

NEXUS AG GRANULAR-ZINC WITH SULPHUR

MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Manufacturer:

Kronos Micronutrients, LP
301 W. Charron Road
P.O. Box 1167,
Moxee, WA 98936
Emergency Telephone: 509-248-4911

Product name: NEXUS AG GRANULAR-ZINC WITH SULPHUR**Common name:** Zinc Sulphate Monohydrate**Date of MSDS Preparation:** August 18, 2011.

Product Uses: (1) The animal feed and fertilizer industries use zinc sulphate as a zinc micronutrient. (2) The cattle industry uses zinc sulphate as a fungicide in hoof bath solutions. Sales for agricultural applications may require appropriate registration and labeling. (3) The mining industry uses zinc sulphate as a flotation agent in the processing of zinc/lead and zinc/copper ores.

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient	Approximate Percent by Weight	CAS Number	Occupational Exposure Limits (OELs)	LD ₅₀ /LC ₅₀ Species and Route
Zinc Sulphate Monohydrate	97.5%	7446-19-7	OSHA PEL 15 mg/m ³ / 5 mg/m ³ * ACGIH TLV (see note below) NIOSH REL None established	LD ₅₀ , oral, rat 1710 mg/kg (Anhydrous)

NOTE: OELs for individual jurisdictions may differ from OSHA PELs. Check with local authorities for the applicable OELs in your jurisdiction. OSHA PEL – All inert or nuisance dusts, whether mineral, inorganic, or organic not listed specifically by substance name in Tables Z-1 or Z-3 of CFR 1910.1000 are covered by the Particulates Not Otherwise Regulated (PNOR) limit of 15 mg/m³ total dust and 5 mg/m³ respirable fraction. ACGIH® TLV® - ACGIH® believes that even biologically inert, insoluble, or poorly soluble particles may have adverse effects and recommends that airborne concentrations should be kept below 3 mg/m³ respirable particles and 10 mg/m³ inhalable particles, until such time as a TLV® is set for a particular substance. While zinc sulphate monohydrate does not completely meet the ACGIH® definition of a Particle Not Otherwise Specified (PNOS) due to its solubility, this is still considered to be a valid guideline for this dust.

OSHA - Occupational Safety and Health Administration; ACGIH - American Conference of Governmental Industrial Hygienists; NIOSH - National Institute for Occupational Safety and Health. OEL – Occupational Exposure Limit, PEL – Permissible Exposure Limit, TLV – Threshold Limit Value, REL – Recommended Exposure Limit.

Trade Names and Synonyms: Zinc Sulphate Monohydrate, ZnSO₄H₂O, Hydrated Zinc Sulphate

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview: Colorless, odorless granules. Not flammable or explosive, but will decompose in extreme heat to produce toxic sulphur oxide gas and zinc oxide fume. The granular solid or dust is relatively non-toxic to humans and poses little immediate hazard to emergency response personnel but is freely soluble in water and can pose a threat to watercourses.

Potential Health Effects: May irritate eyes, skin and respiratory tract. If dusty it may cause breathing difficulty and irritation of mucous membranes. Ingestion may cause strong stomach cramps and diarrhea and may induce spontaneous vomiting. Chronic health hazards include stomach irritation, abdominal cramps and nausea. Zinc sulphate monohydrate is not considered a carcinogen by OSHA, NTP, IARC, ACGIH or the EU (see Toxicological Information, Section 11).

Potential Environmental Effects: This product is highly water soluble and is toxic to fish and other aquatic life. It can also be toxic to plant life and other terrestrial organisms at elevated concentrations in soils (see Ecological Information, Section 12).

SECTION 4. FIRST AID MEASURES

Eye Contact: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: Remove contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Quickly and gently blot or brush away excess chemical. Wash gently and thoroughly with lukewarm gently flowing water and non-abrasive soap for 5 minutes. If irritation persists, repeat flushing. Obtain medical advice. Completely decontaminate clothing, shoes and leather goods before reuse or else discard.

Inhalation: If symptoms are experienced, remove source of contamination or move victim to fresh air. Obtain medical advice.

Ingestion: Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 2 – 8 oz. (60 – 240 ml) of water. Zinc sulphate is an emetic and may cause vomiting. If vomiting occurs naturally, have victim rinse mouth with water again. Obtain medical advice and bring a copy of this MSDS.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Zinc sulphate does not burn or support combustion.

Extinguishing Media: Use any means of extinction appropriate for the surrounding fire conditions such as water spray, carbon dioxide, dry chemical, or foam.

Fire Fighting: Toxic fumes of sulphur dioxide may result from combustion. As with any fire, fire fighters should be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full facepiece mask. Do not use water directly on material. Do not allow water run-off to enter sewers or watercourses.

Flashpoint and Method: Not Applicable.

Upper and Lower Flammable Limit: Not Applicable.

Autoignition Temperature: Not Applicable.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Stop release if possible to do so safely. Contain spill, isolate hazard area, and deny entry. Sweep up or vacuum. Place contaminated material in suitable, labeled containers for final disposal. Dispose of waste material consistent with the requirements of waste disposal authorities.

Personal Precautions: Gloves and coveralls or other protective clothing are recommended for persons responding to an accidental release (see also Section 8). Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact.

Environmental Precautions: This product can pose a threat to the environment. Contamination of soil and water should be prevented. Keep spillage and runoff from storage areas from entering soil, streams or sewers.

SECTION 7. HANDLING AND STORAGE

Store in cool, dry, well-ventilated area away from incompatible substances. Protect from physical damage. It is good practice to keep container closed when not in use. Avoid generating dust and the release of dust into the workplace. Good housekeeping is important to prevent accumulations of dust. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Protective Clothing: The hazard potential of this material is low. Where there is large scale use of this material and significant potential for worker contact, gloves and long sleeved work clothes or disposable coveralls may be necessary. Eye protection should be worn where dust is generated and there is a potential that eye contact may occur.

Ventilation: Use adequate local or general ventilation where necessary to maintain the concentrations of zinc sulphate dust well below the recommended occupational exposure limits for general Particulates, Not Otherwise Specified (PNOS).

Respirators: Where dust or fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-95 particulate filter cartridge).

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Colorless, odorless granules	Odor: None	Physical State: Solid	pH: 5.0 @ 10% solution 4.5 @ saturated solution
Vapor Pressure: Negligible @ 20°C	Vapor Density: Not Applicable	Boiling Point/Range: Not Applicable	Freezing/Melting Point/Range: Loses water at 238°C Decomposes at 680°C (1256°F)
Specific Gravity: 3.28	Evaporation Rate: Not Applicable	Coefficient of Water/Oil Distribution: Log p(oct) = -0.07 (estimated)	Odor Threshold: Not Applicable
Solubility in Water: 53.8 g/100 ml at 20 °C 89.5 g/100 ml at 100°C			

SECTION 10. STABILITY AND REACTIVITY

Stability and Reactivity: This material is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur.

Incompatibilities: None have been identified to date. Avoid excessive heating that may lead to decomposition of the material.

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting, electric arc welding or severe overheating will generate zinc oxide fume which, on inhalation in sufficient quantity, can produce metal fume fever. Under such conditions, sulphur dioxide will also be generated and can cause respiratory distress.

SECTION 11. TOXICOLOGICAL INFORMATION

General: In the form in which this product is sold it is relatively non-toxic. The major route of exposure would be through the generation and inhalation of airborne dust and especially the generation of zinc oxide fume through thermal decomposition.

Acute:

Skin/Eye: Direct contact may cause local irritation of the eyes or skin but would not cause tissue damage. Eye contact with solutions (>1%) may cause the appearance of white flecks on the lens of the eye. Dust or fume from burning or welding operations may also cause local irritation.

Inhalation: Acute inhalation may result in irritation but is not expected to cause significant harmful effects. Symptoms may include discomfort, coughing, tingling sensation, sneezing and/or shortness of breath and wheezing. Extreme heating of zinc sulphate monohydrate will generate zinc oxide fume. If inhaled, this fume can result in the condition called metal fume fever. The symptoms of metal fume fever will occur within 3 to 10 hours of exposure, and include immediate dryness and irritation of the throat, tightness of the chest, and coughing which may later be followed by flu-like symptoms of fever, malaise, perspiration, frontal headache, muscle cramps, low back pain, occasionally blurred vision, nausea, and vomiting. The symptoms are temporary and generally disappear, without medical intervention, within 24 to 48 hours of onset. There are no recognized complications, after effects, or chronic effects that result from this condition.

Ingestion: Ingestion of large doses can cause anemia and stomach symptoms. Zinc sulphate is very astringent, and when ingested in excessive quantities, can irritate the stomach, resulting in abdominal pain, nausea, diarrhea and spontaneous vomiting.

Chronic: In general, zinc is considered to be a low toxicity metal. Zinc is a very important trace element for humans and the body regulates the amount of zinc stored by decreasing absorption and increasing excretion when intake is increased. Industrial experience has not identified any significant chronic effects from zinc sulphate to date. Zinc sulphate is not listed as a carcinogen by the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), the American Conference of Governmental Industrial Hygienists (ACGIH) or the European Union (EU).

SECTION 12. ECOLOGICAL INFORMATION

This product has high water solubility and its zinc contents are directly bioavailable. The zinc in particular may be toxic to aquatic organisms, especially fish, with water hardness, pH and dissolved organic carbon levels being regulating factors. In terrestrial systems, the mobility of zinc in soil and its degree of bioaccumulation in organisms is dependent on soil chemical conditions.

SECTION 13. DISPOSAL CONSIDERATIONS

Do not wash down drain. Put uncontaminated material back into the process if at all possible. Place contaminated material in suitable, labeled containers for disposal. Dispose of waste material consistent with the requirements of waste disposal authorities.

SECTION 14. TRANSPORT INFORMATION

TRANSPORT CANADA CLASSIFICATION.....	Not regulated
US DOT HAZARD CLASSIFICATION.....	Class 9, Packing Group III (RQ) (Regulated only if transported in containers containing 1,000 (RQ) or more lbs. of zinc sulphate.)
SHIPPING NAME U.S. DOT.....	Environmentally Hazardous Substance, Solid, n.o.s. (contains Zinc Sulphate)
DOT REPORTABLE QUANTITY	1000 lbs. per container
US DOT PRODUCT IDENTIFICATION NUMBER.....	UN3077
MARINE POLLUTANT (U.S.).....	No
IMO CLASSIFICATION.....	Not regulated

SECTION 15. REGULATORY INFORMATION

U.S.

INGREDIENTS LISTED ON TSCA INVENTORY.....	Yes
HAZARDOUS UNDER HAZARD COMMUNICATION STANDARD.....	No
CERCLA SECTION 103 HAZARDOUS SUBSTANCES.....	Zinc Sulphate..... RQ: 1,000lbs.
EPCRA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE.....	No Ingredients Qualify
EPCRA SECTION 311/312 HAZARD CATEGORIES.....	None.
EPCRA SECTION 313 TOXIC RELEASE INVENTORY.....	Zinc Compounds (Zinc Sulphate) CAS No. 7446-19-7 Percent by Weight..... 92%

CANADIAN:

INGREDIENTS LISTED ON DSL.....	Yes
WHMIS CLASSIFICATION:	Not a Controlled Product

SECTION 16. OTHER INFORMATION

The information in this Material Safety Data Sheet is based on the following references:

- American Conference of Governmental Industrial Hygienists, 2004, Documentation of the Threshold Limit Values and Biological Exposure Indices, Seventh Edition.
- American Conference of Governmental Industrial Hygienists, 2006, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- American Conference of Governmental Industrial Hygienists, 2005, Guide to Occupational Exposure Values.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition. (P. G. Urben ed.) 1995.
- Canadian Centre for Occupational Health and Safety (CCOHS) CHEMINFO Chemical Substance Data Base, Record 486 – Zinc Sulphate.
- Commission de la santé et la sécurité du travail, Service du répertoire toxicologique, Sulphate de zinc monohydrate, 1994-05.
- European Economic Community, Commission Directives 91/155/EEC and 67/548/EEC and 88/379/EEC.
- Industry Canada, SOR/88-66, Controlled Products Regulations, as amended.
- International Agency for Research on Cancer (IARC), Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, 1972 – 2004, (multi-volume work), World Health Organization, Geneva.
- International Chemical Safety Cards (WHO/IPCS/ILO), ICSC:0349–Zinc Sulphate Heptahydrate (Revised Oct 2001).
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- National Library of Medicine, National Toxicology Information Program, Hazardous Substance Data Bank. (on-line version).
- Patty's Toxicology, 5th Edition, (E Bingham, B Cohrssen & C H Powell, ed.) 2001.
- Sax, N. Irving, 1989, Dangerous Properties of Industrial Materials, Seventh Edition.
- Sax, N. Irving & Lewis, Richard J., Sr., 1987, Hawley's Condensed Chemical Dictionary, Eleventh Edition.
- U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, NIOSH Pocket Guide to Chemical Hazards. CD-ROM Edition, September 2005.
- U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, National Toxicology Program (NTP), 11th Report on Carcinogens, January 2005.
- U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, Registry of Toxic Effects of Chemical Substances (RTECS) Jan 2004.
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.

Notice to Reader

Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. Kronos Micronutrients, LP extends no warranty and assumes no responsibility for the accuracy of the content and expressly disclaims all liability for reliance thereon. This material safety data sheet provides guidelines for the safe handling and processing of this product; it does not and cannot advise on all possible situations. Therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.