

# Magruder 211011 Safety Data Sheet

## UAN Solution

### SECTION 1: IDENTIFICATION

#### 1.1. Product Identifier

**Product Name:** Urea Ammonium Nitrate Solution - 28%, 30%, 32% N (UAN)

**CAS No:** 15978-77-5

**REACH No.:** N/A - mixture

**Synonyms:** UAN (28, 30, and 32% N), Liquid nitrogen fertilizer

**STCC:** 2871313

#### 1.2. Intended Use of the Product

**Uses of the substance/mixture:** Fertilizer

**Uses advised against:** Consumer use

#### 1.3. Name, Address, and Telephone of the Responsible Party

##### Company

CF Industries

4 Parkway North, Suite 400

Deerfield, Illinois 60015-2590

847-405-2400

[www.cfindustries.com](http://www.cfindustries.com)

#### 1.4. Emergency Telephone Number

**Emergency Number** : 800-424-9300

For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call CHEMTREC – Day or Night

### SECTION 2: HAZARDS IDENTIFICATION

#### 2.1. Classification of the Substance or Mixture

**Classification (GHS-US)**

Eye Irrit. 2A H319

Full text of H-phrases: see section 16

#### 2.2. Label Elements

**GHS-US Labeling**

**Hazard Pictograms (GHS-US)** :



**Signal Word (GHS-US)** :

Warning

**Hazard Statements (GHS-US)** :

H319 - Causes serious eye irritation.

**Precautionary Statements (GHS-US)** :

P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.  
P280 - Wear protective gloves, protective clothing, and eye protection.  
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P337+P313 - If eye irritation persists: Get medical advice/attention.

#### 2.3. Other Hazards

No additional information available

#### 2.4. Unknown Acute Toxicity (GHS-US)

No data available

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1. Substances

Name	Product Identifier	REACH Registration No.	% (w/w)	Classification (GHS-US)
Urea Ammonium Nitrate	(CAS No) 15978-77-5	N/A mixture	100	Eye Irrit. 2A, H319
Contains	Product Identifier		% (w/w)	Classification (GHS-US)
Ammonium nitrate	(CAS No) 6484-52-2	01-2119490981-27-0111	35.7 - 48	Ox. Sol. 3, H272 Eye Irrit. 2A, H319
Urea	(CAS No) 57-13-6	01-2119463277-33-0135	28.5 - 38	Not classified
Water	(CAS No) 7732-18-5	N/A	19.4 - 31.1	Not classified

Full text of H-phrases: see section 16

### 3.2. Mixture

Not applicable

## SECTION 4: FIRST AID MEASURES

### 4.1. Description of First Aid Measures

**General:** Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

**Inhalation:** When symptoms occur: go into open air and ventilate suspected area. Call a POISON CENTER/doctor/physician if you feel unwell.

**Skin Contact:** Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation develops or persists. Wash contaminated clothing before reuse.

**Eye Contact:** Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention.

**Ingestion:** Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER or doctor/physician.

### 4.2. Most Important Symptoms and Effects Both Acute and Delayed

**General:** Causes eye irritation.

**Inhalation:** May cause irritation to the respiratory tract.

**Skin Contact:** May cause skin irritation.

**Eye Contact:** Causes eye irritation. Symptoms may include: Redness, pain, swelling, itching, burning, tearing, and blurred vision.

**Ingestion:** Ammonium Nitrate: Ingestion may cause methemoglobinemia. Initial manifestation of methemoglobinemia is cyanosis, characterized by navy lips, tongue and mucous membranes, with skin color being slate grey. Further manifestation is characterized by headache, weakness, dyspnea, dizziness, stupor, respiratory distress and death due to anoxia. If ingested, nitrates may be reduced to nitrites by bacteria in the digestive tract. Signs and symptoms of nitrite poisoning include methemoglobinemia, nausea, dizziness, increased heart rate, hypotension, fainting and possibly shock.

**Chronic Symptoms:** Overexposure to this material may result in methemoglobinemia.

### 4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention. Hot Ammonium Nitrate burns skin, allowing rapid absorption of Ammonium Nitrate through the skin and toxic effects can occur quite rapidly. Causes methemoglobinemia – emergency response should treat appropriately, such as by intravenous administration of methylene blue.

## SECTION 5: FIRE-FIGHTING MEASURES

### 5.1. Extinguishing Media

**Suitable Extinguishing Media:** Use extinguishing media appropriate for surrounding fire.

**Unsuitable Extinguishing Media:** Do not use a heavy water stream. Use of heavy stream of water may spread fire.

### 5.2. Special Hazards Arising From the Substance or Mixture

**Fire Hazard:** Contains substances that are oxidizers when in solid form. May cause fire or explosion if allowed to dry.

**Explosion Hazard:** May be explosive in contact with flammable or organic substances and confinement during fire.

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**Reactivity:** Accelerates the rate of burning materials. Oxidizer if allowed to dry.

### 5.3. Advice for Firefighters

**Precautionary Measures Fire:** Exercise caution when fighting any chemical fire. Under fire conditions closed containers may rupture or explode.

**Firefighting Instructions:** Do not allow product to evaporate to dryness. For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk.

**Protection During Firefighting:** Do not enter fire area without proper protective equipment, including respiratory protection.

**Hazardous Combustion Products:** Nitrogen oxides. Ammonia. Toxic vapors. Carbon oxides (CO, CO<sub>2</sub>).

### Reference to Other Sections

Refer to section 9 for flammability properties.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1. Personal Precautions, Protective Equipment and Emergency Procedures

**General Measures:** Use special care to avoid static electric charges. Keep away from open flames, hot surfaces and sources of ignition. No smoking. Avoid all contact with skin, eyes, or clothing. Avoid breathing vapor, mist, or spray.

#### 6.1.1. For Non-Emergency Personnel

**Protective Equipment:** Use appropriate personal protection equipment (PPE).

**Emergency Procedures:** Evacuate unnecessary personnel. Eliminate ignition sources.

#### 6.1.2. For Emergency Personnel

**Protective Equipment:** Equip cleanup crew with proper protection.

**Emergency Procedures:** Stop leak if safe to do so. Ventilate area.

### 6.2. Environmental Precautions

Prevent entry to sewers and public waters. Contact competent authorities after a spill.

### 6.3. Methods and Material for Containment and Cleaning Up

**For Containment:** Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.

**Methods for Cleaning Up:** Clean up spills immediately and dispose of waste safely. Absorb and/or contain spill with inert material, then place in suitable container. Do not take up in combustible material such as: saw dust or cellulosic material. Contact competent authorities after a spill.

### 6.4. Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection. See Section 13, Disposal Considerations.

## SECTION 7: HANDLING AND STORAGE

### 7.1. Precautions for Safe Handling

**Additional Hazards When Processed:** When the water in UAN evaporates, residue may include solid ammonium nitrate and urea. When sensitized or during decomposition, solid ammonium nitrate may become unstable and/or explosive. UAN pumps operated with blocked discharge have been known to detonate. Smothering, contact with organic material, or combustible material may cause an explosive situation. Thoroughly wash out pipes, tanks, or valves before welding or burning. Residual solidified ammonium nitrate may explode under high temperatures and confinement. Heating above 140°F will promote hydrolysis. Extreme cold (< 32 °F) may cause crystallization of the product. Do not allow liquid to evaporate, as solid ammonium nitrate residue can explode.

**Precautions for Safe Handling:** Use only outdoors or in a well-ventilated area. Avoid all eye and skin contact, and do not breathe vapor and mist.

**Hygiene Measures:** Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work. Wash contaminated clothing before reuse.

### 7.2. Conditions for Safe Storage, Including Any Incompatibilities

**Technical Measures:** Any proposed use of this product in elevated-temperature processes should be thoroughly evaluated to assure that safe operating conditions are established and maintained. Ventilate confined spaces before entering. Proper grounding procedures to avoid static electricity should be followed. Comply with applicable regulations.

**Storage Conditions:** Store in a dry, cool, and well-ventilated place. Keep in fireproof place. Store locked up. Store away from oxidizers, combustible materials, and all ignition sources. Protect container(s) against corrosion, physical damage, and extreme temperatures. Detached outside storage is preferable. May be corrosive to some metals.

**Incompatible Materials:** Strong acids. Strong bases. Strong oxidizers. Chlorine. Hypochlorites. Metallic powders. Combustible materials. Chromates. Zinc. Copper and its alloys. Chlorates.

### 7.3. Specific End Use(s)

Fertilizer

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control Parameters

For substances listed in section 3 that are not listed here, there are no established Exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), NIOSH (REL), OSHA (PEL), Canadian provincial governments, or the Mexican government.

### 8.2. Exposure Controls

**Appropriate Engineering Controls:** Gas detectors should be used when toxic gases may be released. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use explosion-proof equipment. Ensure all national/local regulations are observed. Provide sufficient ventilation to keep ammonia vapors below the permissible exposure limit.

**Personal Protective Equipment:** Gloves. Protective goggles. Insufficient ventilation: wear respiratory protection. Protective clothing.



**Materials for Protective Clothing:** Chemically resistant materials and fabrics.

**Hand Protection:** Wear chemically resistant protective gloves.

**Eye Protection:** Chemical goggles or safety glasses.

**Skin and Body Protection:** Chemical resistant suit. Rubber apron, boots.

**Respiratory Protection:** If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn.

**Other Information:** When using, do not eat, drink, or smoke.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on Basic Physical and Chemical Properties

Physical State	: Liquid
Appearance	: Colorless liquid
Odor	: Little or no detectable ammonia odor
Odor Threshold	: Not available
pH	: 6.5 - 7.8
Evaporation Rate	: Not available
Melting Point	: 0°F (-18°C) for 28%N; 16°F (-9°C) for 30%N; 32°F (0°C) for 32%N (salt out temperature)
Freezing Point	: Not available
Boiling Point	: > 100 °C (> 212 °F)
Flash Point	: Not available
Auto-ignition Temperature	: Not available
Decomposition Temperature	: Not available
Flammability (solid, gas)	: Not available
Lower Flammable Limit	: Not available
Upper Flammable Limit	: Not available
Vapor Pressure	: 0.11 - 0.06 psia (28%, 32% respectively) @60°F (15.6°C) due to water component

<b>Relative Vapor Density at 20 °C</b>	: Not available
<b>Relative Density</b>	: 10.67 lbs/gal (28%N); 10.86 lbs/gal (30%N); 11.08 lbs/gal (32% N)
<b>Specific Gravity</b>	: 1.281 (28%N); 1.304 (30%N); 1.330 (32%N) @60°F (16°C)
<b>Solubility</b>	: Miscible
<b>Partition Coefficient: N-Octanol/Water</b>	: Urea: -1.59, Ammonium Nitrate: -3.1
<b>Viscosity</b>	: 3.6 cP (28%N); 6.1 cP (32%N) @40°F (4.4°C)
<b>Explosion Data – Sensitivity to Mechanical Impact</b>	: Not expected to present an explosion hazard due to mechanical impact.
<b>Explosion Data – Sensitivity to Static Discharge</b>	: Not expected to present an explosion hazard due to static discharge.

## SECTION 10: STABILITY AND REACTIVITY

### 10.1. Reactivity

Accelerates the rate of burning materials. Oxidizer if allowed to dry.

### 10.2. Chemical Stability

Stable.

### 10.3. Possibility of Hazardous Reactions

Hazardous polymerization will not occur.

### 10.4. Conditions to Avoid

Extremely high or low temperatures. Open flame. Heat. Sparks. High pressures- explodes if heated under confinement. Do not allow product to dry out. When the water in UAN evaporates, residue may include solid ammonium nitrate and urea. When sensitized or during decomposition, solid ammonium nitrate may become unstable and/or explosive. UAN pumps operated with blocked discharge have been known to detonate.

### 10.5. Incompatible Materials

Strong acids. UAN will form urea nitrate when mixed with nitric acid at low pH. Urea nitrate may become unstable and/or explosive under certain conditions. Strong bases. Strong oxidizers. Chlorine. Hypochlorites. UAN will form nitrogen trichloride, which may be explosive, when mixed with chlorine and hypochlorite. Metallic powders. Combustible materials. Chromates. Zinc. Copper and its alloys. Chlorates.

### 10.6. Hazardous Decomposition Products

Nitrogen oxides. Ammonia. Carbon oxides (CO, CO<sub>2</sub>). When the water in UAN evaporates, residue may include solid ammonium nitrate and urea. When sensitized or during decomposition, solid ammonium nitrate may become unstable and/or explosive. UAN pumps operated with blocked discharge have been known to detonate.

## SECTION 11: TOXICOLOGICAL INFORMATION

### 11.1. Information on Toxicological Effects - Product

**Acute Toxicity:** Not classified

**LD50 and LC50 Data:** Not available

**Skin Corrosion/Irritation:** Not classified

**pH:** 6.5 - 7.8

**Serious Eye Damage/Irritation:** Causes serious eye irritation.

**pH:** 6.5 - 7.8

**Respiratory or Skin Sensitization:** Not classified

**Germ Cell Mutagenicity:** Not classified

**Teratogenicity:** Not classified

**Carcinogenicity:** Not classified

**Specific Target Organ Toxicity (Repeated Exposure):** Not classified

**Reproductive Toxicity:** Not classified

**Specific Target Organ Toxicity (Single Exposure):** Not classified

**Aspiration Hazard:** Not classified

**Symptoms/Injuries After Inhalation:** May cause irritation to the respiratory tract.

**Symptoms/Injuries After Skin Contact:** May cause skin irritation.

**Symptoms/Injuries After Eye Contact:** Causes eye irritation. Symptoms may include: Redness, pain, swelling, itching, burning, tearing, and blurred vision.

**Symptoms/Injuries After Ingestion:** Ammonium Nitrate: Ingestion may cause methemoglobinemia. Initial manifestation of methemoglobinemia is cyanosis, characterized by navy lips, tongue and mucous membranes, with skin color being slate grey. Further manifestation is characterized by headache, weakness, dyspnea, dizziness, stupor, respiratory distress and death due to anoxia. If ingested, nitrates may be reduced to nitrites by bacteria in the digestive tract. Signs and symptoms of nitrite poisoning include methemoglobinemia, nausea, dizziness, increased heart rate, hypotension, fainting and possibly shock.

**Chronic Symptoms:** Overexposure to this material may result in methemoglobinemia.

### 11.2. Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

<b>Water (7732-18-5)</b>	
LD50 Oral Rat	> 90000 mg/kg
<b>Urea (57-13-6)</b>	
LD50 Oral Rat	8471 mg/kg
<b>Ammonium nitrate (6484-52-2)</b>	
LD50 Oral Rat	2217 mg/kg
LC50 Inhalation Rat	> 88.8 mg/l/4h

## SECTION 12: ECOLOGICAL INFORMATION

### 12.1. Toxicity

No additional information available

<b>Urea (57-13-6)</b>	
LC50 Fish 1	16200 - 18300 mg/l (Exposure time: 96 h - Species: Poecilia reticulata)
EC50 Daphnia 1	3910 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])

### 12.2. Persistence and Degradability

<b>Urea Ammonium Nitrate Solution- 28%, 30%, 32% N (UAN) (15978-77-5)</b>	
Persistence and Degradability	Not established.

### 12.3. Bioaccumulative Potential

<b>Urea Ammonium Nitrate Solution- 28%, 30%, 32% N (UAN) (15978-77-5)</b>	
Log Pow	-1.14
Bioaccumulative Potential	Not established.

<b>Urea (57-13-6)</b>	
BCF Fish 1	< 10
Log Pow	-1.59 (at 25 °C)

<b>Ammonium nitrate (6484-52-2)</b>	
BCF Fish 1	(no bioaccumulation expected)
Log Pow	-3.1 (at 25 °C)

### 12.4. Mobility in Soil

Not available

### 12.5. Other Adverse Effects

**Other Information:** Avoid release to the environment.

## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods

**Sewage Disposal Recommendations:** Do not empty into drains; dispose of this material and its container in a safe way.

**Waste Disposal Recommendations:** Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

## SECTION 14: TRANSPORT INFORMATION

### 14.1. In Accordance with DOT

Not regulated for transport

### 14.2. In Accordance with IMDG

Not regulated for transport

### 14.3. In Accordance with IATA

Not regulated for transport

### 14.4. In Accordance with TDG

Not regulated for transport

## SECTION 15: REGULATORY INFORMATION


### 15.1. US Federal Regulations

<b>Urea Ammonium Nitrate Solution - 28%, 30%, 32% N (UAN) (15978-77-5)</b>	
<b>SARA Section 311/312 Hazard Classes</b>	Immediate (acute) health hazard
<b>Water (7732-18-5)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Urea (57-13-6)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Ammonium nitrate (6484-52-2)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	

### 15.2. US State Regulations

<b>Urea (57-13-6)</b>
U.S. - Minnesota - Hazardous Substance List U.S. - Texas - Effects Screening Levels - Long Term U.S. - Texas - Effects Screening Levels - Short Term
<b>Ammonium nitrate (6484-52-2)</b>
U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728) U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1 U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2 U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1 U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2 RTK - U.S. - Massachusetts - Right To Know List RTK - U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - New Jersey - Special Health Hazards Substances List RTK - U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List RTK - U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Texas - Effects Screening Levels - Long Term U.S. - Texas - Effects Screening Levels - Short Term

### 15.3. Canadian Regulations

<b>Urea Ammonium Nitrate Solution- 28%, 30%, 32% N (UAN) (15978-77-5)</b>	
<b>WHMIS Classification</b>	Class D Division 2 Subdivision B - Toxic material causing other toxic effects
	

<b>Water (7732-18-5)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Urea (57-13-6)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
<b>Ammonium nitrate (6484-52-2)</b>	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class C - Oxidizing Material Class D Division 2 Subdivision B - Toxic material causing other toxic effects

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

**SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION**

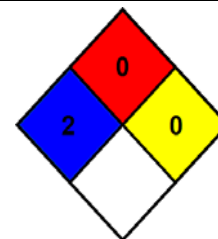
**Revision Date** : 29 September 2018  
**Revision Comments** : This document has undergone extensive revisions and should be reviewed in its entirety.

**GHS Full Text Phrases:**

Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Ox. Sol. 3	Oxidizing solids Category 3
H272	May intensify fire; oxidizer
H319	Causes serious eye irritation

**NFPA Rating**

**Health Hazard** : 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.  
**Fire Hazard** : 0 - Materials that will not burn.  
**Reactivity** : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



**HMIS III Rating**

**Health** : 2 Moderate Hazard – Temporary or minor injury may occur  
**Flammability** : 0 Minimal Hazard  
**Physical** : 0 Minimal Hazard

**Party Responsible for the Preparation of This Document**

CF Industries, Corporate EHS Department, 847-405-2400

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*

*CF believes the information contained herein is accurate; however, CF makes no guarantees or warranties with respect to such accuracy and assumes no liability in connection with the use of the information contained herein by any party. The provision of the information contained herein by CF is not intended to be and should not be construed as legal advice or as ensuring compliance by other parties. Judgments as to the suitability of the information contained herein for the party's own use or purposes are solely the responsibility of that party. Any party handling, transferring, transporting, storing, applying or otherwise using this product should review thoroughly all applicable laws, rules, regulations, standards and good engineering practices. Such thorough review should occur before the party handles, transfers, transports, stores, applies or otherwise uses this product.*