



SAFETY DATA SHEET

AWAKEN® FlowBoost

Section 1. Identification

Product identifier : AWAKEN® FlowBoost
 SDS # : 628
 Product type : Powder.

Relevant identified uses of the substance or mixture and uses advised against

Identified uses

Seed treatment.

Uses advised against

Not available.

Supplier's details : LOVELAND PRODUCTS, INC.
 P.O. Box 1286
 Greeley, CO 80632-1286
 Telephone no. : 1-888-574-2878 (Customer Service)
 Email : retail-SDS2@nutrien.com

Emergency telephone number (with hours of operation) : CHEMTREC: 1-800-424-9300 (24 hrs)
 Medical Emergencies: 1-866-944-8565 (24 hrs)

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : COMBUSTIBLE DUSTS
 SERIOUS EYE DAMAGE - Category 1
 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2

GHS label elements

Hazard pictograms



Signal word : Danger

Hazard statements : Causes serious eye damage.
 May cause damage to organs through prolonged or repeated exposure. (brain)
 May form combustible dust concentrations in air.

Precautionary statements

General : Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

Prevention : Wear eye or face protection. Do not breathe dust or mist.

Response : Get medical advice or attention if you feel unwell. 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.

Storage : Not applicable.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Section 2. Hazards identification

- Supplemental label elements** : Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Prevent dust accumulation.
- Hazards not otherwise classified** : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	%	CAS number
plant-based polysaccharide	30 - 60	9005-25-8
manganese sulfate, monohydrate	< 15	10034-96-5
zinc sulfate, monohydrate	< 10	7446-19-7
manganese dichloride	≤ 3	7773-01-5

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : CORROSIVE. Begin eye irrigation immediately. All eye exposures require medical evaluation following decontamination. Immediately rinse eyes with large quantities of water or saline for a minimum 30 minutes, longer irrigation time is preferred if possible. If possible, remove contact lenses being careful not to cause additional eye damage. If the initial water supply is insufficient, keep the affected area wet with a moist cloth and transfer the person to the nearest place where rinsing can be continued for the recommended length of time. Call an ambulance for transport to hospital. Continue eye irrigation during transport. For additional advice call the medical emergency number on this safety data sheet or your poison center or doctor.
- Inhalation** : Remove person to fresh air. Seek medical attention for any signs of wheezing and/or breathing difficulties. For additional advice call the medical emergency number on this SDS or your poison center or medical provider.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
- Ingestion** : Wash out mouth with water. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Corrosive to eyes. Causes serious eye damage.
- Inhalation** : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. Repeated or prolonged overexposure may result in chronic health effects.
- Skin contact** : May cause skin irritation.
- Ingestion** : Over-exposure by ingestion is unlikely under normal working conditions.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain
watering
redness
- Inhalation** : Adverse symptoms may include the following:
irritation
coughing

Section 4. First aid measures

- Skin contact** : Adverse symptoms may include the following:
redness
- Ingestion** : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : Improved outcome requires prolonged rinsing or soaking with water in order to extract corrosive ions that have penetrated through the stratum corneum. Expert opinion indicates an extended duration of rinsing is required to remove corrosive chemicals - 60 minutes for strong alkalis, and 30 minutes for other corrosive substances. Water should be maintained at a comfortable temperature. It may be necessary to delay transport to emergency care facilities in order to ensure 30 or 60 minutes of rinsing time. However, transporting the patient may be necessary depending on the condition of the patient or the availability of a water supply. If transport is necessary, rinsing the affected area should continue, if possible, during transport. Treat symptomatically.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If dust is generated and ventilation is inadequate, use respirator that will protect against dust/mist.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : In case of fire, use water spray (fog), foam, dry chemical or CO₂.
- Unsuitable extinguishing media** : Avoid high pressure media which could cause the formation of a potentially explosible dust-air mixture.

- Specific hazards arising from the chemical** : May form explosible dust-air mixture if dispersed.

- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
sulfur oxides

- Special protective actions for fire-fighters** : No action shall be taken involving any personal risk or without suitable training. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. Contain and collect the water used to fight the fire for later treatment and disposal.

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Section 6. Accidental release measures

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused adverse impacts (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Small spill** : Put on appropriate personal protective equipment (see Section 8). Move containers from spill area. Recover the material and use it for the intended purpose.
or
Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Put on appropriate personal protective equipment (see Section 8). Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Use appropriate equipment to put the spilled substance in a container for reuse or disposal. Recycle to process, if possible.
or
Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Read label before use. Apply this product only as specified on the label. Do not handle until all safety precautions have been read and understood. Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not ingest. Avoid creating dusty conditions and prevent wind dispersal. Do not breathe dust. Wear suitable respiratory protection. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Must be stored in a dry location. Absorbs moisture on long-term storage under high humidity conditions. May form steep piles that can collapse without warning when stored in bulk. Avoid forming steep slopes when removing product. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Store away from direct sunlight.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Section 8. Exposure controls/personal protection

Ingredient name	Exposure limits
plant-based polysaccharide	NIOSH REL (United States, 10/2020). TWA: 5 mg/m ³ 10 hours. Form: Respirable fraction TWA: 10 mg/m ³ 10 hours. Form: Total OSHA PEL (United States, 5/2018). TWA: 5 mg/m ³ 8 hours. Form: Respirable fraction TWA: 15 mg/m ³ 8 hours. Form: Total dust ACGIH TLV (United States, 1/2022). TWA: 10 mg/m ³ 8 hours.
manganese sulfate, monohydrate	NIOSH REL (United States, 10/2020). [manganese compounds and fume] TWA: 1 mg/m ³ , (as Mn) 10 hours. Form: Fume STEL: 3 mg/m ³ , (as Mn) 15 minutes. Form: Fume ACGIH TLV (United States, 1/2022). [Manganese and inorganic compounds] TWA: 0.1 mg/m ³ , (as Mn) 8 hours. Form: Inhalable fraction TWA: 0.02 mg/m ³ , (as Mn) 8 hours. Form: Respirable fraction OSHA PEL (United States, 5/2018). [Manganese compounds] CEIL: 5 mg/m ³ , (as Mn)
zinc oxide	NIOSH REL (United States, 10/2020). CEIL: 15 mg/m ³ Form: Dust TWA: 5 mg/m ³ 10 hours. Form: Dust and fumes STEL: 10 mg/m ³ 15 minutes. Form: Fume OSHA PEL (United States, 5/2018). TWA: 5 mg/m ³ 8 hours. Form: Fume TWA: 5 mg/m ³ 8 hours. Form: Respirable fraction TWA: 15 mg/m ³ 8 hours. Form: Total dust ACGIH TLV (United States, 1/2022). TWA: 2 mg/m ³ 8 hours. Form: Respirable fraction STEL: 10 mg/m ³ 15 minutes. Form: Respirable fraction
sodium molybdate	ACGIH TLV (United States, 1/2022). [Molybdenum, soluble compounds] TWA: 0.5 mg/m ³ , (as Mo) 8 hours. Form: Respirable fraction OSHA PEL (United States, 5/2018). [Molybdenum Soluble compounds] TWA: 5 mg/m ³ , (as Mo) 8 hours.
manganese dichloride	NIOSH REL (United States, 10/2020). [manganese compounds and fume] TWA: 1 mg/m ³ , (as Mn) 10 hours. Form: Fume STEL: 3 mg/m ³ , (as Mn) 15 minutes. Form: Fume ACGIH TLV (United States, 1/2022). [Manganese and inorganic compounds] TWA: 0.1 mg/m ³ , (as Mn) 8 hours. Form: Inhalable fraction TWA: 0.02 mg/m ³ , (as Mn) 8 hours. Form: Respirable fraction

Section 8. Exposure controls/personal protection

ferric oxide

OSHA PEL (United States, 5/2018).
[Manganese compounds]
CEIL: 5 mg/m³, (as Mn)
NIOSH REL (United States, 10/2020).
TWA: 5 mg/m³, (as Fe) 10 hours. Form: Dust and fumes
ACGIH TLV (United States, 1/2022).
TWA: 5 mg/m³ 8 hours. Form: Respirable fraction
OSHA PEL (United States, 5/2018).
TWA: 5 mg/m³ 8 hours. Form: Respirable fraction
TWA: 15 mg/m³ 8 hours. Form: Total dust

Biological exposure indices

No exposure indices known.

Appropriate engineering controls

- : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls

- : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Contact your personal protective equipment supplier to verify the compatibility of the equipment for the intended purpose.

Hygiene measures

- : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

- : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection

- : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection

- : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection

- : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection

- : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 8. Exposure controls/personal protection

For U.S. work sites where respiratory protection is required, ensure that a respiratory protection program meeting 29 CFR 1910.134 requirements is in place.

Section 9. Physical and chemical properties and safety characteristics

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

Appearance

Physical state	: Solid. [Powder.]
Color	: Red.
Odor	: Slight.
Odor threshold	: Not available.
pH	: Not available.
Melting point/freezing point	: Not available.
Boiling point, initial boiling point, and boiling range	: Not available.
Flash point	: Not applicable.
Flammability	: Not available.
Lower and upper explosion limit/flammability limit	: Not applicable.
Vapor pressure	: Not available.
Relative vapor density	: Not applicable.
Relative density	: Not available.
Solubility in water	: Not available.
Partition coefficient: n-octanol/water	: Not applicable.
Auto-ignition temperature	: Not applicable.
Decomposition temperature	: Not available.
Viscosity	: Not applicable.

Particle characteristics

Median particle size	: Not available.
----------------------	------------------

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: Keep away from heat, sparks and flame. Avoid dust generation. Prevent dust accumulation. Keep away from incompatible materials.
Incompatible materials	: Strong acids.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
sodium molybdate	LD50 Oral	Rat	0.25 g/kg	-
manganese dichloride	LD50 Oral	Rat	250 mg/kg	-
ferric oxide	LD50 Oral	Rat	>5000 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
plant-based polysaccharide	Skin - Mild irritant	Human	-	72 hours 300 ug l	-

Conclusion/Summary

- Skin** : May cause skin irritation.
- Eyes** : Severely irritating to eyes. Causes serious eye damage.
- Respiratory** : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.

Sensitization

Not available.

Conclusion/Summary

- Skin** : No known significant effects or critical hazards.
- Respiratory** : No known significant effects or critical hazards.

Mutagenicity

Not available.

- Conclusion/Summary** : No known significant effects or critical hazards.

Carcinogenicity

Not available.

- Conclusion/Summary** : No known significant effects or critical hazards.

Classification

Product/ingredient name	OSHA	IARC	NTP
ferric oxide	-	3	-

Reproductive toxicity

Not available.

- Conclusion/Summary** : No known significant effects or critical hazards.

Teratogenicity

Not available.

- Conclusion/Summary** : No known significant effects or critical hazards.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
AWAKEN® FlowBoost	Category 2	-	brain
manganese sulfate, monohydrate	Category 2	-	-
manganese dichloride	Category 2	-	-

Aspiration hazard

Not available.

Section 11. Toxicological information

Information on the likely routes of exposure : Dermal contact. Eye contact. Inhalation.

Potential acute health effects

- Eye contact** : Corrosive to eyes. Causes serious eye damage.
- Inhalation** : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. Repeated or prolonged overexposure may result in chronic health effects.
- Skin contact** : May cause skin irritation.
- Ingestion** : Over-exposure by ingestion is unlikely under normal working conditions.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : Adverse symptoms may include the following:
pain
watering
redness
- Inhalation** : Adverse symptoms may include the following:
irritation
coughing
- Skin contact** : Adverse symptoms may include the following:
redness
- Ingestion** : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

- Potential immediate effects** : Acute or intermediate exposure to excess manganese affects the respiratory system and the central nervous system. Inflammation of the lungs may occur after acute toxic inhalation. "Manganese pneumonia" has been reported in mine workers with clinical signs of alveolar inflammation, marked dyspnea, shallow respiration, facial cyanosis and an increased susceptibility to infection. Acute renal failure, abdominal pain, and mild methemoglobinemia have been reported following the ingestion of manganese-containing products.
- Potential delayed effects** : See below.

Long term exposure

- Potential immediate effects** : See above.
- Potential delayed effects** : Inhalation of large quantities of manganese containing dust over many years may result in damage to the central nervous system, with symptoms of sleepiness, tremors and weakness in the legs, slurred speech, emotional disturbances, loss of balance, and in more advanced cases, an irreversible condition with symptoms similar to Parkinsons or Lou Gehrig's disease, including a mask-like facial expression, spastic gait, tremors, slurred speech, fatigue, anorexia, apathy, and inability to concentrate. The neurologic disorder that develops is known as "manganism". A syndrome may develop with symptoms of compulsive behavior, emotional volatility and hallucinations. High levels of manganese in the blood may increase anemia by interfering with iron absorption. Iron deficiency may increase an individual's susceptibility to manganese. Studies suggest that populations at risk of adverse effects due to manganese exposure are infants, and those with existing iron deficiency.

Potential chronic health effects

Not available.

- Conclusion/Summary** : See below.
- General** : May cause damage to organs through prolonged or repeated exposure. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.
- Carcinogenicity** : No known significant effects or critical hazards.
- Mutagenicity** : No known significant effects or critical hazards.
- Reproductive toxicity** : No known significant effects or critical hazards.

Section 11. Toxicological information

Numerical measures of toxicity

Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
zinc sulfate, monohydrate	500	N/A	N/A	N/A	N/A
sodium molybdate	250	N/A	N/A	N/A	N/A
manganese dichloride	250	N/A	N/A	N/A	N/A

Other information : Not available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
manganese sulfate, monohydrate	Acute EC50 8.28 mg/l Fresh water	Daphnia - Daphnia magna	48 hours
zinc oxide	Acute LC50 5.71 mg/l Fresh water Acute IC50 1.85 mg/l Marine water Acute LC50 98 µg/l Fresh water	Fish - Rasbora sumatrana - Adult Algae - Skeletonema costatum Daphnia - Daphnia magna - Neonate	96 hours 96 hours 48 hours
zinc sulfate, monohydrate	Acute LC50 1.1 ppm Fresh water Acute EC50 724.4 µg/l Fresh water Acute EC50 202 µg/l Marine water Acute LC50 4 µg/l Marine water Acute LC50 21.8 µg/l Fresh water Acute LC50 2.36 µg/l Fresh water Chronic NOEC 142.5 µg/l Marine water Chronic NOEC 0.2 mg/l Marine water Chronic NOEC 1.7 mg/l Fresh water	Fish - Oncorhynchus mykiss Algae - Stichococcus bacillaris Algae - Ulva fasciata - Zoea Crustaceans - Temora stylifera - Adult Daphnia - Daphnia magna - Neonate Fish - Cirrhinus mrigala Algae - Ulva fasciata - Zoea Crustaceans - Litopenaeus vannamei - Post-larvae Daphnia - Daphnia magna - Neonate	96 hours 72 hours 96 hours 48 hours 48 hours 96 hours 96 hours 21 days 21 days
sodium molybdate	Chronic NOEC 26 µg/l Fresh water Acute EC50 40.19 mg/l Fresh water Acute LC50 2847.5 mg/l Fresh water Acute LC50 800000 µg/l Fresh water Chronic NOEC 50 mg/l Fresh water Chronic NOEC 87.8 mg/l Fresh water	Fish - Jordanella floridae Crustaceans - Cypris subglobosa Daphnia - Daphnia magna - Neonate Fish - Oncorhynchus mykiss Daphnia - Daphnia magna - Neonate Fish - Oncorhynchus clarkii - Embryo	100 days 48 hours 48 hours 96 hours 21 days 30 days
manganese dichloride	Acute EC50 5.92 mg/l Fresh water Acute EC50 4700 µg/l Fresh water Acute LC50 51800 µg/l Marine water Acute LC50 220 ppm Marine water Chronic NOEC 510 µg/l Fresh water	Algae - Desmodesmus subspicatus Daphnia - Daphnia magna - Neonate Crustaceans - Artemia sp. - Nauplii Fish - Lates calcarifer - Fry Fish - Salmo trutta - Eyed stage, eyed embryo	72 hours 48 hours 48 hours 96 hours 62 days

Conclusion/Summary : Toxic to aquatic life with long lasting effects. Excessive nutrient runoff to a body of water may result in eutrophication.

Persistence and degradability

Section 12. Ecological information

Not available.

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
zinc oxide	-	28960	high
zinc sulfate, monohydrate	-	60960	high

Mobility in soil







Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	IMDG	IATA
UN number	(See remarks below)	UN3077	UN3077	UN3077
UN proper shipping name	-	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (manganese sulfate, monohydrate, zinc oxide)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (manganese sulfate, monohydrate, zinc oxide)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (manganese sulfate, monohydrate, zinc oxide)
Transport hazard class(es)	-	9  	9  	9  
Packing group	-	III	III	III
Environmental hazards	No.	Yes.	Yes.	Yes.

Additional information

DOT Classification : This product does not contain any DOT listed marine pollutants (49 CFR Appendix B to 172.101).

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.43-2.45 (Class 9), 2.7 (Marine pollutant mark).
Non-bulk packages of this product are not regulated as dangerous goods when transported by road or rail.

Section 14. Transport information

- IMDG** : This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.
- IATA** : This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8.
- Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.
- Transport in bulk according to IMO instruments** : Not available.

Section 15. Regulatory information

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

- Australia** : All components are listed or exempted.
- Canada** : All components are listed or exempted.
- China** : All components are listed or exempted.
- Eurasian Economic Union** : **Russian Federation inventory:** All components are listed or exempted.
- Japan** : **Japan inventory (CSCL):** Not determined.
Japan inventory (ISHL): Not determined.
- New Zealand** : All components are listed or exempted.
- Philippines** : All components are listed or exempted.
- Republic of Korea** : All components are listed or exempted.
- Taiwan** : All components are listed or exempted.
- Thailand** : Not determined.
- Turkey** : Not determined.
- United States** : All components are active or exempted.
- Viet Nam** : All components are listed or exempted.
- U.S. Federal regulations** : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
Clean Water Act (CWA) 307: zinc sulfate, monohydrate; zinc oxide
Clean Water Act (CWA) 311: zinc sulfate, monohydrate

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Section 15. Regulatory information

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : COMBUSTIBLE DUSTS
SERIOUS EYE DAMAGE - Category 1
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	manganese sulfate, monohydrate	10034-96-5	10 - 20
	zinc oxide	1314-13-2	10 - 20
	zinc sulfate, monohydrate	7446-19-7	5 - 10
	manganese dichloride	7773-01-5	1 - 5
Supplier notification	manganese sulfate, monohydrate	10034-96-5	10 - 20
	zinc oxide	1314-13-2	10 - 20
	zinc sulfate, monohydrate	7446-19-7	5 - 10
	manganese dichloride	7773-01-5	1 - 5

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations


Massachusetts : The following components are listed: STARCH DUST; zinc oxide; MOLYBDENUM

New York : None of the components are listed.

New Jersey : The following components are listed: zinc oxide; zinc sulfate, monohydrate; MOLYBDENUM

Pennsylvania : The following components are listed: STARCH; MANGANESE COMPOUNDS; zinc oxide; zinc sulfate, monohydrate; MANGANESE COMPOUNDS; MOLYBDENUM

California Prop. 65

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

Section 16. Other information

History

Date of issue/Date of revision : 7/26/2023

Date of previous issue : No previous validation

Version : 1

Key to abbreviations

: ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
N/A = Not available
SGG = Segregation Group

Section 16. Other information

UN = United Nations

[Procedure used to derive the classification](#)

Classification	Justification
COMBUSTIBLE DUSTS SERIOUS EYE DAMAGE - Category 1 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2	Weight of evidence Calculation method Calculation method

✔ Indicates information that has changed from previously issued version.

[Notice to reader](#)

Supply chain partners must ensure they pass this SDS, and all other relevant safety information to their customers.

DISCLAIMER AND LIMITATION OF LIABILITY

The information and recommendations contained in this Safety Data Sheet ("SDS") relate only to the specific material referred to herein (the "Material") and do not relate to the use of such Material in combination with any other material or process. The information and recommendations contained herein are believed to be current and correct as of the date of this SDS. HOWEVER, THE INFORMATION AND RECOMMENDATIONS ARE PRESENTED WITHOUT WARRANTY, REPRESENTATION OR LICENSE OF ANY KIND, EXPRESS OR IMPLIED, WITH RESPECT TO THEIR ACCURACY, CORRECTNESS OR COMPLETENESS, AND THE SELLER, SUPPLIER AND MANUFACTURER OF THE MATERIAL AND THEIR RESPECTIVE AFFILIATES (COLLECTIVELY, THE "SUPPLIER") DISCLAIM ALL LIABILITY FOR RELIANCE ON SUCH INFORMATION AND RECOMMENDATIONS. This SDS is not a guarantee of safety. A buyer or user of the Material (a "Recipient") is responsible for ensuring that it has all current information necessary to safely use the Material for its specific purpose.

FURTHERMORE, THE RECIPIENT ASSUMES ALL RISK IN CONNECTION WITH THE USE OF THE MATERIAL. THE RECIPIENT ASSUMES ALL RESPONSIBILITY FOR ENSURING THE MATERIAL IS USED IN A SAFE MANNER IN COMPLIANCE WITH APPLICABLE ENVIRONMENTAL, HEALTH, SAFETY AND SECURITY LAWS, POLICIES AND GUIDELINES. THE SUPPLIER DOES NOT WARRANT THE MERCHANTABILITY OF THE MATERIAL OR THE FITNESS OF THE MATERIAL FOR ANY PARTICULAR USE AND ASSUMES NO RESPONSIBILITY FOR INJURY OR DAMAGE CAUSED DIRECTLY OR INDIRECTLY BY OR RELATED TO THE USE OF THE MATERIAL.