

Industrial Solutions  
Process Technologies

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Industrial Solutions

High pressure  
solutions for  
urea plants



thyssenkrupp

# The high-pressure specialist in urea production



With the nitrogen content being almost 50 % urea is the fertilizer used most worldwide. As a motor of plant growth urea provides the most important nutrient without releasing compounds which might be harmful to growth.

The high degree of efficiency of nitrogen fertilization has resulted in enormous growth on the global fertilizer market. However, in the meantime suppliers have come under enormous competitive pressure. Therefore, Uhde High Pressure Technologies supports urea producers with the development of new plants and the expansion of existing ones to make production more efficient and more economic.

## Pioneering, progressive, productive

As a company having developed high-pressure technology since 1930 Uhde High Pressure Technologies has succeeded in acquiring renown in many industries in which

high-pressure processes are applied. For more than 50 years Uhde High Pressure Technologies has also gained a considerable share in the industrial production of urea. Therefore, our know-how worldwide influences an application field in which extreme pressures, high temperatures and aggressive media must be mastered safely.

## A partner for all important clients and licensors

Thanks to well-founded experience gained by reference projects, whose number has increased to more than 100 in the meantime, Uhde High Pressure Technologies manufactures and supplies equipment like valves, fittings, prefabricated piping and heat exchangers which we continuously develop further in close contact with clients and licensors. Before this background Uhde High Pressure Technologies has established itself for decades as a partner for all important clients and licensors.



# Tailor-made solutions for maximum demands



Uhde can look back to a successful cooperation with all important licensors like Stamicarbon, Saipem, Toyo, Urea Casale or Kellogg.

Engineering: in 2004 alone more than twenty new plants were built having a nominal capacity of up to 3,850 tons a day of urea single train.



Uhde High Pressure Technologies can substantiate its claim of being the market leader and an excellent specialist in high-pressure technology continuously by innovative applications, techniques and products in most different areas.

We also transfer our comprehensive knowledge into the continuously development of urea plants which impose maximum requirements on design, materials and components.

## A unique high manufacturing content that is convincing

Being a specialist and developer of components Uhde High Pressure Technologies combines the eye for the bigger picture with the know-how for each detail being used in urea plants: with a unique high manufacturing content we recommend ourselves as a highly

specialized provider for heat exchangers, instruments, valves, prefabricated pipes and fittings, which are designed and fabricated by us according to the latest state of the art concerning materials, alloys and machining.

## Tailor-made solutions

From the manufacture of individual structural elements and components via the assembly on site up to the support over the entire life cycle of a plant Uhde High Pressure Technologies, the specialist, offers tailor-made solutions. With our customer-oriented and reliable service our clients can depend on maximum safety and economic efficiency far beyond the initial commissioning.



# Interlinked competences for a perfect component design

## Interlinked competences

- 01 Process engineering
- 02 Component design
- 03 Material selection
- 04 Finite element analysis
- 05 Detail engineering
- 06 Piping engineering
- 07 Stress analysis
- 08 Electrical engineering
- 09 Control systems design
- 10 Installation, operation and maintenance documentation



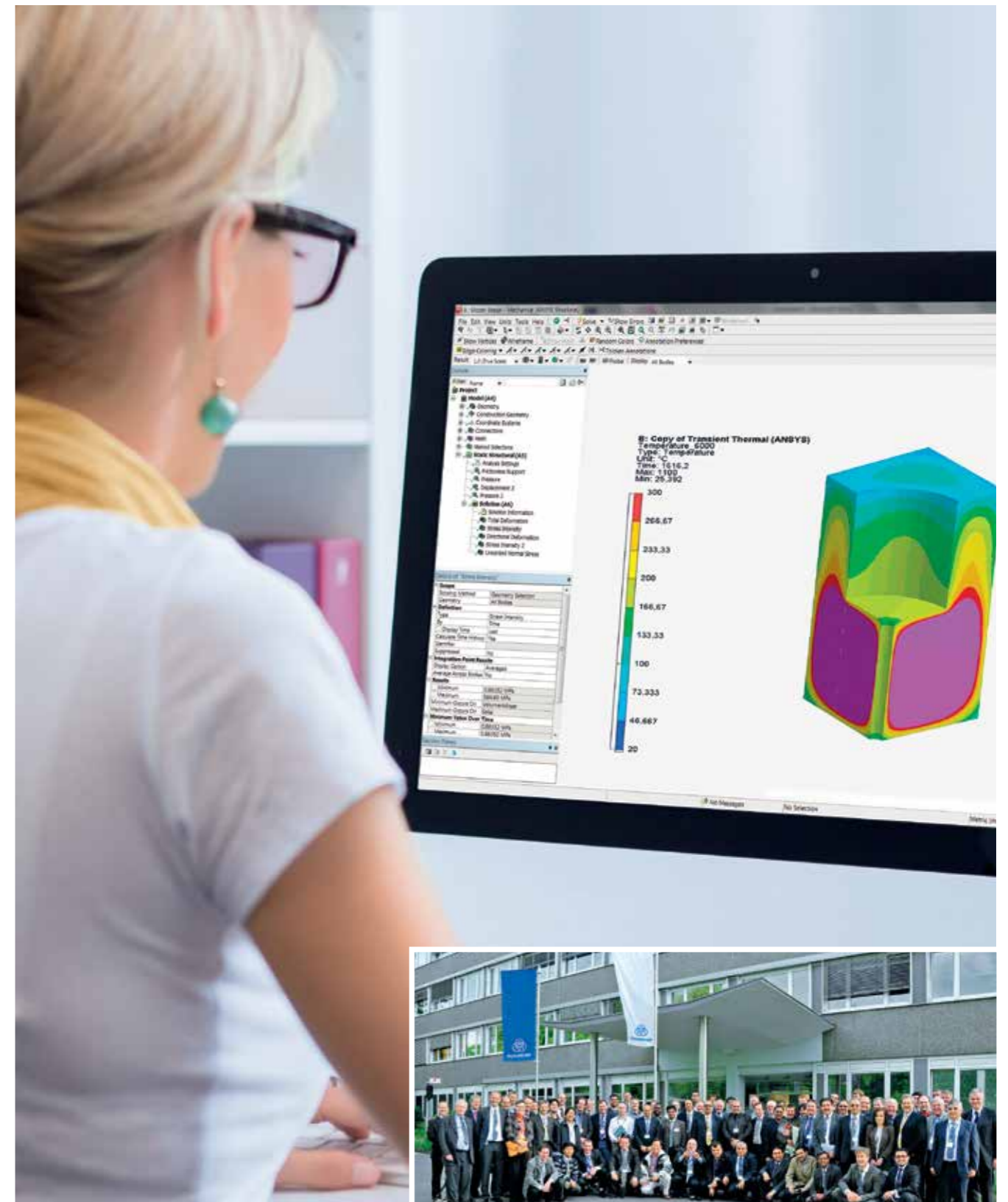
Over the past decades Uhde High Pressure Technologies has gained a grown cross-industry wealth of experience for different high-pressure applications. From the first project phase you can profit from our performances: thanks to the interlinkage of design, measuring and control technologies and own manufacture we give you support from the beginning for all questions of technical feasibility and economic optimization.

## From development of design to assembly

With its comprehensive competence for all high-pressure-specific aspects concerning the design of the plant Uhde High Pressure Technologies has always forced the technological further development, especially in the area of urea plants as well. Our performance spectrum begins with the process-technical design of the complete plant and also comprises the specific design of relevant details. Components as well as piping and pipe holder systems are tested for their reliability already before the integration into the plant – the manufacture of completely premounted assemblies does not only increase safety, but also reduces the efforts during the mounting works on site.

## Realizing flaws before they come up

The high manufacturing content of Uhde High Pressure Technologies offers safety for the design and quality of the entire plant equipment. Thanks to the intense examination of all materials used, precise calculations and test results from labs and pilot plants potential defects can be detected from the start and eliminated – before they can impair safe and continuous operations in the future plant. The documentation of all manufacturing and test steps as well as all later alterations creates the prerequisite for the precise tracking and analysis of the development process of the plant at a later time.



Urea symposium in Hagen/Germany - a highlight for experts

# Comprehensive quality for efficiency and long service lives

Due to high pressures of up to 300 bars, temperatures of 250 °C and especially the aggressive nature of urea maximum technical standards must be met in this area. Uhde High Pressure Technologies is a powerful partner of the fertilizer industry and recommends itself especially by a comprehensive know-how in manufacture.

## Competence in steel

As an affiliate of thyssenkrupp we already possess an excellent qualification concerning the selection of raw steel thanks to close exchange and competence transfer; raw steel is only procured from acknowledged and proven suppliers. Thanks to the continuous development and testing of alloys we can avoid the well-known problems originating from corrosion.

## Uhde sets standards for manufacturing quality

The technique of manufacturing high-pressure pipes from drilled forging steel was developed by Uhde High Pressure Technologies and has established itself as the standard in high-pressure technology in the meantime. Especially as far as the selection of material is concerned Uhde High Pressure Technologies can exploit long-term experience to harmo-

nize the steel used with the relevant requirements. Uhde High Pressure Technologies is one of a few manufacturers worldwide which have been listed for the complex processing technique.

In the Huey test the material is tested comprehensively as to its aptitude concerning susceptibility to corrosion before further processing.

## Safety in each manufacturing phase

We inspect surfaces, bores and wall thicknesses in the course of manufacture already and thus achieve uninterrupted quality assurance in compliance with national and international standards. Impulse, ultrasonic and microscopic tests, but also destruction and corrosion tests in independent test laboratories assure that the components manufactured by us meet all requirements concerning hardness, pressure, tightness, flexibility and precision.

## Uhde stock materials

| Material   | Type/Grade    | Nominal composition |
|--|---------------|---------------------|
| <b>Uhde standard carbon steel material</b>   |               |                     |
| 1.0566   | A350 LF2      | P355NL1             |
| <b>Uhde standard austenitic material</b>   |               |                     |
| 1.4429   | SA182 F316LN  | X2CrNiMoN17-13-3    |
| 1.4435   | SA182 F316LUG | X2CrNiMoN18-14-3    |
| 1.4466   | UNS S31050    | 25Cr-22Ni-2Mo       |
| <b>Uhde standard austenitic-ferritic material (Duplex)</b>   |               |                     |
| 1.4462   | SA182 F51     | X2CrNiMoN22-5-3     |
| 1.4410   | SA182 F53     | X2CrNiMoN25-7-4     |
| <b>Materials acc. to customer specifications</b><br>Safurex, Ferralium, HVD1, Alloy 255, Titanium, Zirconium, etc. |               |                     |



# Perfection in the minutest detail



## Control valves

Control valves belong to our special valves. Hereby, we fulfil all usual standards; our design and flexible construction allows us to meet many customer wishes like closing times, types of actuators and attachments etc. Common nominal sizes of the portfolio are between DN 1" and DN 16" and can be obtained for all pressure stages of forged bodies.



## Hand valves

Hand valves are part of our standard portfolio and can be supplied either individually or in series. In addition, gear actuators are used in case of higher closing forces. Usual nominal sizes of the valves in the portfolio are between DN 0.25" and DN 10" and they can be obtained for all pressure stages for forged bodies.



## Check valves

Check valves assure flow in one direction. Our portfolio comprises check valves of different types (with springs, teardrop shape etc.), which are suitable for horizontal or vertical installation positions. Usual nominal widths of the portfolio are between DN 0,25" and DN 10" and can be procured for all pressure stages for forged bodies.



## Butterfly valves

Those special valves are increasingly used in case of low-pressure differences and because of their compact design. When being closed, they allow a flushing throughput providing that a continuous problem-free function of the valve is guaranteed even after a longer time of being closed.



## Heat exchanger

The hairpin exchanger can be operated for a pressure range up to hundreds of bars on the tube or shell-side. The exchangers have a big surface and a narrow design to place them into an existing plant.



## Analyse valves

Analyse valves with a nominal diameter of 2-6 mm are used to tap of medium from the process to check it and assure the quality of the product. The nominal pressure range goes up to 200 bar. The hand wheel with the integrated coupling ensure a proper dosing and long lifetime of the equipment. The body material can be carbon or stainless steel depending on the medium.



## High pressure piping

References up to 16" HP piping. Bending and welding of pipe classes according to Uhde High Pressure Technologies Standards PN-200, PN-325 und PN-500. Uhde High Pressure Technologies supplies completely prefabricated and tested isometrics, spools and fittings. The high demands on the scope of tests carried out and on the fabrication process can only be satisfied by a comprehensive quality system and properly qualified personnel.

# Keep, regain, improve, support for your safety

Our comprehensive service performances are meant to provide maximum efficiency over the entire life cycle of the plant and individual components. We look after our customers from the installation to the shutdown including all necessary and useful expansions and alterations.



## Installation, commissioning and training

Our service already starts at the time of transfer with the preparation for the installation and setup of the construction site. There we provide for the proper mounting of the high-pressure ports and take over the welding works still required. Alternatively, we train your staff and enable them to carry out the installation yourself. We are ready to make your equipment for immediate installation at plant site.

## Training your operating and maintenance staff

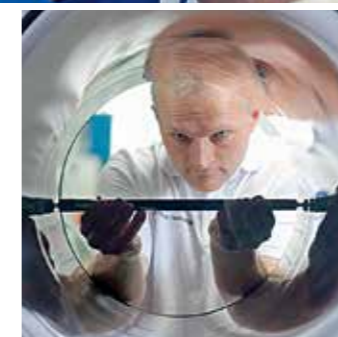
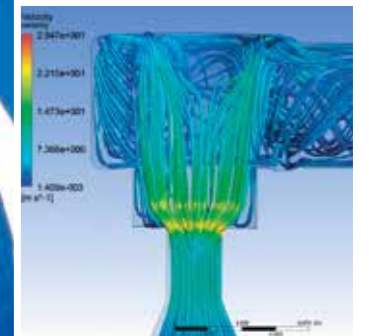
Your staff members can make themselves familiar with the maintenance and repair works on the high-pressure installations by means of our experts. In the training courses on site we impart the necessary understanding of the functions of the high-pressure components and their control.

## Inspections

To improve the safety and availability of your plant we offer inspections of high-pressure equipment according to the specifications of the local supervisory authorities. At the end of each inspection Uhde High Pressure Technologies prepares a documentation in which all test processes and results as well as proposals for measures to assure the availability of the plant are recorded.

## Spare parts and repair works

Defective components need not be replaced in any case – in most cases repairs are much more economic. Our spare parts service helps us make sure that repairs are available even after many years of the initial commissioning. Thus, Uhde High Pressure Technologies still supplies parts for machines which are more than 40 years old. Our repair service begins with the analysis of the defect – our technical staff then provides for the subsequent performance of the repair works at shortest notice.



# Complex solutions from one source



Even if a job demands more than just the replacement of a component, Uhde High Pressure Technologies is the right partner. In case of a planned modernization or expansion of an existing plant Uhde High Pressure Technologies accompanies you from the analysis and first preliminary decisions through the entire process.

## Planning safety from the beginning

Our experience gained in engineering helps us competently assess the necessary efforts as to process engineering, plants or rearrangement of plants, adaptations to the control system and safety. Due to the fast developments in control technology the

continuous adaptation of that technology to the state of the art is often reasonable or even necessary. Our engineers specialized in modernization do not only plan the full innovation process, but also support you in the transitional phase with words and deeds.

## From the analysis to implementation

If the capacity of the plant is to be increased, Uhde High Pressure Technologies offers you all necessary performances – from the entire preliminary works as to purchasing, design and manufacture up to assembly and supervision of the construction works. At the beginning, Uhde High Pressure Technologies supports you – in cooperation with other

companies in the Uhde group, if required – to compile possibilities and prepare the optimum conception for you. Laser-based measurements on site are applied to compile the necessary data for the replacement of pipes, we prepare 3D layouts and perform well-founded pipe stress analyses.

Again Uhde High Pressure Technologies offers modernization or replacement from one source and therefore the basis for a quick and efficient implementation: we can order necessary materials already during the process development and thus minimize the project period.

