SAFETY DATA SHEET

UAN Solution 32-0-0

SECTION 1: Identification of the substance/mixture and of the company/ undertaking

1.1 Product identifier

Product name : UAN Solution 32-0-0

Product code : 508-28007, 508-28008, 508-30246

Product description : EC FERTILIZER Urea Ammonium Nitrate Solution 32-0-0

Product type : Liquid.

Other means of identification : Not available.

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses
Professional use in formulation of mixtures and end-use. Industrial use in the formulation of mixtures, intermediate use, and end use in industrial settings.

Uses advised against	Reason
Other	The supplier has no experience or data on this use.

1.3 Details of the supplier of the safety data sheet

Nutrien Europe SA
Avenue Louise 326/36
1050 Bruxelles
Belgium
Tel : +32 (0)2 646 70 00
Fax : +32 (0)2 646 68 60
commercial@nutrien.eu

e-mail address of person responsible for this SDS : productsafety@nutrien.com

1.4 Emergency telephone number

National advisory body/Poison Center

Telephone number : +43 1 406 43 43 (Austria - 24/7)
+32 70 245 245 (Belgium - 24/7)
+33 (0)1 45 42 59 59 (France - 24/7)
+31 (0)88 755 8000 (Netherlands - 24/7 Only for the purpose of informing medical personnel in case of acute intoxications)
+34 91 562 0420 (Spain - 24/7)
145 or +41 44 251 51 51 (Switzerland - 24/7)

Supplier

Telephone number : **CHEMTREC 24/7**
0800 293702 (Austria)
+32 2 808 32 37 (Belgium)
+33 9 75 18 14 07 (France)
0800 1817059 (Germany)
800 789 767 (Italy)
+48 22 398 80 29 (Poland)
+31 85 888 0596 (Netherlands)
+34 931 768 545 (Spain)
+41-435082011 (Switzerland)
+44 20 3807 3798 (United Kingdom)

SECTION 1: Identification of the substance/mixture and of the company/ undertaking

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition : Mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Eye Irrit. 2, H319

The product is classified as hazardous according to Regulation (EC) 1272/2008 as amended.

See Section 16 for the full text of the H statements declared above.

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : H319 - Causes serious eye irritation.

Precautionary statements

Prevention : P280 - Wear eye or face protection.

Response : 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 or attention.

Storage : Not applicable.

Disposal : Not applicable.

Hazardous ingredients : Urea Ammonium Nitrate Solution

Supplemental label elements : Not applicable.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles : Not applicable.

Special packaging requirements

Containers to be fitted with child-resistant fastenings : Not applicable.

Tactile warning of danger : Not applicable.

2.3 Other hazards

Product meets the criteria for PBT or vPvB according to Regulation (EC) No. 1907/2006, Annex XIII : This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

Other hazards which do not result in classification : None known.

SECTION 3: Composition/information on ingredients

3.2 Mixtures : Mixture

Product/ingredient name	Identifiers	%	Classification	Specific Conc. Limits, M-factors and ATEs	Type
ammonium nitrate	REACH #: 01-2119490981-27 EC: 229-347-8 CAS: 6484-52-2	45	Ox. Sol. 3, H272 Eye Irrit. 2, H319	Eye Irrit. 2, H319: C ≥ 10%	[1]
urea	REACH #: 01-2119463277-33 EC: 200-315-5 CAS: 57-13-6	35	Not classified.	-	[2]
water	REACH #: Annex IV EC: 231-791-2 CAS: 7732-18-5	20	Not classified. **See Section 16 for the full text of the H statements declared above.**	-	[2]

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs, vPvBs or Substances of equivalent concern, or have been assigned a workplace exposure limit and hence require reporting in this section.

Type

[1] Substance classified with a health or environmental hazard
[2] Additional disclosure due to company policy

Occupational exposure limits, if available, are listed in Section 8.

SECTION 4: First aid measures

4.1 Description of first aid measures

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

Inhalation : Remove person to fresh air and keep comfortable for breathing. If exposed person is not breathing, give artificial respiration or oxygen applied by trained personnel. Get medical attention if symptoms occur.

Skin contact : Rinse skin with water. Remove contaminated clothing and shoes. Wash clothing before reuse. Get medical attention if symptoms occur.

Ingestion : Wash out mouth with water. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. Decontamination measures may be necessary. Personnel and equipment must be checked and decontaminated prior to leaving the area.

4.2 Most important symptoms and effects, both acute and delayed

Over-exposure signs/symptoms

Eye contact : Causes serious eye irritation. Adverse symptoms may include the following: pain, watering, redness.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : Over-exposure by ingestion is unlikely under normal working conditions. Adverse symptoms may include the following: nausea or vomiting, stomach pains, diarrhea, methemoglobinemia.

SECTION 4: First aid measures

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician : In case of inhalation of decomposition products (carbon monoxide, carbon dioxide, nitrogen oxides) in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for up to 72 hours. In cases of suspected methemoglobinemia, monitor methemoglobin blood levels. Treatment is supportive; methylene blue may be indicated based on patient severity.

Specific treatments : For additional advice call the medical emergency number on this SDS or your poison center or doctor.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire. Apply water from a safe distance to cool container and protect surrounding area.

Unsuitable extinguishing media : Do not attempt to smother the fire.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture : In a fire or if heated, a pressure increase will occur and the container may burst. Contains an oxidizing substance. If evaporated to dryness, the product acts as an oxidizing agent, and supports combustion by liberating oxygen even if smothered. 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 (NH3, NO, NO2...). Contaminated water can cause environmental damage. Contain and collect water used to fight fire.

Hazardous combustion products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides

5.3 Advice for firefighters

Special protective actions for fire-fighters : No action shall be taken involving any personal risk or without suitable training. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. Contain and collect the water used to fight the fire for later treatment and disposal. Dangerous if allowed to dry out. Residue may exhibit oxidizing properties.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

Additional information : Dangerous if allowed to dry out. Residue may exhibit oxidizing properties.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

SECTION 6: Accidental release measures

6.2 Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused adverse impacts (sewers, waterways, soil or air).

6.3 Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop the release if safe to do so. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Use appropriate equipment to put the spilled substance in a container for reuse or disposal. Dispose of waste according to applicable legislation.

6.4 Reference to other sections : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

7.1 Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid contact with eyes, skin and clothing. Do not ingest. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep away from heat. Keep from freezing. Do not store below the following temperature: 0°C. Keep container tightly closed and sealed until ready for use. Dangerous if allowed to dry out. Residue may exhibit oxidizing properties. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. May form corrosive sludge on prolonged storage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. May be corrosive to metals. Contact your sales representative or a metallurgical specialist to ensure compatibility with your equipment.

While UAN as produced is not classified as an oxidizer, it is important to prevent conditions during handling and storage which may result in concentration of the product which may encourage it to behave as an oxidizer. Ensure that UAN solution pumps are thermally protected against exceeding a temperature of 66 deg. C (150 deg. F). Also ensure that piping sytems, if insulated, are not externally heated (heat traced).

7.3 Specific end use(s)

Recommendations : Fertilizer. Manufacture of specialty fertilizers.

Industrial sector specific solutions : See Annex to the Safety data sheet for additional information in the Exposure Scenario(s).

SECTION 8: Exposure controls/personal protection

The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

8.1 Control parameters

Occupational exposure limits

No exposure limit value known.

Biological exposure indices

None known.

Recommended monitoring procedures : Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

DNELs/DMELs

Product/ingredient name	Type	Exposure	Value	Population	Effects
ammonium nitrate	DNEL	Long term Dermal	5.12 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	36 mg/m³	Workers	Systemic
urea	DNEL	Short term Inhalation	292 mg/m³	Workers	Systemic
	DNEL	Long term Inhalation	292 mg/m³	Workers	Systemic
	DNEL	Short term Dermal	580 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Dermal	580 mg/kg bw/day	Workers	Systemic

PNECs

Product/ingredient name	Compartment Detail	Value	Method Detail
ammonium nitrate	Sewage Treatment Plant	18 mg/l	Assessment Factors
urea	Fresh water	0.47 mg/l	Assessment Factors

8.2 Exposure controls

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Individual protection measures

Contact your personal protective equipment supplier to verify the compatibility of the equipment for the intended purpose.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

SECTION 8: Exposure controls/personal protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

9.1 Information on basic physical and chemical properties

Appearance

Physical state : Liquid. [Clear to slightly hazy liquid.]

Color : Colorless to light yellow.

Odor : Ammoniacal. [Slight]

Odor threshold : Not available.

Melting point/freezing point : 0°C

Initial boiling point and boiling range : 121°C (249.8°F)

Flammability : Not available.

Lower and upper explosion limit : Not available.

Flash point : Not applicable.

Auto-ignition temperature : Not applicable. Decomposes on heating.

Decomposition temperature : Not available.

pH : 6 to 7

Viscosity : Not available.

Solubility in water : Soluble in water in any proportion.

Partition coefficient: n-octanol/water : Not applicable.

Vapor pressure :

	Vapor Pressure at 20°C			Vapor pressure at 50°C		
Ingredient name	**mm Hg**	**kPa**	**Method**	**mm Hg**	**kPa**	**Method**
water	23.8	3.2				

Relative density : Not available.

Density : 1.3 to 1.34 g/cm³

SECTION 9: Physical and chemical properties

Vapor density : Not available.

Explosive properties : Dangerous if allowed to dry out. Residue may exhibit oxidizing properties.

Oxidizing properties : Contains an oxidizing substance. Not an oxidizer at the manufactured concentration. It may become an oxidizing liquid if concentrated by evaporation.

Particle characteristics

Median particle size : Not applicable.

SECTION 10: Stability and reactivity

10.1 Reactivity : Not considered to be reactive. Stable under recommended storage and handling conditions (see Section 7).

10.2 Chemical stability : The product is stable.

10.3 Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur. Risk of explosion if heated under confinement. May be corrosive to metals. Contact your sales representative or a metallurgical specialist to ensure compatibility with your equipment.

10.4 Conditions to avoid : Do not allow to dry out. Avoid high temperatures in combination with high pressures. Keep away from heat and direct sunlight. Keep from freezing. Prevent product contamination. Keep away from incompatible materials. Keep away from combustible material.

10.5 Incompatible materials : Strong acids, strong alkalis, chlorine, hypochlorites, chlorates. Incompatible with copper alloys, copper, and zinc. May be incompatible with some materials of construction.

10.6 Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
ammonium nitrate	LD50 Oral	Rat	2217 mg/kg	-
urea	LD50 Oral	Rat	8471 mg/kg	-
water	LD50 Oral	Rat	>90 g/kg	-

Conclusion/Summary : See below.

Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
ammonium nitrate	2217	N/A	N/A	N/A	N/A
urea	8471	N/A	N/A	N/A	N/A

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
ammonium nitrate	Eyes - Edema of the conjunctivae	Rabbit	3	-	3 days
	Skin - Edema	Rabbit	0	-	72 hours

Conclusion/Summary

SECTION 11: Toxicological information

Skin : Non-irritating to the skin.

Eyes : Irritating to the eyes.

Respiratory : No known significant effects or critical hazards.

Sensitization

Product/ingredient name	Route of exposure	Species	Result
UAN Solution 32-0-0	skin	Mouse	Not sensitizing
ammonium nitrate	skin	Mouse	Not sensitizing

Conclusion/Summary

Skin : Non-sensitizer.

Respiratory : No known significant effects or critical hazards.

Mutagenicity

Product/ingredient name	Test	Experiment	Result
ammonium nitrate	OECD 471 Bacterial Reverse Mutation Test	Experiment: In vitro Subject: Bacteria	Negative
	OECD 476 In vitro Mammalian Cell Gene Mutation Test	Experiment: In vitro Subject: Mammalian-Animal	Negative

Conclusion/Summary : No mutagenic effect.

Carcinogenicity

Conclusion/Summary : Potential for nitrosamine formation if ingested. Do not ingest.

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
ammonium nitrate	Negative	Negative	Negative	Rat - Male, Female	Oral: 1500 mg/kg	-

Conclusion/Summary : No known significant effects or critical hazards.

Teratogenicity

Product/ingredient name	Result	Species	Dose	Exposure
ammonium nitrate	Negative - Oral	Rat - Female	1500 mg/kg	-

Conclusion/Summary : No known significant effects or critical hazards.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Dermal, Eyes.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

SECTION 11: Toxicological information

Ingestion : May be irritating to the digestive tract. May cause nausea, vomiting, diarrhea, and abdominal pain. May cause methemoglobinemia (a condition that interferes with the oxygen-carrying capacity of the blood) if ingested in large quantities or over a prolonged period of time. Persons with methemoglobinemia may have blue tinge color to lips, nails, and skin. Also they may have shortness of breath or trouble breathing. Persons more susceptible to methemoglobinemia include: very young (less than 3 months), the elderly, those with chronic obstructive pulmonary disease (COPD), anemia, coronary artery disease, recent surgery or infection, and those with a genetic deficiency of G-6-PD.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Causes serious eye irritation. Adverse symptoms may include the following: pain, watering, redness.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : Over-exposure by ingestion is unlikely under normal working conditions. Adverse symptoms may include the following: nausea or vomiting, stomach pains, diarrhea, methemoglobinemia.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : See above.

Potential delayed effects : See above.

Long term exposure

Potential immediate effects : See above.

Potential delayed effects : See below.

Potential chronic health effects

Product/ingredient name	Result	Species	Dose	Exposure
ammonium nitrate	Chronic NOAEL Oral	Rat - Male, Female	256 mg/kg	12 months Continuous

Conclusion/Summary : See below.

General : Potential chronic health effects: methemoglobinemia.

Carcinogenicity : Potential for nitrosamine formation if ingested. Do not ingest.

Mutagenicity : No known significant effects or critical hazards.

Reproductive toxicity : No known significant effects or critical hazards.

11.2 Information on other hazards

11.2.1 Endocrine disrupting properties

Not available.

11.2.2 Other information

Not available.

SECTION 12: Ecological information

12.1 Toxicity

SECTION 12: Ecological information

Product/ingredient name	Result	Species	Exposure
ammonium nitrate	NOEC >1700 mg/l	Algae	10 days
	Acute EC50 490 mg/l	Daphnia	48 hours
	Chronic NOEC 6 to 12 mg/l Fresh water	Crustaceans - Cladocera	21 days
urea	Acute EC50 6573.1 mg/l Fresh water	Crustaceans - Ceriodaphnia dubia - Neonate	48 hours
	Acute EC50 3910000 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 22.5 ppt Fresh water	Fish - Oreochromis mossambicus - Young	96 hours
	Chronic NOEC 2 g/L Fresh water	Fish - Heteropneustes fossilis	30 days

Conclusion/Summary : Based on available data, the classification criteria are not met. May be harmful to the environment if released in large quantities. Excessive nutrient runoff to a body of water may result in eutrophication.

12.2 Persistence and degradability

Conclusion/Summary : According to EC criteria: Readily biodegradable
Ammonium nitrate-Ammonium thiosulfate
Testing not required according to Column 2 of Annexes VII, VIII, IX or X, or parts 1-2 of Annex XI of Regulation (EC) No. 1907/2006.

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
ammonium nitrate	-	-	Readily
urea	-	-	Readily
water	-	-	Readily

12.3 Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
urea	<-1.73	-	low
water	-1.38	-	low

12.4 Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Mobility : Not available.

12.5 Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

12.6 Endocrine disrupting properties

Not available.

12.7 Other adverse effects

No known significant effects or critical hazards.

SECTION 13: Disposal considerations

The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

13.1 Waste treatment methods

Product

Methods of disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

Hazardous waste : Yes.

European waste catalogue (EWC)

Waste code	Waste designation
02 01 08*	agrochemical waste containing hazardous substances

Packaging

Methods of disposal : The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Special precautions : This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

	ADR/RID	ADN	IMDG	IATA
14.1 UN number or ID number	Not regulated.	Not regulated.	Not regulated.	Not regulated.
14.2 UN proper shipping name	-	-	-	-
14.3 Transport hazard class(es)	-	-	-	-
14.4 Packing group	-	-	-	-
14.5 Environmental hazards	No.	No.	No.	No.

14.6 Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Maritime transport in bulk according to IMO instruments : Not available.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorization

Annex XIV

None of the components are listed.

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles : Not applicable.

Other EU regulations

Industrial emissions (integrated pollution prevention and control) - Air : Not listed

Industrial emissions (integrated pollution prevention and control) - Water : Not listed

Ozone depleting substances (1005/2009/EU)

Not listed.

Prior Informed Consent (PIC) (649/2012/EU)

Not listed.

Persistent Organic Pollutants

Not listed.

Seveso Directive

This product is not controlled under the Seveso III Directive.

National regulations

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : All components are listed or exempted.

Canada : All components are listed or exempted.

China : All components are listed or exempted.

Eurasian Economic Union : **Russian Federation inventory**: All components are listed or exempted.

SECTION 15: Regulatory information

Japan : **Japan inventory (CSCL)**: All components are listed or exempted.
Japan inventory (ISHL): Not determined.

New Zealand : All components are listed or exempted.

Philippines : All components are listed or exempted.

Republic of Korea : All components are listed or exempted.

Taiwan : All components are listed or exempted.

Thailand : All components are listed or exempted.

Turkey : Not determined.

United States : All components are active or exempted.

Viet Nam : All components are listed or exempted.

15.2 Chemical Safety Assessment : Not applicable.

SECTION 16: Other information

Indicates information that has changed from previously issued version.

Abbreviations and acronyms : ATE = Acute Toxicity Estimate
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
EUH statement = CLP-specific Hazard statement
N/A = Not available
PBT = Persistent, Bioaccumulative and Toxic
PNEC = Predicted No Effect Concentration
RRN = REACH Registration Number
SGG = Segregation Group
vPvB = Very Persistent and Very Bioaccumulative

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
Eye Irrit. 2, H319	Calculation method

Full text of abbreviated H statements

H272	May intensify fire; oxidizer.
H319	Causes serious eye irritation.

Full text of classifications [CLP/GHS]

Eye Irrit. 2	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
Ox. Sol. 3	OXIDIZING SOLIDS - Category 3

Date of issue/ Date of revision : 3/26/2023

Date of previous issue : 2/16/2021

Version : 4

Notice to reader

Supply chain partners must ensure they pass this SDS, and all other relevant safety information to their customers.

DISCLAIMER AND LIMITATION OF LIABILITY

The information and recommendations contained in this Safety Data Sheet ("SDS") relate only to the specific material referred to herein (the "Material") and do not relate to the use of such Material in combination with any other material or process. The information and recommendations contained herein are believed to be current and correct as of the date of this SDS. HOWEVER, THE INFORMATION AND RECOMMENDATIONS ARE PRESENTED WITHOUT WARRANTY, REPRESENTATION OR LICENSE OF ANY KIND, EXPRESS OR

SECTION 16: Other information

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Annex to the extended Safety Data Sheet (eSDS)

Professional

Identification of the substance or mixture

Product definition : Mixture

Code : 508-28007, 508-28008, 508-30246

Product name : UAN Solution 32-0-0

Section 1 - Title

Short title of the exposure scenario : Nutrien UAN Solution ES for Professionals

List of use descriptors : **Identified use name:** Professional use in formulation of mixtures and end-use.
Process Category: PROC03, PROC08a, PROC08b, PROC09, PROC19, PROC11
Substance supplied to that use in form of: As such
Sector of end use: SU01, SU10, SU22
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC02, ERC08c, ERC08f, ERC09a, ERC09b
Market sector by type of chemical product: PC12, PC37

Environmental contributing scenarios : **An environmental assessment has not been done as the substance does not meet the criteria for being classified as dangerous for the environment.**

Health Contributing scenarios : **All process categories are addressed by this contributing scenario as all Operational Conditions and Risk Management Measures are identical.**

Number of the ES : 2

Processes and activities covered by the exposure scenario : Applicable to all identified Process Categories.

Section 2 - Exposure controls

Contributing scenario controlling environmental exposure for 1: An environmental assessment has not been done as the substance does not meet the criteria for being classified as dangerous for the environment.

Not applicable.

Contributing scenario controlling worker exposure for 2: All process categories are addressed by this contributing scenario as all Operational Conditions and Risk Management Measures are identical.

All process categories are addressed by this contributing scenario as all Operational Conditions and Risk Management Measures are identical.

Product characteristics : Liquid.

Concentration of substance in mixture or article : Covers percentage substance in the product up to 100%

Physical state : Liquid.

Dust : Not applicable.

Amounts used : Variable.

Frequency and duration of use/exposure : >4 Hours per shift

Human factors not influenced by risk management : Not applicable.

Other conditions affecting workers exposure : Indoor or outdoor use

Area of use: : Indoor and outdoor use.

Technical conditions and measures at process level (source) to prevent release : Not applicable.

Technical conditions and measures to control dispersion from source towards the worker	:	Use containment as appropriate. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Engineering controls	:	Provide adequate ventilation.
Ventilation control measures	:	Provide adequate ventilation and, if possible, use or install internal exhaust systems.
Product substance-related measures	:	Avoid contact with eyes. Use suitable eye protection. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.

Conditions and measures related to personal protection, hygiene and health evaluation

Advice on general occupational hygiene	:	Avoid contact with eyes. Ensure good industrial hygiene. Use suitable eye protection. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes. Wash hands and face before breaks and immediately after handling the product.
Personal protection	:	Use suitable eye protection. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.

Section 3 - Exposure estimation and reference to its source

Website:	:	Qualitative approach used to conclude safe use.

Exposure estimation and reference to its source - Environment: 1: An environmental assessment has not been done as the substance does not meet the criteria for being classified as dangerous for the environment.

Exposure assessment (environment):	:	Not applicable.
Exposure estimation and reference to its source	:	Not available.

Exposure estimation and reference to its source - Workers: 2: All process categories are addressed by this contributing scenario as all Operational Conditions and Risk Management Measures are identical.

Exposure assessment (human):	:	Qualitative approach used to conclude safe use.
Exposure estimation and reference to its source	:	Not available.

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Environment	:	Not applicable.
Health	:	No additional risk management measures required.

Additional good practice advice beyond the REACH CSA

Environment	:	Not available.
Health	:	Use containment as appropriate. Ensure control measures are regularly inspected and maintained. Pay attention to good general hygiene and housekeeping.

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Mixture

Code : 508-28007, 508-28008, 508-30246

Product name : UAN Solution 32-0-0

Section 1 - Title

Short title of the exposure scenario : Nutrien UAN Solution Exposure Scenario for Workers

List of use descriptors : **Identified use name:** Industrial use in the formulation of mixtures, intermediate use, and end use in industrial settings.
Process Category: PROC02, PROC03, PROC04, PROC08b, PROC09, PROC08a
Substance supplied to that use in form of: As such
Sector of end use: SU03, SU10, SU23
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC02, ERC06a, ERC08d
Market sector by type of chemical product: PC12, PC37
Article category related to subsequent service life: Not applicable.

Environmental contributing scenarios : **Not applicable.**

Health Contributing scenarios : **Bulk transfers -** PROC02, PROC03, PROC08b, PROC09
Clean-down and maintenance of equipment - PROC02, PROC03, PROC08b, PROC09
Laboratory activities
Mixing operations (open systems) - PROC08b
Product packaging - PROC09
Storage - PROC08a, PROC08b

Number of the ES : 1

Processes and activities covered by the exposure scenario : Applicable to all identified Process Categories.
An environmental assessment has not been done as the substance does not meet the criteria for being classified as dangerous for the environment.

Section 2 - Exposure controls

Contributing scenario controlling environmental exposure for 1: Not applicable.

Not applicable. Not classified as dangerous to the environment.

Contributing scenario controlling worker exposure for 2: Bulk transfers

Product characteristics : Liquid.

Concentration of substance in mixture or article : Covers percentage substance in the product up to 100%

Physical state : Liquid.

Dust : Not applicable.

Amounts used : Variable, from day to day.

Frequency and duration of use/exposure : Use duration (h/d): >4

Human factors not influenced by risk management : Not applicable.

Other conditions affecting workers exposure : Indoor or outdoor use Amounts used

Area of use: : Indoor and outdoor use.

Technical conditions and measures at process level (source) to prevent release	:	No measures required.
Process control/change measures	:	Not applicable.
Technical conditions and measures to control dispersion from source towards the worker	:	Not applicable.
Engineering controls	:	Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Ventilation control measures	:	Provide adequate ventilation and, if possible, use or install internal exhaust systems.
Product substance-related measures	:	Avoid contact with eyes.
Product safety-related measures	:	Exposure to product aerosol can irritate the eyes, mouth and throat. Adequate ventilation should be provided if there is risk of aerosol formation. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.
Organizational measures to prevent/limit releases, dispersion and exposure	:	Not applicable.

Conditions and measures related to personal protection, hygiene and health evaluation

Advice on general occupational hygiene	:	A washing facility or water for eye and skin cleaning purposes should be present. Wash hands and face before breaks and immediately after handling the product. Ensure good industrial hygiene. Provide eye shower and mark its location conspicuously.
Personal protection	:	Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.
Respiratory protection	:	Not applicable.

Contributing scenario controlling worker exposure for 3: Clean-down and maintenance of equipment

Product characteristics	:	Liquid.
Concentration of substance in mixture or article	:	Covers percentage substance in the product up to 100%
Physical state	:	Liquid.
Dust	:	Not applicable.
Amounts used	:	Not applicable.
Frequency and duration of use/exposure	:	Use duration (h/d): >4
Human factors not influenced by risk management	:	Not applicable.
Other conditions affecting workers exposure	:	Indoor or outdoor use
Area of use:	:	Indoor and outdoor use.
Technical conditions and measures at process level (source) to prevent release	:	Restrict access while emptying or maintaining the unit. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Empty containers retain product residue and can be hazardous. Ensure the area is organised, well lit and ventilated with enough space to deal with spills easily.
Process control/change measures	:	These controls may include segregation of areas, access only to authorised persons, permit to work systems, confined space working procedures, and hazard awareness training.

Technical conditions and measures to control dispersion from source towards the worker	:	Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Engineering controls	:	Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Ventilation control measures	:	Provide adequate ventilation and, if possible, use or install internal exhaust systems.
Product substance-related measures	:	Avoid contact with eyes.
Product safety-related measures	:	Exposure to product aerosol can irritate the eyes, mouth and throat. Adequate ventilation should be provided if there is risk of aerosol formation. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.
Organizational measures to prevent/limit releases, dispersion and exposure	:	Not applicable.

Conditions and measures related to personal protection, hygiene and health evaluation

Advice on general occupational hygiene	:	A washing facility or water for eye and skin cleaning purposes should be present. Brush off contaminated clothing. Pay attention to good general hygiene and housekeeping. Provide eye shower and mark its location conspicuously. When using do not eat or drink.
Personal protection	:	Use suitable eye protection. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.
Respiratory protection	:	Not applicable.

Contributing scenario controlling worker exposure for 4: Laboratory activities

Product characteristics	:	Liquid.
Concentration of substance in mixture or article	:	Covers percentage substance in the product up to 100%
Physical state	:	Liquid.
Dust	:	Not applicable.
Amounts used	:	Variable, from day to day.
Frequency and duration of use/exposure	:	Use duration (h/d): >4
Human factors not influenced by risk management	:	Not applicable.
Other conditions affecting workers exposure	:	Indoor use
Area of use:	:	Indoor and outdoor use.
Technical conditions and measures at process level (source) to prevent release	:	No measures required.
Process control/change measures	:	Not applicable.
Technical conditions and measures to control dispersion from source towards the worker	:	Manipulate in a well-ventilated area or under an adequate fume hood.
Engineering controls	:	Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Ventilation control measures	:	Provide adequate ventilation and, if possible, use or install internal exhaust systems.
Product substance-related measures	:	Avoid contact with eyes.

Product safety-related measures	:	Exposure to product aerosol can irritate the eyes, mouth and throat. Adequate ventilation should be provided if there is risk of aerosol formation. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.
Organizational measures to prevent/limit releases, dispersion and exposure	:	Not applicable.

Conditions and measures related to personal protection, hygiene and health evaluation

Advice on general occupational hygiene	:	A washing facility or water for eye and skin cleaning purposes should be present. Safety eyewear should be used when there is a likelihood of exposure. Wash hands and face before breaks and immediately after handling the product.
Personal protection	:	Use suitable eye protection. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.
Respiratory protection	:	Not applicable.

Contributing scenario controlling worker exposure for 5: Mixing operations (open systems)

Product characteristics	:	Liquid.
Concentration of substance in mixture or article	:	Covers percentage substance in the product up to 100%
Physical state	:	Liquid.
Dust	:	Not applicable.
Amounts used	:	Not applicable.
Frequency and duration of use/exposure	:	Use duration (h/d): >4
Human factors not influenced by risk management	:	Not applicable.
Other conditions affecting workers exposure	:	Indoor use
Area of use:	:	Indoor and outdoor use.
Technical conditions and measures at process level (source) to prevent release	:	No measures required.
Process control/change measures	:	Not applicable.
Technical conditions and measures to control dispersion from source towards the worker	:	Not applicable.
Engineering controls	:	Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Ventilation control measures	:	Provide adequate ventilation and, if possible, use or install internal exhaust systems.
Product substance-related measures	:	Avoid contact with eyes.
Product safety-related measures	:	Exposure to product aerosol can irritate the eyes, mouth and throat. Adequate ventilation should be provided if there is risk of aerosol formation. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.
Organizational measures to prevent/limit releases, dispersion and exposure	:	Not applicable.

Conditions and measures related to personal protection, hygiene and health evaluation

Advice on general occupational hygiene	:	A washing facility or water for eye and skin cleaning purposes should be present. Safety eyewear should be used when there is a likelihood of exposure. Wash hands and face before breaks and immediately after handling the product.
Personal protection	:	Use suitable eye protection. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.

Respiratory protection	:	Not applicable.

Contributing scenario controlling worker exposure for 6: Product packaging

Product characteristics	:	Liquid.
Concentration of substance in mixture or article	:	Covers percentage substance in the product up to 100%
Physical state	:	Liquid.
Dust	:	Not applicable.
Amounts used	:	Not applicable.
Frequency and duration of use/exposure	:	Use duration (h/d): >4
Human factors not influenced by risk management	:	Not applicable.
Other conditions affecting workers exposure	:	Indoor use
Area of use:	:	Indoor and outdoor use.
Technical conditions and measures at process level (source) to prevent release	:	No measures required.
Process control/change measures	:	Not applicable.
Technical conditions and measures to control dispersion from source towards the worker	:	Ensure the area is organised, well lit and ventilated with enough space to deal with spills easily.
Engineering controls	:	Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Ventilation control measures	:	Provide adequate ventilation and, if possible, use or install internal exhaust systems.
Product substance-related measures	:	Avoid contact with eyes.
Product safety-related measures	:	Exposure to product aerosol can irritate the eyes, mouth and throat. Adequate ventilation should be provided if there is risk of aerosol formation. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.
Organizational measures to prevent/limit releases, dispersion and exposure	:	Not applicable.

Conditions and measures related to personal protection, hygiene and health evaluation

Advice on general occupational hygiene	:	A washing facility or water for eye and skin cleaning purposes should be present. Safety eyewear should be used when there is a likelihood of exposure. Wash hands and face before breaks and immediately after handling the product.
Personal protection	:	Use suitable eye protection. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.
Respiratory protection	:	Not applicable.

Contributing scenario controlling worker exposure for 7: Storage

Product characteristics	:	Liquid.
Concentration of substance in mixture or article	:	Covers percentage substance in the product up to 100%
Physical state	:	Liquid.
Dust	:	Not applicable.
Amounts used	:	Not applicable.
Frequency and duration of use/exposure	:	Use duration (h/d): >4

Human factors not influenced by risk management	:	Not applicable.
Other conditions affecting workers exposure	:	Indoor use
Area of use:	:	Indoor and outdoor use.
Technical conditions and measures at process level (source) to prevent release	:	No measures required.
Process control/change measures	:	Not applicable.
Technical conditions and measures to control dispersion from source towards the worker	:	Not applicable.
Engineering controls	:	Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Ventilation control measures	:	Provide adequate ventilation and, if possible, use or install internal exhaust systems.
Product substance-related measures	:	Avoid contact with eyes.
Product safety-related measures	:	Exposure to product aerosol can irritate the eyes, mouth and throat. Adequate ventilation should be provided if there is risk of aerosol formation. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.
Organizational measures to prevent/limit releases, dispersion and exposure	:	Not applicable.
Conditions and measures related to personal protection, hygiene and health evaluation		
Advice on general occupational hygiene	:	A washing facility or water for eye and skin cleaning purposes should be present. Safety eyewear should be used when there is a likelihood of exposure. Wash hands and face before breaks and immediately after handling the product.
Personal protection	:	Use suitable eye protection. Goggles, face shield or other full-face protection should be worn if there is a risk of direct exposure to aerosols or splashes.
Respiratory protection	:	Not applicable.

Section 3 - Exposure estimation and reference to its source

Website:	:	Qualitative approach used to conclude safe use.

Exposure estimation and reference to its source - Environment: 1: Not applicable.

Exposure assessment (environment):	:	Qualitative approach used to conclude safe use.
Exposure estimation and reference to its source	:	Not available.

Exposure estimation and reference to its source - Workers: 2: Bulk transfers

Exposure assessment (human):	:	Qualitative approach used to conclude safe use.
Exposure estimation and reference to its source	:	Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

Exposure estimation and reference to its source - Workers: 3: Clean-down and maintenance of equipment

Exposure assessment (human):	:	Qualitative approach used to conclude safe use.
Exposure estimation and reference to its source	:	Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

Exposure estimation and reference to its source - Workers: 4: Laboratory activities

Exposure assessment (human):	:	Qualitative approach used to conclude safe use.
Exposure estimation and reference to its source	:	Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

Exposure estimation and reference to its source - Workers: 5: Mixing operations (open systems)

Exposure assessment (human):	:	Qualitative approach used to conclude safe use.
Exposure estimation and reference to its source	:	Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

Exposure estimation and reference to its source - Workers: 6: Product packaging

Exposure assessment (human):	:	Qualitative approach used to conclude safe use.
Exposure estimation and reference to its source	:	Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

Exposure estimation and reference to its source - Workers: 7: Storage

Exposure assessment (human):	:	Qualitative approach used to conclude safe use.
Exposure estimation and reference to its source	:	Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Environment	:	No additional risk management measures required.
Health	:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Additional good practice advice beyond the REACH CSA

Environment	:	Use containment as appropriate.
Health	:	Pay attention to good general hygiene and housekeeping.