

STAMICARBON EQUIPMENT

Experience Meets Expertise

PIONEERING WITH A HIGHER PURPOSE

Enable the World to Feed Itself

At Stamicarbon, we are driven by a mission: to enable the world to feed itself and improve the quality of life. As the nitrogen technology licensor of the

MAIRE Group, we take pride in our role as a pioneer and global leader in developing Sustainable Fertilizer Solutions.



SHAPING THE FUTURE OF FERTILIZER TECHNOLOGY SINCE 1947

75+ Years of Licensing Experience



Oxygen Passivation

1953

Improved corrosion resistance in high-pressure systems.

CO₂ Stripping Technology

1963

Revolutionized urea production processes.

Safurex®

1993

A breakthrough in materials technology.

Granulation Technology

1995

Enhanced production efficiency and product quality.

Ultra Low Energy Design

2012

The most energy efficient design on the market.

Stamicarbon's history is rooted in innovation. Throughout our history, we have been at the forefront of the fertilizer industry, constantly pushing the boundaries of technology.

Our key innovations have become industry standards and helped fertilizer producers meet evolving demands.

New innovations like our **Green Ammonia, scrubbing technologies and digital solutions** provide the industry with new abilities to meet current and future business demands.

THE RIGHT INGREDIENTS, KNOWLEDGE, AND EXPERIENCE

Combining Advanced Materials with Unmatched Expertise for Optimal Equipment Performance

At Stamicarbon, we believe that creating superior equipment is not just about having the right materials – it's about having the right knowledge, people, and experience to apply those materials in the best possible way. Our **super duplex** steel, known for its unmatched corrosion resistance and mechanical strength, plays a crucial role in this, but it's the

combination of expertise, experience, and innovation that truly makes the difference. Since we introduced 316L-UG in the 1950's we have been involved in equipment manufacturing. We know that applying the right materials, together with critical steps in the fabrication process are key to a long lifetime of equipment.

SEQ U-Class E-type material are specially designed to meet the extreme demands of high-pressure environments in urea production. This material selection and our extensive process knowledge guarantee equipment that performs optimally in even the most challenging conditions. Key benefits include:

| Passivation Independence | Improved Mechanical Properties | Chloride Stress Corrosion Resistance | Superior Weldability |
|---|---|---|--|
| Materials that operate efficiently without the need for passivation air, reducing operational complexity. | Durability that withstands high-pressure environments and operational stress. | Robust protection against chloride-induced corrosion, ensuring longevity. | Simplifies maintenance, making repairs faster and more reliable. |

Our decades of experience in material science ensure that your fertilizer plant benefits from durable, corrosion-resistant solutions that can withstand the test of time and environmental stresses.

Different processes require different materials, that is why we use Urea-, Ammonia- and Nitrogen-class materials. In some parts of the process, a more specific material category is needed.

| Category | Application example | Technology |
|----------|---|------------|
| U-class | Plates, Pipes, Bars | Urea |
| U-class | Liquid Dividers, Valves | Urea |
| U-class | Stripper Tubes | Urea |
| U-class | Granulator / MMV Scrubber | Urea |
| U-class | Granulator / MMV Scrubber with Acidic Scrubbing | Urea |
| A-class | Ammonia Convertor | Ammonia |
| N-class | Abatement Reactor | Nitrates |

This list is non-exhaustive and only contains the main materials

ENSURING SAFETY AND PERFORMANCE THROUGH INTEGRITY

From Inspection to Operation: Reliability You Can Count on

At Stamicarbon, reliability means doing the right thing even when no one is watching. We approach every project with integrity, delivering on our promises with transparency, consistency, and the

highest quality standards. Our commitment to reliability extends from our equipment to our communication and services, ensuring safe operations and long-term performance.

Our **inspection services** are designed to extend the life of your equipment and optimize plant performance. Our corrosion engineers and NDT experts offer thorough inspections that include:

Comprehensive Reporting

In-depth analysis of equipment conditions and performance.

Corrosion Identification

Detection of stress corrosion cracking and condensation issues.

Repair Guidance

Recommendations for repairs, operational adjustments, and procedures.

Lifetime Prediction

Accurate forecasting of equipment longevity and maintenance needs.



MAKING IT ALL WORK

Advanced Specifications
and Expert Collaboration:
Ensuring Superior Corrosion
Resistance and Reliability
in Urea Plant Equipment



STAMICARBON'S SPECIFICATIONS

- Materials specification
- Welding technologies and procedure qualifications
- Design requirements to avoid corrosion
- Testing specifications

Stamicarbon specifications go beyond code requirements and build upon decades of operational experience to ensure optimal performance and longevity. This includes everything from material selection and mechanical design to welding and final testing.

HOLD AND WITNESS POINTS AT CRITICAL PRODUCTION STEPS

- Welding procedure Qualifications
- Inspections and testing of critical details
- Final inspections before shipment

To ensure the lifetime of our newly built equipment, we implement hold and witness points at critical production steps, guaranteeing compliance and quality with Stamicarbon specifications and international design codes.

Our inspections begin with the welding procedure qualifications and extend throughout the entire manufacturing process of the vessel, leading up to the final inspections before shipment. We place a strong emphasis on preventing any corrosion or safety issues that could arise during the future operation of the high-pressure vessel.



SUPPLY CHAIN CONTROL

- Critical material availability forecast & delivery KPI
- Sustainable multi-source qualified supply base

Stamicarbon is highly selective in the choice of our fabricators, and we partner with top-tier market players to deliver Proprietary Equipment. This ensures we leverage the best knowledge, engineering prowess, manufacturing expertise, and quality.

Stamicarbon maintains a solid span of control over the overall supply chain by also ensuring the availability of critical (sub-)components made of our proprietary super duplex steels. We strive to maintain a delicate balance between forecasting market demands and optimizing our manufacturing capacity throughout the entire supply chain.

COMBINING THE KNOW-HOW AND EXPERTISE

- Stamicarbon: fundamentals carbamate corrosion
- Specialist producers in high alloyed stainless steels

In the reaction between ammonia and carbon dioxide to synthesize urea, ammonium carbamate is produced as an intermediate chemical compound.

The synthesis reaction occurs at high pressures and temperatures, the latter has a direct effect on the acidity of ammonium carbamate.

Therefore, materials that are used to fabricate the equipment in the high-pressure synthesis section of urea plants must be corrosion resistant and have the required mechanical properties to allow the safe and efficient operation of these units.

Stamicarbon has a history of working closely together with steel mills who specialize in producing high alloyed stainless steels for niche applications where superior performance is non-negotiable.

This collaboration has led to the development of proprietary super duplex stainless steel grades with tailor made chemical compositions specifically selected to yield excellent corrosion resistance and high mechanical properties in the challenging urea synthesis environment.

Over more than two decades, hundreds of equipment have been manufactured and are operating in urea plants worldwide, without any catastrophic failures reported. The success of Stamicarbon's collaboration with specialist steel producers to develop materials, is borne out by the satisfaction of operators of the urea plants where our equipment are in operation.

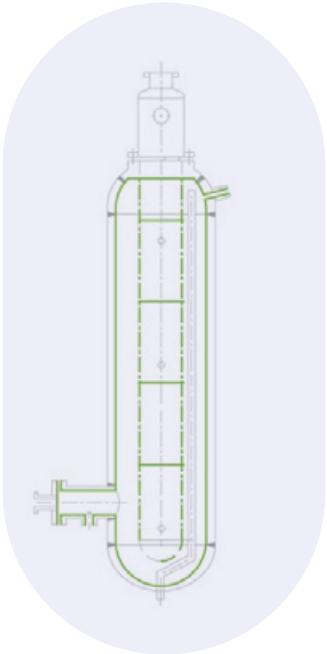
Continuous improvement

Stamicarbon ensure continues development of our own and as well as our partner's procedures.

ENGINEERED FOR LONGEVITY, PERFORMANCE AND RELIABILITY

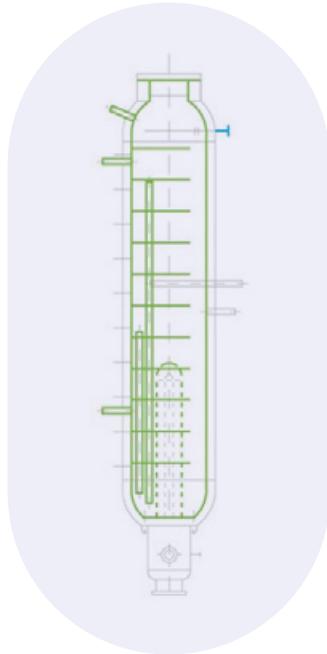
At Stamicarbon, we specialize in designing and engineering reliable equipment that ensures the safe and efficient operation of urea plants. Each piece of **Stamicarbon Equipment** is crafted for maximum

performance, longevity, and reliability in challenging environments. Below is an overview of our Stamicarbon equipment and its specific functions:



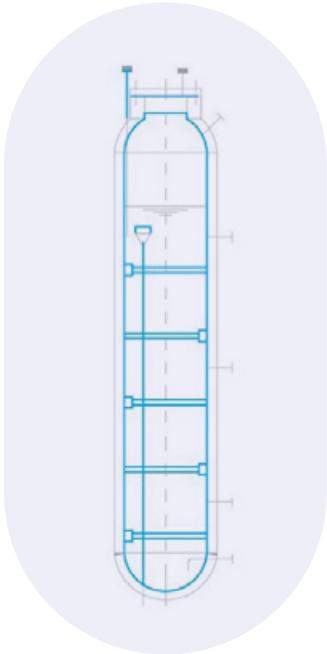
POOL CONDENSER

A submersed high-pressure carbon steel vessel with U-Class steel protection. The Pool Condenser uses a specially designed gas distributor to achieve optimal crossflow, allowing efficient heat exchange. Its U-shaped bundle transfers heat into low-pressure steam, making it a crucial component for energy efficiency.



POOL REACTOR

This horizontal high-pressure vessel combines two vital process steps: urea condensation and reaction. With specially designed distributor and flow deflector plates, the Pool Reactor maximizes the chemical reaction efficiency while managing heat transfer with minimal energy loss.

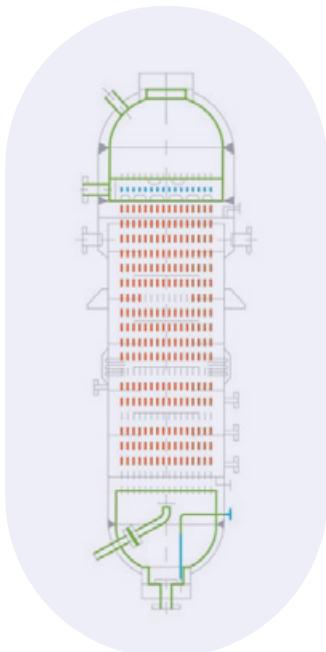


UREA REACTOR

The vertical Urea Reactor is equipped with high-efficiency trays and U-Class steel internals. It optimizes liquid flow, ensuring that the reaction approaches plug flow for maximum conversion efficiency. The reactor's design minimizes back-mixing, stagnation, and bypassing, ensuring a consistent, high-quality product.

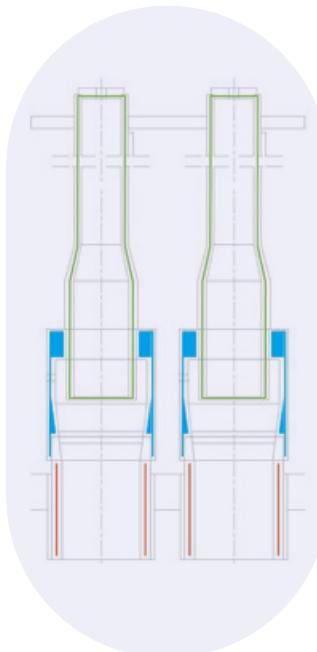
HP STRIPPER

A high-pressure carbon steel vessel with a falling film heat exchanger. The liquid is distributed evenly across the tubes using a sophisticated liquid distribution system. Custom-designed based on plant conditions, the HP Stripper plays a vital role in efficiently recovering ammonia and carbon dioxide.



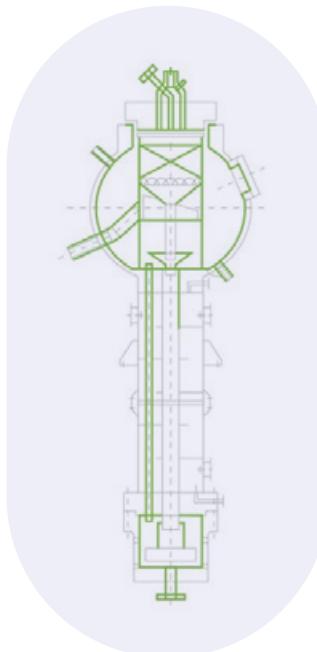
HP LIQUID DIVIDERS

These dividers ensure uniform liquid distribution over the heat exchanger tubes of the high-pressure stripper, which is crucial for maintaining consistent thermal performance and minimizing wear. Their design is based on years of experience and proven performance.



HP SCRUBBER

Designed to minimize emissions, the HP Scrubber recovers residual ammonia from non-condensable gases, making it a vital part of the plant's environmental management. The U-class steel internals and special alloy protection ensure longevity and performance, even in the harshest conditions.



HP EJECTOR

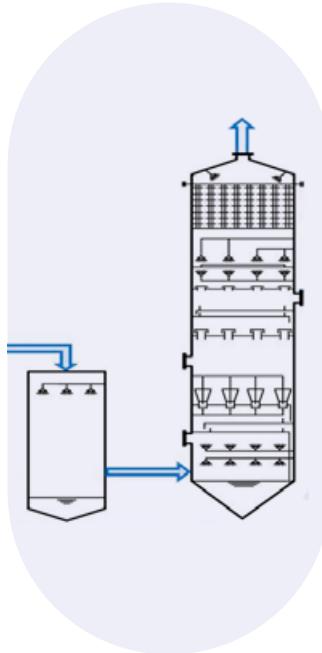
Facilitates the efficient transfer of carbamate solution between process stages, ensuring stable pressure and process continuity. It is a critical component in maintaining the smooth operation of high-pressure urea systems.

CONTROL VALVES & SAFETY VALVES

These valves regulate pressure and ensure the safety of the high-pressure sections. They are designed to handle the extreme conditions found in urea plants, providing reliable control and safety.

GRANULATOR

Stamicarbon's granulation technology features innovative nozzle designs that minimize formaldehyde use and reduce dust emissions. This results in longer on-stream time and reduced downtime for clean-up, offering superior operational efficiency.



MVV SCRUBBER

The MicroMist™ Venturi Scrubber provides high-efficiency scrubbing of submicron particulate matter and ammonia collection. Its integrated Wet ElectroStatic Precipitator further reduces urea dust emissions, setting a new standard in environmental performance.

TERTIARY ABATEMENT SYSTEM

The ultimate solution for reducing N₂O and NOx emissions. Stamicarbon's Tertiary Abatement System ensures high conversion rates with long-lasting catalyst performance, offering a straightforward and efficient way to reduce environmental impact while maintaining an optimal energy balance.

AMMONIA CONVERTER

Stamicarbon's Ammonia Converter is meticulously designed to boost synthesis efficiency. Engineered with precision, this converter offers unparalleled performance and robustness, making it a crucial component for achieving a low to zero carbon footprint.

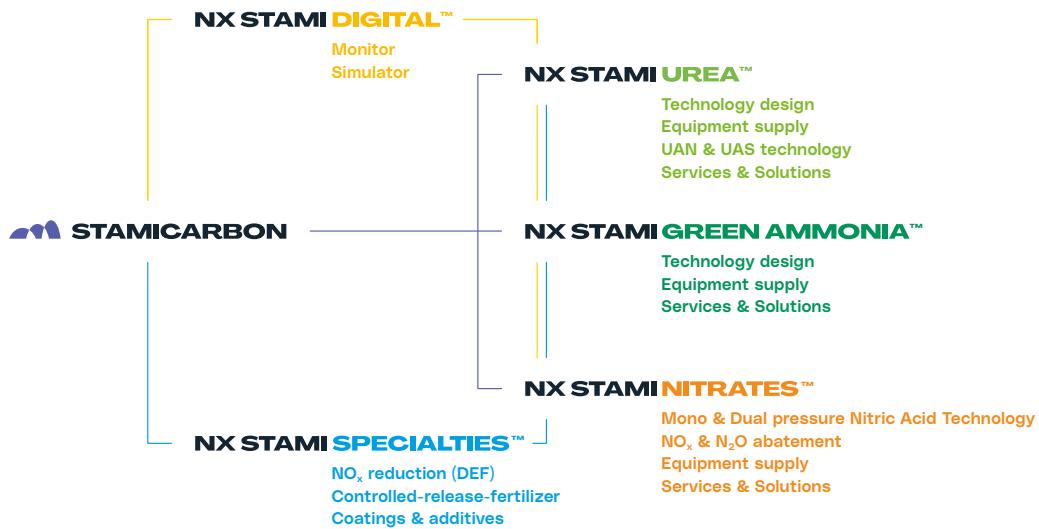


BUILDING A BETTER FUTURE TOGETHER



EVOLUTION

As we have expended the business and provide our innovation, materials knowledge and reliability to more and more elements of the industry. We have created Stamicarbon equipment.



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 licensing company of NEXTCHEM (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.

WHAT CAN WE DO FOR YOU?

Any questions about Equipment?

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.



Stamicarbon

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