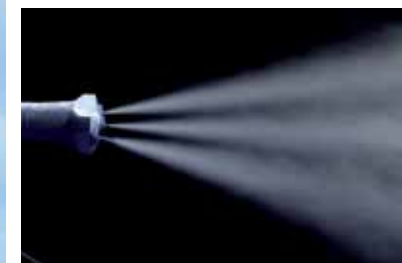
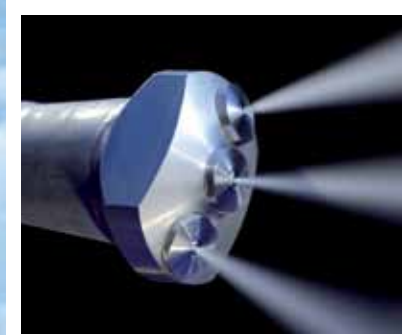




VarioClean - NO_x

Nozzle lances and systems
for NO_x removal



SCR/SNCR
SCR/SNCR

LECHLER NOZZLE LANCES AND SYSTEMS FOR NO_x REMOVAL PROCESSES

Lechler is one of the world's leading spray technology companies. With more than 130 years of experience, we have developed the skills and expertise that bring you the products you need to maintain your competitive advantage in a rapidly changing business and manufacturing environment.



Lechler's experienced engineers are working constantly to develop products and devise solutions that will keep you at the forefront of your business sector. Our engineers, technical specialists, and sales staff have a proven track record of building successful partnerships with businesses that require high quality and reliable products. Let Lechler lead the way for your precision spray nozzles and engineered solutions.

What is NO_x Removal?

Nitrogen oxide emissions must be reduced

NO_x is a generic term for mono-nitrogen oxides (NO and NO₂). These oxides are produced during combustion, especially combustion at high temperatures.

When NO_x and volatile organic compounds (VOCs) react in the presence of sunlight, they form photochemical smog, a significant form of air pollution, especially in the summer.

NO_x formation is promoted by rapid fuel-air mixing. This produces high peak flame temperatures and excess available oxygen, which, in turn, promotes NO_x emissions.

It is economically logical to consider NO_x controls that achieve the lowest emission levels possible. These post-combustion control systems are referred to as selective catalytic reduction (SCR) and selective noncatalytic reduction (SNCR). In either technology, NO_x is reduced to nitrogen (N₂) and water (H₂O) through a series of reactions with a reagent (or reagents) injected into the flue gas. The most common reagents used in commercial applications are ammonia and urea for both SCR and SNCR systems.

CFD simulation assists in process optimization



CFD analysis determines temperature, gas distribution and ammonia-NO_x concentration for injection locations.



Lechler – your competent partner in this specialist field

The complexity of the task and the stringent technical requirements come with many risks. Choose Lechler and you can be sure of unsurpassed know-how and perfect technology.

What this means for you:

- Greater efficiency thanks to optimum process-related design aided by state-of-the-art CFD simulation.
- Precise measurement data on the nozzles' spray characteristic are available for your own CFD calculations.
- Design, delivery, commissioning and service all from a single source.
- Reliable spare parts supply throughout the world.

SNCR

SNCR process

The SNCR process is often used in waste-to-energy plants (WTE) and the cement and power plants. The droplets are injected at the optimal temperature range.

In addition to the temperature, the correct droplet distribution is also of particular importance for ensuring that the process runs optimally: The droplets must be sufficiently large so that they penetrate sufficiently deep into the flue gas flow and nevertheless still evaporate reliably. The most even distribution possible of the reducing agent in the flue gas flow is also important.

Lechler twin fluid spray lances meet these requirements effectively.

Twin fluid nozzles are used for fluctuating NO_x concentrations.

SCR

SCR process

The SNCR process with spray lance injections is commonly used in power and waste-to-energy (WTE) plants. This involves injecting the reducing agent upstream of the catalyst, whereby

it must be distributed in the flue gas flow as homogeneously as possible and evaporated very quickly.

In practice, static mixers that mix gas and the reducing agent are often used in addition to the nozzles. This allows extremely short evaporation paths at low temperature levels.

It must be guaranteed that the reducing agent is completely evaporated before it reaches the catalyst. To make sure of this, Lechler has developed twin fluid nozzles that meet these requirements. Their fine droplet distribution and precise controllability have proven to be successful.

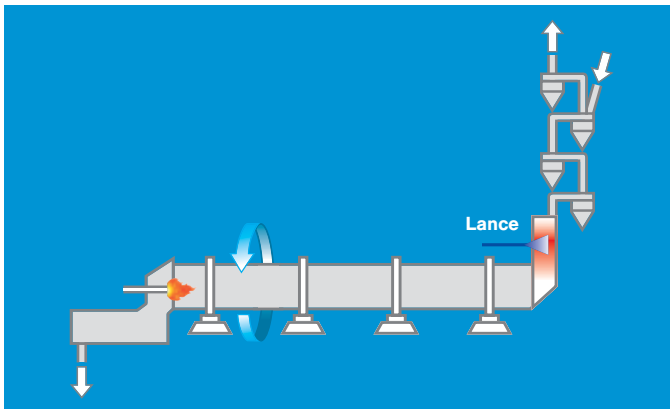


LECHLER PRODUCTS PROVE THEMSELVES IN MANY APPLICATIONS

Cement / Calciners – SNCR

Cement / Calciners – SNCR process

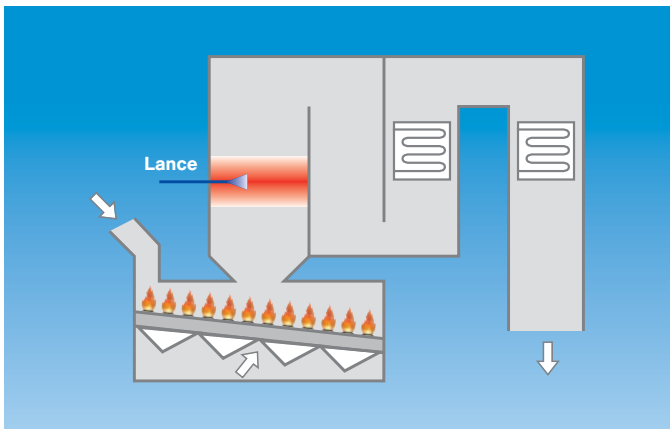
- Optimum mass transfer between the reducing agent and flue gas, e.g., via twin fluid spray nozzles.



Waste-to-energy – SNCR

Waste-to-energy – SNCR process

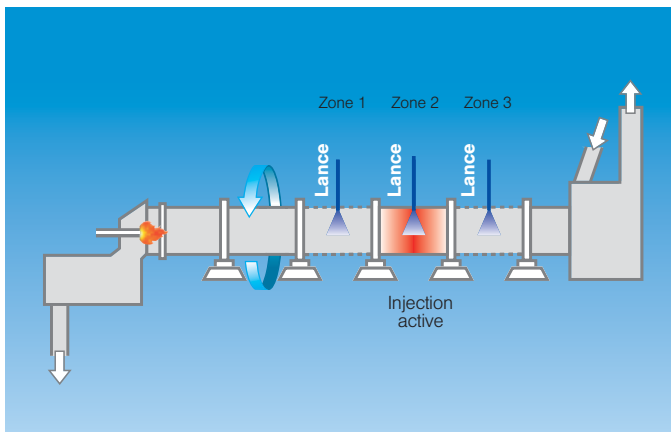
- Very good controllability of droplet size / pulse rate so that fluctuating NO_x concentrations can be counteracted.



Cement / Long Kiln – SNCR

Cement / Long Kiln – SNCR process

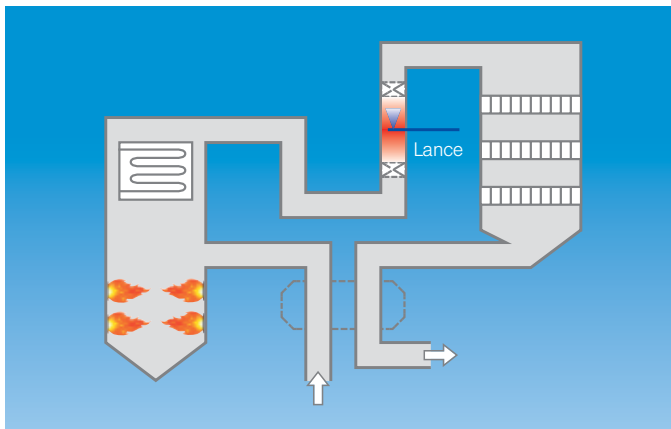
- Process for denitrification directly in the kiln, including media routing along the rotary kiln.



Power Plants – SCR

Power Plants – SCR process

- New nozzle technology for very short evaporation paths (patent pending).

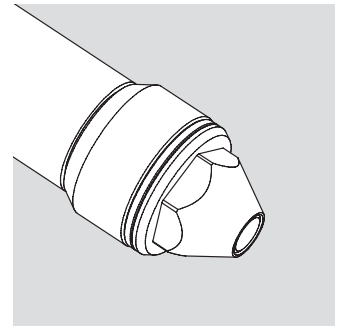


LECHLER NOZZLE TECHNOLOGY FOR PERFECT SOLUTIONS

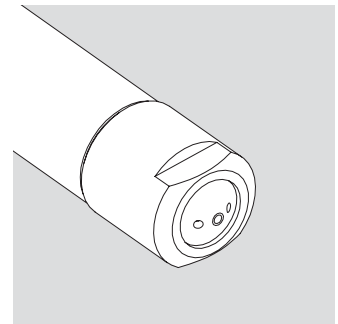
Lechler nozzle lances and systems for NOx control are the result of many years of research and development work.

Taking our field experience and nozzle technology as the basis, Lechler has developed special solutions for use in SNCR and SCR plants. State-of-art design and simulation and measuring technology ensures in advance that the results will meet your requirements exactly.

Lechler twin fluid nozzles for SNCR plants atomize on the basis of the internal mixing principle. Varying the air / liquid ratio allows the droplet size spectrum to be controlled. A proven design and the correct material choice enable use at high temperatures.



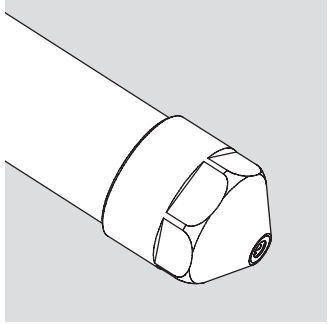
Lechler twin fluid flat spray nozzles add to these properties with even better, complete coverage.



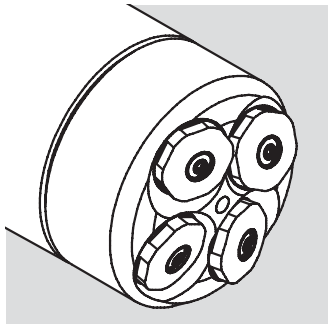
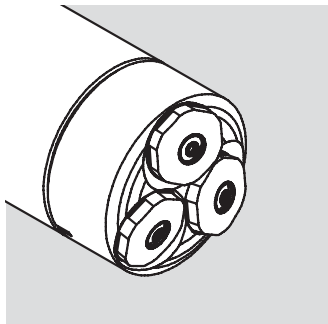
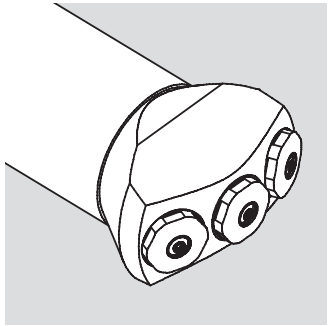
Lechler nozzles for SNCR systems

Lechler nozzles for SCR systems

Lechler twin fluid nozzles for SCR plants operate on the principal of a newly developed atomization principal for which the patent is pending. This allows for very fine droplet distributions and extremely short evaporation paths.



Specially designed cluster head nozzles allow multiplication of the flow rates and adaptation of the spray pattern to the requirements at the injection location.



LECHLER NOZZLE LANCES

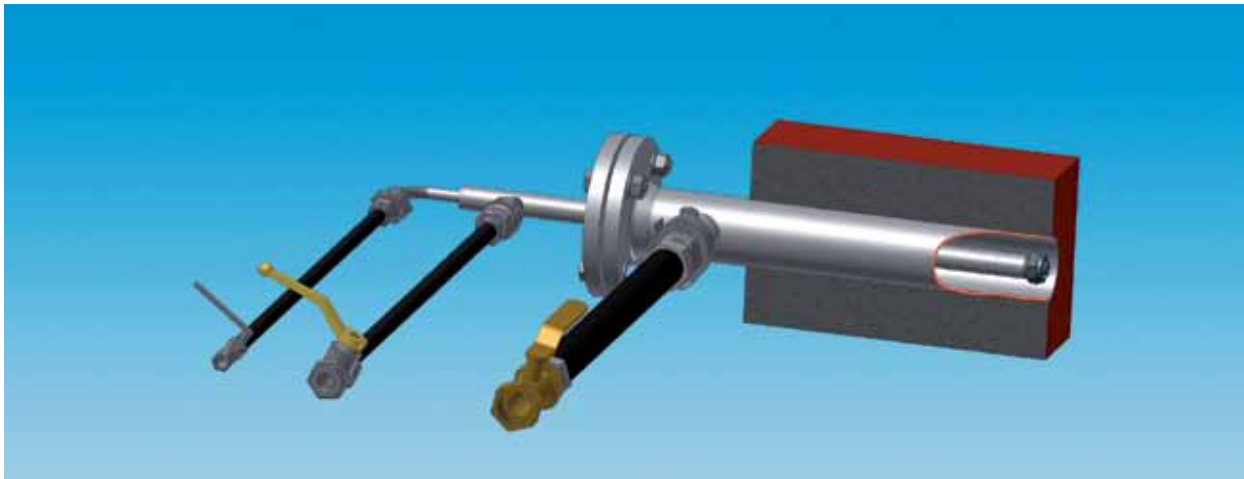
Lechler nozzle lances custom designed to meet your needs

Lechler nozzle lances ensure optimum placement and alignment of the spray pattern in the flue gas duct. They are adapted precisely to the particular denitrification process and the individual process needs.

In practice, different design variants and special accessory parts often open up completely new possibilities. Lechler accommodates to your specific design requirements as follows:

- Protective tubes with barrier air connection
- Mounting configurations for sealing into the flue gas duct

- Differential thermal expansions
- Adjustable lance length
- Auxiliary equipment



Nozzle lance for SNCR applications (for installation in the wall of the gas duct)



Nozzle lance for SCR applications (for installation in the gas duct)

COMPLETE SOLUTIONS

Pump and metering skids

Lechler pump and metering skids are custom made precisely to the process-specific requirements and the function of the nozzle lances. Preassembled, tested units with defined interfaces minimize the amount of installation required for you.

Your reagent can be used with Lechler pump and metering skids.



Metering unit



Pumping unit



Compact pump and unit for metering in an enclosure

**ENGINEERING
YOUR SPRAY SOLUTION**



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