

**OCI AGRO** *Fertilizers*

# Product information

Efficient quality



**OCI**   
**NITROGEN**

# Table of Contents

## 03 Healthy growth!

## 05 Trend-setting and reliable

## 07 Fertilizers

07 Our brands

11 Blending

## 11 Services

## 12 Recommendations for storage and handling of mineral fertilizers

12 Environment

12 Health

12 Transport

## 14 Safety guidelines

14 Fire

14 Storage

15 Guides for storage of ammonium-nitrate-containing fertilizers

16 In case of fire or decomposition of fertilizers

16 First aid

16 After fire or decomposition

17 Recommendations for working safely

17 Security and registration

19 Storage and stacking of bagged product

20 Storage of bulk product

21 Maintenance of product quality at the farm

21 Corrosion

21 Suitable material in the storage and use of UAN

## 23 General information

23 Production and carbon dioxide emissions

23 Raw materials

23 Nutrients

23 Dosage

## 25 Nitrogen efficiency

25 Emissions



## Healthy growth!

This brochure gives you an overview of the fertilizers and services of OCI Agro, with current information and suggestions on matters such as safe storage, processing, and use of fertilizers.

OCI Agro stands for healthy growth. We set the tone in quality and durability and provide reliability as one of the largest suppliers of nitrogen fertilizers in Europe. Our 80 years of experience in the production, sale, and distribution of fertilizers are at your disposal in order to ensure this healthy growth.

OCI Agro is a member of Fertilizers Europe (formerly EFMA). In this association, we are one of the leaders of the Product Stewardship program. This means that it is not only our fertilizers, but also the raw materials, additives and intermediate products we use that are produced, handled, stored, distributed and used in a safe manner with respect to health, safety, security and the environment. Product Stewardship also guarantees that our plant nutrients meet the safety requirements of foodstuff production. Of course, we are also ISO 9001 certified.

You will find more information on Product Stewardship, our products, and our firm at [www.oci-agro.com](http://www.oci-agro.com). We wish you healthy growth!

**Marc van Doorn**  
Director, OCI Agro



## Trend-setting and reliable

Trend-setting and reliable, with a rich history dating back to 1929, this is OCI Agro. A division of one of the leading nitrogen manufacturers in Europe: OCI Nitrogen. Leading in the production and sale of high-quality nitrogen-containing mineral fertilizers, but also in the supply of various industrial products. For us, quality and service make the difference. From our central office in Geleen, over 400 staff members devote themselves daily to providing this quality. In this goal they share a common ambition: to ensure healthy growth for the world around us.

### Our clients

With a production capacity of 1.4 million tons of *NUTRAMON CAN*, over 1 million tons of Ammonia, 0.2 million tons of *UAN*, and 0.75 million tons of Ammonium Sulphate, we serve clients the world over, particularly in north western Europe, from Geleen. Furthermore we deliver urea and ammonia from OCI out of North Africa (Egypt and Algeria). By means of wholesaling and cooperation, our products are supplied to dairy farmers and cattle farmers, as well as mixed farms. In doing so, we guarantee quality, service, reliability, and cooperation with our clients.

### OCI Nitrogen

OCI Agro along with OCI Melamine, is a division of OCI Nitrogen. OCI Nitrogen is one of Europe's market leaders in nitrogen-containing fertilizers, as well as the largest producer of melamine in the world. The fertilizers of OCI Nitrogen play an essential role in improving agricultural productivity. In this manner, they help to meet the increasing demand for food and feed worldwide.

Melamine is used as a raw material for adhesives and resins in numerous applications, such as blockboards, laminated parquet floors, coatings, paints and plastic tableware.

OCI Nitrogen aspires to be the best-performing business in both markets, a company that stands for quality and good service, flexibility and reliability.

### Orascom Construction Industries

OCI Nitrogen is a division of Orascom Construction Industries (OCI). This is the largest firm in Egypt and has a staff of 86,000 employees worldwide. Orascom is active in fertilizer, industrial and infrastructure construction, particularly in Europe, the Middle East and North Africa. In 2012, the fertilizer division is projected to have a production and distribution scope of more than 7.7 million tons of nitrogen fertilizers.

### Head office

The head office of OCI Nitrogen is located in Geleen (the Netherlands). Production plants of OCI Nitrogen are located in the United States, Indonesia, and China, as well as in the Netherlands (Geleen).



*Our head office in Geleen*

“OCI Agro stands for quality fertilizers.”



Nutramon



Granular 3



Granular 2

## Fertilizers

### Our brands

**NUTRAMON** is the calcium ammonium nitrate fertilizer from OCI Agro. This highly versatile nitrogen fertilizer has by far the smallest CO<sub>2</sub>-footprint in Europe and can be recognized by its orange granules. The nitrogen content is 27%, and **NUTRAMON** also contains 4% MgO.

**GRANULAR 3** is the trade name of ammonium sulphate, a nitrogen-containing sulphur fertilizer sold by OCI Agro having a particle diameter of approximately 3.3 mm. This makes spreading widths of greater than 36 meters possible. The fertilizer is composed of ammonium sulphate and contains 21% nitrogen and 24% sulphur (S), equivalent to 60% SO<sub>3</sub>.

**GRANULAR 2** is the trade name of ammonium sulphate, a nitrogen-containing sulphur fertilizer sold by OCI Agro having a particle diameter of approximately 2 mm. The fertilizer is composed of ammonium sulphate and contains 21% nitrogen and 24% sulphur (S), equivalent to 60% SO<sub>3</sub>.

### Explanation

- Fertilizers supplied by OCI Agro are 'EC FERTILIZER' and conform to the requirements established by the European Commission Directives 2003/2003/EC and any supplements or revisions applicable thereto.
- Sampling and analysis of the fertilizers are performed following the European Commission Guidelines 2003/2003/EC and any supplements or revisions applicable thereto.
- All amounts specified in the product information are expressed in percent by weight.
- Sieve analysis and mean particle diameter are determined according to ISO-8397.
- Bulk density is determined according to ISO-3944.
- Water content is determined according to the Karl-Fischer method.
- OCI Agro reserves the right to modify the properties and specifications of the fertilizers listed in the product information at any time.
- The indicated product specifications are applicable at point of shipping ex works.
- Safety Data Sheets are available at [www.oci-agro.com](http://www.oci-agro.com).



### NUTRAMON

CALCIUM AMMONIUM NITRATE 27 (+4)  
27N + 4MgO



EC-FERTILIZER

<b>N</b>	<b>Total nitrogen</b>		27,00 %
	Nitric nitrogen		13,50 %
	Ammoniacal nitrogen		13,50 %
<b>MgO</b>	<b>Total Magnesium oxide</b>		4,00 %
	Water-soluble magnesium oxide		1,20 %
•	Water		approx. 0,30 %
	<b>Sieve analysis</b>		
	Fraction		
	smaller than	2,00 mm	maximum 1 %
	larger than	4,75 mm	maximum 4 %
	Mean particle size	3,60 mm	± 0,20
•	<b>Loose bulk density</b>	approx. 1040 kg/m <sup>3</sup>	

In addition to the above-mentioned nutrients, NUTRAMON contains approx. 2,00% water-soluble calcium oxide.

### GRANULAR 3

AMMONIUM SULPHATE 21 (+24)  
21N + 24S  
Granular



EC-FERTILIZER

<b>N</b>	<b>Ammoniacal nitrogen</b>		21,00 %
<b>S</b>	<b>Water-soluble sulphur</b>		24,00 %
<b>SO3</b>	<b>Water-soluble sulphur trioxide</b>		60,00 %
•	Free sulphuric acid		maximum 0,02 %
	Water		approx. 0,20 %
•	<b>Sieve analysis</b>		
	Fraction		
	smaller than	2,00 mm	maximum 10 %
	larger than	4,75 mm	maximum 10 %
	Mean particle diameter	3,30 mm	± 0,30
•	<b>Loose bulk density</b>	approx. 1010 kg/m <sup>3</sup>	

### GRANULAR 2

AMMONIUM SULPHATE 21 (+24)  
21N + 24S  
Granular



EC-FERTILIZER

<b>N</b>	<b>Ammonium nitrogen</b>		21,00 %
<b>S</b>	<b>Water-soluble sulphur</b>		24,00 %
<b>SO3</b>	<b>Water-soluble sulphur trioxide</b>		60,00 %
•	Free sulphuric acid		maximum 0,02 %
	Water		approx. 0,20 %
•	<b>Sieve analysis</b>		
	Fraction		
	smaller than	1,40 mm	maximum 10 %
	larger than	3,35 mm	maximum 5 %
	Mean particle diameter	2,00 mm	± 0,30
•	<b>Loose bulk density</b>	approx. 1040 kg/m <sup>3</sup>	

### AS CRYSTAL

AMMONIUM SULPHATE 21 (+24)  
21N + 24S  
Crystalline

EC-FERTILIZER

<b>N</b>	<b>Ammonium nitrogen</b>		21,00 %
<b>S</b>	<b>Water-soluble sulphur</b>		24,00 %
<b>SO3</b>	<b>Water-soluble sulphur trioxide</b>		60,00 %
•	Free sulphuric acid		maximum 0,02 %
	Water		approx. 0,20 %
•	<b>Sieve analysis</b>		
	Fraction		
	smaller than	0,50 mm	maximum 10 %
	larger than	2,00 mm	maximum 5 %
	Mean particle diameter	1,10 mm	± 0,20
•	<b>Loose bulk density</b>	approx. 1040 kg/m <sup>3</sup>	

### UREA 46N

AMIDE NITROGEN / CO(NH<sub>2</sub>)<sub>2</sub>

Granular

EC-FERTILIZER

<b>N</b>	<b>Total nitrogen (Urea)</b>	<b>46,00 %</b>
•	Biuret	maximum 1,00 %
•	Water	approx. 0,50 %
•	<b>Sieve analysis</b>	
	Fraction	
	Range	2,00 - 4,50 mm
		minimum 90 %
•	<b>Loose bulk density</b>	approx. 750 kg/m <sup>3</sup>

### UAN 30N

UREA AMMONIUM NITRATE SOLUTION 30 (UAN)

EC-FERTILIZER

<b>N</b>	<b>Total nitrogen</b>	<b>30,00 %</b>
	Ureic nitrogen	15,00 %
	Nitric nitrogen	7,00 %
	Ammoniacal nitrogen	8,00 %
•	Biuret	maximum 0,50 %
•	pH (20°C)	6,40 - 7,20 mm
•	Density (20°C)	approx. 1320 kg/m <sup>3</sup>
•	Storage temperature, not below	-10°C
•	Kg N / 100 L	39,5

OCI Agro recommends that the UAN be circulated before use after winter storage in order to homogenize the product.

### Blending

An advantage of using blends is that the nutrients can be precisely adapted to crop requirements. The number of working steps can also be reduced. The fertilizers *NUTRAMON* and *GRANULAR 3* from

OCI Agro, constitute high-quality components for the production of blends, because of the uniform granule size distribution of these fertilizers. It is therefore possible to produce homogenous blends with good spreading properties.

#### Examples of blend combinations for a superior blend

Element in mixture	Extra element	Mixing ratio per 100 kg		
<b>N</b>	<b>S (SO<sub>3</sub>)</b>	<b>MgO</b>	<b><i>NUTRAMON</i></b>	<b><i>GRANULAR 3</i></b>
24,5%	10,0% (25,0%)	2,3%	58 kg	42 kg
24,0%	12,0% (30,0%)	2,0%	50 kg	50 kg
23,5%	14,0% (35,0%)	1,7%	42 kg	58 kg

## Services

### Spreading tables

At [www.oci-agro.com](http://www.oci-agro.com), you will find spreading tables for many different makes and types of spreader and for all common spreading widths. The tables for *NUTRAMON*, *GRANULAR 2* and *GRANULAR 3*, give optimum adjustments for spreaders in terms of application and spreading patterns.

## Recommendations for storage and handling of mineral fertilizers

Mineral fertilizers are safe, provided that they are properly handled in accordance with current laws and regulations. Fertilizers are not poisonous, and they do not ignite or explode spontaneously. When sufficiently heated, however, they can decompose, resulting in the emission of poisonous fumes. Caution with respect to health, the environment, and transportation is essential for safe processing of mineral fertilizers.

### Environment

The products degrade readily in the environment, but are harmful to aquatic organisms. For this reason, prevent them from entering or polluting surface water. Furthermore do not spread any fertilizers at the edges of fields: this can cause a reduction in biodiversity.



Spreader with an edge spreading device

Make sure that the spreader is properly adjusted, with an edge spreading device and precise dosing equipment. Spilled material should be picked up whenever possible.

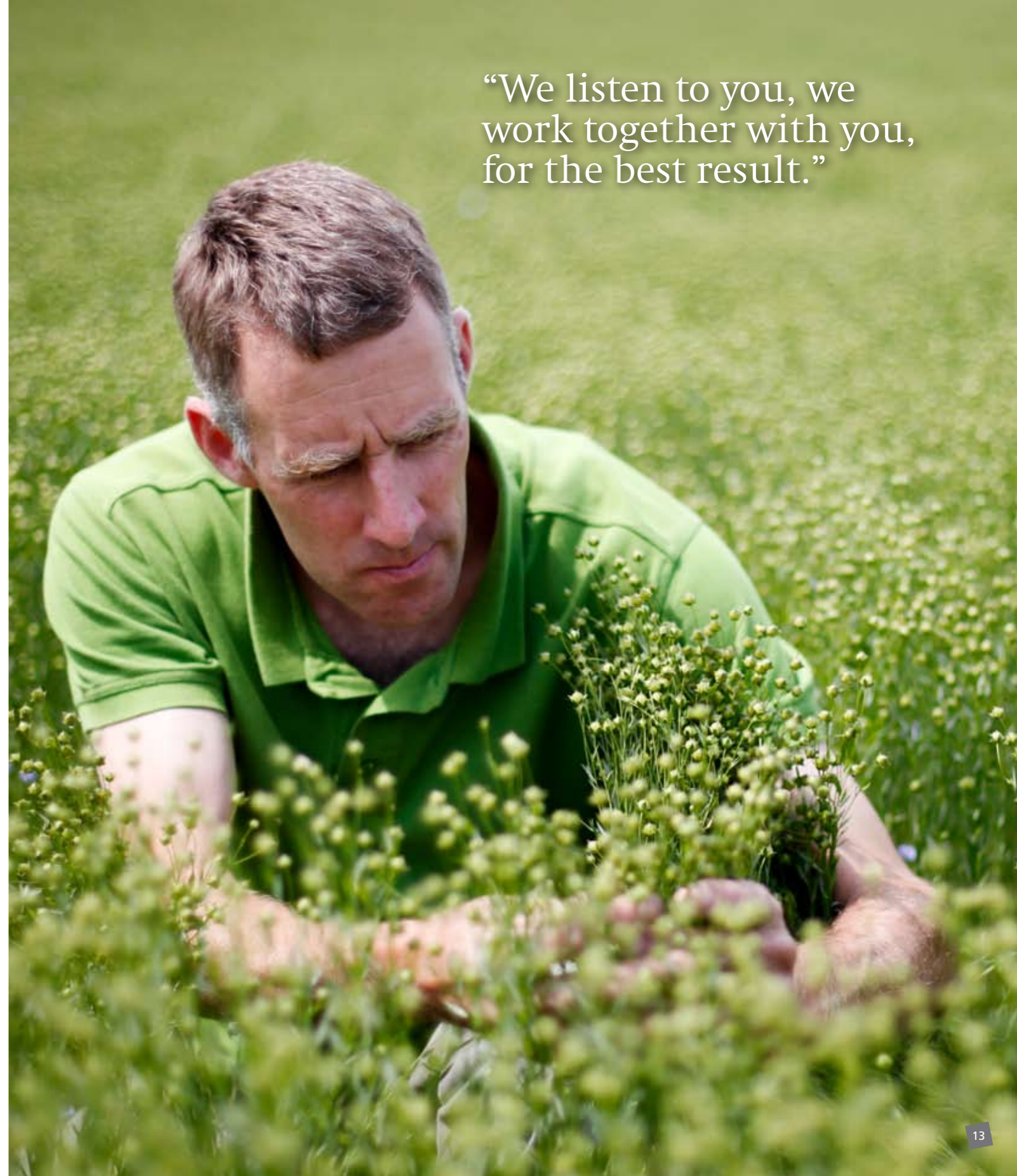
### Health

The products may have an irritating effect on skin and eyes. Therefore, wear protective clothing: gloves, overalls and safety shoes/boots. In case of exposure to the product, rinse the eyes and wash the skin thoroughly with water. Ingestion of the product may cause symptoms such as sore throat, abdominal pain, and nausea. In such cases, drink large amounts of water, but do not induce vomiting. While handling fertilizers, eating, drinking and smoking are not advisable.

### Transport

No specific regulations apply here. We recommend that you follow the ADR regulations.

“We listen to you, we work together with you, for the best result.”



# Safety guidelines

Ammonium-nitrate-containing fertilizers are safe, provided that the manufacturer's guidelines are followed. They are not poisonous, and they do not ignite or explode spontaneously. When exposed to heat or flame, however, they can decompose, resulting in the emission of poisonous fumes.

## Fire

Solid products are stable, with decomposition only occurring at temperatures above 200°C (above 290°C for UAN). The product cannot ignite, but nitrate-containing products can keep fire going. In the case of UREAN, crystallized material may contain urea nitrate, which may ignite. In the case of fire, poisonous fumes may result (nitrogen oxides; ammonia and sulphur dioxide in the case of ammonium sulphate). In such cases the fire should be extinguished with water.

## Storage

Solid products must be stored away from strong bases (such as quicklime, cement, or ground metal slag), strong acids (such as hydrochloric acid and sulphuric acid), organic materials (such as oils and grease, sawdust, grains, seeds, and grass), chromates, zinc, copper, nickel and cobalt alloys. Liquid UAN must not come into contact with nitric acid. The resulting formation of urea nitrate poses a detonation hazard in equipment when friction or impacts occur.

These guidelines can be found at [www.oci-agro.com](http://www.oci-agro.com).

Hazardous property		
Product	UREA, GRANULAR 3, GRANULAR 2, AS CRYSTAL	NUTRAMON CAN, UAN
Flammable	no	no
Emits poisonous fumes on external <sup>1</sup> combustion	yes	yes
Promotes fire by emitting O <sub>2</sub>	no	limited
Deflagration <sup>2</sup>	no	no
Explosive <sup>3</sup>	no	no
Dust explosion	n/a	n/a
Autoignition	no risk	no risk

<sup>1</sup> Depending on the type of fertilizer, this primarily involves NH<sub>3</sub>, NO<sub>x</sub>, HCl

<sup>2</sup> Deflagration is slow decomposition without flame

<sup>3</sup> Under the test conditions specified by Ordinance (EC) No. 2003/2003[4]

## Guidelines for the storage of ammonium-nitrate-containing fertilizers



DO

- Keep precise records of what is in the storage area. OCI Agro will provide labels for this purpose on request.
- Keep the storage instructions readily available.
- Train staff in safe handling and emergency situations.
- Note product movements: first in - first out.
- Keep the storage area clean and in good condition.
- Keep (emergency) exits free and keep firefighting equipment available for immediate use.
- For maintenance work, first make sure that you have formal approval from the authorities, and work according to the guidelines. Clean the equipment thoroughly before beginning maintenance.
- Use only approved electrical tools.
- Use safety and warning symbols.
- Be sure to clearly label bags and correctly label fertilizer bins.
- Conduct regular safety inspections.



DON'T

- Do not allow access by unauthorized persons.
- Smoking and open flame are prohibited.
- Forklift trucks and/or loaders must not be left running, abandoned, or left behind, near or in the storage area. Park them outside the storage area.
- (Re)fueling of forklift trucks and / or loaders in a fertilizer storage area is prohibited.
- Do not place any gas canisters, oil barrels, gas or oil tanks, or fuel tank stations, in the vicinity of fertilizers.
- Rather than using incandescent lamps, use only fluorescent lamps and avoid contact with fertilizers.
- Prevent fertilizers from coming into contact with hot objects or surfaces. Examples include lamps, switches and overheated parts of transportation equipment.
- No hot or grinding work should be conducted unless permission for this has been obtained, and only under close supervision.
- Do not mix fertilizers with flammable and organic materials, hay and straw, agricultural chemicals, oils and grease, road salt, acids and alkalis (such as hydrochloric acid and sulphuric acid), or alkaline substances (such as unslaked lime, cement, and ground metal slag).
- Rather than using sawdust for drying wet floors, use only inert materials.

## In case of fire or decomposition of fertilizers



### DO

- Call the fire department and inform them of the substances / materials involved.
- Evacuate all personnel.
- Open doors, windows and roof hatches for maximum ventilation.
- Provided this can be done safely, look for the fire source and try to get it under control.
- Fight the fire from upwind, avoid inhaling fumes and use respiratory protection as needed.
- If possible, remove decomposing fertilizers and spray water over them.
- If removal is unsuccessful or impossible, use VICTOR lances and large amounts of water to stop decomposition.
- Prevent runoffs of molten fertilizers or contaminated water from entering drains.
- Inform the authorities if there is a risk of water contamination.



### DON'T

- Don't use any chemical extinguishers, foam, steam or sand on decomposing fertilizers.

## First aid



- Evacuate persons who have been exposed to fumes to a safe area, have them lie down in the shade but keep them warm.
- Seek medical assistance, informing the doctor of the type of gas (NO<sub>x</sub> and / or HCl) and provide the Safety Information Sheet.
- If breathing stops, give mouth-to-mouth resuscitation (do not press on the chest) or oxygen (by trained staff).
- Keep the victim under medical supervision for at least 48 hours.

## After fire or decomposition



- Be vigilant against fire or decomposition to prevent it from reoccurring and keep watch for some time afterwards if necessary.
- Clean up the area.
- Remove damaged fertilizers in a safe manner (follow the manufacturer's guidelines).
- Prevent damaged fertilizers from contaminating the environment (such as surface and ground water).

## Recommendations for working safely

- Storage areas should be properly lit. The minimum distance between the stored fertilizer and any lighting should be one meter.
- The distance between the stored fertilizers and the roof construction, rafters, and girders should be at least one meter.
- Spilled fertilizers should be cleaned up as quickly as possible so as to prevent accidents. Spilled and / or contaminated fertilizers should be removed and processed in a responsible manner. Repair broken packaging immediately.
- Follow the regulations as specified in your permits and the guideline 'Control of Major Accident Hazards (Amendment) Regulations 2005'.
- Check the quality of the product on receipt and again after a few hours. Continue regular inspections. In the event of any quality discrepancies, contact the supplier.
- During storage, the formation of steep product walls resulting from stiff or hardened product may lead to hazardous situations. Prevent undercutting or destabilization and take measures to prevent collapse during digging or transferring.
- Make sure that pallets are not stacked unevenly.
- When using *UAN*, solid material may form consisting of crystallized *UAN* with various compositions of urea nitrate. Both substances are explosive and are sensitive to friction and impacts. Use water for cleaning.

## Safety and registration

- Follow national and local safety regulations.
- Do not deliver any product to a purchaser whose name and address are unknown.
- Suspicious transactions, i.e., situations in which discrepancies are noted in purchasing, selling, transfer, or storage, as well as theft, should be reported to the local police.

Source:

Fertilizers Europe (formerly EFMA) 11.01.2003, NL-PGS 7, OCI Agro



## Storage and stacking of bagged product

- Check the condition of the shipment. Report damage on the bill of lading and inform the supplier thereof.
- Use only big bags with a plastic inner bag.
- Store bagged product on a stationary, dry, flat surface that allows water to drain. Otherwise there is a risk that the stacks may become uneven and fall over.
- Restack any uneven stacks.
- Do not use any damaged pallets with bagged product to make stacks.
- Stacks must be constructed in the form of a pyramid (see photo). The bags in the second and third layer are positioned with each bag centered on the line in between the two bags underneath.
- Do not stack bagged product too high (maximum of three pallets or three big bags), and avoid damage to bags, covers, and pallets.
- The stacks must not weigh more than a maximum of 300 tons and must be placed at intervals of at least one meter from one another.
- Do not stack products outside if possible. Due to warming during the day and cooling at night, the temperature of nitrate-containing granules may fluctuate between 25 and 40°C. Specifically, this causes pulverization of the granules. If outside storage is unavoidable, then the products should preferably be stored in the shade.
- Use a tarpaulin to completely protect stowed products, inside and outside, from direct sunlight.
- Tarpaulins covering stacks outside must be securely tied down against the wind.
- Tie down covering tarpaulin ropes using work gloves rather than your bare hands.
- Prevent ingress of water. Make sure that no water remains pooled on the covering tarpaulin.
- Be careful when climbing the stacks and attaching and removing the tarpaulin cover.
- Keep the stacks outside covered when the weather is good.
- Be aware that moisture, ice or moss may make the tarpaulin slippery and hazardous.
- During freezing weather, be aware that pieces of ice may fall when the tarpaulin is removed from the stacks.
- Follow the bagged product manufacturer's safety guidelines.
- Do not exceed the safe operating load.
- Make sure that your forklift truck or loader has rounded off lifting arms.
- Make sure that the protective cover on the loop (sleeve) remains in its proper place.
- Put the loop in place on the right from the front rather than obliquely from the side. When lifted up, do not allow the big bag to slip over the loaders. This may cause damage to the loop. If it should break, this can result in serious accidents.
- Do not lift any damaged big bags or pallets.
- Never stand under a big bag that has been lifted up.
- Lift and drive carefully.
- Do not drive with the big bag or pallet too high off the ground.
- Emptying big bags: Stand at the edge and use a blade having a long handle. Do not remove product from a stacked big bag. Use a **\_** shaped cut in the side edge of the big bag in order to partially and gradually allow the contents to flow out. If necessary, use a slide plate to control outflow of the product.
- Do not re-use bags, but dispose of them using an approved waste processor.

## Storage of bulk product

- Store fertilizers in a dry place. Prevent entry of water which can occur via non-watertight floors, leaking roofs, open doors or vents, or driving in of wet vehicles.
- Check the sheds regularly for leakage and penetration of moisture, particularly after storms, heavy rain, etc.
- Nitrate-containing fertilizer should be covered with plastic foil as soon as possible after being stored. For this purpose, use transparent plastic foil having a thickness of 0.10 to 0.15 mm. Make sure that there is an overlap of approximately 0.5 meter. After unloading from a covered pile, cover the pile again with foil.
- Keep walk- and roadways clean and clean up spilled product immediately.
- Prevent nitrate-containing granules from being subjected to temperature fluctuations between 25 and 40°C. Specifically, such fluctuations cause the granules to break down. Remember that particularly during the day in summer, high temperatures can occur at the highest point of a shed.
- Mixing of certain fertilizers can cause reactions that severely harm quality. Therefore, avoid contamination with other fertilizers during storage. Also be alert for spillage from conveyor belts and contamination by oil, grease, straw, sawdust, cereals, sulphur, etc.
- Keep equipment clean.
- Do not drive with overfilled loads, as this can cause spillage, and avoid driving over the product.
- Use mechanical tools only to remove any caked-on product.
- Do not use any granule-pulverizing equipment.
- Do not load or unload during precipitation.

## Maintenance of product quality at the farm

- Keep silos moisture-free (including the filling and ventilation pipe).
- Always cover loose product with foil.
- Never store nitrate-containing fertilizer in direct sunlight.
- Do not mix incompatible fertilizers.
- Do not store any leftover amounts in the spreader.
- Be careful to avoid leakage from the spreader, particularly on public roads.
- Do not leave fertilizers unattended in the field.



## Corrosion

Fertilizers consist largely of salts that can cause corrosion of exposed metal components and exposed concrete. Equipment can best be protected by regular cleaning and thorough cleaning with water. Concrete can be protected by coating layers (epoxy coating) and regular cleaning.

## Suitable material in the storage and use of UAN



### SUITABLE

- Plastic: such as polyester, PVC, PE
- Steel Alloys
- Nozzle: plastic, stainless steel, ceramic



### DEFINITELY DO NOT USE

- Copper, bronze, galvanized iron, zinc



## General information

OCI Agro produces mineral fertilizers under controlled conditions. This ensures that our products have constant high quality. This is required in order to meet the rules and regulations for good practical application in agriculture. Fertilizers make a significant contribution in providing food and feed production. This in turn is necessary in order to continue to feed the growing world population. You can find more information on this at [www.oci-agro.com](http://www.oci-agro.com).

### Production and carbon dioxide emissions

Fertilizer production in Western Europe is subject to strict regulations with respect to environmental pollution. Less than 1% of fertilizer is lost through emissions during manufacturing. The use of natural gas in fertilizer production accounts for about 2% of carbon dioxide emissions worldwide. Emission levels at OCI Agro are well within the statutory requirements. In addition, OCI Agro's policy, aims to keep emissions as low as possible by using the best existing production processes in modern plants. In these plants, energy is used very efficiently. In 2008, OCI Agro reduced the N<sub>2</sub>O emissions of its nitric acid plants by 6500 tons per year. This is equivalent to 2 million tons of CO<sub>2</sub>. In two nitric acid plants, the reduction was even 100%. Thus, *NUTRAMON*, our calcium ammonium nitrate fertilizer, has the smallest CO<sub>2</sub>-footprint of any CAN in Europe.

### Raw materials

Nitrogen fertilizer is produced from ammonia and nitric acid. Ammonia is produced using air (as a nitrogen source). Nitric acid is obtained from air, ammonia and water.

### Foodstuffs

Fertilizers maintain soil fertility and productivity by providing it with essential plant nutrients. If no nutrients are added, yield declines. Nature is unable to make up for a deficiency of nutrients under current agricultural conditions. Fertilizers make up for this deficiency.

Crops use nitrogen primarily in the form of nitrate. Organic nitrogen, *UREA* and ammoniacal nitrogen must first be converted by soil bacteria into nitrate so that they can be rapidly consumed. Nitrogen is lost in this conversion. Organic fertilizers contain insufficient nutrients, frequently not in the proper ratio to compensate for the nutrients extracted from the soil by crops. In addition, a portion of organic fertilizers is not immediately available to crops. In such cases, mineral fertilizers are used as a supplement. Both organic and mineral fertilizers are therefore necessary for sustainable agriculture.

### Dosage

The required dose of fertilizer depends, among other factors, on the crop to be grown, soil conditions, whether organic fertilizer is used and climatic conditions. The fertilizer spreaders currently on the market, provided they are properly adjusted, ensure even spreading. In addition to adjusting spreaders, the physical quality of the fertilizer is also important for even spreading. Consistent particle size distribution and sufficient crushing strength constitute important physical properties of fertilizers, showing good spreadability. OCI Agro fertilizers meet the highest physical quality requirements, thus ensuring favorable spreadability.

“Our fertilizers are based on state of the art technology.”



## Nitrogen efficiency

### Emissions

Most nitrate present in groundwater originates from mineralization of plant residues and other forms of organic matter in the soil. Leaching out of nitrate from fertilizer may occur when more nitrate is applied than the crops can take up, or if, after the harvest, there is no winter crop or catch crop to consume the nitrate residues in the soil. In general, leaching out of fertilizers is only minor when the optimum dosage is applied. When the amount of fertilizer applied is the same as the amount extracted from the soil by the crop, there will be no leaching of the fertilizer at all. Balanced use of fertilizer has a positive effect on soil structure. Use of nitrogen-containing

fertilizers, however, inevitably increases the acidity of the soil. This should be compensated for by applying calcium in order to maintain soil structure. The dosage of calcium depends on the nitrogen fertilizer used. The dosage of calcium should be lowest when using e.g. calcium ammonium nitrate, as this product already contains calcium. When using calcium ammonium nitrate, some 50% less calcium is required than when using UAN or UREA. When using the latter two products, moreover, considerable amounts of nitrogen may be lost in the form of ammonia as a result of chemical reactions after the product is applied to the soil.

### Storage regulations

B : Decree C2006/36000, May 12, 2006, amending VLAREM [Flemish Regulation on Environmental Permits], Classification Heading 17.2

Decree 2004/29086, February 4, 2004, amending the list of classified facilities, Heading 63.12.20

D : Hazardous Substance Ordinance und TRGS [Technical Rules for Hazardous Substances] 511, 'Ammonium nitrate'

F : Decree 2005-989, of August 10, 2005, amending the nomenclature for classified facilities

IRL : S.I. no. 74, 2006, European Communities (Control Major Accident Hazards Involving Dangerous Substances) Regulations 2006

NL : Storage of Solid Mineral Inorganic Fertilizers, PGS7

UK : Control of Major Accident Hazards (Amendment) Regulations 2005

### Specific classification

Product	% N	% AN-N	% AN	F	D	NL
<b>NUTRAMON</b>	27	27	77,1	Heading 1331-II	Group C I	Group 1.2
<b>GRANULAR 3</b>	21	0	0,0	nc	-	Group 1.1
<b>GRANULAR 2</b>	21	0	0,0	nc	-	Group 1.1
<b>AS CRYSTAL</b>	21	0	0,0	nc	-	Group 1.1
<b>UREA</b>	46	0	0,0	nc	-	Group 1.1
<b>UAN</b>	30	15	42,9	Heading 2175	Group D I	Group 1.2



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