

**Metal Sulfates Formulation**

|         |                |                |                                 |
|---------|----------------|----------------|---------------------------------|
| Version | Revision Date: | SDS Number:    | Date of last issue: -           |
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**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : Metal Sulfates Formulation  
Product code : Minebloom

**Manufacturer or supplier's details**

Company name of supplier : MSD  
Address : 126 E. Lincoln Avenue  
Rahway, New Jersey U.S.A. 07065  
Telephone : 908-740-4000  
Emergency telephone : 1-908-423-6000  
E-mail address : EHSDATASTEWARD@msd.com

**Recommended use of the chemical and restrictions on use**

Recommended use : Veterinary product  
Restrictions on use : Not applicable

**SECTION 2. HAZARDS IDENTIFICATION****GHS Classification**

Acute toxicity (Oral) : Category 4  
Acute toxicity (Inhalation) : Category 4  
Skin corrosion/irritation : Category 3  
Serious eye damage/eye irritation : Category 1  
Skin sensitization : Category 1  
Carcinogenicity : Category 1B  
Reproductive toxicity : Category 1B  
Specific target organ toxicity - repeated exposure : Category 1 (Brain)

**GHS label elements**

Hazard pictograms :



Signal Word : Danger

Hazard Statements : H302 + H332 Harmful if swallowed or if inhaled.  
H316 Causes mild skin irritation.  
H317 May cause an allergic skin reaction.  
H318 Causes serious eye damage.  
H350 May cause cancer.  
H360FD May damage fertility. May damage the unborn child.

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H372 Causes damage to organs (Brain) through prolonged or repeated exposure.

## Precautionary Statements :

**Prevention:**

P201 Obtain special instructions before use.  
P202 Do not handle until all safety precautions have been read and understood.  
P260 Do not breathe dust.  
P264 Wash skin thoroughly after handling.  
P270 Do not eat, drink or smoke when using this product.  
P271 Use only outdoors or in a well-ventilated area.  
P272 Contaminated work clothing should not be allowed out of the workplace.  
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

**Response:**

P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.  
P302 + P352 IF ON SKIN: Wash with plenty of water.  
P304 + P340 + P312 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.  
P305 + P351 + P338 + P310 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 or doctor/ physician.  
P308 + P313 IF exposed or concerned: Get medical advice/ attention.  
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.  
P362 + P364 Take off contaminated clothing and wash it before reuse.

**Storage:**

P405 Store locked up.

**Disposal:**

P501 Dispose of contents/ container to an approved waste disposal plant.

**Other hazards**

May form explosive dust-air mixture during processing, handling or other means.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Substance / Mixture : Mixture

**Components**

| Chemical name                         | CAS-No.   | Concentration (% w/w) |
|---------------------------------------|-----------|-----------------------|
| Calcium bis(dihydrogenorthophosphate) | 7758-23-8 | >= 20 -< 30           |
| Potassium chloride                    | 7447-40-7 | >= 5 -< 10            |
| Silicon dioxide                       | 7631-86-9 | >= 5 -< 10            |
| Ethylene diamine tetraacetic acid     | 60-00-4   | >= 5 -< 10            |

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| Sulfuric acid, iron(2+) salt (1:1), monohydrate | 17375-41-6 | >= 1 -< 5      |
| Sodium molybdate (VI) dihydrate                 | 10102-40-6 | >= 1 -< 5      |
| Disodium octaborate tetrahydrate                | 12280-03-4 | >= 1 -< 5      |
| Manganese sulfate                               | 10034-96-5 | >= 1 -< 3      |
| Copper(II) sulfate, pentahydrate                | 7758-99-8  | >= 1 -< 3      |
| Zinc sulphate monohydrate                       | 7446-19-7  | >= 1 -< 3      |
| Sodium selenite                                 | 10102-18-8 | >= 0.1 -< 1    |
| Cobalt Chloride                                 | 7646-79-9  | >= 0.01 -< 0.1 |

## SECTION 4. FIRST AID MEASURES

- General advice : In the case of accident or if you feel unwell, seek medical advice immediately.  
When symptoms persist or in all cases of doubt seek medical advice.
- If inhaled : If inhaled, remove to fresh air.  
If not breathing, give artificial respiration.  
If breathing is difficult, give oxygen.  
Get medical attention.
- In case of skin contact : In case of contact, immediately flush skin with plenty of water.  
Remove contaminated clothing and shoes.  
Get medical attention.  
Wash clothing before reuse.  
Thoroughly clean shoes before reuse.
- In case of eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes.  
If easy to do, remove contact lens, if worn.  
Get medical attention immediately.
- If swallowed : If swallowed, DO NOT induce vomiting.  
Get medical attention.  
Rinse mouth thoroughly with water.  
Never give anything by mouth to an unconscious person.
- Most important symptoms and effects, both acute and delayed : Harmful if swallowed or if inhaled.  
Causes mild skin irritation.  
May cause an allergic skin reaction.  
Causes serious eye damage.  
May cause cancer.  
May damage fertility. May damage the unborn child.  
Causes damage to organs through prolonged or repeated exposure.
- Protection of first-aiders : First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists (see section 8).
- Notes to physician : Treat symptomatically and supportively.

## SECTION 5. FIRE-FIGHTING MEASURES

- Suitable extinguishing media : Water spray  
Alcohol-resistant foam  
Carbon dioxide (CO<sub>2</sub>)  
Dry chemical
- Unsuitable extinguishing media : None known.

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- Specific hazards during fire fighting : Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.  
Exposure to combustion products may be a hazard to health.
- Hazardous combustion products : Sulfur oxides  
Metal oxides  
Oxides of phosphorus  
Chlorine compounds  
Carbon oxides  
Nitrogen oxides (NO<sub>x</sub>)
- Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.  
Use water spray to cool unopened containers.  
Remove undamaged containers from fire area if it is safe to do so.  
Evacuate area.
- Special protective equipment for fire-fighters : In the event of fire, wear self-contained breathing apparatus.  
Use personal protective equipment.

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**SECTION 6. ACCIDENTAL RELEASE MEASURES**

- Personal precautions, protective equipment and emergency procedures : Use personal protective equipment.  
Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).
- Environmental precautions : Avoid release to the environment.  
Prevent further leakage or spillage if safe to do so.  
Retain and dispose of contaminated wash water.  
Local authorities should be advised if significant spillages cannot be contained.
- Methods and materials for containment and cleaning up : Surround spill with absorbents and place a damp covering over the area to minimize entry of the material into the air.  
Add excess liquid to allow the material to enter into solution.  
Soak up with inert absorbent material.  
Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air).  
Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration.  
Clean up remaining materials from spill with suitable absorbent.  
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.  
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

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**SECTION 7. HANDLING AND STORAGE**

- Technical measures : Static electricity may accumulate and ignite suspended dust causing an explosion.  
 Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.
- Local/Total ventilation : If sufficient ventilation is unavailable, use with local exhaust ventilation.
- Advice on safe handling : Do not get on skin or clothing.  
 Do not breathe dust.  
 Do not swallow.  
 Do not get in eyes.  
 Wash skin thoroughly after handling.  
 Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment  
 Keep container tightly closed.  
 Minimize dust generation and accumulation.  
 Keep container closed when not in use.  
 Keep away from heat and sources of ignition.  
 Take precautionary measures against static discharges.  
 Do not eat, drink or smoke when using this product.  
 Take care to prevent spills, waste and minimize release to the environment.
- Hygiene measures : If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place.  
 When using do not eat, drink or smoke.  
 Contaminated work clothing should not be allowed out of the workplace.  
 Wash contaminated clothing before re-use.  
 The effective operation of a facility should include review of engineering controls, proper personal protective equipment, appropriate degowning and decontamination procedures, industrial hygiene monitoring, medical surveillance and the use of administrative controls.
- Conditions for safe storage : Keep in properly labeled containers.  
 Store locked up.  
 Keep tightly closed.  
 Keep in a cool, well-ventilated place.  
 Store in accordance with the particular national regulations.
- Materials to avoid : Do not store with the following product types:  
 Strong oxidizing agents  
 Self-reactive substances and mixtures  
 Organic peroxides  
 Explosives  
 Gases

**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Ingredients with workplace control parameters**

| Components | CAS-No. | Value type<br>(Form of | Control parameters / Permissible | Basis |
|------------|---------|------------------------|----------------------------------|-------|
|------------|---------|------------------------|----------------------------------|-------|

# SAFETY DATA SHEET



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|   |            | exposure)                           | concentration                      |                   |
|---|------------|-------------------------------------|------------------------------------|-------------------|
| Sulfuric acid, iron(2+) salt (1:1), monohydrate | 17375-41-6 | VLE-PPT                             | 1 mg/m <sup>3</sup> (Iron)         | NOM-010-STPS-2014 |
|   |            | TWA                                 | 1 mg/m <sup>3</sup> (Iron)         | ACGIH             |
| Sodium molybdate (VI) dihydrate                 | 10102-40-6 | VLE-PPT (Respirable fraction)       | 0.5 mg/m <sup>3</sup> (Molybdenum) | NOM-010-STPS-2014 |
|   |            | TWA (Respirable particulate matter) | 0.5 mg/m <sup>3</sup> (Molybdenum) | ACGIH             |
| Disodium octaborate tetrahydrate                | 12280-03-4 | TWA (Inhalable particulate matter)  | 2 mg/m <sup>3</sup> (Borate)       | ACGIH             |
|   |            | STEL (Inhalable particulate matter) | 6 mg/m <sup>3</sup> (Borate)       | ACGIH             |
| Manganese sulfate                               | 10034-96-5 | VLE-PPT                             | 0.2 mg/m <sup>3</sup> (Manganese)  | NOM-010-STPS-2014 |
|   |            | TWA (Inhalable particulate matter)  | 0.1 mg/m <sup>3</sup> (Manganese)  | ACGIH             |
|   |            | TWA (Respirable particulate matter) | 0.02 mg/m <sup>3</sup> (Manganese) | ACGIH             |
| Sodium selenite                                 | 10102-18-8 | TWA                                 | 20 µg/m <sup>3</sup> (OEB 3)       | Internal          |
|   |            | Wipe limit                          | 200 µg/100 cm <sup>2</sup>         | Internal          |
|   |            | VLE-PPT                             | 0.2 mg/m <sup>3</sup> (selenium)   | NOM-010-STPS-2014 |
|   |            | TWA                                 | 0.2 mg/m <sup>3</sup> (selenium)   | ACGIH             |
| Cobalt Chloride                                 | 7646-79-9  | VLE-PPT                             | 0.02 mg/m <sup>3</sup> (Cobalt)    | NOM-010-STPS-2014 |
|   |            | TWA (Inhalable particulate matter)  | 0.02 mg/m <sup>3</sup> (Cobalt)    | ACGIH             |

### Biological occupational exposure limits

| Components      | CAS-No.   | Control parameters | Biological specimen | Sam-pling time                   | Permissible concentra-tion | Basis     |
|-----------------|-----------|--------------------|---------------------|----------------------------------|----------------------------|-----------|
| Cobalt Chloride | 7646-79-9 | Cobalt (Cobalt)    | Urine               | End of shift at end of work-week | 15 µg/l                    | ACGIH BEI |

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**Engineering measures** : The information below is intended for larger pilot/commercial-scale operations and manufacturing. For smaller scale, clinical, or pharmacy settings, site-specific internal risk assessment practices should be conducted to determine appropriate exposure control measures. The health hazard risks of handling this material are dependent on multiple factors, including but not limited to physical form and quantity handled. If applicable, use process enclosures, local exhaust ventilation (e.g., Biosafety Cabinet, Ventilated Balance Enclosures), or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels as low as reasonably achievable.

Containment technologies suitable for controlling compounds are required to control at source and to prevent migration of the compound to uncontrolled areas (e.g., vacuum conveying from a closed system, packout head with inflatable seal from stationary container, ventilated enclosure, etc.).

All engineering controls should be implemented by facility design and operated in accordance with GMP principles to protect products, workers, and the environment.

Essentially no open handling permitted.

Use closed processing systems or containment technologies.

**Personal protective equipment**

**Respiratory protection** : If adequate local exhaust ventilation is not available or exposure assessment demonstrates exposures outside the recommended guidelines, use respiratory protection.

**Filter type** : Particulates type

**Hand protection**

**Material** : Chemical-resistant gloves

**Remarks** : Consider double gloving.

**Eye protection** : Wear safety glasses with side shields or goggles. If the work environment or activity involves dusty conditions, mists or aerosols, wear the appropriate goggles. Wear a faceshield or other full face protection if there is a potential for direct contact to the face with dusts, mists, or aerosols.

**Skin and body protection** : Work uniform or laboratory coat. Additional body garments should be used based upon the task being performed (e.g., sleevelets, apron, gauntlets, disposable suits) to avoid exposed skin surfaces. Use appropriate degowning techniques to remove potentially contaminated clothing.

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance** : powder

**Color** : No data available

**Odor** : No data available

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|  |   |   |
|--|---|---|
| Odor Threshold                                   | : | No data available   |
| pH   | : | No data available   |
| Melting point/freezing point                     | : | No data available   |
| Initial boiling point and boiling range          | : | No data available   |
| Flash point                                      | : | Not applicable  |
| Evaporation rate                                 | : | Not applicable  |
| Flammability (solid, gas)                        | : | May form explosive dust-air mixture during processing, handling or other means. |
| Flammability (liquids)                           | : | Not applicable  |
| Upper explosion limit / Upper flammability limit | : | No data available   |
| Lower explosion limit / Lower flammability limit | : | No data available   |
| Vapor pressure                                   | : | Not applicable  |
| Relative vapor density                           | : | Not applicable  |
| Relative density                                 | : | No data available   |
| Density  | : | No data available   |
| Solubility(ies)                                  |   |   |
| Water solubility                                 | : | No data available   |
| Partition coefficient: n-octanol/water           | : | Not applicable  |
| Autoignition temperature                         | : | No data available   |
| Decomposition temperature                        | : | No data available   |
| Viscosity  |   |   |
| Viscosity, kinematic                             | : | Not applicable  |
| Explosive properties                             | : | Not explosive   |
| Oxidizing properties                             | : | The substance or mixture is not classified as oxidizing.                        |
| Molecular weight                                 | : | No data available   |
| Particle characteristics                         |   |   |
| Particle size                                    | : | No data available   |



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**SECTION 10. STABILITY AND REACTIVITY**

|                                    |   |  |
|------------------------------------|---|--|
| Reactivity                         | : | Not classified as a reactivity hazard.   |
| Chemical stability                 | : | Stable under normal conditions.  |
| Possibility of hazardous reactions | : | May form explosive dust-air mixture during processing, handling or other means.<br>Can react with strong oxidizing agents. |
| Conditions to avoid                | : | Heat, flames and sparks.<br>Avoid dust formation.  |
| Incompatible materials             | : | Oxidizing agents   |
| Hazardous decomposition products   | : | No hazardous decomposition products are known.   |

**SECTION 11. TOXICOLOGICAL INFORMATION****Information on likely routes of exposure**

Inhalation  
Skin contact  
Ingestion  
Eye contact

**Acute toxicity**

Harmful if swallowed or if inhaled.

**Product:**

|                           |   |  |
|---------------------------|---|--|
| Acute oral toxicity       | : | Acute toxicity estimate: 481.73 mg/kg<br>Method: Calculation method  |
| Acute inhalation toxicity | : | Acute toxicity estimate: 4.19 mg/l<br>Exposure time: 4 h<br>Test atmosphere: dust/mist<br>Method: Calculation method |

**Components:****Calcium bis(dihydrogenorthophosphate):**

|                           |   |   |
|---------------------------|---|---|
| Acute oral toxicity       | : | LD50 (Rat): 3,986 mg/kg   |
| Acute inhalation toxicity | : | LC50 (Rat): > 2.6 mg/l<br>Exposure time: 4 h<br>Test atmosphere: dust/mist<br>Method: OECD Test Guideline 403 |
| Acute dermal toxicity     | : | LD50 (Rabbit): > 2,000 mg/kg<br>Assessment: The substance or mixture has no acute dermal toxicity             |

**Potassium chloride:**

|                       |   |   |
|-----------------------|---|---|
| Acute oral toxicity   | : | LD50 (Rat): 3,020 mg/kg   |
| Acute dermal toxicity | : | LD50 (Rabbit): > 2,000 mg/kg<br>Assessment: The substance or mixture has no acute dermal toxicity |

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toxicity  
Remarks: Based on data from similar materials

**Silicon dioxide:**

Acute oral toxicity : LD50 (Rat): > 5,110 mg/kg  
Method: OECD Test Guideline 401  
Remarks: The test was conducted according to guideline

Acute inhalation toxicity : LC50 (Rat): > 5.198 mg/l  
Exposure time: 4 h  
Test atmosphere: dust/mist  
Method: OECD Test Guideline 403  
Remarks: The test was conducted according to guideline

Acute dermal toxicity : LD50 (Rabbit): > 5,000 mg/kg  
Remarks: No test guideline followed

**Ethylene diamine tetraacetic acid:**

Acute oral toxicity : LD50 (Rat): 4,500 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 1 mg/l  
Exposure time: 6 h  
Test atmosphere: dust/mist  
Method: OECD Test Guideline 412  
Remarks: Based on data from similar materials

**Sulfuric acid, iron(2+) salt (1:1), monohydrate:**

Acute oral toxicity : LD50 (Rat): > 300 - 2,000 mg/kg  
Remarks: Based on data from similar materials

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg  
Method: OECD Test Guideline 402  
Remarks: The test was conducted according to guideline  
Based on data from similar materials

**Sodium molybdate (VI) dihydrate:**

Acute oral toxicity : LD50 (Rat): 4,972 mg/kg  
Method: OECD Test Guideline 401  
Remarks: Based on data from similar materials

Acute inhalation toxicity : LC50 (Rat): > 3.93 mg/l  
Exposure time: 4 h  
Test atmosphere: dust/mist  
Assessment: The substance or mixture has no acute inhalation toxicity  
Remarks: Based on data from similar materials

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg  
Method: OECD Test Guideline 402  
Assessment: The substance or mixture has no acute dermal toxicity  
Remarks: Based on data from similar materials

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**Disodium octaborate tetrahydrate:**

Acute oral toxicity : LD50 (Rat): 2,550 mg/kg  
Method: OECD Test Guideline 401

Acute inhalation toxicity : LC50 (Rat): > 2.01 mg/l  
Exposure time: 4 h  
Test atmosphere: dust/mist  
Method: OECD Test Guideline 403

Acute dermal toxicity : LD50 (Rabbit): > 2,000 mg/kg  
Assessment: The substance or mixture has no acute dermal toxicity

**Manganese sulfate:**

Acute oral toxicity : LD50 (Rat): > 2,000 - 5,000 mg/kg  
Remarks: No test guideline followed

Acute inhalation toxicity : LC50 (Rat): > 4.98 mg/l  
Exposure time: 4 h  
Test atmosphere: dust/mist  
Method: OECD Test Guideline 403  
Remarks: The test was conducted according to guideline

**Copper(II) sulfate, pentahydrate:**

Acute oral toxicity : LD50 (Rat): 481 mg/kg  
Method: OECD Test Guideline 401

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg  
Method: OECD Test Guideline 402  
Assessment: The substance or mixture has no acute dermal toxicity

**Zinc sulphate monohydrate:**

Acute oral toxicity : LD50 (Rat): > 1,000 mg/kg  
Remarks: Based on data from similar materials

Acute dermal toxicity : LD50 (Rabbit): > 2,000 mg/kg  
Method: OECD Test Guideline 402  
Remarks: Based on data from similar materials

**Sodium selenite:**

Acute oral toxicity : LD50 (Rat): 4.8 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 0.052 - 0.51 mg/l  
Exposure time: 4 h  
Test atmosphere: dust/mist  
Method: OECD Test Guideline 403

**Cobalt Chloride:**

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Acute oral toxicity : LD50 (Rat): 537 mg/kg

**Skin corrosion/irritation**

Causes mild skin irritation.

**Components:****Calcium bis(dihydrogenorthophosphate):**

Species : Rabbit  
Result : No skin irritation

**Potassium chloride:**

Species : reconstructed human epidermis (RhE)  
Method : OECD Test Guideline 439

Result : No skin irritation

**Silicon dioxide:**

Species : Rabbit  
Method : OECD Test Guideline 404  
Result : No skin irritation  
Remarks : The test was conducted according to guideline

**Ethylene diamine tetraacetic acid:**

Species : Rabbit  
Result : No skin irritation

**Sulfuric acid, iron(2+) salt (1:1), monohydrate:**

Species : Rabbit  
Method : OECD Test Guideline 404  
Result : Skin irritation  
Remarks : The test was conducted according to guideline

**Sodium molybdate (VI) dihydrate:**

Species : Rabbit  
Method : OECD Test Guideline 404  
Result : No skin irritation  
Remarks : Based on data from similar materials

**Disodium octaborate tetrahydrate:**

Species : Rabbit  
Result : No skin irritation

**Manganese sulfate:**

Species : Rabbit  
Method : OECD Test Guideline 404  
Result : No skin irritation  
Remarks : The test was conducted according to guideline

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**Copper(II) sulfate, pentahydrate:**

|         |   |                         |
|---------|---|-------------------------|
| Species | : | Rabbit                  |
| Method  | : | OECD Test Guideline 404 |
| Result  | : | No skin irritation      |

**Zinc sulphate monohydrate:**

|         |   |                                      |
|---------|---|--------------------------------------|
| Species | : | Rabbit                               |
| Method  | : | OECD Test Guideline 404              |
| Result  | : | No skin irritation                   |
| Remarks | : | Based on data from similar materials |

**Sodium selenite:**

|         |   |                                     |
|---------|---|-------------------------------------|
| Species | : | reconstructed human epidermis (RhE) |
| Method  | : | OECD Test Guideline 431             |

|         |   |                                     |
|---------|---|-------------------------------------|
| Species | : | reconstructed human epidermis (RhE) |
| Method  | : | OECD Test Guideline 439             |

|        |   |                 |
|--------|---|-----------------|
| Result | : | Skin irritation |
|--------|---|-----------------|

**Cobalt Chloride:**

|         |   |                         |
|---------|---|-------------------------|
| Species | : | Rabbit                  |
| Method  | : | OECD Test Guideline 404 |
| Result  | : | No skin irritation      |

**Serious eye damage/eye irritation**

Causes serious eye damage.

**Components:****Calcium bis(dihydrogenorthophosphate):**

|         |   |                                 |
|---------|---|---------------------------------|
| Species | : | Rabbit                          |
| Result  | : | Irreversible effects on the eye |
| Method  | : | OECD Test Guideline 405         |

**Potassium chloride:**

|         |   |                                      |
|---------|---|--------------------------------------|
| Species | : | Rabbit                               |
| Result  | : | No eye irritation                    |
| Remarks | : | Based on data from similar materials |

**Silicon dioxide:**

|         |   |   |
|---------|---|---|
| Species | : | Rabbit  |
| Result  | : | No eye irritation   |
| Method  | : | OECD Test Guideline 405                                   |
| Remarks | : | The test was conducted equivalent or similar to guideline |

**Ethylene diamine tetraacetic acid:**

|         |   |  |
|---------|---|--|
| Species | : | Rabbit                                       |
| Result  | : | Irritation to eyes, reversing within 21 days |

**Metal Sulfates Formulation**

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**Sulfuric acid, iron(2+) salt (1:1), monohydrate:**

Result : Irritation to eyes, reversing within 21 days

**Sodium molybdate (VI) dihydrate:**

Species : Rabbit  
Result : No eye irritation  
Method : OECD Test Guideline 405  
Remarks : Based on data from similar materials

**Disodium octaborate tetrahydrate:**

Species : Rabbit  
Result : No eye irritation

**Manganese sulfate:**

Species : Rabbit  
Result : Irreversible effects on the eye  
Method : OECD Test Guideline 405  
Remarks : The test was conducted according to guideline

**Copper(II) sulfate, pentahydrate:**

Species : Rabbit  
Result : Irreversible effects on the eye  
Method : OECD Test Guideline 405

**Zinc sulphate monohydrate:**

Species : Rabbit  
Result : Irreversible effects on the eye  
Method : OECD Test Guideline 405  
Remarks : Based on data from similar materials

**Sodium selenite:**

Result : Irritation to eyes, reversing within 21 days

**Cobalt Chloride:**

Species : Rabbit  
Result : Irreversible effects on the eye  
Method : OECD Test Guideline 405

**Respiratory or skin sensitization****Skin sensitization**

May cause an allergic skin reaction.

**Respiratory sensitization**

Not classified based on available information.

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**Components:****Calcium bis(dihydrogenorthophosphate):**

|                    |  |
|--------------------|--|
| Test Type          | : Local lymph node assay (LLNA)        |
| Routes of exposure | : Skin contact                         |
| Species            | : Mouse                                |
| Method             | : OECD Test Guideline 429              |
| Result             | : negative                             |
| Remarks            | : Based on data from similar materials |

**Potassium chloride:**

|                    |  |
|--------------------|--|
| Test Type          | : Buehler Test                         |
| Routes of exposure | : Skin contact                         |
| Species            | : Guinea pig                           |
| Result             | : negative                             |
| Remarks            | : Based on data from similar materials |

**Silicon dioxide:**

|                    |   |
|--------------------|---|
| Test Type          | : Buehler Test                                  |
| Routes of exposure | : Skin contact                                  |
| Species            | : Guinea pig                                    |
| Method             | : OECD Test Guideline 406                       |
| Result             | : negative                                      |
| Remarks            | : The test was conducted according to guideline |

**Ethylene diamine tetraacetic acid:**

|                    |  |
|--------------------|--|
| Test Type          | : Maximization Test                    |
| Routes of exposure | : Skin contact                         |
| Species            | : Guinea pig                           |
| Method             | : OECD Test Guideline 406              |
| Result             | : negative                             |
| Remarks            | : Based on data from similar materials |

**Sulfuric acid, iron(2+) salt (1:1), monohydrate:**

|                    |   |
|--------------------|---|
| Test Type          | : Local lymph node assay (LLNA)                 |
| Routes of exposure | : Skin contact                                  |
| Species            | : Mouse   |
| Method             | : OECD Test Guideline 429                       |
| Result             | : negative                                      |
| Remarks            | : The test was conducted according to guideline |

**Sodium molybdate (VI) dihydrate:**

|                    |  |
|--------------------|--|
| Test Type          | : Maximization Test                    |
| Routes of exposure | : Skin contact                         |
| Species            | : Guinea pig                           |
| Result             | : negative                             |
| Remarks            | : Based on data from similar materials |

**Disodium octaborate tetrahydrate:**

|           |                |
|-----------|----------------|
| Test Type | : Buehler Test |
|-----------|----------------|

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|                    |   |                         |
|--------------------|---|-------------------------|
| Routes of exposure | : | Skin contact            |
| Species            | : | Guinea pig              |
| Method             | : | OECD Test Guideline 406 |
| Result             | : | negative                |

**Manganese sulfate:**

|                    |   |   |
|--------------------|---|---|
| Test Type          | : | Local lymph node assay (LLNA)   |
| Routes of exposure | : | Skin contact  |
| Species            | : | Mouse   |
| Method             | : | OECD Test Guideline 429   |
| Result             | : | negative  |
| Remarks            | : | The test was conducted equivalent or similar to guideline<br>Based on data from similar materials |

**Copper(II) sulfate, pentahydrate:**

|                    |   |                                 |
|--------------------|---|---------------------------------|
| Test Type          | : | Freund's complete adjuvant test |
| Routes of exposure | : | Skin contact                    |
| Species            | : | Guinea pig                      |
| Method             | : | OECD Test Guideline 406         |
| Result             | : | negative                        |

**Zinc sulphate monohydrate:**

|                    |   |                                      |
|--------------------|---|--------------------------------------|
| Test Type          | : | Local lymph node assay (LLNA)        |
| Routes of exposure | : | Skin contact                         |
| Species            | : | Mouse                                |
| Result             | : | negative                             |
| Remarks            | : | Based on data from similar materials |

**Sodium selenite:**

|            |   |   |
|------------|---|---|
| Assessment | : | Probability or evidence of skin sensitization in humans |
| Remarks    | : | Based on national or regional regulation.               |

**Cobalt Chloride:**

|                    |   |                                      |
|--------------------|---|--------------------------------------|
| Test Type          | : | Maximization Test                    |
| Routes of exposure | : | Skin contact                         |
| Species            | : | Guinea pig                           |
| Result             | : | positive                             |
| Remarks            | : | Based on data from similar materials |

|            |   |   |
|------------|---|---|
| Assessment | : | Probability or evidence of high skin sensitization rate in humans |
|------------|---|---|

|                    |   |                                      |
|--------------------|---|--------------------------------------|
| Routes of exposure | : | inhalation (dust/mist/fume)          |
| Species            | : | Humans                               |
| Result             | : | positive                             |
| Remarks            | : | Based on data from similar materials |

|            |   |  |
|------------|---|--|
| Assessment | : | May cause sensitization by inhalation. |
|------------|---|--|



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**Germ cell mutagenicity**

Not classified based on available information.

**Components:****Calcium bis(dihydrogenorthophosphate):**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative  
Remarks: Based on data from similar materials

Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: negative  
Remarks: Based on data from similar materials

Test Type: in vitro micronucleus test  
Method: OECD Test Guideline 487  
Result: negative  
Remarks: Based on data from similar materials

**Potassium chloride:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative

Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: equivocal

Test Type: Chromosome aberration test in vitro  
Result: positive

**Silicon dioxide:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative  
Remarks: The test was conducted equivalent or similar to guideline

Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: negative  
Remarks: The test was conducted according to guideline

Test Type: Chromosome aberration test in vitro  
Method: OECD Test Guideline 473  
Result: negative  
Remarks: The test was conducted equivalent or similar to guideline

Genotoxicity in vivo : Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)  
Species: Rat

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Application Route: Ingestion  
Method: OECD Test Guideline 475  
Result: negative  
Remarks: The test was conducted equivalent or similar to guideline

**Ethylene diamine tetraacetic acid:**

Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro  
Result: negative  
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Application Route: Ingestion  
Method: OECD Test Guideline 474  
Result: negative  
Remarks: Based on data from similar materials

**Sulfuric acid, iron(2+) salt (1:1), monohydrate:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative  
Remarks: The test was conducted according to guideline  
Based on data from similar materials

Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: negative  
Remarks: The test was conducted equivalent or similar to guideline

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Application Route: Intraperitoneal injection  
Method: OECD Test Guideline 474  
Result: negative  
Remarks: The test was conducted equivalent or similar to guideline

**Sodium molybdate (VI) dihydrate:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative  
Remarks: Based on data from similar materials

**Disodium octaborate tetrahydrate:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Result: negative  
Remarks: Based on data from similar materials

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Test Type: In vitro mammalian cell gene mutation test  
 Result: negative  
 Remarks: Based on data from similar materials

Test Type: Chromosome aberration test in vitro  
 Result: negative  
 Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
 Species: Mouse  
 Application Route: Ingestion  
 Result: negative  
 Remarks: Based on data from similar materials

**Manganese sulfate:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
 Method: OECD Test Guideline 471  
 Result: negative  
 Remarks: The test was conducted equivalent or similar to guideline

Test Type: In vitro mammalian cell gene mutation test  
 Method: OECD Test Guideline 476  
 Result: negative  
 Remarks: The test was conducted according to guideline  
 Based on data from similar materials

Test Type: Chromosome aberration test in vitro  
 Method: OECD Test Guideline 473  
 Result: negative  
 Remarks: The test was conducted according to guideline  
 Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
 Species: Mouse  
 Application Route: Ingestion  
 Method: OECD Test Guideline 474  
 Result: negative  
 Remarks: The test was conducted according to guideline  
 Based on data from similar materials

**Copper(II) sulfate, pentahydrate:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
 Method: OECD Test Guideline 471  
 Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
 Species: Mouse  
 Application Route: Ingestion  
 Method: Directive 67/548/EEC, Annex V, B.12.

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Result: negative

**Zinc sulphate monohydrate:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Application Route: Intraperitoneal injection  
Result: negative  
Remarks: Based on data from similar materials

**Sodium selenite:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative

**Cobalt Chloride:**

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: positive  
Remarks: Based on data from similar materials

Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: positive  
Remarks: Based on data from similar materials

Test Type: Chromosome aberration test in vitro  
Method: OECD Test Guideline 473  
Result: positive  
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Micronucleus test  
Species: Mouse  
Application Route: Intraperitoneal injection  
Result: positive  
Remarks: Based on data from similar materials

Germ cell mutagenicity - Assessment : Positive result(s) from in vivo mammalian somatic cell mutagenicity tests.

**Carcinogenicity**

May cause cancer.

**Components:****Potassium chloride:**

Species : Rat  
Application Route : Ingestion

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Exposure time : 2 Years  
Result : negative

**Silicon dioxide:**

Species : Rat  
Application Route : Ingestion  
Exposure time : 103 weeks  
Result : negative  
Remarks : No test guideline followed

**Ethylene diamine tetraacetic acid:**

Species : Rat  
Application Route : Ingestion  
Exposure time : 103 weeks  
Result : negative  
Remarks : Based on data from similar materials

**Sulfuric acid, iron(2+) salt (1:1), monohydrate:**

Species : Rat  
Application Route : Ingestion  
Exposure time : 2 Years  
Method : OECD Test Guideline 451  
Result : negative  
Remarks : The test was conducted equivalent or similar to guideline  
Based on data from similar materials

**Sodium molybdate (VI) dihydrate:**

Species : Rat  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 106 weeks  
Result : negative  
Remarks : Based on data from similar materials

**Disodium octaborate tetrahydrate:**

Species : Mouse  
Application Route : Ingestion  
Exposure time : 2 Years  
Result : negative  
Remarks : Based on data from similar materials

**Manganese sulfate:**

Species : Rat  
Application Route : Ingestion  
Exposure time : 103 weeks  
Result : negative

**Zinc sulphate monohydrate:**

Species : Mouse  
Application Route : Ingestion  
Exposure time : 1 Years

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Result : negative  
Remarks : Based on data from similar materials

**Cobalt Chloride:**

Species : Rat  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 105 weeks  
Result : positive  
Remarks : Based on data from similar materials

Species : Mouse  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 105 weeks  
Result : positive  
Remarks : Based on data from similar materials

Carcinogenicity - Assessment : Sufficient evidence of carcinogenicity in animal experiments

**Reproductive toxicity**

May damage fertility. May damage the unborn child.

**Components:****Calcium bis(dihydrogenorthophosphate):**

Effects on fertility : Test Type: Reproduction/Developmental toxicity screening test  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 421  
Result: negative  
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Embryo-fetal development  
Species: Rat  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials

**Potassium chloride:**

Effects on fetal development : Test Type: Embryo-fetal development  
Species: Rat  
Application Route: Ingestion  
Result: negative

**Silicon dioxide:**

Effects on fertility : Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 416  
Result: negative  
Remarks: The test was conducted according to guideline

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Effects on fetal development : Test Type: Embryo-fetal development  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 414  
Result: negative  
Remarks: The test was conducted according to guideline

**Ethylene diamine tetraacetic acid:**

Effects on fertility : Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Embryo-fetal development  
Species: Rat  
Application Route: Ingestion  
Result: negative

**Sulfuric acid, iron(2+) salt (1:1), monohydrate:**

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 422  
Result: negative  
Remarks: The test was conducted according to guideline

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 422  
Result: negative  
Remarks: The test was conducted according to guideline

**Sodium molybdate (VI) dihydrate:**

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 416  
Result: negative  
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Embryo-fetal development  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 414  
Result: negative  
Remarks: Based on data from similar materials

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**Disodium octaborate tetrahydrate:**

- Effects on fertility : Test Type: Three-generation reproduction toxicity study  
Species: Rat  
Application Route: Ingestion  
Result: positive  
Remarks: Based on data from similar materials
- Effects on fetal development : Test Type: Embryo-fetal development  
Species: Rabbit  
Application Route: Ingestion  
Result: positive  
Remarks: Based on data from similar materials
- Reproductive toxicity - Assessment : Clear evidence of adverse effects on sexual function and fertility, based on animal experiments., Clear evidence of adverse effects on development, based on animal experiments.

**Manganese sulfate:**

- Effects on fertility : Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application Route: inhalation (dust/mist/fume)  
Method: OECD Test Guideline 416  
Result: negative  
Remarks: The test was conducted according to guideline  
Based on data from similar materials

**Copper(II) sulfate, pentahydrate:**

- Effects on fertility : Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 416  
Result: negative
- Effects on fetal development : Test Type: Embryo-fetal development  
Species: Rabbit  
Application Route: Ingestion  
Method: OECD Test Guideline 414  
Result: negative  
Remarks: Based on data from similar materials

**Zinc sulphate monohydrate:**

- Effects on fertility : Test Type: Fertility  
Species: Rat  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials
- Effects on fetal development : Test Type: Embryo-fetal development  
Species: Rat  
Application Route: Ingestion  
Result: negative



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Remarks: Based on data from similar materials

**Sodium selenite:**

Effects on fertility : Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Embryo-fetal development  
Species: Mouse  
Application Route: Ingestion  
Result: negative

**Cobalt Chloride:**

Effects on fertility : Test Type: Fertility/early embryonic development  
Species: Rat  
Application Route: Ingestion  
Result: positive  
Remarks: Based on data from similar materials

Test Type: Fertility/early embryonic development  
Species: Mouse  
Application Route: Ingestion  
Result: positive  
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Embryo-fetal development  
Species: Rat  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials

Reproductive toxicity - Assessment : Clear evidence of adverse effects on sexual function and fertility, based on animal experiments.

**STOT-single exposure**

Not classified based on available information.

**STOT-repeated exposure**

Causes damage to organs (Brain) through prolonged or repeated exposure.

**Components:****Manganese sulfate:**

Routes of exposure : inhalation (dust/mist/fume)  
Target Organs : Brain  
Assessment : Causes damage to organs through prolonged or repeated exposure.  
Remarks : Based on data from similar materials

**Copper(II) sulfate, pentahydrate:**

Routes of exposure : Ingestion

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Assessment : No significant health effects observed in animals at concentrations of 100 mg/kg bw or less.

**Sodium selenite:**

Routes of exposure : Ingestion  
 Assessment : Shown to produce significant health effects in animals at concentrations of 10 mg/kg bw or less.

**Cobalt Chloride:**

Routes of exposure : Ingestion  
 Target Organs : Thyroid, Heart, Blood  
 Assessment : Shown to produce significant health effects in animals at concentrations of 10 mg/kg bw or less.

Routes of exposure : inhalation (dust/mist/fume)  
 Target Organs : Respiratory Tract  
 Assessment : Shown to produce significant health effects in animals at concentrations of 0.02 mg/l/6h/d or less.

**Repeated dose toxicity****Components:****Calcium bis(dihydrogenorthophosphate):**

Species : Rat  
 NOAEL : > 300 mg/kg  
 Application Route : Ingestion  
 Exposure time : 28 Days  
 Method : OECD Test Guideline 407  
 Remarks : Based on data from similar materials

**Potassium chloride:**

Species : Rat  
 NOAEL : 1,820 mg/kg  
 Application Route : Ingestion  
 Exposure time : 2 y

**Silicon dioxide:**

Species : Rat  
 NOAEL : > 100 mg/kg  
 Application Route : Ingestion  
 Exposure time : 26 Weeks  
 Method : OECD Test Guideline 408  
 Remarks : The test was conducted equivalent or similar to guideline

Species : Rat  
 NOAEL : > 2,000 mg/kg  
 Application Route : Skin contact  
 Exposure time : 13 Weeks  
 Method : OECD Test Guideline 411  
 Remarks : The test was conducted according to guideline

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**Ethylene diamine tetraacetic acid:**

|                   |  |
|-------------------|--|
| Species           | : Mouse                                |
| NOAEL             | : $\geq 500$ mg/kg                     |
| Application Route | : Ingestion                            |
| Exposure time     | : 13 Weeks                             |
| Remarks           | : Based on data from similar materials |

**Sulfuric acid, iron(2+) salt (1:1), monohydrate:**

|                   |  |
|-------------------|--|
| Species           | : Rat                                  |
| LOAEL             | : $> 100$ mg/kg                        |
| Application Route | : Ingestion                            |
| Exposure time     | : 90 Days                              |
| Remarks           | : Based on data from similar materials |

**Sodium molybdate (VI) dihydrate:**

|                   |  |
|-------------------|--|
| Species           | : Rat                                  |
| NOAEL             | : 17 mg/kg                             |
| Application Route | : Ingestion                            |
| Exposure time     | : 60 Days                              |
| Method            | : OECD Test Guideline 408              |
| Remarks           | : Based on data from similar materials |

**Disodium octaborate tetrahydrate:**

|                   |  |
|-------------------|--|
| Species           | : Rat                                  |
| NOAEL             | : $> 10$ mg/kg                         |
| LOAEL             | : $> 100$ mg/kg                        |
| Application Route | : Ingestion                            |
| Exposure time     | : 2 y                                  |
| Remarks           | : Based on data from similar materials |

|                   |  |
|-------------------|--|
| Species           | : Rat                                  |
| NOAEL             | : $> 0.2$ mg/l                         |
| Application Route | : inhalation (dust/mist/fume)          |
| Exposure time     | : 10 Weeks                             |
| Remarks           | : Based on data from similar materials |

**Manganese sulfate:**

|                   |               |
|-------------------|---------------|
| Species           | : Rat, male   |
| NOAEL             | : 1,700 mg/kg |
| Application Route | : Ingestion   |
| Exposure time     | : 13 Weeks    |

**Copper(II) sulfate, pentahydrate:**

|                   |             |
|-------------------|-------------|
| Species           | : Rat       |
| NOAEL             | : 17 mg/kg  |
| LOAEL             | : 34 mg/kg  |
| Application Route | : Ingestion |
| Exposure time     | : 92 Days   |

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**Zinc sulphate monohydrate:**

|                   |  |
|-------------------|--|
| Species           | : Rat                                  |
| NOAEL             | : 234 mg/kg                            |
| Application Route | : Ingestion                            |
| Exposure time     | : 13 Weeks                             |
| Method            | : OECD Test Guideline 408              |
| Remarks           | : Based on data from similar materials |

**Sodium selenite:**

|                   |              |
|-------------------|--------------|
| Species           | : Rat        |
| NOAEL             | : 0.88 mg/kg |
| Application Route | : Ingestion  |
| Exposure time     | : 13 Weeks   |

**Cobalt Chloride:**

|                   |  |
|-------------------|--|
| Species           | : Rat                                  |
| LOAEL             | : 5.5 mg/kg                            |
| Application Route | : Ingestion                            |
| Exposure time     | : 8 Weeks                              |
| Remarks           | : Based on data from similar materials |

|                   |  |
|-------------------|--|
| Species           | : Rat                                  |
| LOAEL             | : < 0.01 mg/l                          |
| Application Route | : inhalation (dust/mist/fume)          |
| Exposure time     | : 13 Weeks                             |
| Remarks           | : Based on data from similar materials |

**Aspiration toxicity**

Not classified based on available information.

**Experience with human exposure****Components:****Manganese sulfate:**

|            |  |
|------------|--|
| Inhalation | : Target Organs: Brain<br>Symptoms: Tremors, Lack of coordination<br>Remarks: Based on data from similar materials |
|------------|--|

**Sodium selenite:**

|            |   |
|------------|---|
| Inhalation | : Target Organs: Respiratory Tract<br>Symptoms: Irritation, Edema<br>Target Organs: Cardio-vascular system<br>Symptoms: Lowered blood pressure<br>Target Organs: Digestive organs<br>Symptoms: Nausea, Vomiting, Irritability |
| Ingestion  | : Target Organs: Nervous system<br>Symptoms: Neurological disorders<br>Target Organs: Hair<br>Symptoms: hair loss<br>Target Organs: Skin<br>Symptoms: Rash, Skin disorders<br>Target Organs: Endocrine system                 |

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## SECTION 12. ECOLOGICAL INFORMATION

## Ecotoxicity

Components:**Calcium bis(dihydrogenorthophosphate):**

- Toxicity to fish : LC50 (*Oryzias latipes* (Japanese medaka)): > 100 mg/l  
Exposure time: 96 h  
Method: OECD Test Guideline 203  
Remarks: Based on data from similar materials
- Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): > 100 mg/l  
Exposure time: 48 h  
Method: OECD Test Guideline 202  
Remarks: Based on data from similar materials
- Toxicity to algae/aquatic plants : ErC50 (*Pseudokirchneriella subcapitata* (green algae)): > 100 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials
- Toxicity to microorganisms : EC50: > 1,000 mg/l  
Exposure time: 3 h  
Method: OECD Test Guideline 209

**Potassium chloride:**

- Toxicity to fish : LC50 (*Pimephales promelas* (fathead minnow)): 880 mg/l  
Exposure time: 96 h
- Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): 660 mg/l  
Exposure time: 48 h
- Toxicity to algae/aquatic plants : ErC50 (*Desmodesmus subspicatus* (green algae)): > 100 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201
- EC10 (*Desmodesmus subspicatus* (green algae)): > 100 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201
- Toxicity to microorganisms : EC50: > 1,000 mg/l  
Exposure time: 3 h  
Method: OECD Test Guideline 209

**Silicon dioxide:**

- Toxicity to fish : LL50 (*Danio rerio* (zebra fish)): > 100 mg/l  
Exposure time: 96 h  
Test substance: Water Accommodated Fraction  
Method: OECD Test Guideline 203  
Remarks: The test was conducted according to guideline

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- Toxicity to daphnia and other aquatic invertebrates : EL50 (Daphnia magna (Water flea)): > 1,000 mg/l  
Exposure time: 48 h  
Test substance: Water Accommodated Fraction  
Method: OECD Test Guideline 202  
Remarks: The test was conducted according to guideline
- Toxicity to algae/aquatic plants : EL50 (Desmodesmus subspicatus (green algae)): > 10,000 mg/l  
Exposure time: 72 h  
Test substance: Water Accommodated Fraction  
Method: OECD Test Guideline 201  
Remarks: The test was conducted according to guideline
- NOELR (Desmodesmus subspicatus (green algae)): 10,000 mg/l  
Exposure time: 72 h  
Test substance: Water Accommodated Fraction  
Method: OECD Test Guideline 201  
Remarks: The test was conducted according to guideline
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : (Daphnia magna (Water flea)): 132.7 mg/l  
Exposure time: 21 d  
Test substance: Water Accommodated Fraction  
Method: OECD Test Guideline 211  
Remarks: The test was conducted according to guideline
- Toxicity to microorganisms : NOEC (activated sludge): 1,000 mg/l  
Exposure time: 3 h  
Method: OECD Test Guideline 209  
Remarks: The test was conducted according to guideline

**Ethylene diamine tetraacetic acid:**

- Toxicity to fish : LC50 (Lepomis macrochirus (Bluegill sunfish)): 159 mg/l  
Exposure time: 96 h
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 625 mg/l  
Exposure time: 24 h
- Toxicity to algae/aquatic plants : EC50 (Pseudokirchneriella subcapitata (green algae)): > 1,000 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials
- NOEC (Pseudokirchneriella subcapitata (algae)): 100 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials
- Toxicity to fish (Chronic toxicity) : NOEC (Danio rerio (zebra fish)): >= 25.7 mg/l  
Exposure time: 35 d  
Method: OECD Test Guideline 210  
Remarks: Based on data from similar materials

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Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 25 mg/l  
Exposure time: 21 d  
Remarks: Based on data from similar materials

Toxicity to microorganisms : EC50: 2.4 mg/l  
Exposure time: 24 h

**Sodium molybdate (VI) dihydrate:**

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 7,600 mg/l  
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 330 mg/l  
Exposure time: 48 h

Toxicity to algae/aquatic plants : EC50 (Pseudokirchneriella subcapitata (green algae)): > 419.9 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials

EC10 (Pseudokirchneriella subcapitata (green algae)): 99.3 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials

Toxicity to fish (Chronic toxicity) : NOEC (Oncorhynchus mykiss (rainbow trout)): > 17 mg/l  
Exposure time: 12 Months  
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Ceriodaphnia dubia (water flea)): 156.5 mg/l  
Exposure time: 21 d  
Remarks: Based on data from similar materials

Toxicity to microorganisms : EC50: 820 mg/l  
Exposure time: 3 h  
Test Type: Respiration inhibition of activated sludge  
Method: OECD Test Guideline 209  
Remarks: Based on data from similar materials

**Disodium octaborate tetrahydrate:**

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 380.17 mg/l  
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : LC50 (Ceriodaphnia dubia (water flea)): 443.61 mg/l  
Exposure time: 48 h

Toxicity to algae/aquatic plants : ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials

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EC10 (Pseudokirchneriella subcapitata (green algae)): > 1 mg/l  
 Exposure time: 72 h  
 Method: OECD Test Guideline 201  
 Remarks: Based on data from similar materials

Toxicity to fish (Chronic toxicity) : EC10 (Pimephales promelas (fathead minnow)): 103 mg/l  
 Exposure time: 32 d

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Hyalella azteca (Amphipod)): 31.48 mg/l  
 Exposure time: 42 d

Toxicity to microorganisms : NOEC (activated sludge): > 1 mg/l  
 Exposure time: 7 h  
 Remarks: Based on data from similar materials

**Manganese sulfate:**

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): > 1 - 10 mg/l  
 Exposure time: 96 h  
 Remarks: No test guideline followed

Toxicity to daphnia and other aquatic invertebrates : EC50 (Hyalella azteca (Amphipod)): > 1 - 10 mg/l  
 Exposure time: 48 h  
 Remarks: No test guideline followed  
 Based on data from similar materials

Toxicity to algae/aquatic plants : NOEC (Desmodesmus subspicatus (green algae)): 1 mg/l  
 Exposure time: 72 h  
 Method: OECD Test Guideline 201  
 Remarks: The test was conducted according to guideline

ErC50 (Desmodesmus subspicatus (green algae)): > 10 - 100 mg/l  
 Exposure time: 72 h  
 Method: OECD Test Guideline 201  
 Remarks: The test was conducted according to guideline

Toxicity to fish (Chronic toxicity) : NOEC (Oncorhynchus mykiss (rainbow trout)): > 1 mg/l  
 Exposure time: 65 d  
 Method: OECD Test Guideline 210  
 Remarks: The test was conducted equivalent or similar to guideline

Toxicity to microorganisms : NOEC (activated sludge): 560 mg/l  
 Exposure time: 3 h  
 Method: OECD Test Guideline 209  
 Remarks: The test was conducted according to guideline

**Copper(II) sulfate, pentahydrate:**

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): > 0.01 - 0.1 mg/l  
 Exposure time: 96 h  
 Remarks: Based on data from similar materials



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- Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): > 0.01 - 0.1 mg/l  
Exposure time: 48 h  
Remarks: Based on data from similar materials
- Toxicity to algae/aquatic plants : ErC50 (*Pseudokirchneriella subcapitata* (green algae)): > 0.01 - 0.1 mg/l  
Exposure time: 72 h  
Remarks: Based on data from similar materials
- NOEC (*Chlamydomonas reinhardtii* (green algae)): > 0.01 - 0.1 mg/l  
Exposure time: 72 h  
Remarks: Based on data from similar materials
- Toxicity to fish (Chronic toxicity) : NOEC (*Oncorhynchus mykiss* (rainbow trout)): > 0.01 - 0.1 mg/l  
Exposure time: 32 d  
Remarks: Based on data from similar materials
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (*Ceriodaphnia dubia* (water flea)): > 0.01 - 0.1 mg/l  
Exposure time: 7 d  
Remarks: Based on data from similar materials
- Toxicity to microorganisms : EC50: 7 mg/l

**Zinc sulphate monohydrate:**

- Toxicity to fish : EC50 (*Oncorhynchus mykiss* (rainbow trout)): 0.384 mg/l  
Exposure time: 96 h  
Remarks: Based on data from similar materials
- Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): 0.192 mg/l  
Exposure time: 48 h  
Remarks: Based on data from similar materials
- Toxicity to algae/aquatic plants : EC50 (*Selenastrum capricornutum* (fresh water algae)): 0.373 mg/l  
Exposure time: 96 h  
Remarks: Based on data from similar materials
- NOEC (*Pseudokirchneriella subcapitata* (green algae)): 34.5 µg/l  
Remarks: Based on data from similar materials
- Toxicity to fish (Chronic toxicity) : NOEC (*Jordanella floridae* (flagfish)): 205.2 µg/l  
Remarks: Based on data from similar materials
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (*Daphnia magna* (Water flea)): 415.7 µg/l  
Remarks: Based on data from similar materials
- Sodium selenite:**
- Toxicity to fish : LC50 (*Pimephales promelas* (fathead minnow)): > 1 - 10 mg/l  
Exposure time: 96 h

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Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): 1.2 mg/l  
Exposure time: 48 h

Toxicity to algae/aquatic plants : ErC50 (*Chlamydomonas reinhardtii* (green algae)): > 0.1 - 1 mg/l  
Exposure time: 96 h  
Remarks: Based on data from similar materials

NOEC (*Chlamydomonas reinhardtii* (green algae)): > 0.1 - 1 mg/l  
Exposure time: 96 h  
Remarks: Based on data from similar materials

Toxicity to fish (Chronic toxicity) : NOEC (*Lepomis macrochirus* (Bluegill sunfish)): 0.022 mg/l  
Exposure time: 258 d

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: 0.096 mg/l  
Exposure time: 28 d

Toxicity to microorganisms : EC50 (activated sludge): 180 mg/l  
Exposure time: 3 h  
Method: OECD Test Guideline 209

**Cobalt Chloride:**

Toxicity to fish : LC50 (*Oncorhynchus tshawytscha* (chinook salmon)): 0.77 mg/l  
Exposure time: 14 d

Toxicity to daphnia and other aquatic invertebrates : EC50 (*Ceriodaphnia dubia* (water flea)): 1.33 mg/l  
Exposure time: 48 h

Toxicity to algae/aquatic plants : EC50 (*Champia parvula* (marine algae)): 0.053 mg/l  
Exposure time: 72 h

EC10 (*Lemna minor* (common duckweed)): 0.01 mg/l  
Exposure time: 7 d

Toxicity to fish (Chronic toxicity) : NOEC (*Danio rerio* (zebra fish)): 0.748 mg/l  
Exposure time: 16 d  
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : EC10 (*Daphnia magna* (Water flea)): 0.01 mg/l  
Exposure time: 28 d  
Remarks: Based on data from similar materials

**Persistence and degradability****Components:****Ethylene diamine tetraacetic acid:**

Biodegradability : Result: Inherently biodegradable.  
Biodegradation: 80 - 90 %

## Metal Sulfates Formulation

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Exposure time: 28 d

**Bioaccumulative potential****Components:****Ethylene diamine tetraacetic acid:**

Bioaccumulation : Species: Lepomis macrochirus (Bluegill sunfish)  
Bioconcentration factor (BCF): 1.8  
Remarks: Based on data from similar materials

Partition coefficient: n-octanol/water : log Pow: 0.13

**Cobalt Chloride:**

Bioaccumulation : Bioconcentration factor (BCF): 724

**Mobility in soil**

No data available

**Other adverse effects**

No data available

**SECTION 13. DISPOSAL CONSIDERATIONS****Disposal methods**

Waste from residues : Do not dispose of waste into sewer.  
Dispose of in accordance with local regulations.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.  
If not otherwise specified: Dispose of as unused product.

**SECTION 14. TRANSPORT INFORMATION****International Regulations****UNRTDG**

UN number : UN 3077

Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.  
(Copper(II) sulfate, pentahydrate, Zinc sulphate monohydrate)

Class : 9

Packing group : III

Labels : 9

Environmentally hazardous : yes

**IATA-DGR**

UN/ID No. : UN 3077

Proper shipping name : Environmentally hazardous substance, solid, n.o.s.  
(Copper(II) sulfate, pentahydrate, Zinc sulphate monohydrate)

Class : 9

Packing group : III

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Labels : Miscellaneous  
 Packing instruction (cargo aircraft) : 956  
 Packing instruction (passenger aircraft) : 956  
 Environmentally hazardous : yes

**IMDG-Code**

UN number : UN 3077  
 Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.  
 (Copper(II) sulfate, pentahydrate, Zinc sulphate monohydrate)  
 Class : 9  
 Packing group : III  
 Labels : 9  
 EmS Code : F-A, S-F  
 Marine pollutant : yes

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

Not applicable for product as supplied.

**Domestic regulation****NOM-002-SCT**

UN number : UN 3077  
 Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.  
 (Copper(II) sulfate, pentahydrate, Zinc sulphate monohydrate)  
 Class : 9  
 Packing group : III  
 Labels : 9

**Special precautions for user**

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

**SECTION 15. REGULATORY INFORMATION****Safety, health and environmental regulations/legislation specific for the substance or mixture**

NOM-165-SEMARNAT-2013, Norm establishing a list of substances subject to report for the Registry of Emissions and Pollutant Transfer

| Components                       | CAS-No.   | MPU (kg/year) | Transfer/Release (kg/year) |
|----------------------------------|-----------|---------------|----------------------------|
| Copper(II) sulfate, pentahydrate | 7758-99-8 | 2500 kg/year  | 100 kg/year                |

MPU: Applicable reporting threshold when the substance, pure or in mixture in a composition of more than 1% by weight, is used for industrial activities at facilities that are subject to report or are produced by them

Federal Law for the control of chemical precursors, essential chemical products and machinery for producing capsules, tablets and pills. : Not applicable

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**The ingredients of this product are reported in the following inventories:**

|         |   |                |
|---------|---|----------------|
| AICS    | : | not determined |
| CA. DSL | : | not determined |
| IECSC   | : | not determined |

**SECTION 16. OTHER INFORMATION**

|               |   |            |
|---------------|---|------------|
| Revision Date | : | 22.09.2025 |
| Date format   | : | dd.mm.yyyy |

**Full text of other abbreviations**

|                          |   |   |
|--------------------------|---|---|
| ACGIH                    | : | USA. ACGIH Threshold Limit Values (TLV)   |
| ACGIH BEI                | : | ACGIH - Biological Exposure Indices (BEI)   |
| NOM-010-STPS-2014        | : | Mexico. Norm NOM-010-STPS-2014 on Chemicals Polluting the Work Environment - Identification, Assessment and Control - Appendix 1 Occupational Exposure Limits |
| ACGIH / TWA              | : | 8-hour, time-weighted average   |
| ACGIH / STEL             | : | Short-term exposure limit   |
| NOM-010-STPS-2014 / VLE- | : | Time weighted average limit value   |
| PPT                      | : |   |

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardization; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organization for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MERCOSUR - The Agreement for the Facilitation of the Transport of Dangerous Goods; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorization and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations

# SAFETY DATA SHEET



## Metal Sulfates Formulation

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on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative;  
WHMIS - Workplace Hazardous Materials Information System

Sources of key data used to compile the Material Safety Data Sheet : Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

The information is considered as correct, but not exhaustive, and will be used only as a guide, which is based in the current knowledge of the substance or mixture, and is applicable to proper safety precautions for the product.

MX / Z8