

NFPA Classification	DOT / TDG Pictograms	WHMIS Classification	HMIS		PROTECTIVE CLOTHING
			Health	1	
			Flammability	0	
			Reactivity	0	
			PPE	F	

Section I. Chemical Product and Company Identification

PRODUCT NAME/ TRADE NAME Ultra Yield Zinc Oxy-Sulfate 31%

SYNONYM Sulfated zinc oxide

MSDS NUMBER: 14272

CHEMICAL NAME Zinc sulfate, basic

REVISION NUMBER 1.1

CHEMICAL FAMILY Metal.

MSDS prepared by January 25, 2007
the Environment,
Health and Safety
Department on:

CHEMICAL FORMULA $Zn_4O_3(SO_4)$

24 HR EMERGENCY TELEPHONE NUMBER:

MATERIAL USES Agricultural use: Fertilizer ingredient.

Transportation Emergency: 1 (800) 792-8311
Medical Emergency: 1 (888) 670-8123

MANUFACTURER

Agrium
North American Wholesale
13131 Lake Fraser Drive, S.E.
Calgary, Alberta, Canada, T2J 7E8

SUPPLIER

Agrium
North American Wholesale
13131 Lake Fraser Drive, S.E.
Calgary, Alberta, Canada, T2J 7E8

Agrium U.S. Inc.
Suite 1700, 4582 South Ulster St.
Denver, Colorado, U.S.A., 80237

Agrium U.S. Inc.
Suite 1700, 4582 South Ulster St.
Denver, Colorado, U.S.A., 80237

Section II. Hazardous Ingredients

NAME	CAS #	Exposure Limits (ACGIH)						% by Weight
		TLV-TWA mg/m ³	TLV-TWA ppm	STEL mg/m ³	STEL ppm	CEIL mg/m ³	CEIL ppm	
Zinc sulfate	7733-02-0	---		---				10-30 as Zn
Zinc oxide	1414-13-2	2 (R)		10 (R)				10-30 as Zn
Zinc sulfate, basic	59766-35-7	----						5-10

ACGIH TLV notations:

--- No assigned TLV

(C) - Ceiling - the concentration not to be exceeded at any time

(I) - measured as the Inhalable fraction of the aerosol

(R) - measured as the Respirable fraction of the aerosol

(T) - measured as the Thoracic fraction of the aerosol

TOXICOLOGICAL DATA ON INGREDIENTS

Zinc sulfate:

Rat oral (LD50), Acute: 1710 mg/kg RTECS

Aquatic Toxicity: 0.3 mg/l as Zn/120 hr/stickleback/lethal

4.6 ppm/96 hr/rainbow trout/LC 50/fresh water

Zinc oxide:

LD50: 7950 mg/kg Mouse, oral, RTECS.

Section III. Hazards Identification.

POTENTIAL ACUTE HEALTH EFFECTS	<p>Zinc is an essential dietary element, and is generally not extremely toxic. However, some characteristics of certain zinc compounds can affect humans severely. Zinc salts produce effects ranging from a burning pain in the mouth and throat caused by zinc sulfate, to intense chest and stomach pain, violent vomiting, diarrhea, shock, and possible death on massive ingestion. May cause severe eye irritation. Corrosive to eyes and skin.</p> <p>Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Fumes generated from high temperatures such as from welding and cutting on metals contaminated with this product may result in formation of zinc oxide fumes at levels above the occupational exposure limit, which can cause "metal fume fever", a flu-like condition involving fever, chills, sweats, nausea, vomiting, muscular aches and pains and breathing disturbance. Symptoms may appear a few hours after exposure and subside within 24-48 hours with no permanent effect.</p>
POTENTIAL CHRONIC HEALTH EFFECTS	<p>Not considered to be a human carcinogen, teratogen or mutagen by ACGIH, IARC, or NTP. Repeated skin exposure may produce local skin damage or dermatitis.</p>

Section IV. First Aid Measures

EYE CONTACT	Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Use warm water if available. Obtain medical attention if irritation persists.
MINOR SKIN CONTACT	May cause skin irritation. Wash contaminated skin with soap and water. Cover dry or irritated skin with a good quality skin lotion. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.
EXTENSIVE SKIN CONTACT	No additional information.
MINOR INHALATION	Allow to rest in a well ventilated area. Seek medical attention, if not feeling well. Inhalation of dust may produce irritation to the respiratory tract, characterized by burning, sneezing and coughing.
SEVERE INHALATION	In emergency situations, use respiratory protection to evacuate the person to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the person is not breathing, perform artificial respiration. Seek medical attention.
SLIGHT INGESTION	<p>Do not induce vomiting. May cause digestive tract irritation, with accompanying nausea, vomiting and diarrhea. If spontaneous vomiting does occur, lower the head so that the vomit will not reenter the mouth and throat.</p> <p>If tolerated, give no more than 1 cup of milk or water for adults or 1/2 cup for children to rinse the mouth and throat, dilute the stomach contents, and minimize irritation. Obtain medical attention if irritation persists.</p>
EXTENSIVE INGESTION	No additional information.

Section V. Fire and Explosion Data

THE PRODUCT IS	Non-flammable.
AUTO-IGNITION TEMPERATURE	Not applicable.
FLASH POINT	Not applicable.
FLAMMABILITY LIMITS	Not applicable.
PRODUCTS OF COMBUSTION	Not applicable.
FIRE HAZARD IN THE PRESENCE OF VARIOUS SUBSTANCES	Non-flammable. Decomposes to produce toxic gases (SO ₂).

Continued on Next Page

EXPLOSION HAZARD IN THE PRESENCE OF VARIOUS SUBSTANCES	This substance is non-explosive.
FIRE FIGHTING MEDIA AND INSTRUCTIONS	Non-flammable.
SPECIAL REMARKS ON FIRE HAZARDS	No additional information.
SPECIAL REMARKS ON EXPLOSION HAZARDS	No additional information.

Section VI. Accidental Release Measures

SMALL SPILL	Use appropriate tools or equipment to place the spilled solid in a suitable container for recycle or disposal. Cleanup personnel should be protected against dust inhalation and dermal contact. Consult your environmental advisor regarding disposal alternatives.
LARGE SPILL	Stop spill if possible to do so without risk. Keep spills from entering sewers, wells, watercourses, etc. Product will promote algae growth which may degrade water quality and taste. Notify downstream water users. Sulfate in potable drinking water should be maintained below 250 mg/L (U.S.) or 500 mg/L (Canada). Water spill: Neutralize with agricultural lime, crushed limestone or sodium bicarbonate. Add soda ash. Adjust pH to neutral (pH= 7). Dredge to remove immobilized precipitates. Recover and place in suitable containers for recycle, reuse, or disposal. Ensure disposal complies with government requirements and local regulations.

Section VII. Handling and Storage

PRECAUTIONS	Do not ingest or breathe dust. Wear suitable protective clothing. If ingested, seek medical advice immediately.
STORAGE	Keep container tightly closed. Keep in a cool, well-ventilated place. Keep away from food, drink and animal feeds. Keep away from combustible materials. Keep away from incompatible materials. Keep out of reach of children.

Section VIII. Exposure Controls/Personal Protection

ENGINEERING CONTROLS	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, use adequate local exhaust or general ventilation to keep exposure to airborne contaminants below the exposure limits.
PERSONAL PROTECTION	The selection of personal protective equipment varies, depending upon conditions of use. Wear appropriate respiratory protection for dust/mist when ventilation is inadequate. A filtering facepiece dust mask is recommended for most applications if respiratory protection is needed. Where skin and eye contact may occur as a result of brief periodic exposures, wear long sleeved clothing, coveralls, chemical resistant gloves, and safety glasses with side shields.
PERSONAL PROTECTION IN CASE OF LARGE RELEASE	Where skin and eye contact may occur as a result of prolonged or repeated exposures, wear long sleeved clothing, coveralls or apron, leather gloves, and safety glasses with side shields. Use a dust and mist respirator if concentrations may exceed the exposure limit. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. For U.S. work sites where respiratory protection is required, ensure that a respiratory protection meeting 29 CFR 1910.134 is in place.
EXPOSURE LIMITS	<p>Zinc oxide: ACGIH TLV-TWA 2 mg/m³ as respirable dust Fed OSHA Permissible Exposure Limit: Table Z-1 8-hr Time Weighted Avg: 15 mg/m³ as total dust, 5 mg/m³ as respirable dust, and 5 mg/m³ as fume. MI OSHA Permissible Exposure Limit: 8-hr Time Weighted Avg: 10 mg/m³ as total dust, 5 mg/m³ as respirable dust, and 5 mg/m³ as fume.</p> <p>For the product as a whole: ACGIH TLV-TWA: 10 mg/m³ Inhalable, 3 mg/m³ Respirable, as Particles (insoluble or poorly soluble) Not Otherwise Specified, Fed OSHA PEL: 15 mg/m³ Total dust, 5 mg/m³ Respirable fraction, for Particulates Not Otherwise Regulated.</p>

Continued on Next Page

Federal, State or Provincial exposure limits may vary by jurisdiction. Consult local authorities for acceptable exposure limits in your area.

Section IX. Physical and Chemical Properties

PHYSICAL STATE AND APPEARANCE	Granular solid.		
MOLECULAR WEIGHT	Not available	COLOR	Grey.
pH (10% SOLN/WATER)	5.0 - 6.0	ODOR	Not available.
BOILING POINT	Decomposes	ODOR THRESHOLD	Not available.
MELTING POINT	Not available	TASTE	Not available.
CRITICAL TEMPERATURE	Not applicable	VOLATILITY	Not available.
SPECIFIC GRAVITY g/cc	Not available	SOLUBILITY	Partially soluble in cold or hot water.
BULK DENSITY kg/m ³ ; lbs/ft ³	Not available	DISPERSION PROPERTIES	See solubility.
VAPOR PRESSURE	Not applicable.	WATER/OIL DIST. COEFF.	Not available.
VAPOR DENSITY	Not applicable		

Section X. Stability and Reactivity Data

STABILITY	The product is stable.
INSTABILITY TEMPERATURE	Not applicable
CONDITIONS OF INSTABILITY	No additional information.
INCOMPATIBILITY WITH VARIOUS SUBSTANCES	No information is available in our database regarding the reactivity of this material.
CORROSIVITY	No specific information is available in our database regarding the corrosivity of this substance.
SPECIAL REMARKS ON REACTIVITY	No additional information.
SPECIAL REMARKS ON CORROSIVITY	Contact your sales representative or a metallurgical specialist to ensure compatibility with your equipment.

Section XI. Toxicological Information

SIGNIFICANT ROUTES OF EXPOSURE	Ingestion. Inhalation.
TOXICITY TO ANIMALS	See Section II.
SPECIAL REMARKS ON TOXICITY TO ANIMALS	<p>Low toxicity for humans or animals under normal conditions of use. May be harmful to livestock and wildlife if ingested. Clean up all spilled material, especially where bulk fertilizer loading of equipment occurs to prevent animal exposure.</p> <p>Aquatic/Marine Toxicity: Will disperse with current. Release to watercourses may cause effects down stream from the point of release. Harmful to fish and other water organisms. U.S. D.O.T.: This material is NOT listed as a Marine pollutant.</p>
OTHER EFFECTS ON HUMANS	No additional information is available in our database regarding other toxic effects of this material.

Continued on Next Page

SPECIAL REMARKS ON CHRONIC EFFECTS ON HUMANS	Animal embryotoxic. Effects are seen at maternally toxic doses. The significance of these findings to humans is unknown.
SPECIAL REMARKS ON OTHER EFFECTS ON HUMANS	No additional information.


Section XII. Ecological Information

ECOTOXICITY	Very low toxicity. The product itself and its products of degradation are not harmful under normal conditions of use. Aquatic/Marine Toxicity: Harmful to fish and other water organisms. Zinc poisoning causes inflamed gills in fish. Will disperse with current. Release to watercourses may cause effects down stream from the point of release.
BOD and COD	Not available.
PRODUCTS OF DEGRADATION	Inorganic mineral salts and oxides.
TOXICITY OF THE PRODUCTS OF DEGRADATION	The products of degradation are less toxic than the product itself.
SPECIAL REMARKS ON THE PRODUCTS OF DEGRADATION	No additional information.

Section XIII. Disposal Considerations

WASTE DISPOSAL OR RECYCLING	Recover and place material in a suitable container for intended use or disposal. Ensure disposal is in compliance with government requirements and local regulations.
------------------------------------	---

Section XIV. Transport Information

DOT / TDG CLASSIFICATION	Not controlled under DOT (US) or TDG (Canada).
PIN and Shipping Name	Not applicable.
SPECIAL PROVISIONS FOR TRANSPORT	No additional remark.
DOT (U.S.A) (Pictograms)	

Section XV. Other Regulatory Information and Pictograms

OTHER REGULATIONS	<p>Federal Secondary Drinking Water Standards: EPA 5mg/L Zinc</p> <p>Clean Water Act Requirements: Designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance.</p> <p>Toxic pollutant designated pursuant to section 307(a)(1) of the Clean Water Act and is subject to effluent limitations. (Zinc and compounds). For total recoverable zinc the criterion to protect freshwater aquatic life is 47 ng/l as a 24 hr average at a hardnesses of 50, 100, and 200 mg/l as CaCO₃. The concentration of total recoverable zinc should not exceed 180, 320, 570 ug/l at any time. For total recoverable zinc the criterion to protect saltwater aquatic life is 58 ug/l as a 24 hr average and the concentration should not exceed 170 ug/l at any time. (Soluble zinc salts)</p> <p>CERCLA Reportable Quantities: Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or</p>
--------------------------	--

Continued on Next Page

greater than its reportable quantity of 1,000 lb or 454 kg. The toll free telephone number of the NRC is (800) 424-8802; In the Washington metropolitan area (202) 426-2675. The rule for determining when notification is required is stated in 40 CFR 302.6 (section IV. D.3.b).

This product contains the following chemicals subject to the reporting requirements of SARA Section 313 and 40 CFR 372:

Zinc compounds, chemical category code N982, 31% of total product weight is Zn.

TSCA (Toxic Substance Control Act): This product is listed on the TSCA Inventory.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): This product is on the Domestic Substances List (DSL), and is acceptable for use under the provisions of CEPA.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by the Controlled Products Regulations.

OTHER CLASSIFICATIONS**HCS (U.S.A.)**

HCS CLASS: Irritating substance.

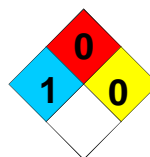
DSCL (EEC)

Not available.

National Fire Protection Association (U.S.A.)

Hazards presented under acute emergency conditions only:

Health

**Fire Hazard****Reactivity****Specific Hazard****TDG (Pictograms - Canada)****DSCL (Europe) (Pictograms)**

Not Available
No Disponible
Pas Disponible

ADR (Europe) (Pictograms)

Not Available
No Disponible
Pas Disponible

Section XVI. Other Information**REFERENCES**

- Transportation of Dangerous Goods Act and Clear Language Regulations, current revision.
- Canada Gazette Part II, Vol. 122, No. 2 Registration SOR/88-64 31 December, 1987 Hazardous Products Act "Ingredient Disclosure List".
- Domestic Substances List, Canadian Environmental Protection Act.
- 29 CFR Part 1910
- 33 CFR Parts 151, 153, 154, 156
- 40 CFR Parts 1-799
- 46 CFR Part 153
- 49 CFR Parts 1-199
- American Conference of Governmental Industrial Hygienists, Threshold Limit Values for Chemical Substances, 2006.
- NFPA 704, National Fire Codes Online, National Fire Protection Association, current edition at time of MSDS preparation.
- Corrosion Data Survey, Sixth Edition, 1985, National Association of Corrosion Engineers
- TOMES® System: Heitland G & Hurlbut KM (Eds) (electronic version): MICROMEDEX, Greenwood Village, Colorado, USA. Available at: <http://csi.micromedex.com> (2007). The TOMES® System includes MEDITEXT® Medical Management; HAZARDTEXT® Hazard Management; INFOTEXT® Documents; ERG2000 Emergency Response Guidebook Documents; REPROTEXT®: Heitland G & Hurlbut KM (Eds); CHRIS Hazardous Chemical Data: U.S. Department of Transportation, U.S. Coast Guard, Washington, D.C. (2007); HSDB:

Hazardous Substances Data Bank. National Library of Medicine, Bethesda, Maryland (2007); IRIS: Integrated Risk Information System. U.S. Environmental Protection Agency, Washington, D.C. (2007); NIOSH: Pocket Guide to Chemical Hazards. National Institute for Occupational Safety and Health, Cincinnati, Ohio (2007); OHM/TADS: Oil and Hazardous Materials Technical Assistance Data System. U.S. Environmental Protection Agency, Washington, D.C. (2007); REPROTOX®: Scialli A.R. Georgetown University Medical Center and Reproductive Toxicology Center, Columbia Hospital for Women Medical Center, Washington, D.C. (2007); RTECS®: Registry of Toxic Effects of Chemical Substances. National Institute for Occupational Safety and Health, Cincinnati, Ohio (2007); and SHEPARDS: Shepard T.H.: Shepard's Catalog of Teratogenic Agents (2007).

-The Fertilizer Institute Product Testing Program Results, March 2003

-Michigan Office of Regulatory Reform R325.51108

**OTHER SPECIAL
CONSIDERATIONS**

HMIS information added in this revision.

FOR FURTHER SAFETY, HEALTH, OR
ENVIRONMENTAL INFORMATION ON
THIS PRODUCT, CONTACT

AGRIUM
Wholesale Environment, Health and Safety
Telephone (780) 998-6906 or Fax (780) 998-6677

NOTICE TO READER

The buyer assumes all risk in connection with the use of this material. The buyer assumes all responsibility for ensuring this material is used in a safe manner in compliance with applicable environmental, health and safety laws, policies and guidelines. Agrium Inc. assumes no responsibility or liability for the information supplied on this sheet, including any damages or injury caused thereby. Agrium Inc. does not warrant the fitness of this 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. The information contained in this sheet is developed from what Agrium Inc. believes to be accurate and reliable sources, and is based on the opinions and facts available on the date of preparation.