VarioClean - NO\textsubscript{x}

Nozzle lances and systems for NO\textsubscript{x} removal

SCR/SNCR
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.

What is NOx Removal?

Nitrogen oxide emissions must be reduced

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

When NOx 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.

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

It is economically logical to consider NOx 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, NOx 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

Lechler GmbH, Germany Lechler Inc., USA

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.
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 NOx concentrations.

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 process

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

Waste-to-energy – SNCR process

- Very good controllability of droplet size / pulse rate so that fluctuating NOx concentrations can be counteracted.
Cement / Long Kiln – SNCR process

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

Power Plants – SCR process

- New nozzle technology for very short evaporation paths (patent pending).
Lechler twin fluid flat spray nozzles add to these properties with even better, complete coverage.

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 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 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)
**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.