLASS 9 placard is not required for domestic (USA ground) transportation, however shipments with packaging exceeding the Reportable Quantity (RQ) or bulk packaging must be marked with the appropriate identification number on a CLASS 9 placard, an orange panel, or a white square-on-point display configuration as required. Since the Class 9 placard is not required (although it may be used) the hazardous material endorsement is also not required on a Commercial Drivers License.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

DOT



General information

Not DOT regulated in domestic (USA ground) transportation in package sizes less than 16,667 lbs (1,592 gallons); 7,560 kg (6,026 liters). The DOT transportation information above is for shipments with package sizes equal to or exceeding this value.

15. Regulatory information

US federal regulations

This product is 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 Nitrate (CAS 10377-66-9) | Listed. |
| Zinc Nitrate (CAS 7779-88-6) | Listed. |

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

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

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

| Chemical name | CAS number | % by wt. |
|-------------------|------------|----------|
| Manganese Nitrate | 10377-66-9 | 5 - < 10 |
| Zinc Nitrate | 7779-88-6 | 5 - < 10 |

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

Manganese Nitrate (CAS 10377-66-9)

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

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

US. Massachusetts RTK - Substance List

Zinc Nitrate (CAS 7779-88-6)

US. New Jersey Worker and Community Right-to-Know Act

Disodium Octaborate Tetrahydrate (CAS 12008-41-2)

Manganese Nitrate (CAS 10377-66-9)

Zinc Nitrate (CAS 7779-88-6)

US. Pennsylvania Worker and Community Right-to-Know Law

Zinc Nitrate (CAS 7779-88-6)

US. Rhode Island RTK

Manganese Nitrate (CAS 10377-66-9)

Zinc Nitrate (CAS 7779-88-6)

US. California Proposition 65

WARNING: This product can expose you to chemicals including arsenic, cadmium, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

International Inventories

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

*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 08-21-2014

Revision date 05-07-2018

Version # 07

Disclaimer The information provided in this Safety Data Sheet is correct to the best of Manufacturer's knowledge, information and belief at the date of its publication; however, it is provided only as a guidance for safe handling, use, processing, storage, transportation, disposal and release of the Product. No warranties of any kind, either expressed or implied, including warranties of merchantability or fitness for a particular purpose, are made with respect to the Product or the information provided herein, or that the Product or information herein may be used without infringing the intellectual property rights of others. The information provided in this Safety Data Sheet relates only to the specific Product designated and may not be valid if the Product is used in combination with other materials or in any other process, unless specified herein. The user assumes all risk and liability for loss, injury, damage or expense due to any use, handling, storage or disposal of the Product, and Manufacturer recommends that the user conducts its own tests of the Product to determine suitability of the Product for user's particular use.