

# Urea Solution

Centennial Ag Supply  
PO Box 557  
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## 1. CHEMICAL PRODUCT and EMERGENCY TELEPHONE CONTACT

Product Name:..... Urea Solution  
Chemical Family: ..... Amide  
Synonyms:..... Urea Solution; UREX (32, 40, 50); DEF  
Formula: .....  $\text{CH}_4\text{N}_2\text{O} + \text{H}_2\text{O}$   
Primary Product Use:..... NSCR and SCR  $\text{NO}_x$  Control

### EMERGENCY TELEPHONE NUMBER

INFOTRAC (U.S.):..... 800-535-5053

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	Percentage by Weight	CAS Number
Urea	30 - 70%	57-13-6
Free Ammonia	0.1 - 1.0%	7664-41-7
Biuret	0.1 - 0.5%	108-19-0
Water	28 - 69.7%	7732-18-5

### Exposure Limits

Component	TWA	STEL	PEL	IDLH
Ammonia	25 ppm	35 ppm	50 ppm	300 ppm
No limits established for urea liquor, biuret, or ammonium carbamate				

## 3. HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

Colorless (or green-dyed) liquid. With slight ammonia (pungent) odor. Reacts with sodium hypochlorite or calcium hypochlorite to form the explosive nitrogen trichloride. When heated, urea releases ammonia and when heated to decomposition it emits toxic fumes of nitrogen oxides ( $\text{NO}_x$ ), ammonia, and cyanuric acid. Use water to control fires involving urea liquor if water is compatible with burning material. Urea liquor itself is non-flammable.

### POTENTIAL HEALTH EFFECTS

**Primary Routes of Entry:** Skin contact/absorption, eye contact, and vapor inhalation.

**General Acute Exposure:** May cause irritation to eyes and skin. Ammonia and carbon dioxide vapors may accumulate in a confined space.

**General Chronic Exposure:** No test data available.

### Carcinogenicity:

NTP:..... Not Listed

IARC:..... Not Listed

OSHA:..... Not Regulated

**Medical Conditions Aggravated by Exposure:** No test data available.

## 4. FIRST AID MEASURES

**First Aid for Eyes:** Flush eyes with copious amounts of tepid water for at least 15 minutes. If irritation, pain, swelling, excessive tearing, or light sensitivity persists, the patient should be seen in a health care facility.

**First Aid for Skin:** If irritation occurs, flush exposed area with copious amounts of tepid water for at least 15 minutes followed by washing area thoroughly with soap and water. The patient should be seen in a health care facility if irritation or pain persists.

**First Aid for Inhalation:** If irritation develops move patient to fresh air and monitor. If cough or difficulty in breathing develops, evaluate for respiratory tract irritation. If trained to do so, administer supplemental oxygen if needed. If irritation, coughing, or difficulty in breathing persists the patient should be seen in a health care facility.

**First Aid for Ingestion:** If conscious, give the patient large quantities of water to drink and induce vomiting. Seek medical attention.

## 5. FIRE FIGHTING MEASURES

*Urea liquor is not flammable.*

**Extinguishing Media:** Use water to extinguish a fire involving urea liquor if water is compatible with the burning material.

### **Special Fire Fighting Procedures:**

- a. Positive pressure self-contained breathing apparatus (SCBA) should be used when there is a potential for inhalation of vapors and/or fumes.
- b. Wear full fire fighting protective equipment that is appropriate for conditions.

### **Caution:**

- a. Runoff from fire control or dilution water may cause pollution.
- b. At elevated temperature, urea liquor may decompose to form cyanuric acid, ammonia, biuret, and/or nitrogen oxides.

## 6. ACCIDENTAL RELEASE MEASURES

**Spill or Leak Measures:** Keep unnecessary people away and isolate hazard area. Urea liquor may be toxic to cattle (ruminants) when ingested if amount ingested is not controlled properly.

**Determining Spill Size:** Generally, a small spill is one that involves a single, small package (i.e. up to a 55 gallon drum), small cylinder, or a small (non-continuing) leak from a large container.

### **Small or Large Spill:**

- a. Spilled urea liquor may cause slippery conditions.
- b. Recover and use as fertilizer.
- c. If disposal of product or contaminated by-products is necessary, follow guidelines set forth by local, state, and federal environmental agencies.
- d. Runoff may cause pollution.

## 7. HANDLING AND STORAGE

No unusual storage precautions are necessary.

**Handling Precautions:** Use proper personal protective equipment when working with or around urea liquor. (See section 8).

## 8. EXPOSURE CONTROLS, PERSONAL PROTECTION

**Respiratory Protection Requirements:** Urea liquor may pose an inhalation hazard in confined areas due to its ability to produce ammonia and carbon dioxide vapors. If necessary to enter an area that contains urea liquor, monitor for ammonia and oxygen content. Oxygen levels should be maintained between 19.5% and 23.5%, if outside of this range use appropriate precautions. If ammonia vapors are present, protect as follows:

- <25 ppm: No protection required.
- 25 to 35 ppm: Protection required if the daily TWA is exceeded.
- 35 to 50 ppm: Protection required if exposed for more than 15 minutes

50 to 250 ppm: Minimum of an air-purifying respirator equipped with ammonia canister(s) or cartridge(s).

250 to 300 ppm: Minimum of a full- face air-purifying respirator equipped with ammonia canister(s) or cartridge(s).

>300 ppm: A fresh air supply system must be used (i.e. positive pressure self contained breathing apparatus)

**Engineering Controls:** Adequate ventilation should be supplied.

**Skin Protection Requirements:** Impervious gloves (nitrile, PVC, EPDM, etc.) should be worn. 70% urea liquor is shipped as a hot liquid (approximately 150°F - 220°F). Additional protection for hands and skin should be used to prevent contact of hot liquid. Lower concentrations are shipped at lower temperatures, and therefore do not require thermal protection.

**Eye Protection Requirements:** It is recommended that safety glasses or goggles be used and if there is a potential for splashing liquid, a face shield should be used in conjunction with the safety glasses or goggles.

**Other Protective Equipment:** Safety shower and eyewash fountain or at least 5 gallons of accessible clean water should be provided in a urea liquid handling area.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form:	Liquid
Color:	Colorless (or dyed green in certain markets)
Odor:	Slight ammonia odor (pungent)
Boiling Point:	50% urea solution boils at 223°F (106°C)
Melting point:	50% urea solution salts out at 64°F (18°C) 70% urea solution salts out at 135°F (57°C)
pH:	No test results
Solubility:	100%
Specific Gravity:	1.14 for 50% urea solution 1.175 for 70% urea solution
Vapor Density:	No test results
Vapor Pressure:	No test results
% Volatile by Volume:	No test results
Molecular Weight:	Not applicable
Density:	9.43 lb. per gallon for 46% solution; 9.51 lb. per gallon for 50 % solution; 9.80 lb. per gallon for 70 % solution
Critical Temperature:	No test results
Critical Pressure:	No test results

## 10. REACTIVITY

Stability: ..... This is a stable material.

Hazardous Polymerization: ..... Will not occur.

**Decomposition:** Urea liquor forms ammonia, cyanuric acid, biuret, and/or nitrogen oxides (Nox) upon decomposition.

**Incompatibilities:** Reacts with sodium hypochlorite or calcium hypochlorite to form nitrogen trichloride that may explode spontaneously in air. Incompatible with sodium nitrite, phosphorus pentachloride, and nitrosyl or gallium perchlorate.

## 11. TOXICOLOGICAL INFORMATION

### Toxicity

#### Acute Oral Toxicity

LD<sub>50</sub>, Rat: ..... 14,300 – 15,000 mg/kg

LD<sub>50</sub>, Mouse:..... 11,500 – 13,000 mg/kg

LD<sub>50</sub>, Cattle: ..... 510 mg/kg

#### Repeated Dose Toxicity

Rat: ..... NOAEL = 40% in ointment (24 wks; dermal)

### Ecotoxicity

#### Acute Toxicity to Fish

LC<sub>50</sub> *Barillius barna* ..... 9,100 mg/L (96 hr)

#### Acute Toxicity to Aquatic Invertebrates

EC<sub>50</sub> *Daphnia magna*..... >10,000 mg/L (DIN 38412 Part II; 24 hr)

#### Toxicity to Aquatic Plants

TT *Scenedesmus quadricauda* ..... >10,000 mg/L (192 hr cell multiplication inhibition test)

Note: Data is for Urea

Source: TFI Product Testing Program April 2003

## 12. ECOLOGICAL INFORMATION

Notify local health and wildlife officials and operators of any nearby water intakes of contamination or discharge into or leading to waterways.

**Note:** See Ecotoxicity information in section 11.

## 13. DISPOSAL CONSIDERATIONS

Urea liquor is not listed by the Federal EPA as a hazardous waste. Consult state and local environmental agencies for acceptable disposal methods. Recover product for use as a fertilizer if possible.

## 14. TRANSPORTATION INFORMATION

Urea liquor is not listed by any U.S. or Canadian transportation authority as a hazardous material and as such, no specific information is available.

## 15. REGULATORY INFORMATION

**SARA TITLE III:** Not Listed

**CERCLA Hazardous Substances List:** Not Listed

**TSCA Inventory:** Listed

## 16. OTHER INFORMATION

August 23, 2004: This MSDS was revised to the ANSI Standard Z400.1-1993. Toxicity information is from the TFI Product Testing Program 2003. The information and recommendations herein are taken from data contained in independent, industry-recognized references including but not limited to NIOSH, OSHA, CHRIS, the TFI Product Testing Program, and SAX's Dangerous Properties of Industrial Materials - ninth edition. Centennial Ag Supply Company makes no guarantee, warranty or other representation concerning this substance, since conditions of its use are beyond the control of the company. Centennial Ag Supply Company disclaims any liability for loss or damage incurred in connection with the use of this substance.