



VDH | GROUP

5

5 COMPANIES

30

ACTIVE IN OVER
30 COUNTRIES

80

80 EMPLOYEES

20

OVER 20 MILLION
EURO TURNOVER

CONTENTS

VDH | GROUP

Foreword	6
VDH GROUP - Your partner in plant engineering & construction	8
Our company structure	10
Everything under one roof	12
Why us?	14
Milestones	16
VDH GROUP is the future	22

Mehldau & Steinfath Umwelttechnik GmbH

For clean air	24
Our scope of supply and services	26
The right storage area for every application	28
The SNCR process	30
Our mobile SNCR	32
Chemicals & reducing agents	34
Reduce dependencies - Strengthen security of supply	36
Our patents	38
Our processes	40
Knowledge becomes more when we share it	42

HKL Anlagentechnik GmbH

Process and plant engineering	44
Our scope of supply and services	46
Our service promise	48
We set accents	50
Ammonia (NH ₃) supply system	52
Large-scale ammonia (NH ₃) plants	54
We produce quality	56
Our expertise: Ammonia	58

DrySoTec GmbH

Tailor-made solutions	60
Our scope of supply & services	62
A little insight into our work	64

vysion-aset GmbH

Plant engineering, automation, service	66
Our projects	68

Contact | Imprint

Contact	70
Imprint	70

FOREWORD



Timo, Bernd & Daniel von der Heide

are responsible for the management of the companies M&S Umwelttechnik, M&S Environmental Technologies s.r.o. and HKL Anlagentechnik. Together as a family, they hold 100 % of the company shares. They are also managing directors of DrySoTec GmbH.

We warmly welcome you to VDH | GROUP. We represent the association of the companies Mehldau & Steinfath Umwelttechnik GmbH, HKL Anlagentechnik GmbH, Mehldau & Steinfath Environmental Technologies s.r.o., DrySoTec GmbH, and vvision•aset GmbH.

Over the past years, we've undergone a remarkable development and are now active and successful in various sectors of plant construction. Our continuous growth is, in no small part, due to the dedication and expertise of our employees. They are the foundation of our company and enable us to develop and implement first-class, tailored solutions for our customers.

We would like to express our deep gratitude to our staff for their commitment. Their dedication is the engine that drives us and plays a significant role in our success.

Likewise, we would like to thank our clients and suppliers for decades of outstanding collaboration. Your trust in our services and products, and your constructive collaboration have enabled us to grow and improve consistently. Your demands have constantly spurred us to innovate.

Our responsibility to future generations is of utmost importance to us as a family-owned company. Our primary objective is to merge economic success with a positive contribution to society and the environment. Through sustainable management, we aim to ensure that our work contributes to a livable and healthy environment not just today, but for future generations.

Looking at our achievements fills us with pride, and looking forward, we're optimistic about what we can achieve in the future. As a family business, we stand for reliability, quality, and responsibility. We will continue to uphold these values in our decisions and actions.

We cordially invite you to learn more about VDH | GROUP and get to know us as a reliable partner in plant engineering & construction. Whether you are a long-standing customer, business partner, or prospective client, we look forward to working with you on new projects and fostering successful collaboration.

Warm regards,

Bernd von der Heide

Daniel von der Heide

Timo von der Heide

VDH | GROUP

Your Partner in Plant Engineering & Construction

The VDH | GROUP is your partner in
plant engineering & construction.

Together, we ensure successful project completion worldwide
in environmental technology, process and system engineering,
and electrical, measurement, control, and regulatory technology.

We utilize our expertise to develop individual and tailored
solutions for your facility, continuously defining the Best
Available Technology (BAT). We are constantly evolving and
setting the industry standard. With our patented processes,
we can overcome even the most challenging conditions.

Our motto:

“DOESN'T WORK, DOESN'T EXIST!”



“As a family business,
we don't think in quarterly
figures, but in generations.”

Bernd von der Heide

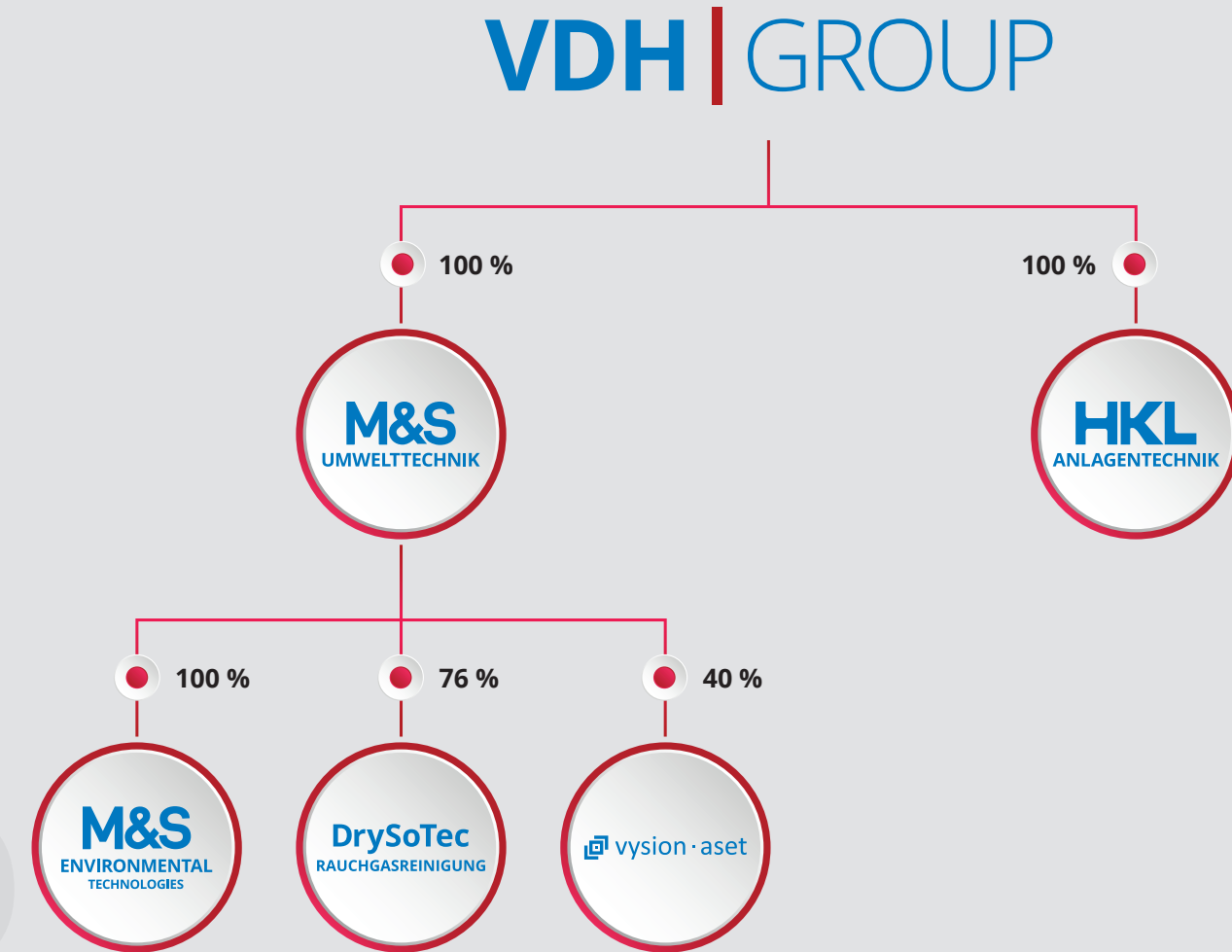
Founder & CEO

OUR CORPORATE STRUCTURE

The VDH | GROUP combines various companies owned by the von der Heide family. Bernd von der Heide, along with his sons Daniel and Timo von der Heide, manages the businesses of M&S Umwelttechnik GmbH, M&S Environmental Technologies s.r.o., and HKL Anlagentechnik GmbH. The family owns 100% of these companies' shares.

In recent years, M&S Umwelttechnik GmbH has invested in other companies. In 2018, they acquired 40% of shares in vvision·aset GmbH. In 2022, they took a 76% stake in DrySoTec GmbH. Furthermore, Bernd, Daniel, and Timo von der Heide are also involved in the management of DrySoTec.

The VDH | GROUP, as a family business, has a clear goal: to grow healthily in the future. With a keen eye on the market landscape, they are always open to investing in exciting projects or acquiring promising companies.



EVERY-
THING
UNDER
ONE
ROOF



Environmental Technology

Mehldau & Steinfath Umwelttechnik is your partner and solution provider in the field of flue gas denitrification, especially for large combustion plants.



Process and Plant Engineering

HKL Anlagentechnik offers consultation, planning, and manufacturing of storage, filling, handling systems in all materials, and production plants for liquid media and gases in all application areas.



Environmental Technologies

M&S Environmental Technologies, a subsidiary of M&S Umwelttechnik located in Ostrava, Czech Republic, provides valuable support in the areas of engineering, commissioning, and service.



Innovative Flue Gas Cleaning

DrySoTec is your specialist for innovative, ecologically and economically optimized state-of-the-art flue gas cleaning.



Electrical, Measurement, Control, and Regulatory Technology

We set up electrical, measurement, control, and regulatory systems in the industry, energy production, and distribution. Our tasks include the planning and setup of partial and complete systems.

VDHI GROUP



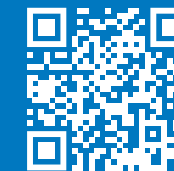
www.ms-umwelt.de/en/



www.hkl-anlagentechnik.de/en/



www.ms-umwelt.de/en/



www.drysootec.de/en/



www.vysion-aset.de

WHY US?

BECAUSE WE PROVIDE COMPREHENSIVE SOLUTIONS FROM A SINGLE SOURCE.

Our companies cover a significant portion of the plant engineering sector.

Our years of experience, our high quality standards, and our streamlined communication channels allow us to create synergies that guarantee competent, economical, and reliable execution of projects.



EXPERIENCE

Combined, we have more than 80 years of experience in plant engineering & construction. We are familiar with the industry's challenges and the solutions.



MADE IN GERMANY

All of our products are manufactured in Germany. Our HKL Anlagentechnik GmbH is a certified manufacturing facility that guarantees quality in its own production.



SYNERGY EFFECTS

Whether it's environmental technology, process and plant engineering, or electrical, measuring, control, and regulation technology – we bring all these areas together under one roof. This saves us and our clients time, ensures efficient execution, and upholds a high quality standard.



PARTNERSHIP-ORIENTED

As a customer-focused company, we think and act collaboratively, openly, and honestly. Our high performance across diverse specializations is based on an efficient structure with streamlined processes, unbureaucratic decisions, and a pronounced cost-awareness.



PATENTS

We define the state of the art and continually evolve. With our patented methods for flue gas denitrification, we are able to overcome even the most challenging boiler conditions. Our motto: "Doesn't work, doesn't exist!"



CERTIFICATES

We place great emphasis on quality and occupational safety. All of our companies are ISO 9001 and SCC certified. Moreover, our businesses possess numerous other qualifications, such as ISO 3834-2, specialist company according to WHG, Module A2 according to DGRL, etc.



REFERENCES

We operate globally and have successfully completed over 500 projects. If needed, we are happy to provide you with our extensive reference lists from each respective company.



TRAINING

Our services are built on the solid foundation of well-trained specialists. By combining our diverse high-level qualifications, we offer our clients the opportunity to hire us as a general contractor for new builds and renovations or as a full-service provider for maintenance.



MILESTONES



2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

PROGRESSING WITH TIME



WHERE WE ARE AND KEY MILESTONES ACHIEVED



2000

NH₃-STORAGE
2 x 32 m³ single-walled tanks above ground, rail car supply, unloading with compressors, pressure-increasing pumps, evaporator station
3 x 100 kg/h electrically heated, pressure regulation.

FOUNDATION
Mehldau & Steinfath Umwelttechnik GmbH

2002

SNCR + Storage tanks for biomass, glass troughs, and liquid chemical waste.

2004

MHKW
Commissioning of the first SNCR for a waste incineration plant.

SNCR for lignite and fluidized bed boilers.

2006

NH₃-OH-PLANT
2 x 1,000 m³ double-walled flat-bottom tanks, ship unloading station, truck unloading station, and pressure regulation including assembly, piping, electrical engineering, switchgear construction, and cabling.

SNCR for lignite and fluidized bed boilers.

2008

NH₃-OH-PLANT
2 x 1,500 m³ double-walled flat-bottom tanks, ship unloading station, truck unloading station, and pressure regulation including assembly, piping, electrical engineering, switchgear construction, and cabling.

SINGLE LANCE SWITCHING
Introduction of temperature-controlled activation of individual lances for MHKW plants (NO_x < 100 mg/Nm³).

NH₃-OH-PLANT
2 x 1,300 m³ double-walled flat-bottom tanks, ship unloading station, truck unloading station, and pressure regulation including assembly, piping, electrical engineering, switchgear construction, and cabling.

2010

MHKW FENNE
Commissioning of an SNCR for a 200 MWe boiler with 5 injection levels and 60 individually activated SNCR lances.

PATENT GRANTS TWIN-NO_x FROM 2011
Countries: Germany, Europe, China, Eurasia, USA, UK

2012

SNCR
Commissioning of the first of 6 SNCR plants for 225 MWe boilers in Jaworzno, Poland
3 X SNCR FOR MHKW in Wijster, Netherlands (compliance NO_x clean gas < 60 mg/Nm³)

INTEGRATION
HKL Anlagentechnik GmbH Essen, Germany
PATENT GRANTS SELECTIVE FLUE GAS COOLING FROM 2013
Countries: Germany, Europe, China, USA, UK

2014

SNCR + STORAGE TANKS
Storage tanks + 3 x SNCR for 225 MWe boilers in Rybnik, Poland

ACQUISITION
of the company shares of M&S Feuerungstechnik M&S Umwelttechnik 100% family-owned
PATENT GRANTS DYNAMIC FLUE GAS TREATMENT FROM 2015
Countries: Germany, Europe, USA

2016

PATENTED SNCR PROCESS
Storage tanks + 2 x SNCR with a combination of urea solution and ammonia water as a reducing agent (patent) for 2 x 115 MWe boilers in Krakow, Poland.

FOUNDATION
M&S Environmental Technologies s.r.o. Ostrava, Czech Republic

2018

SNCR PLANT, STORAGE TANK + MIXING STATION
for 5 x lignite-fired 210 MWe boilers in Kemerköy and Yeniköy, Turkey.

PARTICIPATION
40% stake in vvision+aset GmbH Cottbus, Germany

2020

STORAGE TANKS FOR SUBSTITUTE FUELS
Planning and construction of a storage tank and dosing for cold and hot substitute fuels.

COMBINED SNCR PLANTS
Equipped for more performance: Two SNCR plants with urea solution and ammonia water as a reducing agent for a boiler.

2022

RENEWAL SPRAY DRYER AND NEW CONSTRUCTION LIME MILK NEUTRALIZATION
Replacement of a reactor with a rotary atomizer against a spray dryer and new construction of a neutralization of the acidic washer discharge with lime milk. Demolition of rotary atomizer and construction/ connection of a new spray dryer within 10 days.

FOR LIQUID GAS
Reactivation and modernization of a liquid gas storage tank built by HKL in 1986 and decommissioned in 2014 with a gas-air mixing plant for 1,050 m³ storage volume.

PATENTED SNCR PROCESS
Conversion of an SNCR plant with the introduction of a dynamic flue gas treatment/ reducing agent control based on the NO_x mass flow profile (patent) and retrofitting of adaptive and selective flue gas cooling (patent).

SNCR FOR HYDROGEN REFORMER
SNCR custom-made with three independently selectable levels with their own control paths. Combined denitrification by SNCR with utilization of the NH₃ slip in the CAT.
NH₃-STORAGE
Approval planning and engineering for a 50 m³ NH₃ storage.

PARTICIPATION
76% stake in DrySoTec GmbH Essen, Germany



VDH | GROUP IS THE FUTURE



Environmental Awareness and Sustainability

- | Consistent reduction of pollutant emissions to improve air quality, compliance with emission standards, and promoting general health.
- | Participation towards a CO₂-neutral energy supply by providing the necessary infrastructure for the storage of energy carriers, such as ammonia or methanol.



Healthy Growth

- | Expansion of the supplier and customer network.
- | Healthy growth through product diversification and sustainable economic practices for future generations, and avoiding risky investments.



Customer/Supplier Relationship and Product Quality

- | Maintaining our trustworthy customer and supplier relationships through high-quality standards, reliability, adherence to delivery dates, professional execution, and after-sales service.



Employee Development and Culture

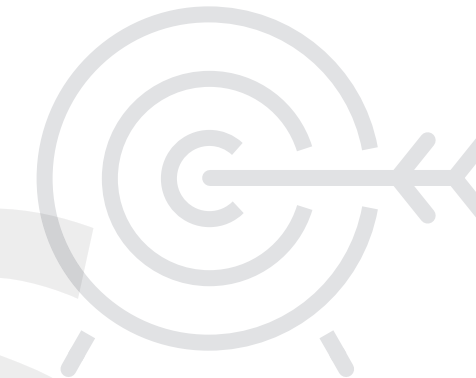
- | Focus on personal and professional development and promotion of our employees.
- | Attracting more talents to our team and collaboratively making a significant contribution to the energy transition.
- | Ensuring stability through the transfer of knowledge and experience to the next generation, securing sustainable expertise.



Adaptability and Vision

- | Ongoing development and adaptation to recognize and exploit future opportunities and challenges.

GOALS



“Paths are made by walking.”

M&S

Mehldau & Steinfath Umwelttechnik GmbH

FUNCTIONALITY AND ECONOMIC EFFICIENCY

M&S Umwelttechnik, as a technology service provider, bridges the gap between innovative technical solutions and the requirements for compliance with legal emission limits. M&S offers both the retrofitting of existing facilities to comply with new, stricter limits, as well as the development and delivery of tailor-made facilities, which are specifically adapted to local and technical conditions.

Our patented solutions ensure compliance with legal limits through high levels of nitrogen oxide reduction.

MADE IN GERMANY

Our reliable “made in Germany” technology impresses with a low risk of failure, a high level of user and maintenance friendliness, and a long operational life.

Thanks to the high operational reliability of our facilities, we enable our customers to achieve maximum availability and the highest possible output. But we not only focus on functionality but also on economic efficiency.

With us, the cost-benefit ratio is right due to

- | low investment costs
- | low consumption of reduction agents
- | easy retrofitting capabilities of our facilities



For
clean
air

23

23 YEARS M&S

28

ACTIVE IN 28
COUNTRIES

25

25 EMPLOYEES

300

OVER 300
REALIZED
SYSTEMS

M&S
UMWELTTECHNIK
VDH | GROUP

OUR SCOPE OF SUPPLY & SERVICES

FLUE GAS DENITRIFICATION

We design, supply, and install turnkey denitrification plants using the SNCR method with ammonia, ammonia water, or urea solution as the reducing agent. We also optimize existing plants and supply the pump stations for urea solution and ammonia water for SNCR and SCR plants, as well as mixing stations for urea solutions.



CHEMICALS & REDUCING AGENTS

M&S Umwelttechnik supplies urea-based reducing agents under the brand name NO_xAMID, which, if necessary, can also be conditioned with our special additives for the specific operational requirements in SNCR plants. We are particularly proud that, through our close network of suppliers and freight forwarders, we can deliver the urgently needed chemicals for plant availability at short notice in emergencies. If SNCR plants are to be operated with regular process water instead of fully desalinated water (DI water), urea solution can only be used with a special additive, otherwise, lime precipitates quickly, clogging the pipes and instruments. For ammonia water, only DI water must be used for dilution.

MAINTENANCE, SERVICE & SPARE PARTS

Mehldau and Steinfath does not only mean top-notch SNCR plants + tank farms. You can also rely on us in the service area at any time, be it for service and maintenance or for the delivery of spare parts. To ensure high availability of your SNCR plant, we offer you professional maintenance, service, and spare parts from a single source. In case of service, our own well-trained and experienced service technicians ensure that your SNCR plant's functionality is maintained.

For a long service life of your SNCR plant, we create individual, plant-specific maintenance and service plans. After the work is completed, you will receive a detailed maintenance report. We maintain and optimize your plant based on the latest findings. For repairs or the replacement of parts, we offer you quality-tested spare and wear parts in OEM quality. If spare parts are needed, we guarantee quick, reliable delivery, and high availability from stock. We are happy to create tailor-made spare part packages for you and advise you on your stockkeeping.



THE RIGHT STORAGE TANK

for every application.



STORAGE TANKS FOR UREA SOLUTION AND/OR AMMONIA WATER UREA MIXING STATION

We plan and supply complete storage and supply systems for ammonia, ammonia water, urea solution, heating oil, or other hazardous substances. Whether for power plants, waste incineration plants, the glass and cement industry, or industrial combustion – from 10 to over 1000 m³ – we are your partner for your storage tank including all field devices and safety devices according to the provisions of the WHG or country-specific regulations. Depending on the requirement, the containers are made in various materials, such as various stainless steels or plastics (HDPE, GRP), in single or double-walled design, standing or lying, and with or without trace heating and insulation.



THE SNCR PROCESS

Selective non-catalytic reduction (SNCR) is a process for the denitrification of flue gases (DeNO_x). A reducing agent is used, which reacts with the environmentally harmful nitrogen oxides (NO_x) to form harmless nitrogen (N₂) and water. The reaction temperature ranges between 850 and 1050 °C. SNCR systems are usually operated with an aqueous urea solution or ammonia water as the reducing agent.

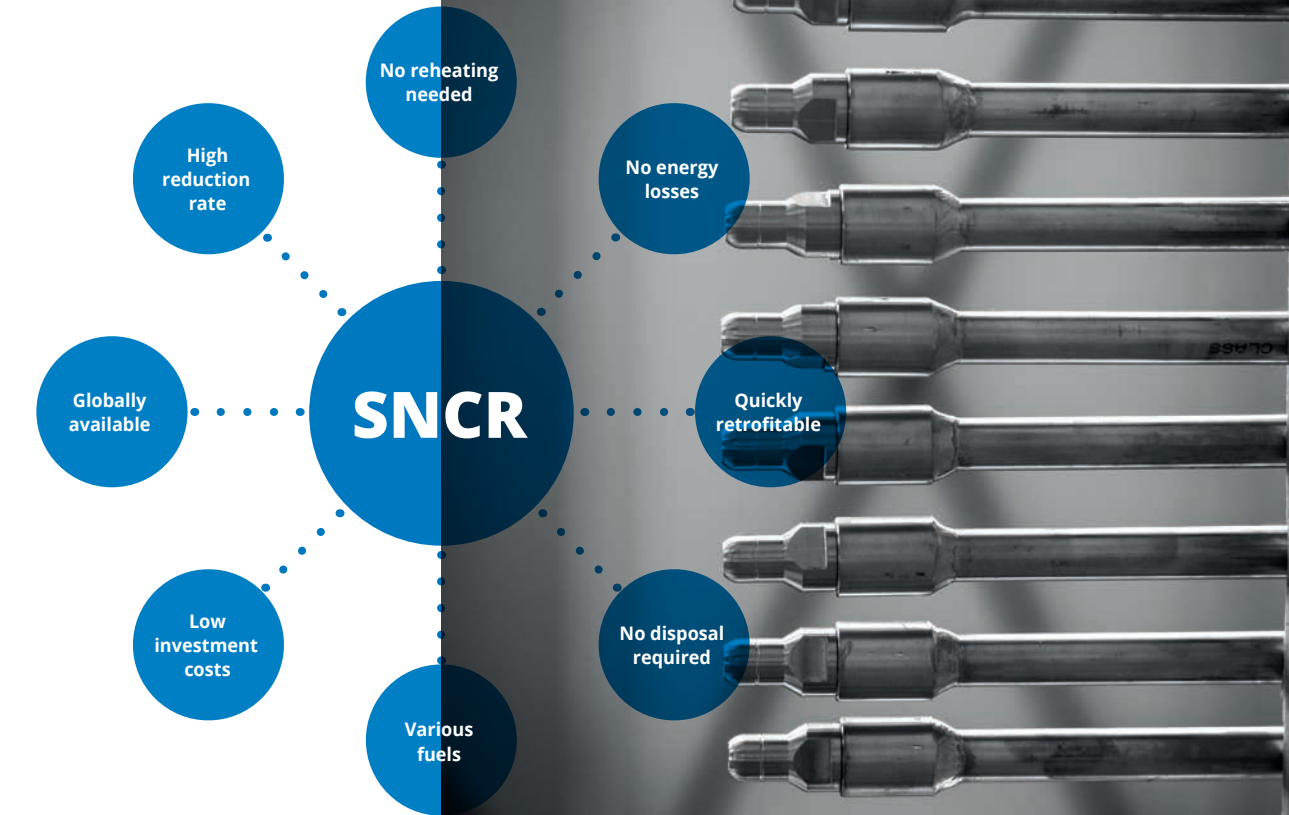
ADVANTAGES OF THE PROCESS

The advantage of this process is the low technical effort compared to an SCR process, which operates after the boiler with the help of a catalyst and often requires additional primary energy.

- | Low investment costs since the combustion chamber or the flue gas duct does not need to be modified
- | The SNCR process can be retrofitted in almost all existing boilers in a short period, as only the injection nozzles need to be installed
- | No need to reheat the flue gas
- | No energy losses due to pressure drops
- | Suitable for various fuels



- | Sufficiently high separation rates without a catalyst
- | The reducing agents are produced in large quantities and are available worldwide
- | No need to dispose of used catalyst elements



OUR MOBILE SNCR



Set your
flue gas denitrification
in motion.

**FOR SHORT FEASIBILITY STUDIES
OR AN EXTENDED TRIAL RUN –
OUR MOBILE SNCR SYSTEMS ARE
FLEXIBLE AND ADAPT TO YOUR
REQUIREMENTS.**

It is recommended to conduct tests with a mobile SNCR trial system to obtain further planning security. With the tests, additional information is obtained with reasonable expenditure of time and money on whether the required NO_x and NH_3 limit values can be safely met, even with changing boiler loads, and what technical effort may be required.



WHY A MOBILE SNCR?

- | SNCR operation tests & feasibility studies with urea solution (40/45 wt.-%) or ammonia water (25 wt.-%) as a reducing agent
- | Suitable for automated multi-level operation for the injection at different boiler loads
- | Individually switchable injection lances
- | Integration of NO_x target values possible.
- | Commissioning of the system
- | Support or implementation and evaluation of the operational tests
- | Provision of injection lances, flexible hose connections, pump modules, etc.
- | Provision of reducing agents
- | Control cabinet with S7 control
- | Remote maintenance unit
- | Deionized/process water pressure booster pump

CHEMICALS & REDUCING AGENTS



M&S Umwelttechnik supplies urea-based reducing agents under the brand name NO_xAMID, which, if necessary, can also be conditioned with our special additives for the specific operational requirements in SNCR systems. We are particularly proud that, through our close network of suppliers and freight forwarders, we can deliver the urgently required chemicals for plant availability at short notice in emergencies.

OUR SCOPE OF SUPPLY AND SERVICES

- | Europe-wide delivery of urea-based reducing agents under the brand name NO_xAMID
- | Depending on your preference, we supply our NO_xAMID with a urea concentration of 32.5%, 40% or 45% with or without additives
- | We also deliver our reducing agents with our special additives to prevent calcium precipitation and clogging of pipes and instruments
- | Europe-wide delivery of AdBlue
- | Europe-wide delivery of hydrochloric acid
- | Europe-wide delivery of ammonia water



“We are particularly proud that we can offer our customers, through our tight network of suppliers and freight forwarders, the urgently required chemicals for plant availability on short notice in emergencies.”

T. von der Heide
Managing Director & Shareholder

REDUCE DEPENDENCIES – STRENGTHEN SUPPLY SECURITY



WITH US, YOU ARE PREPARED FOR ANY CRISIS.

Together with our long-standing partners, we have rentable storage capacities of approximately 24,000 m³ for various media, especially urea solution or AdBlue.

Storage capacities at various locations in Germany:

8 x tank batteries each with a capacity of 144 m³ inside a building
 1 x tank storage of 1,180 m³
 2 x tank storage each with a capacity of 1,180 m³, heated and insulated
 2 x tank storage each with a capacity of 4,833 m³

1 x tank storage of 4,833 m³
 6 x tank storage each with a capacity of 100 m³

1 x tank storage of 1,700 m³
 1 x tank storage of 1,200 m³
 1 x tank storage of 900 m³
 3 x tank storage each with a capacity of 100 m³

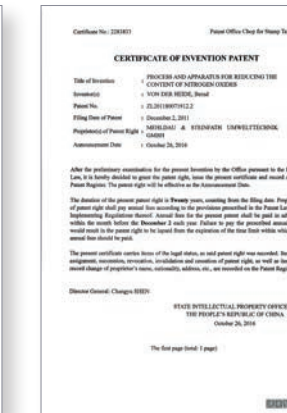
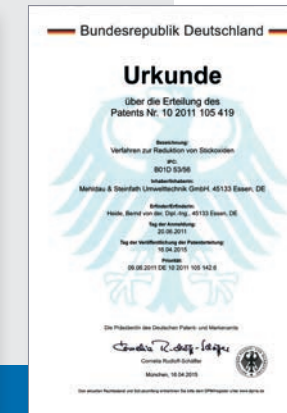
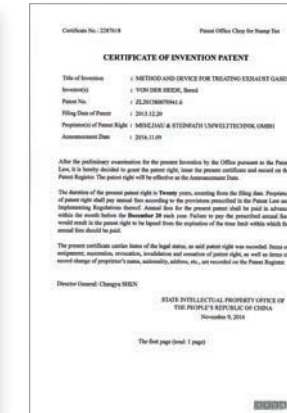
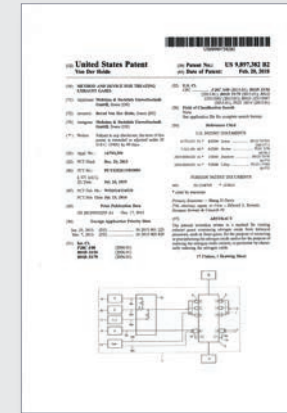
- | All locations are equipped with flow measurements as well as calibrated vehicle scales
- | Simultaneous loading and unloading of at least 2 tank vehicles per tank storage
- | Full-day, flexible loading and unloading time
- | Daily ship loading and unloading with up to 1,500 tons
- | Cost-effective storage of larger quantities using suitable tank vehicles
- | On-time delivery to the destination



OUR PATENTS

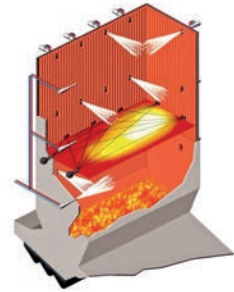
We define the state of the art and continue to evolve. With our patented flue gas denitrification processes, we can overcome even the most challenging boiler conditions.

We are present at conferences and fairs worldwide, give lectures, and together with our customers and suppliers, find solutions to meet the legal emission limits.



OUR PROCESSES

SINGLE LANCE SWITCHING

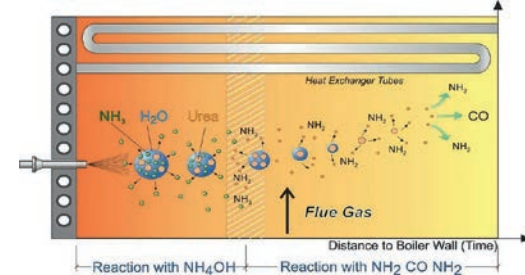


In order to ensure that the reducing agent is always injected into the optimum range of the temperature window, which is most effective in terms of NO_x separation, NH₃ slip and reducing agent consumption, in modern systems, the individual injection lances, and thus not the entire level, switched depending on the flue gas temperatures at the respective injection points.

The advantages of single lance switching are:

- | Higher efficiency
- | Low NO_x emissions
- | Low NH₃ slip
- | Low CO emissions
- | Low consumption of reducing agents

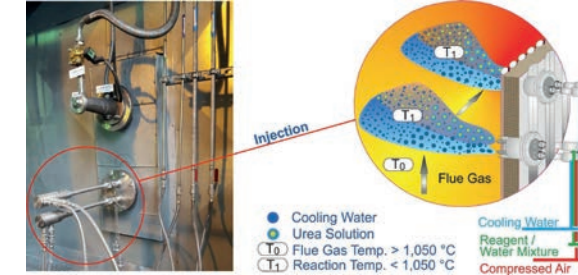
TWIN-NO_x



Our patented TWIN-NO_x® process combines the advantages of the reducing agents ammonia water and urea and thus achieves the best results.

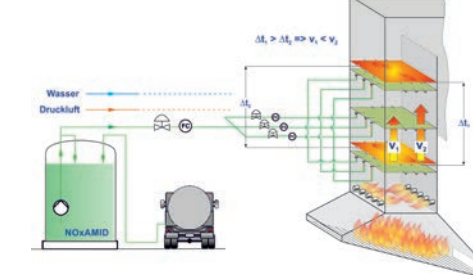
With the TWIN-NO_x® process, the different reaction behaviors of urea solution and ammonia water are specifically applied. Both reducing agents are used alternately or as a mixture, depending on the operating conditions. The respective advantages can thus be used alternatively or in combination, depending on requirements, in order to expand or shift the effective temperature range for the NO_x separation and thus to significantly improve the performance of the SNCR process.

SELECTIVE FLUE GAS COOLING



Selective flue gas cooling is a patented process by which the flue gases are locally and temporarily cooled down at the injection points, where the flue gas temperatures are too hot for the SNCR process, to increase efficiency and minimize NH₃ slip. In case of temperature imbalances, only the zones that are too hot are “selectively” cooled. If necessary, only a single or a group of cooling lances is activated based on the temperature profile, which significantly reduces the cooling water consumption and, therefore, the heat loss in the boiler. With selective flue gas cooling, an entire injection level for reducing agents can often be omitted.

DYNAMIC FLUE GAS TREATMENT



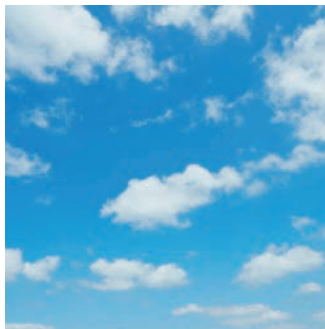
During the operation of combustion plants, flue gas flows and NO_x concentrations are difficult to measure. Therefore, a uniform NO_x distribution is assumed, which can lead to imprecise dosing of the reducing agent. This increases NH₃ slip and consumption of reducing agents. Different flue gas speeds influence dosing. To avoid over- or under-dosing, in our patented “Dynamic Flue Gas Treatment” process, each injection lance or group of lances has its own control valve, adjusting the amount of reducing agent according to the NO_x mass flow profile. This improves NO_x removal, reduces NH₃ slip, and significantly saves on reducing agents.



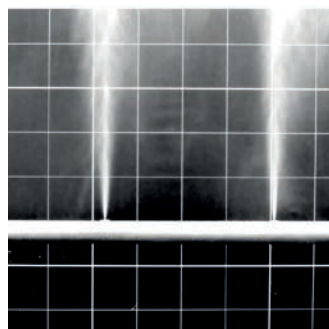
Interested?
Learn more
about our
patented
processes
here.

KNOWLEDGE GROWS WHEN WE SHARE IT.

Flue gas denitrification is our expertise and passion, and it has been for over 20 years. We would like to make available to you the accumulated knowledge in the form of lectures and presentations that we have given on various occasions.



Air purification: Non-catalytic denitrification (SNCR) remains state of the art: Cost-effective retrofitting



Future-Oriented SNCR Technologies – Application and Advantages of Selective Cooling in Large Coal-Fired Boilers



Energy from Waste – Adaptation of existing SNCR



Find more knowledge here:



www.ms-umwelt.de/downloads

PROCESS AND PLANT TECHNOLOGY

Planning, construction, and maintenance of facilities for hazardous media require specialized knowledge to implement the procedural and legal requirements in a cost-effective manner. To comprehensively support our clients from preliminary planning to final acceptance, our employees undergo continuous training and education to stay up-to-date with current technology and regulations. We at HKL Anlagentechnik GmbH offer solutions to our clients' requirements efficiently and without bureaucracy. Years of experience allow HKL Anlagentechnik to refer to numerous references and completed plant construction projects.

MADE IN GERMANY

Our reliable technology "made in Germany" stands out due to its low risk of failure, high user and maintenance friendliness, and long service life. Our high operational reliability ensures the highest availability and maximum output for our clients. However, for us, not only functionality matters but also cost-effectiveness.

With us, the cost-benefit ratio is right due to:

- | Low investment costs
- | Low reduction agent consumption
- | Easy retrofitting of our systems



Storage for liquid media and gases

51

51 YEARS HKL

25

ACTIVE IN 25 COUNTRIES

27

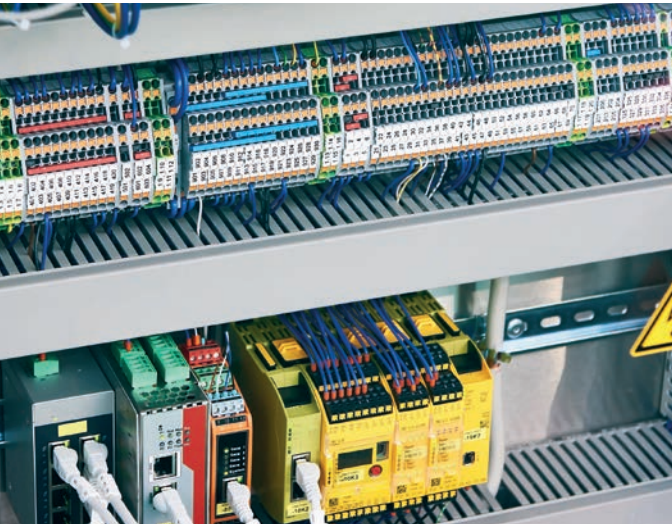
27 EMPLOYEES

5.000

OVER 5000 REALIZED SYSTEMS

HKL
ANLAGENTECHNIK
VDH | GROUP

OUR SCOPE OF SUPPLY & SERVICES



QUALIFIED PIPELINE CONSTRUCTION

Whether a new plant with a new pipeline system needs installation, a plant needs to be connected to an existing pipeline system, or just repair work on pipelines is required: We can help! Our services include the planning and approval process which encompasses sizing and routing of pipelines. Thanks to our trained staff, we ensure timely execution, assembly, and acceptance. Our employees are especially trained in handling hazardous media, thus we guarantee quick and flexible assistance in emergencies.



PROCESS AND PLANT TECHNOLOGY

We are experts in consulting, planning, and constructing storage, filling, and handling facilities in various materials and production plants. We build tanks and supply systems for the chemical industry, including the related pipelines, especially for hazardous fluids. We also ensure the regular maintenance of these systems.

Our specialization includes the development of storage and filling facilities for water-endangering, flammable liquids, and liquefied gases under pressure, especially ammonia. For hardening plants, we offer customized systems for liquid and gaseous media. We always ensure the highest plant safety, legal conformity, and the individual needs of our customers.

MEASUREMENT, CONTROL, AND REGULATION TECHNOLOGY

Our MSR department offers control and visualization systems based on S7 and with WinCC or TIA Portal. We modernize controls from all manufacturers in cooperation with the customer. Furthermore, we produce control cabinets, undertake wiring and commissioning on-site, and create circuit diagrams with E-Plan. We also conduct explosion protection tests.



SERVICE, MAINTENANCE, AND REVISIONS

HKL Anlagentechnik is your competent partner for all maintenance, service, and repair works in the fields of NH_3 , NH_4OH , LPG, Methanol plants. Do you want to ensure the operational and supply security of your facility? We'll support you!



OUR SERVICE PROMISE



HKL - YOUR CERTIFIED SPECIALIST

We are a specialist company according to AD2000-HP0 for the construction of pipelines and tanks with the necessary welding technical qualifications such as process and welder tests. Furthermore, we have certification as a specialist company under the Water Resources Act (WHG).



BEST TRAINING FOR HIGHEST QUALITY

Our services are built on a solid foundation of well-trained specialists. Our combination of various high-level qualifications offers our customers the opportunity to use us as a general contractor for new constructions or conversions or a complete service provider for maintenance.



PARTNERSHIP

As a customer-oriented family business, we think and act in a partnership, open, and honest manner. Our high-performance capability in various specialist areas is based on an efficient structure with short paths, non-bureaucratic decisions, and a pronounced cost consciousness.

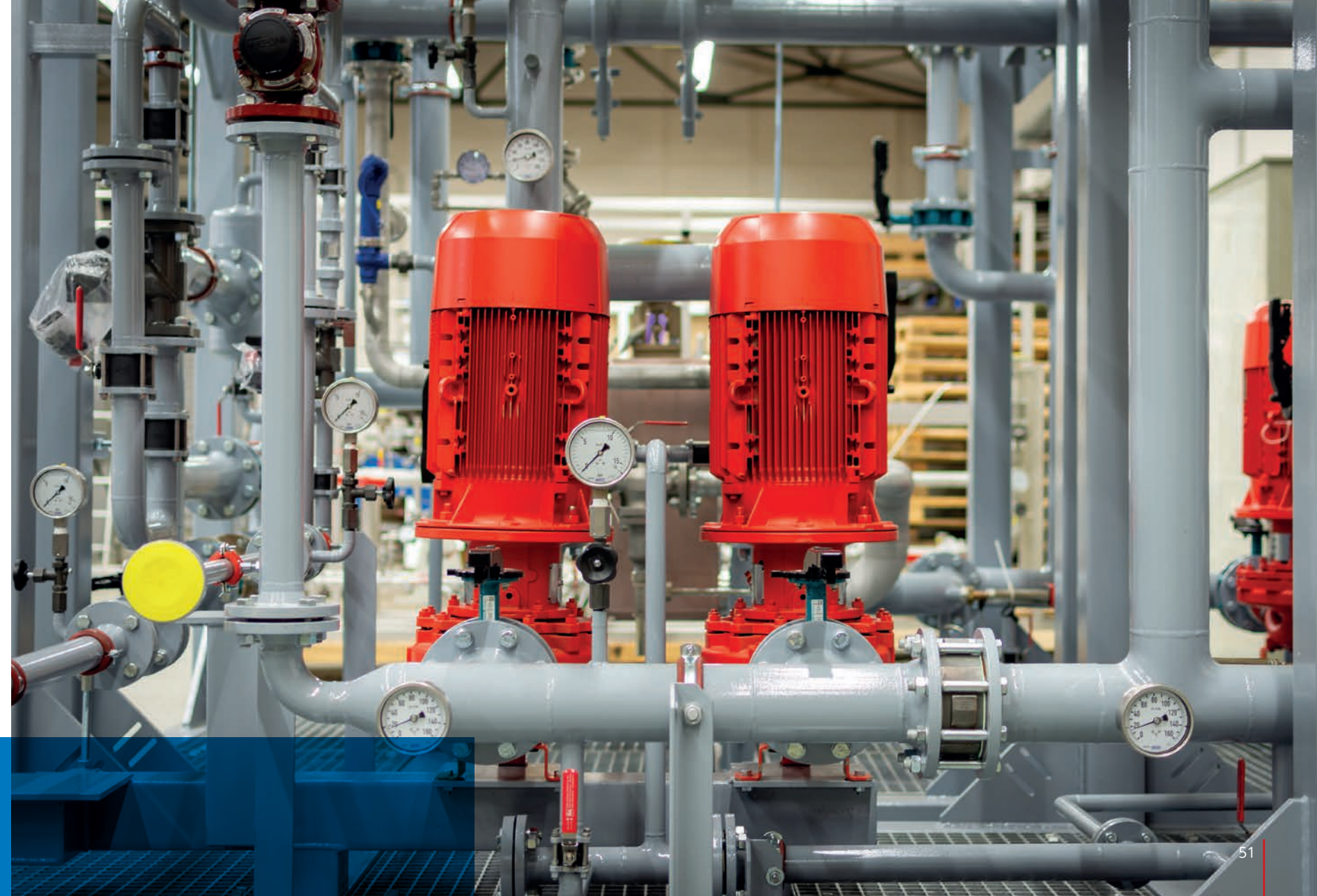


WE SET ACCENTS



WITH OUR PUMP STATIONS FOR A VARIETY OF APPLICATIONS.

We plan and manufacture pump stations for various media, e.g., ammonia for engine test stand supply or for the fertilizer industry, ammonia water for flue gas cleaning systems (SNCR or SCR), liquefied gases for handling tank storage as well as for energy-intensive consumption facilities, or solvents for the paint industry, up to rust and funnel cooling systems in waste incineration plants. The materials range, depending on the medium, from stainless steel to steel to plastics. Pressures up to 63 bar are often standard.



AMMONIA (NH₃) BARREL SYSTEMS

OUR COMPACT CONTAINER SOLUTION

- | NH₃ barrel systems as compact units in containers, factory-fitted, ready for connection, and wired.
- | Containers with the required WHG or fire protection and explosion protection requirements for storing water-hazardous and flammable substances.
- | Prefabricated module solutions for delivering cost-effective NH₃ systems, optionally with evaporators



- and pressure control stations for ammonia supply for various industrial processes, filters/oil separators to protect downstream system components.
- | Control of the system technology through its own switchgear in a separate, explosion-free container area or in the customer system. Control is independently initiated and tested by the factory regardless of production processes.



- | Typically, only the connection piping and wiring are required on-site. This shortens the installation time on-site, as the system is largely prepared and ready for operation.
- | High flexibility as the system can easily be relocated or expanded if necessary.
- | Reduction of on-site measures to comply with the WHG and fire protection requirements.

- | Proven "everything from one source" principle with support for the necessary approval process (BImSchG, AwSV, etc.). HKL is a full-service provider with all required specialist qualifications (e.g., WHG, ATEX, PED, SCC, etc.). The system typically comes with CE certification.

LARGE SCALE AMMONIA (NH₃) PLANTS

In combination with the mixing of ammonium hydroxide (NH₄OH)

In modern industry, the safe and efficient production and storage of chemicals play a crucial role. Not only technical aspects but also environmental protection and safety standards are of utmost importance. From specialized storage tanks to compressor and pump stations, to first-class service by HKL, we offer everything from a single source to meet the requirements of our customers and legal provisions.

OUR SCOPE OF SUPPLY AND SERVICES

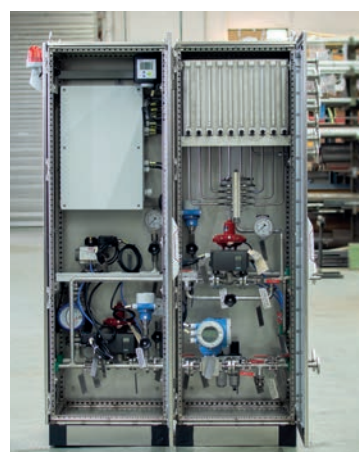
- | NH₃ storage tanks with a capacity of ≥ 100 m³ for:
 - | Storage of various NH₃ qualities
 - | Unloading from/refilling into tank trucks using a compressor station, as well as filling into barrels and bottles with the help of pump modules
- | Production of ammonium hydroxide (NH₄OH) in mix ratios of 15 % – 31 % using demineralized water
- | Heat exchangers and tube bundle coolers for dissipating the reaction heat
- | Use of a mixing tube developed by HKL, mounted on a solid base structure with vibration dampers



- | Storage of the ammonium hydroxide mixture in stainless steel tanks
- | Filling using calibrated preset counters, mass flow meters, and calibrated scales
- | Complete emptying of NH₃ bottles and barrels and the return of ammonia to the system
- | Pressure protection of the NH₃ pipelines with system feedback
- | Exhaust gas scrubbers to minimize emissions
- | Comprehensive service by HKL, including planning, delivery, assembly, after-sales service, revision work, pipeline inspections, and system maintenance



WE PRODUCE QUALITY



OUR MANUFACTURING

We place great emphasis on doing it ourselves to meet our high-quality standards. Our own manufacturing facility ensures:

- | Quality
- | Flexibility
- | Speed
- | Safety
- | Cost optimization
- | Flow of experience from development to production and vice versa.

OUR EXPERTISE: AMMONIA

AMMONIA: A KEY PLAYER IN THE ENERGY TRANSITION

Ammonia (NH₃) could play a pivotal role in the energy transition in the future, particularly as a medium for storing and transporting hydrogen. Here are some reasons why ammonia will be important in the energy transition.

HYDROGEN STORAGE

Hydrogen is considered a promising energy carrier for the future, especially in the context of renewable energies. However, storing hydrogen, due to its low density and the associated tendency to escape, presents challenges. Ammonia can be viewed as a type of "liquid hydrogen" since it has a higher density than hydrogen gas and can be liquefied and stored at comparatively moderate pressure and temperature.

STORAGE

Ammonia has a higher energy density than gaseous hydrogen, meaning that less volume is needed for a given amount of energy. While hydrogen must be liquefied at extremely low temperatures (below -253 °C) or stored under very high pressures (200-900 bar) for efficient storage and transport, ammonia is already liquid at -33 °C at 1 bar or at 20 °C at 9 bar. The compression effort is therefore much lower than with hydrogen.

INFRASTRUCTURE

There's already an established infrastructure for the production, storage, and transportation of ammonia due to its use in agriculture as a crucial raw material for fertilizers.

TRANSPORT

Liquid ammonia can be transported with relatively minor modifications in existing tankers, tank trucks, and pipelines. This offers potential for international hydrogen trade in the form of ammonia.

RECONVERSION

Ammonia can be reverted back into hydrogen and nitrogen. This process is called "cracking." The produced hydrogen can then be used, for example, in fuel cells or other applications.

DIRECT USE

There are also researches into the direct use of ammonia in fuel cells and as fuel in specialized combustion engines and gas turbines, which would eliminate the step of reconverting it into hydrogen.

CARBON-DIOXIDE NEUTRAL PRODUCTION

With "green" hydrogen, produced from renewable energies through the electrolysis of water, ammonia can be produced in a carbon-neutral manner. This is referred to as "green ammonia."

PROVEN TECHNOLOGY

The technology for producing ammonia – the Haber-Bosch process – has been known and well-established for over a century.

NH₃



"We at VDH | GROUP have decades of experience in building ammonia storage and evaporator systems that are also in use in various research institutions and provide ammonia as fuel. Thanks to our expertise, we are already in a position to support you on your journey to using CO₂-free energy."

Silke Braun

Technical Director, Operations Manager &
Authorized Officer of HKL Anlagentechnik GmbH

DRYSOTEC

DrySoTec GmbH

TAILOR-MADE SOLUTIONS FOR YOUR PROJECT

DrySoTec GmbH is your partner for innovative, ecologically and economically optimized flue gas cleanings using the latest state-of-the-art technology.

Our longstanding experience with the processes of

- | Dry absorption
- | Spray absorption
- | MKT systems
- | Wet scrubbing
- | and combined systems

allows us to optimally address your requirements.

WE DEAL WITH

- | Design and construction of new innovative flue gas cleaning plants
- | Refurbishment / upgrading of existing facilities based on the latest findings
- | Technical optimization of existing systems

Our range of services encompasses all project phases, from identifying the problem to devising system-adapted concepts, through to implementing the best concept as a turnkey solution. Upon request, after handing over the running plant, we also undertake the After Sales Service.



Innovation through knowledge and experience

19

19 YEARS DrySoTec

7

ACTIVE IN 7 COUNTRIES

10

10 EMPLOYEES

40

OVER 40 REALIZED SYSTEMS

DrySoTec
RAUCHGASREINIGUNG
VDH | GROUP

OUR EXPERTISE & PRODUCT AREAS



IMPLEMENTATION OF THE BEST CONCEPT INTO A TURNKEY SOLUTION

During the project phases of:

- | Engineering
- | Supply
- | Assembly
- | Commissioning and Training

our experienced team ensures that your plant is constructed on schedule, in accordance with the agreed concept and the agreed costs.

OUR RANGE OF TECHNICAL SOLUTIONS INCLUDES:

- | Turnkey flue gas cleaning plants
- | Fabric filters
- | Additive storage, dosing, and conveying systems
- | Residue plants for conveying, storage, and loading
- | Evaporative coolers
- | Spray absorbers
- | Solid distribution systems based on the MPI system
- | DeNO_x procedures (SNCR or SCR)
- | Heat exchangers for further utilization of exhaust gas heat



PROBLEM DEFINITION

To devise an optimal solution, an initial situational analysis is required.

Important factors such as the type and amount of burned materials, pollutant values, and volume flows are determined. Since operators often cannot determine the required parameters themselves, our engineers also conduct on-site analyses.

PRE-ENGINEERING / DEVELOPING SYSTEM-ADAPTED CONCEPTS

Once all required factors are known, we begin to develop system-adapted solutions.

We consider all aspects such as relevant cost parameters (investment costs, operational and subsequent costs), benefits, future viability, spatial situation, aesthetics, etc.

Our vast experience allows us to choose from a wide range of processes and device alternatives, achieving a balance between meeting low emission values and incurring low costs.



Once a general approach is decided in consultation with the plant operator, a detailed planning of the concept for the turnkey plant is carried out.

A SMALL INSIGHT INTO OUR WORK

Our scope of supply and services:



EVAPORATIVE COOLERS

- | For cooling and humidifying exhaust gases before flue gas cleaning

SPRAY DRYERS:

- | For evaporating salt-containing wastewater from wet flue gas cleaning

ADDITIVE SILOS, DOSING, AND CONVEYING EQUIPMENT

- | For storing, dosing, and conveying sodium bicarbonate, lime-based additives, and activated carbon

AEROSTREAM REACTORS

- | Reaction path in the flue gas stream for pollutant separation

ADDITIVE DISTRIBUTION SYSTEMS

- | For optimal distribution of additives in the flue gas stream with the MPI system

BIG-BAG AND CONTAINER STATIONS

- | For dosing and conveying sodium bicarbonate, lime-based additives, and activated carbon

ABSORPTION FABRIC FILTERS

- | For efficient dust separation as a foundation for our dry processes

HEAT EXTRACTION FROM FLUE GAS

- | For feedwater preheating or district heating generation

RESIDUE CONVEYING, RESIDUE SILOS, AND LOADING

- | For dust-free transport, storage, and loading of contaminated residues from flue gas cleaning

SCR SYSTEMS

- | For NO_x separation in the low-temperature range

SNCR SYSTEMS

- | For direct denitrification in the boiler area



VYSION•ASET

vysion•aset GmbH



PLANT CONSTRUCTION & SERVICE ELECTRICAL, MEASUREMENT, CONTROL, AND REGULATION TECHNOLOGY

We are a young company with experienced employees from various industrial sectors. Our core competencies are in the construction of electrical industrial plants, in automation technology, and in service. Flat hierarchies, a dedicated staff, expertise, intergenerational know-how, and cooperative partnerships in all business relationships – that's vysion•aset. As a family-run business, for vysion•aset, not only a particularly good working atmosphere counts, but primarily the employees and the satisfaction of every individual customer.



Plant
construction,
automation,
service

8

8 YEARS vysion•aset

19

ACTIVE IN 19
COUNTRIES

20

20 EMPLOYEES

231

231 PROJECTS

 vysion • aset

OUR PROJECTS

PLANT CONSTRUCTION

Thanks to the many years of experience of our employees in various industrial sectors, we are not just your specialist in plant construction. We provide you with packages precisely tailored to your needs, from engineering, through overhead to individual electrical plant fitters. Retrofit measures, new constructions, and conversions, as well as our entire range of services, are provided not only nationally but also internationally with a very experienced staff who face every new challenge.

- | Construction, coordination, and organization of site processes - nationally and internationally
- | Overhead for the electrical industry
- | Engineering of industrial electrical switchgear



AUTOMATION

As an independent system provider, we offer tailor-made solutions for individual and complete systems at the field and control level. Our portfolio starts with engineering and ends with the handover of a fully functional system, including an operating manual and CE documentation. Together with our network partners, we can create solutions for complex or unique customer concerns.

- | Planning of process-specific systems
- | Creation of circuit diagrams with E-Plan
- | Creation of logic and function plans as well as commissioning of automation systems worldwide
- | Software and hardware engineering
- | Production of control and automation cabinets

SERVICE

Maintenance and repair of electrical, measurement, control, and regulation systems in continuous operating processes and during their revision periods. Optimization of process-engineering systems and "standby" systems with personalized response times.



CONTACT | IMPRINT



Mehldau & Steinfath Umwelttechnik GmbH
Alfredstraße 279 | 45133 Essen
Tel.: +49 201 43783 – 0 | Fax: +49 201 43783 – 33
zentrale@vdh-group.de | www.ms-umwelt.de



HKL Anlagentechnik GmbH
Haßlinghauser Straße 156 | 58285 Gevelsberg
Tel.: +49 2332 8461 – 0 | Fax: +49 2332 8461 – 199
hkl@vdh-group.de | www.hkl-anlagentechnik.de



DrySoTec GmbH
Alfredstraße 279 | 45133 Essen
Tel.: +49 201 45095 – 0 | Fax: +49 201 45095 – 18
info@drysotec.de | www.drysotec.de



vysion·aset GmbH
Franz-Schubert Straße 2 | 03050 Cottbus
Tel.: +49 355 12 10 01 60 | Fax: +49 355 12 10 01 69
info@vysion-aset.de | www.vysion-aset.de

IMPRINT

PUBLISHER

VDH | GROUP

Mehldau & Steinfath Umwelttechnik GmbH
HKL Anlagentechnik GmbH
DrySoTec GmbH

MANAGING DIRECTORS

Bernd, Daniel und Timo von der Heide

RESPONSIBLE FOR CONTENT & EDITING

Timo von der Heide

DESIGN | IMPLEMENTATION

grafikkontor GmbH | Sandra Bindschus

Changes and errors reserved.

[This publication is also available for download on the website www.vdh-group.de/en/](http://www.vdh-group.de/en/)



VDH | GROUP