

# STAMI UREA ADVANCE

---

Optimizing your plant





# HOW CAN WE HELP YOU?

---

We help you  
find the right  
technologies.

## INTRODUCTION

---

Stamicarbon is the **world market leader in designing, licensing and developing urea plants**. Through our Stami Urea business unit we apply our expertise, knowledge and experience to help you find the right fertilizer production technologies, emission reduction technologies and all technologies for the integration of urea and adjacent processes. Moreover, we are beside you every step of the way: from creating a new plant to optimizing and upgrading existing facilities in light of a sustainable and futureproof production. We are there throughout your plant's entire life cycle.

# LICENSING STATE-OF-THE-ART UREA PLANTS

---

When it comes to creating a urea plant, our engagement and commitment does not stop after signing the contract and building your plant. We have developed an extensive technology, product and service portfolio for urea plants. We distinguish ourselves from the competition with our high-quality standards and our **Full Life Cycle philosophy**.

## Enjoy a full service

With continuous **support through the whole life cycle of your plant**, regardless of what stage your plant is at, we offer you bespoke technological solutions, products and/or services that match your requirements. We offer a **set of three series** that suit a wide range of real world specifications. We call these our **LAUNCH, ADVANCE and EVOLVE** series. Your plant's life cycle starts with

launching the design, executing the engineering, procurement and finally, construction of your plant. After the **LAUNCH** phase of the plant, you enter into the next stage – **ADVANCE**. Our products and services optimize the plant's performance. Furthermore, we provide you with the knowledge and latest designs in urea technology to upgrade your plant to **EVOLVE** to the next level.



We offer you technological solutions, products and/or services that match your requirements.

# LAUNCH<sup>TM</sup>

## Creating your plant

Launch a new plant, with all the technologies, products and services needed for successful, sustainable and profitable urea production.

Solutions for melt synthesis

Solutions for urea finishing

# ADVANCE<sup>TM</sup>

## Optimizing your plant

Advance your plant performance, reduce downtime, improve product quality and increase efficiency with these products and services:

Support and plant staff training

Optimizing plant output and operation control

Improving product quality

Improving safety and environmental impact

Inspections and plant maintenance

# EVOLVE<sup>TM</sup>

## Upgrading your plant

Evolve your plant to the next level with revamp and debottlenecking:

Increase product capacity

Reduce emission output

Reduce energy consumption

We control  
the whole  
life cycle of  
a urea plant.



# ADVANCE™

High pressure equipment replacement  
Relining/repair  
Emission reductions  
Mechanical services  
Lifetime assessment  
Plant staff training  
Troubleshooting  
Process optimization tools  
Additives/coatings  
Plant inspections  
High pressure piping/fittings/valves  
Process control equipment  
Welding training & supervision  
Spare parts

## Optimizing your plant

By fully optimizing your urea plant, you extend its life, boost its output and raise its energy efficiency. Your urea plant will meet the highest safety standards and

exceed all environmental regulations. Our ADVANCE series provides a range of product and service options that take your plant performance to the next level. We help you advance your plant operations in five areas.

1

### **Inspections and plant maintenance**

With our inspection services, we ensure an optimal performance and lifespan of your equipment and piping. It includes equipment relining and leak detection.

2

### **Product quality**

Maintaining and further improving your product quality (coating, prilling and inhibiting corrosion)? We take care of it, so you can keep meeting and exceeding your clients' expectations.

3

### **Safety and environment**

The smallest leak in the high-pressure synthesis section can lead to the release of ammonia. This is one of the many reasons proper HSE measures must be in place. We help you create the right conditions.

4

### **Plant output and operational control**

We assess your plant's status and advise on possible improvements. This includes N/C Meter and Radar Level Measurement.

5

### **Support and training**

To keep you and your staff up to date we support you with: operational and technical, mechanical and maintenance, and simulator trainings.



# INSPECTIONS AND PLANT MAINTENANCE

---

You can optimize the  
performance of your plant.





## ENJOY OUR INSPECTION SERVICES

Extending a plant's lifetime and ensuring safe urea production depends on good operation, good maintenance, and state-of-the-art technology. That's why we have developed plant integrity inspection services to ensure optimal performance and maximum lifespan of equipment and piping. Our services include:

- Urea Equipment inspection
- High-Pressure (HP) Piping inspection

All inspections are performed on equipment and piping based on vessel building knowledge, years of experience and expertise in the urea process, materials of construction, integrity (corrosion) loops and failure modes. The goal is to clearly understand the condition of your equipment, piping and parts, evaluate their lifetime, and determine the steps for risk mitigation to ensure safe operation.

**For more detailed information, please ask for our Inspection Services brochure.**

# EQUIPMENT RELINING

---

With this alternative **cost-effective solution** to replacing high pressure equipment you can **extend the lifetime of your equipment** by resolving the issue of the thinning alloy protection and safety. All this with minimum outlay, downtime and production loss.

Our solution can either involve a complete relining or a partial relining. Equipment on which this is mainly performed includes the urea reactor and, in some cases, also the high-pressure stripper or high pressure carbamate condenser.

## Our solutions offer three options:

1. Design relining procedure + on-site supervision during relining
2. As above and including supply of all relining material and consumables
3. As above and including relining execution

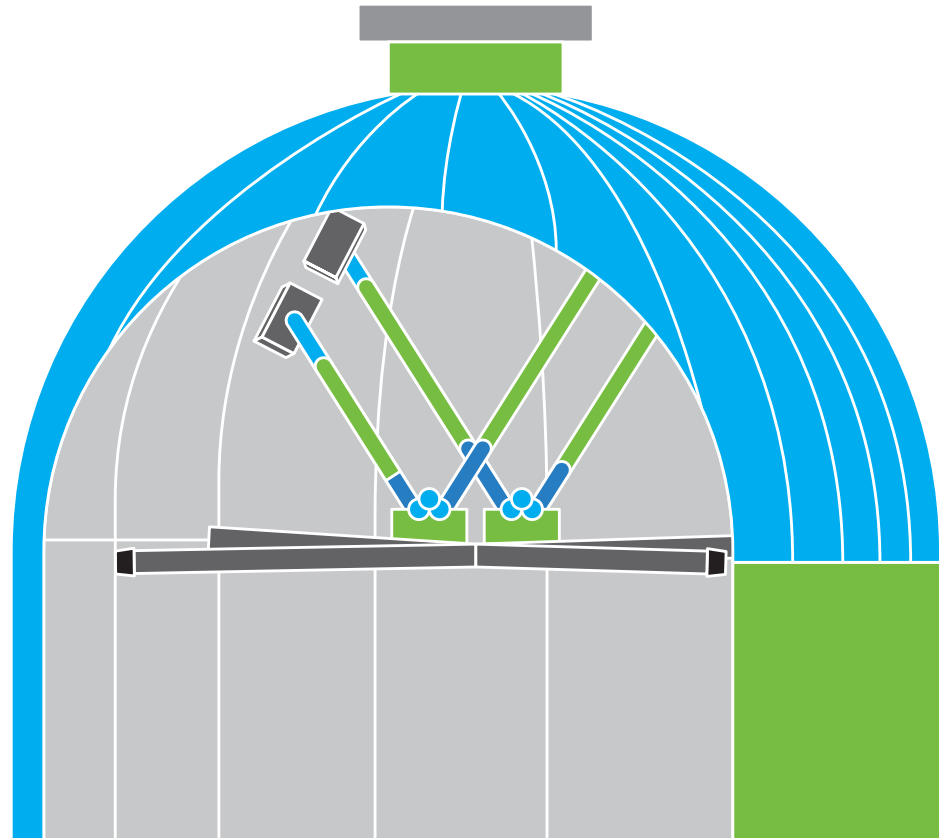


## Your benefits

- Minimum through-put time of the on-site relining project
- Minimum downtime / minimum production loss
- Minimum capital expenses
- Proven quality

## The process

Whilst designing the relining procedure, our experienced and conscientious engineers give special attention to the installation and welding procedures ensuring that the liner fits perfectly, including an essential check of the condition of the carbon steel pressure vessel before starting installation of the new liner. In most of the cases in-situ relining is possible. Where preparations are done correctly, a partial relining can be completed in approx. twenty days. A total relining will naturally need more time. As regards to devising the relining project, Stamicarbon has proven experience and is fully prepared to assist you from the start up-until the final testing of the relined vessel, to ensure that all your needs and expectations are met.



# LEAK DETECTION

---

To ensure **safe and proper operation of lined high-pressure equipment**, new or existing, and to be able to instantly detect any leakage or blockage, we offer a **continuous and accurate leak monitoring service**. That way, you are always, within the hour, on top of any leakage problem in whatever piece of high-pressure equipment it may occur. You can easily identify its location and

calculate its size\*. Furthermore, our leak detection system accurately detects and measures ammonia in the ppm range. **Safety first!** Additional services like inspection, evaluation, training, commissioning and assistance can be delivered.

\* applicable to pressurized type Leak Detection Monitoring System

We offer a continuous and accurate leak monitoring service.



## Did you know?

Several pieces of high pressure equipment can be connected to one Leak Detection Monitoring System. There's no drift nor aging of ammonia analyzer. An explosion proof version is optional.



### **How does it work?**

Depending on the specific application, one or two systems can be implemented, depending on the specifics of the equipment either one is favored.

## **1. PRESSURIZED TYPE LEAK DETECTION MONITORING SYSTEM**

Ideal for loose liner constructions with passageways in the carbon steel pressure bearing part.

### **Principle of the pressurized leak detection system**

Instrument air is supplied via a pressure reducer and a flow meter. This air flows through the passageways of the compartments between the liner and the

carbon steel pressure vessel wall.

A pressure safety valve prevents the pressure in the Leak Detection Monitoring System of exceeding the maximum system pressure, which might cause buckling of the liner. The piping of each liner compartment ends in an equipment header. The air is then fed into a gas sensor which analyzes the ammonia level continuously.

### **Locating leaks**

The leak flow rate in the identified compartment can be calculated based on the ammonia concentration measured.

The leak flow rate in the identified compartment can be calculated based on the ammonia concentration measured.

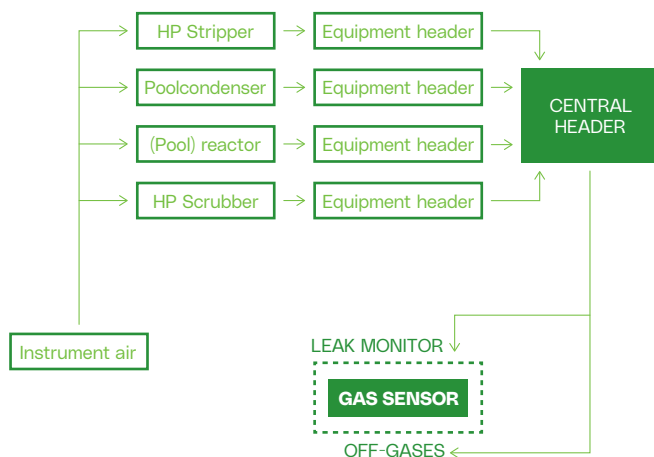
## 2. VACUUM TYPE LEAK DETECTION SYSTEM

The leak detection system consists of a number of tubes connecting the liner compartments to an equipment header.

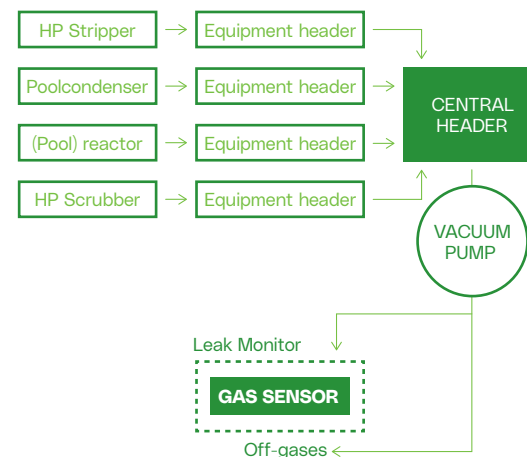
A constant under pressure will be maintained in the leak detection system by a vacuum pump. The discharge of this vacuum pump is connected to the ammonia analyzer.

The leak detection system consists of a number of tubes connecting the liner compartments to an equipment header.

### Schematic overview of a **pressurized** type Leak Detection Monitoring System



### Schematic overview of a **vacuum** type Leak Detection Monitoring System





# IMPROVING PRODUCT QUALITY

---





## COATING, PRILLING AND INHIBITING CORROSION

With our ADVANCE series we can support you in maintaining and further improving your product quality. This is essential if you want to keep meeting and exceeding your clients' expectations.

We can support you in maintaining and further improving your product quality.

# ADVANCE COAT™

---

This coating composition solution for strengthening urea prill stability dramatically improves the handling and storage properties of the prills.

## Why apply a coating?

Urea prills absorb moisture from the atmosphere, which leads to caking, a decrease in dynamic strength and increased dust formation. This problem is particularly notable when stored in bulk. Prolonged bulk storage often leads to out of spec product, handling problems and health risks. Conventional ways to reduce these problems include packaging the urea in bags rather than in bulk or adding urea formaldehyde to

increase the prill strength. Both solutions come with significant disadvantages. It adds complexity to loading and unloading and increases the product costs. Addition of urea formaldehyde further poses limitations on the technical applications of the product.

## This is our solution

Easily applied as an additive coating, ADVANCE COAT™ increases the moisture resistance of urea prills which dramatically improves the handling and storage properties. ADVANCE COAT™ is easier and cheaper to apply than urea formaldehyde making it a cost-effective, safe and crop-friendly solution.

We improve the handling and storage properties of your prills.

## What you can expect from us?

- We deliver assured quality from an out-performing product.
- You can rely on our integrated approach which covers a deep knowledge of the urea value chain from production of urea melt to urea finished prilled product to product quality improvement by a world market leader in urea technology.
- Our highly skilled technical support team is at your service.
- You get a full range of state-of-the-art laboratory services (analysis, testing, R&D).



## Your benefits

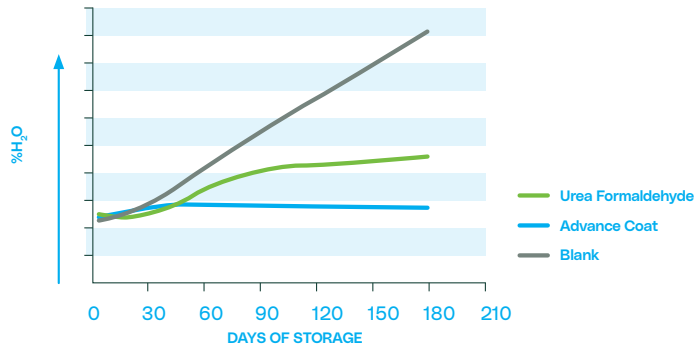
With its very effective anti-caking and water-repellent properties, ADVANCE COAT™ offers you lots of benefits. You can store them for several months with minimal changes in product quality – also during shipping. Moreover, it is easier and cheaper to apply than urea formaldehyde making it a cost-effective, safe and crop-friendly solution (no risk of foaming).

Our highly skilled technical support team is at your service.

## This is the proof

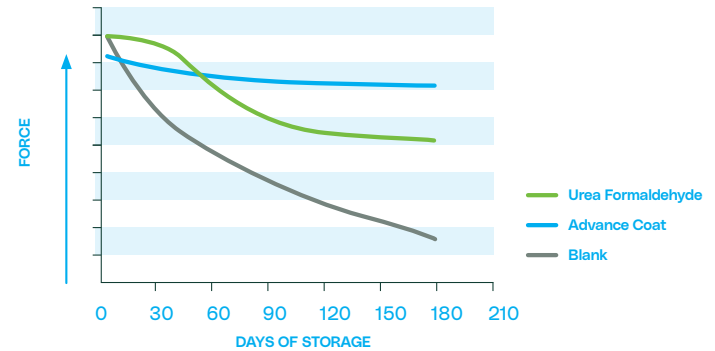
The following graphs reveal the results of test cases performed by Stamicarbon:

### H<sub>2</sub>O Test Result



Prills treated with ADVANCE COAT™ absorbed less water than both those untreated and those treated with Urea Formaldehyde.

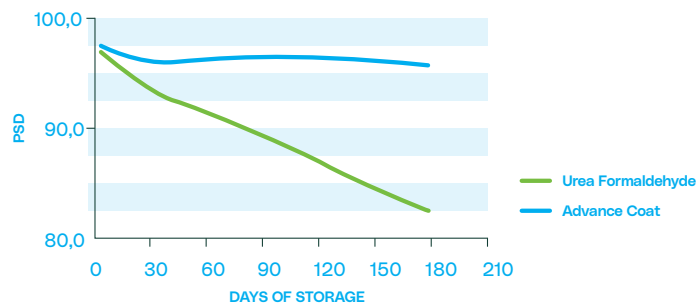
### Dynamic Strength Test Result



The dynamic strength of urea prills treated with ADVANCE COAT™ hardly declined in comparison with the untreated prills and the urea formaldehyde treated prills which has lost more than half of its dynamic strength after 6 months of storage.

## Granulometry Test Result

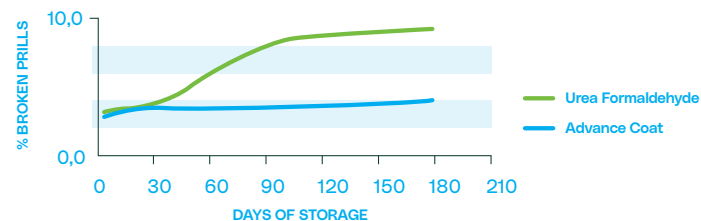
Granulometry 2.5 - 1.0 mm



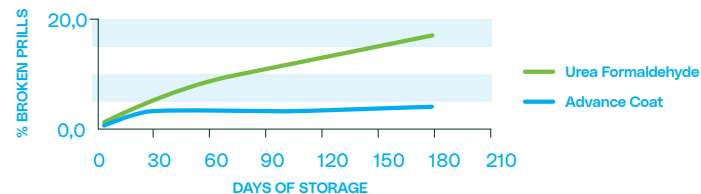
The granulometry (PSD, Particle Size Distribution) of the urea prills treated with ADVANCE COAT™ remained constant whilst that treated with urea formaldehyde decreased drastically.

## Granulometry (dust) Test Result

Granulometry 1.0 - 0.5 mm



Granulometry < 0.5 mm



The low size fraction is less at ADVANCE COAT™ products. The dust content (fines) is significantly lower by use of ADVANCE COAT™.



2

## PRILLING BUCKET DESIGN

---

Our high-quality prilling bucket design is especially developed to produce reliable, uniform and superior prills within a steady operation. It requires the minimal amount of necessary cleaning of the prilling bucket,

whilst still ensuring its long lifespan.

The prilling bucket is tailor-made according to your prilling tower performance requirements and the desired product quality you want to meet

## What you can expect from us?

- A unique proprietary prilling bucket design, produced of stainless steel to minimize corrosion for longevity.
- Prills are formed uniformly within the operating range and capacity for the ideal particle size distribution.
- The spreading of melt droplets/prills in the tower is designed for optimal cooling and low prill temperature when collected at the bottom of the prilling tower.
- Our prilling bucket provides a typical granulometry of 97.5 % between 1-2.4 mm



## Your benefits

- Ideal size distribution
- Uniform prill distribution over the total prilling tower area enabling better heat transfer between the falling prills and the air flow
- Uniformly-sized prills
- Low dust formation
- Designed for low prill temperature
- Suitable for large and small plant capacities

## Did you know?

The most important step in prilling is the formation of the liquid droplets before they are cooled, solidified and sub-cooled. The way the droplets are formed determines whether the plant produces the required, uniform, round product with a desired size distribution. The spinning bucket prill head, determines the average particle size of the prills and its design is critical.

# PRILL IMPACT STRENGTHENER DESIGN

Improving the mechanical strength of your urea prills through seeding and decreasing disintegration, dust formation and caking is necessary to guarantee a better product quality and uniformity. We can take care of that.

## What's the challenge?

Mechanical strength is especially important when the product needs to be stored after being subjected to a variety of handling operations. Poor mechanical strength leads

to disintegration and dust formation, which also increases caking tendency. Improvement of the impact strength is important if the prills are handled several times.

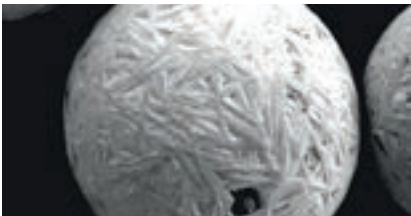
## Why do you need to improve the mechanical strength of your urea prills?

- During prilling, the impact of the prills on the prilling tower floor and the action of the scraper give rise to formation of very

fine urea dust. A part of this dust can be carried along with the rising air stream in the prilling tower.

- On collision with the descending urea droplets the dust particles act as nuclei. If a droplet collides with several dust particles, the prill will ultimately consist of a number of randomly oriented crystals. Because of the coherence between these irregular crystals, the prills have high impact strength.

- If the dust concentration in the rising air is low, the droplets do not collide with enough dust particles.



Urea prill with seeding



Urea prill without seeding

- Urea droplets may get super cooled. Owing to crystallization from the super cooled phase, the weak prill modification is formed. Super cooling is the physical phenomenon, whereby a substance is in the liquid phase even though its temperature is below the crystallization temperature. The crystallization emperature of super cooled droplets can be as low as 90°C.
- The absence of sufficient urea dust particles is imputable to the quantity of dust carried along with the rising air stream from the prilling tower bottom or by atmospheric conditions.
- Due to the hygroscopic nature of urea, the urea dust particles will adsorb moisture from the ambient air, if the relative humidity of the air is higher than the Critical Relative Humidity (CRH) of the urea. At high humidity of the ambient air the dust particles may adsorb so much water, that they pass in the solution and act no longer as nuclei.

### This is our solution

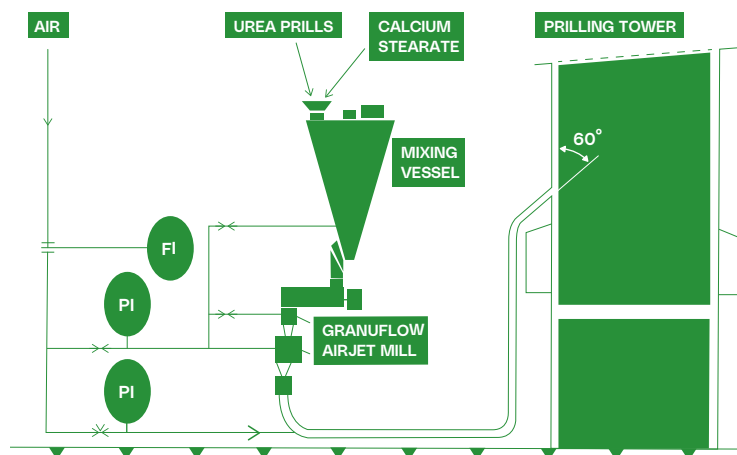
Our unique technology improves the impact strength of the prills to reduce the formation of mechanically weak prills. Urea seeds are introduced into the prilling tower, allowing the urea dust particles to collide with the urea droplets. The seeds will act as nuclei for crystallization, leading to prills with many different crystal orientations and much higher strength.



### Your benefits

- Better product quality
- Higher mechanical strength
- Less dust formation
- Better uniformity

### Schematic drawing of a seeding system



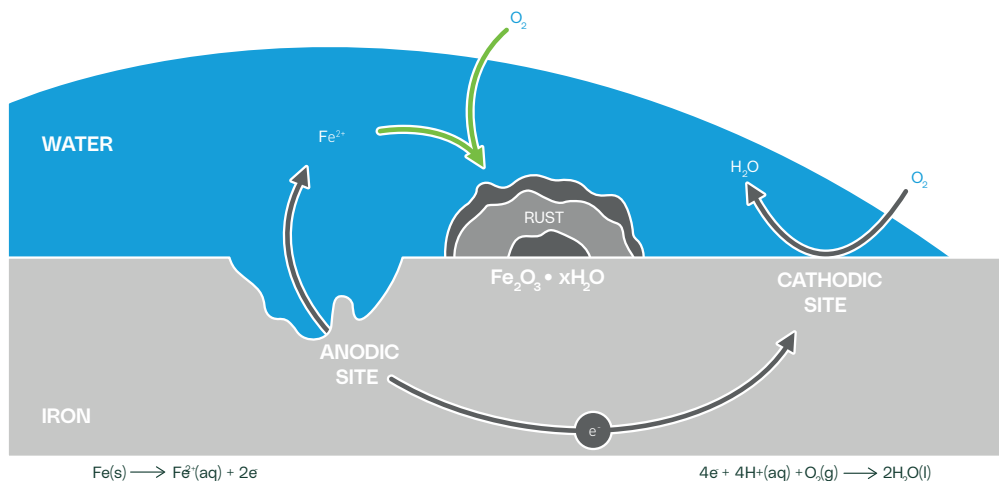
# UAN CORROSION INHIBITOR

Corrosion can cause severe damage to a plant's equipment, pipes and tanks. It can lead to high and heavy reparation costs. Our UAN corrosion inhibitor effectively inhibits harmful corrosion of carbon steel

under various conditions. It produces a stable, non-toxic organic barrier that provides crucial long term, cathodic and anodic protection.

## Why is a corrosion inhibitor essential?

- It prevents damaging corrosion of carbon steel
- It is extremely effective for storage facilities and farming equipment
- It allows storage for long periods



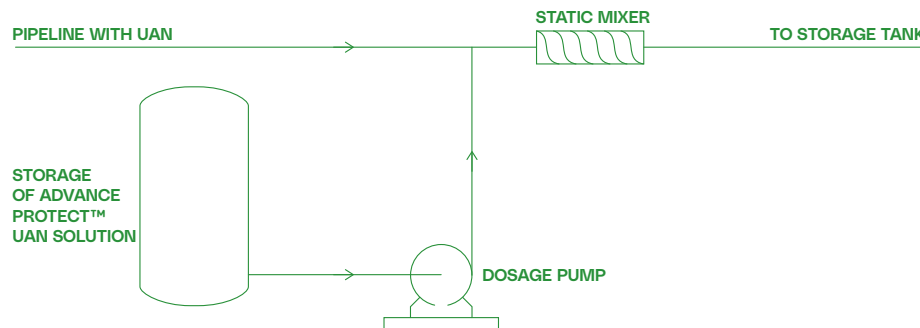
Corrosion of metal surface

## What's our solution?

Our corrosion inhibitor, directly available via Stamicarbon, has an integrated dosage with UAN plant and a low consumption with maximum protection. It has especially been developed to avoid general and intergranular corrosion of metals under various conditions such as:

- A wide range of temperature
- Extended storage time
- Transport in pipelines
- Barges, tank cars and wagons
- Pumping at terminals
- Blending operations
- Spraying in operation gear

## Schematic overview of UAN dosage



## Your benefits

- Film forming on metal surface
- Over 99% of corrosion inhibition
- Cathodic and anodic protection
- Non toxic
- Non polluting
- Low foaming tendency
- Easy to clean and remove in case vessels or tanks are used for dual purposes

We deliver full-service packages of process design, product quality and plant integrity.



# IMPROVING SAFETY AND REDUCING ENVIRONMENTAL IMPACT

---

The smallest leak in the high-pressure synthesis section can lead to the release of toxic ammonia.

## HEALTH, SAFETY AND ENVIRONMENT

There are various potential hazards in a urea plant. For example, most safety hazards occur in the high-pressure equipment because of its exposure to high pressure, high temperature and corrosive ammonium carbamate. The smallest leak in the high-pressure synthesis section can lead to the

release of toxic ammonia. This is one of the many reasons proper HSE measures must be in place. With our ADVANCE HSE™ Products and Services we help you improve the Health, Safety and Environmental conditions of your plant. An overview.

1

# HEALTH

---

## **ADVANCE COAT™**

A urea coating for prills, or pastilles.

It enhances the shelf life and prevents caking, maintains product strength and protects urea from moisture. Our harmless coating can be an excellent replacement for formaldehyde and during handling hardly any dust is produced.

The smallest leak in the high-pressure synthesis section can lead to the release of toxic ammonia.

# SAFETY

---

## Life Time Assessment (LTA) for high-pressure piping

Since regular inspections on high-pressure piping is often neglected, a Life Time Assessment (LTA) by means of Risk based Inspection (RBI) is essential to help avoid catastrophic failures. All the components will be ranked critically from both the process and the atmospheric point of view, using our in-depth knowledge of corrosion and process knowledge in urea plants.

## Urea design safety training

This training helps people to understand our approach to process safety and to broaden the understanding of the typical design solutions to safeguard the most relevant

risk scenarios in urea plants. Herewith we improve your hazard recognition skills and capability of identifying and controlling potential hazards.

## Process safety plant review

The process safety plant review will facilitate a technical field review to be considered as a spot-check, comparing the plant design against internationally recognized engineering practices to obtain a safe operation. Using a project specific checklist and field verifications, including interviews with key contractor and client personnel, we evaluate the presence and adequacy of mandatory safety provisions.

## Radar Level Measurement (RMD)

This is a proven and improved substitute for the common used radioactive level measurement. The RMD has many advantages compared to radioactive level measurements:

- Accurate measurement (+/- 10mm)
- Made of Safurex® material
- Absolutely safe in use/handling (no radioactive-sources)
- Replacement of existing radioactive device by radar is possible

## Leak detection monitoring system

To ensure safe operation of lined HP equipment in a urea plant, a reliable leak detection monitor system providing short response time between the start of a leak and its detection is of the utmost importance. It can be used for both new and existing HP equipment. The benefits?

- Potential leaks are continuously monitored and leaks activates an alarm in the control room.
- The location of the leak can be identified easily.
- It accurately detects and measures in ppm range.

## Safurex® material

Safurex® was initially developed by Stamicarbon in a partnership as a super duplex stainless steel that has superior corrosion resistance properties. The Safurex® brand has expanded into a family of long-lasting solutions, in not only materials, but also products and services, which have optimized urea production and safety because no active corrosion takes place.

## Ammonia storage tank inspections

We are one of few companies who can assist you with ammonia storage tank inspection within a reasonable shutdown time. As an ammonia tank inspection is only required once every 15-20 years, special preparation and expertise is required to provide you with valuable advice based on the results of the inspection report. We offer the following benefits:

- Total inspection including de-commissioning and commissioning
- Short shutdown time because there is no need for scaffolding

## Safety services

HAZOP support (management of change and/or projects), HSE management system assessment (OSHA/PSM) and major incident investigation. In addition to the presented safety services we have a long experience in the following:

- HAZOP support (management of change and/or projects)
- HSE management system assessment (OSHA/PSM)
- Major incident investigation

# ENVIRONMENT

---

## Plant performance assessment

A study on safe working limits of each critical process equipment item and the actual performance of the plant related to maximize efficiency of safety, energy, effluents/emissions, product quality, bottlenecks/capacity.

## Thermal treatment technology

Our thermal treatment technology is designed to incinerate the ammonia enriched

off-gasses from the atmospheric absorber (to ~ 1 ppm), urea storage tank and ammonia water tank, while using the hydrogen rich off-gasses of the low pressure absorber as fuel for the incinerator.

- Guaranteed lowest NH<sub>3</sub> and NO<sub>x</sub> emission
- Independent of melt technology
- Low consumption of gas and reuse of heat for steam production

We are one of few companies who can assist you with ammonia storage tank inspection within a reasonable shutdown time.



# OPTIMIZING PLANT OUTPUT AND OPERATIONAL CONTROL

---





## PLANT ASSESSMENT

When it comes to recognizing opportunities related to improving plant performance, a plant assessment is the essential starting point. Through a comprehensive analysis, we can determine the current status of the plant and give advice on possible improvements. These are our different consulting and monitoring services.

A plant assessment  
is the essential  
starting point.

# N/C METER

---

The N/C Meter helps control the N/C ratio of your urea plant more accurately whilst guiding it to its optimal performance. This leads to a more stable operation of the synthesis process and in doing so, a more stable operation of the whole plant.

This leads to a more stable operation of the synthesis process.



## Your benefits

- Markedly increased plant capacity
- Economically beneficial - you save on energy and laboratory analysis costs
- Lower ammonia consumption
- More stable production
- Noticeably safer when compared to taking manual samples

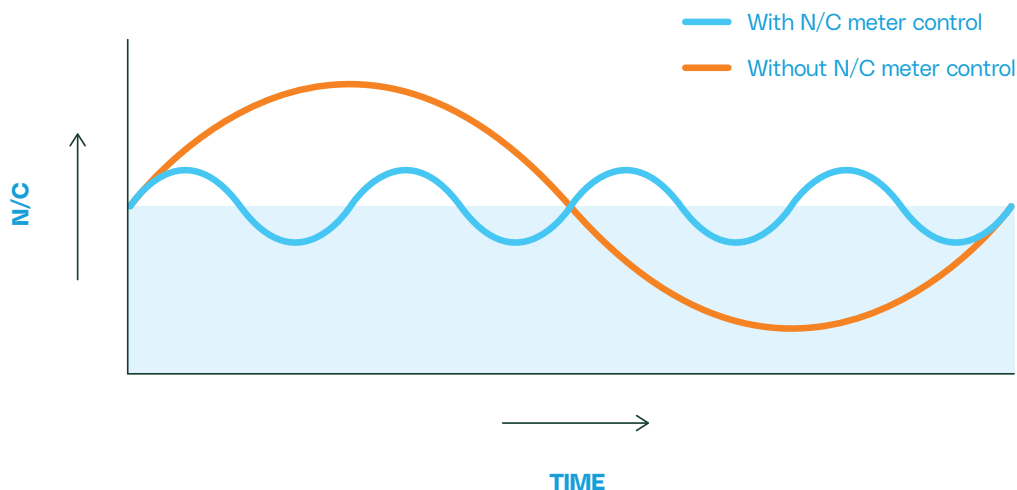
## The features

- Accurate and continuous measurement of the N/C ratio
- Highly reliable and solid industrial design
- The system is designed to control stable temperature and pressure designed to control stable measuring conditions continuously and to prevent carbamate from solidifying
- Immediate indication of any undesirable conditions
- Limited maintenance required

### Controlled oscillation, increased output

The phenomenon of an oscillating N/C ratio has been observed in many plants and is predominately a consequence of the ambient temperature changes over day and night, although other influences can influence the N/C ratio as well. When using our N/C Meter, the variance of the N/C ratio will be reduced. By narrowing down the variations of the N/C ratio in the reactor, we have experienced approximately 2% reduction in steam consumption, approx. 60% in reduction of ammonia losses and up to 4% increase in urea production output.

When using our N/C Meter,  
the variance of the N/C ratio  
will be reduced.



# RADAR LEVEL MEASUREMENT SYSTEM

---

This radar ensures a safe and reliable continuous level measurement under arduous process conditions.

It can be used for both new and existing high-pressure equipment.

A safe and reliable continuous level measurement under arduous process conditions.



## Your benefits

- Maintenance free operation through a non-contact measuring principle
- High plant availability
- Accurate and reliable measurement
- Completely safe in use and handling (no radioactive sources)
- Possible replacement of existing radioactive device by radar
- Wetted parts made of Safurex® material
- No calibration required
- Remote start-up assistance, services and trouble shooting

### How does it work?

The measuring instrument sends out short radar pulses towards the measured product via the antenna system. The product surface reflects the signal waves, which are then received back by the antenna system. The instrument calculates the level from the running time of the radar pulses and the entered, tank height.

### Start-up assistance

All our radar devices will be calibrated before delivery. For commissioning and start-up our radar devices are equipped with a remote access device. Therefore we are able to

execute the commissioning and start-up remotely by logging into the system, with your permission.

### Installation & supervision

For the installation of the radar into the vessel, Stamicarbon can offer a wide range of services. In many cases, modifications have to be executed on the existing vessels and Safurex® welding is involved. For this, we can execute the welding activities by our own trained and qualified welders. We can also offer training & qualification to your own welders.

## Stami Digital: Optimizing the future of plant operations

To advance your plant even more, we are convinced that digitalization can increase production efficiency, while reducing energy use, emissions and downtimes. With Stami Digital we offer a wide variety of digital solutions that can turn real-time process data into meaningful information, delivering your staff insights through customized dashboards, advanced automation and high-fidelity Operator Training Simulators. A tailor-made service that can help you take your plant to new heights.

For more information check:

[www.stamicarbon.com/digital](http://www.stamicarbon.com/digital)



# SUPPORT AND PLANT STAFF TRAINING

---

We offer operational and technical training & support, mechanical and maintenance training programs.





## OPERATIONAL AND TECHNICAL PROGRAMS

To keep you and your staff up to date we developed a series of training programs. The trainings can be tailor-made to your specific needs, to get the most out of yourself

and your staff. We offer operational and technical training & support, mechanical and maintenance training programs and, last but not least, simulator trainings.

# UREA PROCESS TRAINING

---

During this 6-day training we train process engineers on the entire urea process, covering the basics (e.g. explaining the systems and reactions), urea process concepts, synthesis and high pressure equipment, plant safety, revamp concepts and case studies. This training can be tailor-made based on the client's individual needs.

## **The model is equipped with all relevant items including:**

- Control valves
- Interlocking system
- Clearly marked (field) manual valves
- Sample points
- Trending system

## **What will you get out of this training?**

- Experience in the urea process and its fully real-time dynamic behavior
- Knowledge in how to deal with standard operating procedures
- How to handle upset conditions
- Learning how to run the plant at maximum capacity whilst dealing with boundary conditions e.g.: minimizing specific steam consumption and minimizing ammonia losses
- Stamicarbon Academy certificate

This training is relevant for personnel of all levels of experience: urea melt plant operators, urea melt plant engineers as well as urea production managers.

The complete training offers guided use of the simulator, covering:

- Normal operation  
(for the full capacity range: turn-down to full capacity)
- Cold start-up
- Recovery mode
- Blocking-in and restarting
- Blocking-in and draining
- Switching pumps
- Recovering from pre-defined upset scenarios

# MECHANICAL & MAINTENANCE TRAINING

With this 4-day training program on mechanical and inspection topics we provide you valuable insights in how to operate your urea plant at maximum efficiency. We aim to improve the skills of your mechanical engineers, inspection engineers and maintenance managers (of all levels of experience). Several case studies will be incorporated in the training and discussed in detail.

## What will you get out of this training?

- Knowledge on how to deal with corrosion issues and how to prevent it
- Leak Detection insights: pro & cons of NH<sub>3</sub> and helium leak tests
- Get to know the ins-and-outs of working with Safurex®
- Insight into case studies
- Training study materials
- Stamicarbon Academy certificate

## Who will give this training?

This training will be given by Stamicarbon's Manager Inspections & Materials Engineering, Alex Scheerder, a world class specialist with more than 30 years experience in the field of urea. This training is relevant for personnel of all levels of experience: urea mechanical engineers, urea inspection engineers as well as urea maintenance managers.

## What main topics will be covered?

- Degradation mechanisms in urea plants
- Corrosion issues in urea plants
- Leak repairs in urea equipment
- Safurex® (introduction and welding)
- Examples of catastrophic failure in urea plants
- Installation, maintenance, relining and reparation of HP equipment



# WE SHARE OUR KNOWLEDGE WITH YOU

---



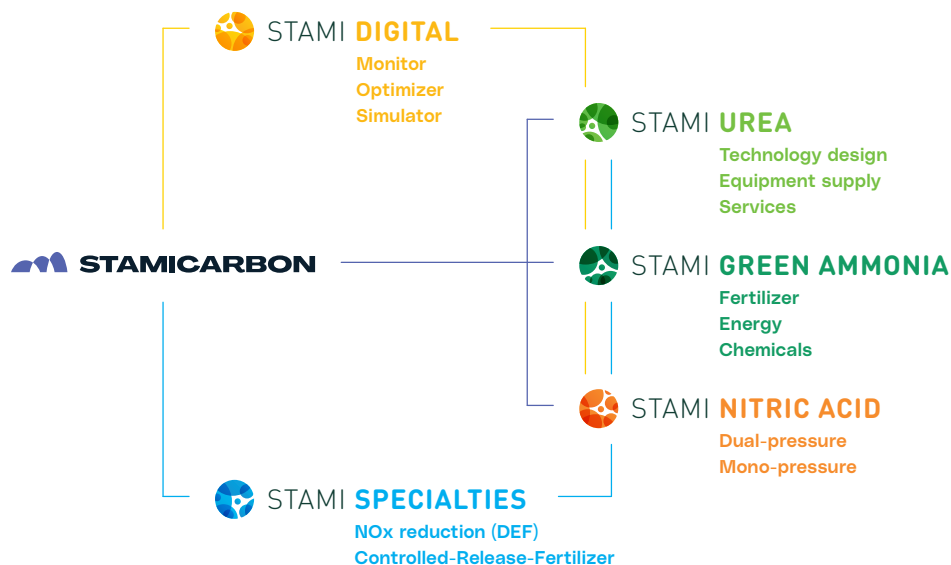
# CONCLUSION

Our solutions are built on 75 years of high-quality research and in-depth industry knowhow. We work closely with the entire value chain to improve and innovate our technologies. As the world's leading urea authority, we show our commitment to driving the long-term success of the industry by sharing our insights, solutions and knowledge.

## Get more insights

Brochures, papers and other information published over many decades are available at [www.stamicarbon.com](http://www.stamicarbon.com).

We also share our knowledge at various conferences to keep you up to speed on the latest developments in urea.



## Contact us

Interested in advancing your plant?  
We look forward to discussing your requirements and putting together a personalized proposal.

# WE ARE STAMICARBON

---

Stamicarbon is the Nitrogen innovation and license company of the MAIRE Group. We are a trailblazing specialist in the fertilizer industry, with the vision needed to help feed the world and improve everyone's quality of life. As a global leader in fertilizer technologies, we have licensed more than 260 urea plants and completed more than 110 revamping and optimization projects.

Our leading position is based on more than 75 years' licensing experience and maintained by continuous innovation in terms of technologies, products and materials. Headquartered in Sittard, the Netherlands, Stamicarbon has a sales office in the USA and representative offices in Russia and China. For more information, see [www.stamicarbon.com](http://www.stamicarbon.com).

# WHAT CAN WE DO FOR YOU?

---

Any questions about Stami Urea? Like to know how our expertise, knowledge and experience creating, optimizing and upgrading fertilizer plants can help you make the switch to sustainable, futureproof production? We are here for you. Contact our experts at [www.stamicarbon.com](http://www.stamicarbon.com).



## Stamicarbon

Mercator 3 - 6135 KW Sittard - Netherlands | P.O. Box 53 - 6160 AB Geleen - Netherlands  
Tel. +31 46 4237000 - [communication@stamicarbon.com](mailto:communication@stamicarbon.com) - [www.stamicarbon.com](http://www.stamicarbon.com)