

DIGITAL PROCESS SOLUTIONS FOR FERTILIZER PLANTS

Optimizing the future of plant operations



STAMI DIGITAL

WHAT ARE THE CHALLENGES

Today's fertilizer plants face?

The fertilizer industry faces many challenges. Changes in market demand, in personnel and regulations, fluctuations in energy prices and new technologies. Production is more and more complex and there's a growing need to raise operational efficiency, reduce energy consumption and emissions, increase flexibility, improve product quality and lower cost of operation. How do you achieve all this without comprising safety and process efficiency? How do you develop the skills your need in your team to operate in new challenging conditions?

Bottomline: How do you improve performance to make your fertilizer plant futureproof? With our digital process solutions and 70 years of knowledge and experience, we believe we are part of the answer. Our suite of digital services has been developed to help fertilizer plants achieve operational excellence by harnessing the power of real-time data. We share valuable insights with you to show how digitalization drives continuous process improvement and generates new opportunities for your plant and your people. Are you up to the challenge? We are!

Our software and quality assurance services allow you to control and optimize your processes and systems.



OUR DIGITAL SOLUTIONS

Take your plant to new heights.

As a leading licensor of fertilizer plant technology, we understand that digitalization helps increase production efficiency, while reducing energy consumption, emissions and downtime. All you need is the right kind of data – and

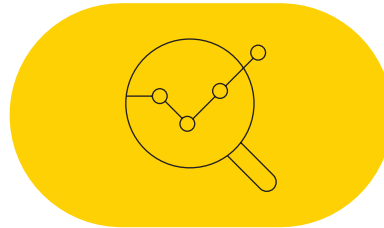
the knowhow and technology to interpret and benefit from it. Our digital solutions turn real-time process data into meaningful information, providing your staff with insights that help them take your plant to new heights.

The right kind of data to interpret and benefit from it.



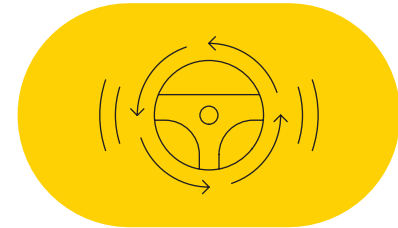
Process Monitor

We take a deep dive into your process operations, generating rich data in dashboard form. You get the insights you need to optimize your plant performance. The online Process Monitor incorporates our state-of-the-art H&M balance, and thermodynamic and kinetic fertilizer models.



Process Optimizer

A comprehensive plant assessment is essential to identify opportunities to improve performance. Our engineers assess and analyse your plant processes in depth and give advice about where any improvements could be made. Our digital Process Optimizer is paired with real-time process control to take our service to the next level.



OTS for urea

Stamicarbon develops high-fidelity operator training simulator systems for a wide range of customers in different kinds of industries. Customers of Stami Digital solutions are licensors, engineering contractors, plant owners and training centers.



PROCESS MONITOR

Keep a constant eye
on your plant



Key benefits

- Review all data in clear dashboards
- Access real-time key process data
- Compare expected and actual plant behavior
- Monitor equipment and instrument performance
- Monitor ammonia emissions

More insights at

www.stamicarbon.com

MONITOR YOUR PROCESS IN REAL TIME

For your plant to operate at optimal capacity, you need all equipment and instrumentation functioning properly and all plant indicators where they need to be. But many of them cannot be monitored continuously. Well, until now...

Our Process Monitor solution generates continuous real-time equipment and instrument performance data. We deliver soft-sensor output based on live distributed control system (DCS) data and a first principles-based process model tailored to your historical plant operation. This supports your staff in their day-to-day process optimization activities.

Assess: the first step to success

The first step in the monitoring process is an in-depth assessment of your plant,

your process control and your process dynamics. We build a process plant model, tailored to your fertilizer plant. The model results are validated during the assessment, factoring in a wide range of operating conditions.

What's in it for you?

Our Process Monitor solution allows you to calculate all key process parameters, equipment and instrument performance parameters, and ammonia emissions in real time. Operators can use this data to improve plant performance (throughput, energy consumption, emissions) or initiate troubleshooting and maintenance activities.



PROCESS OPTIMIZER

Take your operations to the next level

Our digital technology takes control of all operations.





TOWARDS THE OPTIMUM OPERATING POINT

Improving your plant operations in a sustainable way to increase your plant load and operating margins is a challenge. Our Process Optimizer makes it easy for you. So how does it work? Our digital technology takes control of all operations 24/7 to steer your plant towards its optimum operating point. Your plant operators become plant supervisors, whose sole role is to respond to unexpected events. An efficient use of your resources.

Building a dedicated model

In-depth assessment of your plant, your process control and your process dynamics is essential before implementing the Process Optimizer solution, your gateway to plant automation. We build a process plant model, tailored to your

fertilizer plant. The model results are validated during the assessment, based on actual plant data in a wide range of operating conditions.

What does the Process Optimizer do?

- Calculate key process variables
- Monitor ammonia emissions in real time
- Generate laboratory data in real time
- Predict maintenance on instrumentation

Towards improved plant stability on autopilot

Based on the assessment, the Process Optimizer model allows you to calculate optimal set points for current plant operations, factoring in constraints and disruptions. But we go a step further, by implementing its process control solutions. In this mode the Process Optimizer works on autopilot. This improves plant stability and enables you to improve efficiency in a sustainable way.



Key benefits

- Higher fertilizer production
- Lower energy consumption
- Maximal uptime, minimal alarms
- Fewer operator interventions
- Improved equipment reliability, due to consistent, best-practice operation

More insights at

www.stamicarbon.com







PROCESS SIMULATOR

Get valuable insights into
plant operations

Optimize your plant



FROM SIMULATION TO OPERATION

Production system simulations provide input for the development of valuable solutions. That's because they are the source of clear insights into complex systems. In the fertilizer industry, we provide high fidelity operator training simulators (OTS) specifically developed to that end. Our process simulator software creates a dynamic environment to analyse computer models while they are running, harnessing world-class thermodynamics knowhow. It has already proved its worth at various (urea, ammonia and nitric acid) fertilizer plants and in other chemical processes, such as hydrogen peroxide to propylene oxide (HPPO).

How does it work?

The Process Simulator runs various urea melt and granulation operating modes, including:

- Normal operation
- Cold start-up
- Recovery mode
- Blocking-in and restarting
- Blocking-in and draining
- Switching pumps
- Recovering from pre-defined scenarios

The simulator is fully equipped, including:

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

The process simulator can be configured to precisely mirror your plant process equipment, control and interlocking system, with corresponding DCS setup.

UNLIMITED OPPORTUNITIES FOR EXPERIMENTING AND LEARNING

Why use a process simulator?

Our operator training simulators are real-time dynamic process simulators for fertilizer plants. They create a process simulation that behaves like a real plant. Each OTS has the look and feel of a real DCS system, with unlimited opportunities for experimenting and learning. This helps make your plant safer, more cost-effective and improve its technical performance.

More dynamics insights

The simulation software delivers more insights in the technical ins and outs of operational processes. It's a valuable training tool that enhances the knowhow of plant operators, giving them a better understanding of plant dynamics.

Maximum risk reduction

Safety first! By simulating the operation processes in a risk-free environment, plant operators learn how to keep their fertilizer plant running even when unforeseen issues occur. Simulation models can be animated in 2D/3D, allowing concepts and ideas to be more easily verified, communicated and understood. Analysts and engineers gain trust in a model by seeing it in action and can clearly demonstrate findings to management.

Lower operating costs

Training in standard operating procedures and unforeseen issues brings more efficient plant operations within reach and saves you valuable time and money

down the line. Downtime, equipment damage, disruptions, training time and human error are reduced. You also benefit from trouble-free start-ups and faster recovery after disruptions. Your staff are trained to run your plant at maximum capacity while dealing with boundary conditions, including minimizing steam consumption and ammonia losses, testing new modified operation procedures before implementation, and checking control and interlocking functions.

Operators learn how to optimize plant performance.

OTS by Stamicarbon

For over 25 years, Stamicarbon offers advanced high-fidelity operator training simulators with state-of-the-art techniques that can be used in all levels of education, from technical students in training centers to highly experienced operators in chemical facilities. Our solutions can be used - and have proved their value - in different markets/segments.

More insights at www.stamicarbon.com





ADVANCE™ CONSULT

Next-level plant assessment

Improving your process through assessment

Our ADVANCE™ CONSULT service takes your operational performance to an even higher level. This plant assessment helps you evaluate opportunities to increase capacity, lower operating costs and reduce emissions.

Absolutely essential

A plant assessment is absolutely essential to be able to identify opportunities to enhance plant performance. Our engineers need to conduct an in-depth analysis to determine the current status and give advice about any improvements.

Our expert advice drives you forward

We provide expert advice on innovative processes and optimal equipment conditions to help you operate your plant at a consistently high level and achieve high-quality outputs long-term. We evaluate the feasibility of enhancing plant performance, raising production and lowering energy consumption by troubleshooting and optimizing process conditions.

An ADVANCE CONSULT™ plant assessment provides valuable insights when you want to:

- Find a sustainable solution to an operational bottleneck
- Analyze your plant status to identify ways to enhance performance

Added value for
your plant.

The ADVANCE CONSULT™ service includes:

- Calculating current material balances
- Identifying sections operating at maximum load
- Identifying equipment that constantly operates close to design limits, needs replacing or will require essential upgrades in the future
- Providing recommendations to address areas of concern (such as LP steam venting)
- Advising how to improve your plant's performance, including using proven debottlenecking solutions to take full advantage of all design margins and so to produce more urea while also reducing emissions

ADVANCE CONSULT™ can be combined with our digital Process Monitor and Process Optimizer solutions to improve results, gain a better understanding of the digital tools and train your operators.

We take your operational performance to an even higher level.

ADVANCE™ CONSULT

Interested?

Like to know what ADVANCE™ CONSULT can do for you? How it can increase your plant's capacity and cut your operating costs and carbon emissions? Contact our experts at www.stamicarbon.com.



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.

WHAT CAN WE DO FOR YOU?

Questions about our digital solutions? 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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