

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

## Section I. Chemical Product and Company Identification

**PRODUCT NAME/ TRADE NAME** Urea Ammonium Nitrate Solution Fertilizers with added Sulfur

**SYNONYM** This MSDS applies to UAN - Sulfur Solutions, and/or UAN - Thiosulfate Solutions including, but not limited to:

15-0-0-20S  
18-0-0-3S  
20-0-0-4.5S  
20-0-0-10S  
21.4-0-0-10.7S  
24-0-0-3S (24-S)  
26-0-0-3S  
26.35-0-0-2.54S  
28-0-0-5S

**MSDS NUMBER:** 16010

**CHEMICAL NAME** Not applicable. **REVISION NUMBER** 1.2

**CHEMICAL FAMILY** Aliphatic amide and nitrate salt solution. **MSDS prepared by** the Environment, Health and Safety Department on: **November 18, 2009**

**CHEMICAL FORMULA** Not applicable.

**MATERIAL USES** Agricultural industry: Fertilizer.

### 24 HR EMERGENCY TELEPHONE NUMBER:

Transportation: 1-800-792-8311  
Medical: 1-888-670-8123

#### MANUFACTURER

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

#### 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

## Section II. Hazardous Ingredients

NAME	CAS #	Exposure Limits (ACGIH)						% by Weight
		TLV-TWA mg/m <sup>3</sup>	TLV-TWA ppm	STEL mg/m <sup>3</sup>	STEL ppm	CEIL mg/m <sup>3</sup>	CEIL ppm	
Urea	57-13-6	---						16-26
Ammonium nitrate	6484-52-2	---						24-34
Ammonium sulfate	7783-20-2	---						0-14
Ammonium thiosulfate	7783-18-8	---						0-14

#### 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

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**TOXICOLOGICAL DATA ON INGREDIENTS****Ammonium Nitrate:**<sup>^</sup>

Rat oral LD<sub>50</sub>: 4500 mg/kg. [Peer Reviewed] [Environment Canada;Tech Info for Problem Spills: Ammonium Nitrate (Draft) p.59 (1981)]  
 Rat oral LD<sub>50</sub>: 2217 mg/kg (Rat) [Gigiena i Sanitariya. For English translation, see HYSAAV. (V/O Mezhdunarodnaya Kniga, 113095 Moscow, USSR) V.1- 1936- (52(8),25,1987)]  
 Huntingdon Research Center Testing Results (3 studies), OECD Guide 401: 2462- 2900 mg/kg (rat oral)  
 TFI Product Testing Results, OECD Guideline 402: > 5,000 mg/kg acute dermal LD<sub>50</sub>, rat,  
 Bacterial reverse mutation assay: negative, with and without metabolic activation, (Salmonella)  
 Developmental teratogenicity: Not teratogenic to rats. NOAEL >57 mg/kg  
 Ecotoxicity Values:  
 Acute fish toxicity: Chinook salmon, rainbow trout, bluegill: 96hr LC<sub>50</sub> = 420-1360 mg NO<sub>3</sub>/L  
 Acute toxicity to aquatic invertebrates: Daphnia magna EC<sub>50</sub> = 555mg/L  
 Acute toxicity to aquatic plants (algae): Scenedesmus quadricauda EC<sub>50</sub> = 83mg/L  
 LD<sub>50</sub> Aspergillus niger (fungus) 15 mg/l/40 hr (36 deg C). [Peer Reviewed] [Environment Canada; Tech Info]

**Ammonium Sulfate TFI Product Testing Program Results:**

Acute oral LD<sub>50</sub>, rat: >2,000-4,250 mg/kg  
 Acute oral LD<sub>50</sub>, mouse: 640 mg/kg  
 Acute dermal LD<sub>50</sub>: >2,000 mg/kg (rat, mouse)  
 Ecotoxicity:  
 Acute toxicity to fish, Coho salmon, rainbow trout, largemouth bass, bluegill, fathead minnow, 24-96 hr LC<sub>50</sub>: >90->1500 mg/L  
 Acute toxicity to aquatic invertebrates, Daphnia magna, 50-96 hr LC<sub>50</sub>: >433 mg/L  
     Amphipod, 96 hrs, LC<sub>50</sub>=40-62 mg/L  
     Snails, 48-96 hrs, LC<sub>50</sub>=>100-700 mg/L  
 Toxicity to aquatic plants, Chlorella vulgaris, 21 days, NOEC=250 mg N/L  
 Chronic toxicity to fish, Rainbow trout, 12 & 35 days, LC<sub>50</sub>: 0.26-0.68 mg unionized NH<sub>3</sub>/L  
     Pink salmon, 21, 40, & 61 days, NOEC=1.2mg unionized NH<sub>3</sub>/L  
     Channel catfish, 6 months, LOEC=100-500 mg/L

**Ammonium Thiosulfate Solution TFI Product Testing Program Results:**

Acute oral toxicity, LD<sub>50</sub>: 1,950-2,890 mg/kg (rat, mouse)  
 Acute inhalation toxicity, LC<sub>50</sub>: >1,800, >2,260 mg/m<sup>3</sup> (rat, mouse)  
 Ecotoxicity:  
 Acute toxicity to fish, species not specified, 48 hr LC<sub>50</sub>: >48.6 mg total NH<sub>3</sub>/L

**TFI Product Testing Program Results - Urea 46-0-0 :**<sup>^</sup>

Acute oral toxicity: 14,300 mg/kg rat; 11,500 mg/kg mouse; 510 mg/kg cattle  
 Chronic oral toxicity, NOAEL: 6,750 mg/kg mouse; 2,250 mg/kg rat  
 Ecotoxicity:  
 Acute toxicity to fish, Barillius barna, LC<sub>50</sub>, 96hr: >9,100 mg/L  
 Acute toxicity to invertebrates, Daphnia, EC<sub>50</sub> (24kr) >10,000 mg/L  
 Acute toxicity to birds, pigeon, LDLo = 16,000 mg/kg subcutaneous  
 Toxicity to algae, Scenedesmus quadricauda, cell multiplication inhibition, TT(192 hr) > 10,000 mg/L

**Section III. Hazards Identification.****POTENTIAL ACUTE HEALTH EFFECTS**

Dangerous in case of ingestion. May interfere with oxygen carrying capacity of the blood (Methemoglobinemia). Over-exposure by inhalation may cause respiratory irritation. This product may irritate eyes and skin upon contact but is unlikely to injure tissue.

Symptoms of overexposure may include:

Cardiovascular: methemoglobinemia, low blood pressure (hypotension), irregular heart beat (arrhythmia), shock (vasodilation)

CNS: headache, dizziness, generalized tingling sensation (parasthesia)

Gastrointestinal: nausea, vomiting, diarrhea, abdominal pain

Eye: redness and inflammation (conjunctivitis)

Skin: bluish discoloration (cyanosis) with profuse sweating or flushed skin

**POTENTIAL CHRONIC HEALTH EFFECTS**

**CARCINOGENIC EFFECTS:** NONE by ACGIH, EPA, IARC, NTP, OSHA.

**MUTAGENIC EFFECTS:** NONE by ACGIH, EPA, IARC, NTP, OSHA.

**TERATOGENIC EFFECTS:** NONE by ACGIH, EPA, IARC, NTP, OSHA.

Repeated or prolonged overexposure by ingestion can reduce the oxygen carrying capacity of the blood producing anoxia in infants or individuals with preexisting bowel or blood diseases. Ensure that nitrate containing fertilizers are not applied near wells where contamination may occur. Consult your agronomist regarding the advisability and precautions for use of nitrate fertilizers on fruit or vegetable crops.

**Section IV. First Aid Measures**

<b>EYE CONTACT</b>	May cause eye irritation. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Obtain medical attention.
<b>MINOR SKIN CONTACT</b>	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 reuse.
<b>EXTENSIVE SKIN CONTACT</b>	No additional information.
<b>MINOR INHALATION</b>	Repeated or prolonged inhalation of vapors or spray mist may produce irritation of respiratory tract. Loosen tight clothing. Allow to rest in a well ventilated area. Obtain medical attention.
<b>SEVERE INHALATION</b>	In emergency situations use proper respiratory protection to evacuate affected individuals to a safe area as soon as possible. Loosen tight clothing around the person's neck and waist. Oxygen may be administered if breathing is difficult. If the person is not breathing, perform artificial respiration. Obtain immediate medical attention.
<b>SLIGHT INGESTION</b>	Have conscious person drink several glasses of water or milk. Induce vomiting. Lower the head so that the vomit will not reenter the mouth and throat. NEVER give an unconscious person anything to drink. Obtain medical attention.
<b>EXTENSIVE INGESTION</b>	No additional information.

**Section V. Fire and Explosion Data**

<b>THE PRODUCT IS</b>	Non-flammable.
<b>AUTO-IGNITION TEMPERATURE</b>	Not applicable.
<b>FLASH POINT</b>	Not applicable.
<b>FLAMMABILITY LIMITS</b>	Not applicable.
<b>PRODUCTS OF COMBUSTION</b>	Material will not burn, but thermal decomposition may result in flammable/toxic gases being formed after material evaporates to dryness. These products are nitrogen oxides, sulfur oxides, carbon oxides and ammonia (CO, CO <sub>2</sub> , SO <sub>2</sub> , SO <sub>3</sub> , NO, NO <sub>2</sub> , NH <sub>3</sub> ).
<b>FIRE HAZARD IN THE PRESENCE OF VARIOUS SUBSTANCES</b>	Material will not burn. Avoid temperatures above 100°C (212°F) which may result in evaporation and thermal decomposition.
<b>EXPLOSION HAZARD IN THE PRESENCE OF VARIOUS SUBSTANCES</b>	This product is non-explosive. However, do not allow ammonium nitrate containing solutions to concentrate through evaporation. Concentrated ammonium nitrate containing solutions may present a possible risk of explosion under high temperatures and pressures.
<b>FIRE FIGHTING MEDIA AND INSTRUCTIONS</b>	Cool containing vessels with flooding quantities of water until well after fire is out. A self contained breathing apparatus should be used to avoid inhalation of toxic fumes. When heated to decomposition it emits toxic fumes. Fire fighters should wear self-contained breathing apparatus (SCBA) and full turnout gear.
<b>SPECIAL REMARKS ON FIRE HAZARDS</b>	Evolves toxic fumes when heated to the decomposition state. Avoid temperatures above 100°C (212°F).
<b>SPECIAL REMARKS ON EXPLOSION HAZARDS</b>	

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Do not allow to evaporate. Unconfirmed industry reports indicate a possibility that ammonium nitrate containing solutions may detonate if subjected to extreme heat while under pressure or if allowed to evaporate to near dryness.

### Section VI. Accidental Release Measures

<b>SMALL SPILL</b>	<p>Stop leak if possible to do so without risk. Dike and contain spilled material. Ensure that the spilled material does not enter sewers, wells, or watercourses. Product will promote algae growth which may degrade water quality and taste.</p> <p>Notify downstream water users. Nitrate in potable drinking water should be maintained below the U.S. National Primary Drinking Water Regulations MCL of 10mg/L as nitrogen, or the Canadian Guidelines for Drinking Water Quality MAC of 45mg/L (equivalent to 10mg/L nitrate-nitrogen). Will dissolve and disperse in water. Where possible, pump up spilled material and place in suitable containers for reuse or disposal. Ensure disposal complies with local regulations. Reclaiming material may not be viable.</p>
<b>LARGE SPILL</b>	No additional information in case of a spill and/or a leak of the product.

### Section VII. Handling and Storage

<b>PRECAUTIONS</b>	Keep away from sources of ignition and incompatible materials such as reducing agents, or combustible materials. Avoid contact with skin and eyes. Do not breathe fumes or vapors. Keep out of reach of children.
<b>STORAGE</b>	Keep at temperatures not exceeding 100 °C. Keep away from incompatible materials.

### Section VIII. Exposure Controls/Personal Protection

<b>ENGINEERING CONTROLS</b>	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
<b>PERSONAL PROTECTION</b>	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. A respiratory protection program that meets OSHA 29 CFR 1910.134 requirements must be followed whenever workplace conditions warrant a respirator's use.
<b>PERSONAL PROTECTION IN CASE OF LARGE RELEASE</b>	No additional information.
<b>EXPOSURE LIMITS</b>	<p>OSHA PEL: 15 mg/m<sup>3</sup> for Particulates Not Otherwise Regulated (nuisance particulates).</p> <p>Federal, State or Provincial exposure limits may vary by jurisdiction. Consult local authorities for acceptable exposure limits in your area.</p>

### Section IX. Physical and Chemical Properties

<b>PHYSICAL STATE AND APPEARANCE</b>	Liquid. (Clear to slightly hazy liquid.)		
<b>MOLECULAR WEIGHT</b>	Not applicable.	<b>COLOR</b>	Clear colorless to light yellow.
<b>pH (10% SOLN/WATER)</b>	6-8	<b>ODOR</b>	Odorless.
<b>BOILING POINT</b>	Decomposes.	<b>ODOR THRESHOLD</b>	17 PPM threshold, recognizable as ammonia.
<b>MELTING POINT</b>	Salt out temperature: variable depending on formulation	<b>TASTE</b>	Acrid. Burning. Disagreeable.
<b>CRITICAL TEMPERATURE</b>	Not applicable.	<b>VOLATILITY</b>	dependent on formulation
<b>SPECIFIC GRAVITY g/cc</b>	1.2 to 1.4 (Water = 1)	<b>SOLUBILITY</b>	Easily soluble in cold water, hot water.

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<b>BULK DENSITY</b> kg/m <sup>3</sup> ; lbs/ft <sup>3</sup>	Variable depending on formulation	<b>DISPERSION PROPERTIES</b>	See solubility in water.
<b>VAPOR PRESSURE</b>	17.2 mm of Hg (@ 20°C) based on data for: Water	<b>WATER/OIL DIST. COEFF.</b>	Only soluble or dispersed in water.
<b>VAPOR DENSITY</b>	Not applicable.		

**Section X. Stability and Reactivity Data**

<b>STABILITY</b>	The product is stable.
<b>INSTABILITY TEMPERATURE</b>	Not available.
<b>CONDITIONS OF INSTABILITY</b>	No additional remark.
<b>INCOMPATABILITY WITH VARIOUS SUBSTANCES</b>	Slightly reactive with reducing agents, combustible materials, organic materials, metals. Very slightly reactive with acids, alkalis.
<b>CORROSIVITY</b>	Slightly corrosive to mild steel, aluminum, zinc, and copper. Non-corrosive to stainless steel (304 or 316).
<b>SPECIAL REMARKS ON REACTIVITY</b>	Incompatible with sulfur, chlorides, or other oxidizers. Incompatible with finely powdered metals (cadmium, copper, lead, cobalt, nickel, bismuth, chromium, magnesium, zinc, sodium, potassium and aluminum).
<b>SPECIAL REMARKS ON CORROSIVITY</b>	Incompatible with copper alloys. Corrosive to ferrous metals and alloys. Corrosive to brass. Contact your sales representative or a metallurgical specialist to ensure compatability with your equipment.

**Section XI. Toxicological Information**

<b>SIGNIFICANT ROUTES OF EXPOSURE</b>	Ingestion. Inhalation.
<b>TOXICITY TO ANIMALS</b>	See Section II.
<b>SPECIAL REMARKS ON TOXICITY TO ANIMALS</b>	Will slowly release ammonia and degrade to nitrate. Ammonia is a toxic hazard to fish. The product itself and its products of degradation are not harmful 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.
<b>OTHER EFFECTS ON HUMANS</b>	Recent studies undertaken by the U.S. Government using Canadian and American databases have determined that ammonium nitrate fertilizer does not demonstrate any risk of gastrointestinal cancer.
<b>SPECIAL REMARKS ON CHRONIC EFFECTS ON HUMANS</b>	Exposure can cause headache, stomach pains, vomiting and diarrhea. Under prolonged or repeated overexposure, may produce methemoglobin which reduces oxygen supply in the circulating blood. Although predominantly affecting infants, nitrate induced methemoglobinemia has also been documented in adults.
<b>SPECIAL REMARKS ON OTHER EFFECTS ON HUMANS</b>	No additional remark.

**Section XII. Ecological Information**

<b>ECOTOXICITY</b>	May be harmful to fish, livestock, and wildlife. Dissolved mineral salts may cause irritation of the digestive tract.  Aquatic/Marine Toxicity: Harmful to fish and other water organisms. Highly soluble. Will disperse with current. Release to watercourses may cause effects down stream from the point of release. Will release ammonium ions. Ammonia is a toxic hazard to fish. Clean up all spilled material, especially where bulk fertilizer loading of equipment occurs. U.S. D.O.T.: This material is NOT listed as a Marine pollutant.
<b>BOD and COD</b>	Not available.


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<b>PRODUCTS OF DEGRADATION</b>	Ammonia, nitrogen oxides (NO, NO <sub>2</sub> ), sulfur oxides (SO <sub>2</sub> , SO <sub>3</sub> ), and carbon oxides (CO, CO <sub>2</sub> )
<b>TOXICITY OF THE PRODUCTS OF DEGRADATION</b>	The product itself and its products of degradation are not harmful under normal conditions of use. Avoid spills or releases to watercourses.
<b>SPECIAL REMARKS ON THE PRODUCTS OF DEGRADATION</b>	Product will promote algae growth which may degrade water quality and taste. Notify downstream water users. Will dissolve and disperse in water. Reclaiming material may not be viable.

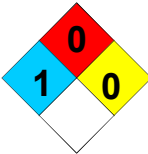
**Section XIII. Disposal Considerations**

<b>WASTE DISPOSAL OR RECYCLING</b>	Pump up spilled material and place in suitable containers for reuse or disposal. Ensure disposal complies with local regulations.
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**Section XIV. Transport Information**

<b>DOT / TDG CLASSIFICATION</b>	Not controlled under DOT (US) or TDG (Canada).
<b>PIN and Shipping Name</b>	Not applicable.
<b>SPECIAL PROVISIONS FOR TRANSPORT</b>	Not applicable.
<b>DOT (U.S.A) (Pictograms)</b>	

**Section XV. Other Regulatory Information and Pictograms**

<b>OTHER REGULATIONS</b>	<p>CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): This product is on the Domestic Substances List (DSL), and acceptable for use under the provisions of CEPA.</p> <p>CERCLA/SUPERFUND, 40 CFR 117,302: This product contains no Reportable Quantity (RQ) Substances.</p> <p>This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:</p> <p>Aqueous ammonia from water dissociable ammonium ions, 10% of which is reportable under this listing, as ammonium nitrate CAS# 6484-52-2 and/or ammonium sulphate CAS# 7783-20-2 and/or as ammonium thiosulfate CAS# 7783-18-8. Refer to EPA doc 745-R-00-005 and the specific product analysis for your product to determine your reporting requirements under this regulation.</p> <p>This product is not considered a priority pollutant as regulated under the Clean Water Act. Exempt under Table 2, 46 CFR 153 from classification category "D" NLS requirements under 33 CFR 151, 154 or 156 for barges or vessels not subject to the requirements of MARPOL 73/78.</p> <p>TSCA (Toxic Substance Control Act): This product is listed on the TSCA Inventory. This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and is not subject to control under WHMIS (Canada), or the Hazcom Standard (US).</p>	
<b>OTHER CLASSIFICATIONS</b>	<b>HCS (U.S.A.)</b>	No hazardous components identified per 29 CFR 1910.1200
	<b>DSCL (EEC)</b>	44- Risk of explosion if heated under confinement.
<b>National Fire Protection Association (U.S.A.)</b>	Hazards presented under acute emergency conditions only:	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">Health</div>  <div style="margin-left: 10px;"> <p><b>Fire Hazard</b></p> <p><b>Reactivity</b></p> <p><b>Specific Hazard</b></p> </div> </div>
<b>TDG (Pictograms - Canada)</b>		



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, 2009.
- 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
- ERG2008 Emergency Response Guidebook
- CHRIS: Hazardous Chemical Data: U.S. Coast Guard, Washington, D.C.
- HSDB: Hazardous Substances Data Bank. National Library of Medicine, Bethesda, Maryland
- IRIS: Integrated Risk Information System. U.S. Environmental Protection Agency, Washington, D.C.
- NIOSH: Pocket Guide to Chemical Hazards. National Institute for Occupational Safety and Health, Cincinnati, Ohio
- OHM/TADS: Oil and Hazardous Materials Technical Assistance Data System U.S. Environmental Protection Agency, Washington, D.C.
- RTECS®: Registry of Toxic Effects of Chemical Substances. National Institute for Occupational Safety and Health, Cincinnati, Ohio
- The Fertilizer Institute Product Testing Program Results, March 2003

#### OTHER SPECIAL CONSIDERATIONS

Three year review. Reference information revised.

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

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