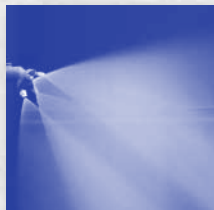


CHOOSING THE RIGHT NOZZLE



Best results are achieved in gas cooling and conditioning processes only when detailed knowledge of process-specific requirements is available to assist in the choice of nozzles.

We will provide you with comprehensive advice taking your system and the applications you require into account. Our portfolio includes nozzles made of different materials for a wide range of droplet sizes and spray angles. The combination of your specific process requirements and our decades of experience results in a tailor-made solution for your needs.



Laval nozzles

Twin-fluid nozzles for a wide droplet spectrum in special applications



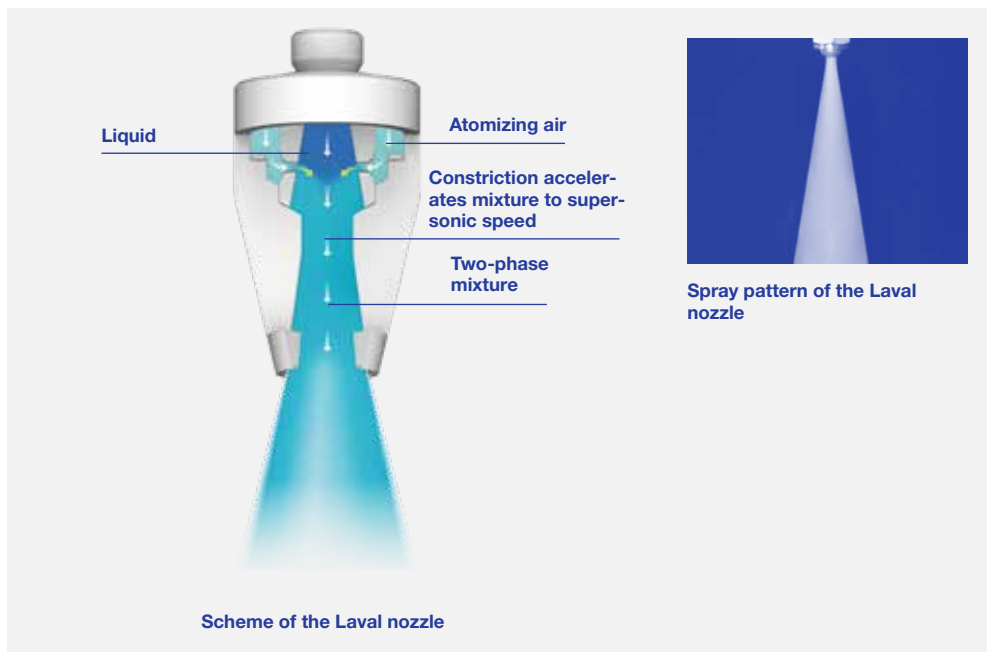
Lechler Laval nozzles

atomize liquids as a fine full cone. These twin-fluid nozzles work according to the supersonic principle.

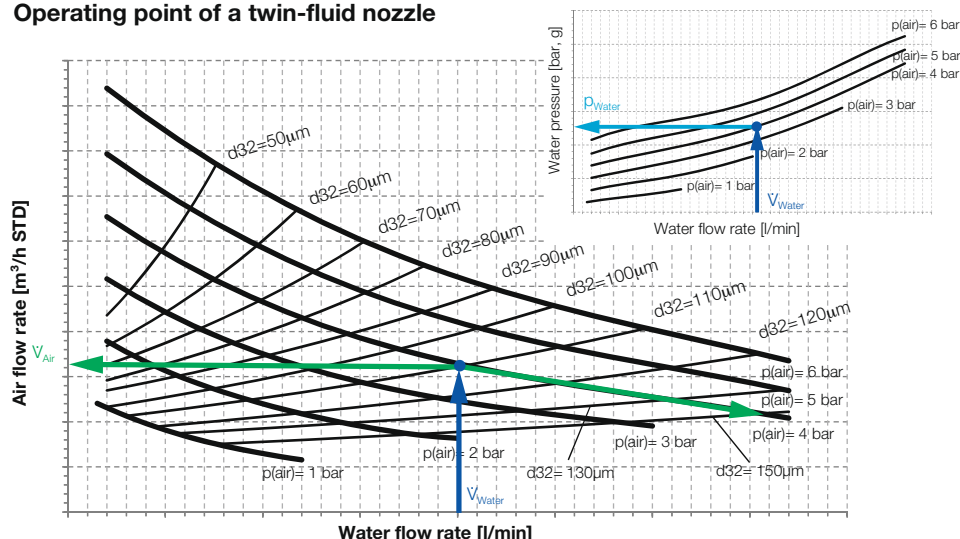
A dual-phase mixture is created from atomizing air and liquid in the mixing chamber inside the nozzle. The shape of the nozzle causes this mixture to be accelerated to supersonic speed, resulting in an extremely fine atomization of the droplets.

By changing the air/liquid ratio, the droplet size and the droplet spectrum can be adapted within a wide range. The large free cross sections of the nozzle also allow atomization of viscous or solids-laden liquids.

Choosing the right material prevents wear even where abrasive media are present, and enables use at high temperatures.



Operating point of a twin-fluid nozzle



Use:

- Gas cooling in gas-bearing pipes (ducts) and medium-sized and small gas cooling towers
- Injection of solids-laden water
- Introduction of lime water in the desulfurisation process
- Injection of aqueous ammonia or urea solution for the DeNOx process (SNCR/SCR)
- Chemical process engineering (spray dryers etc.).

Properties



Small spray angle
(15°), suitable for small cross-sections and horizontal ducts



Adjustment of the droplet spectrum by changing the air/fluid ratio



Clog-resistant thanks to large free cross-sections without internal fittings



Very large turn down ratio of 20:1 (in some cases up to 40:1)



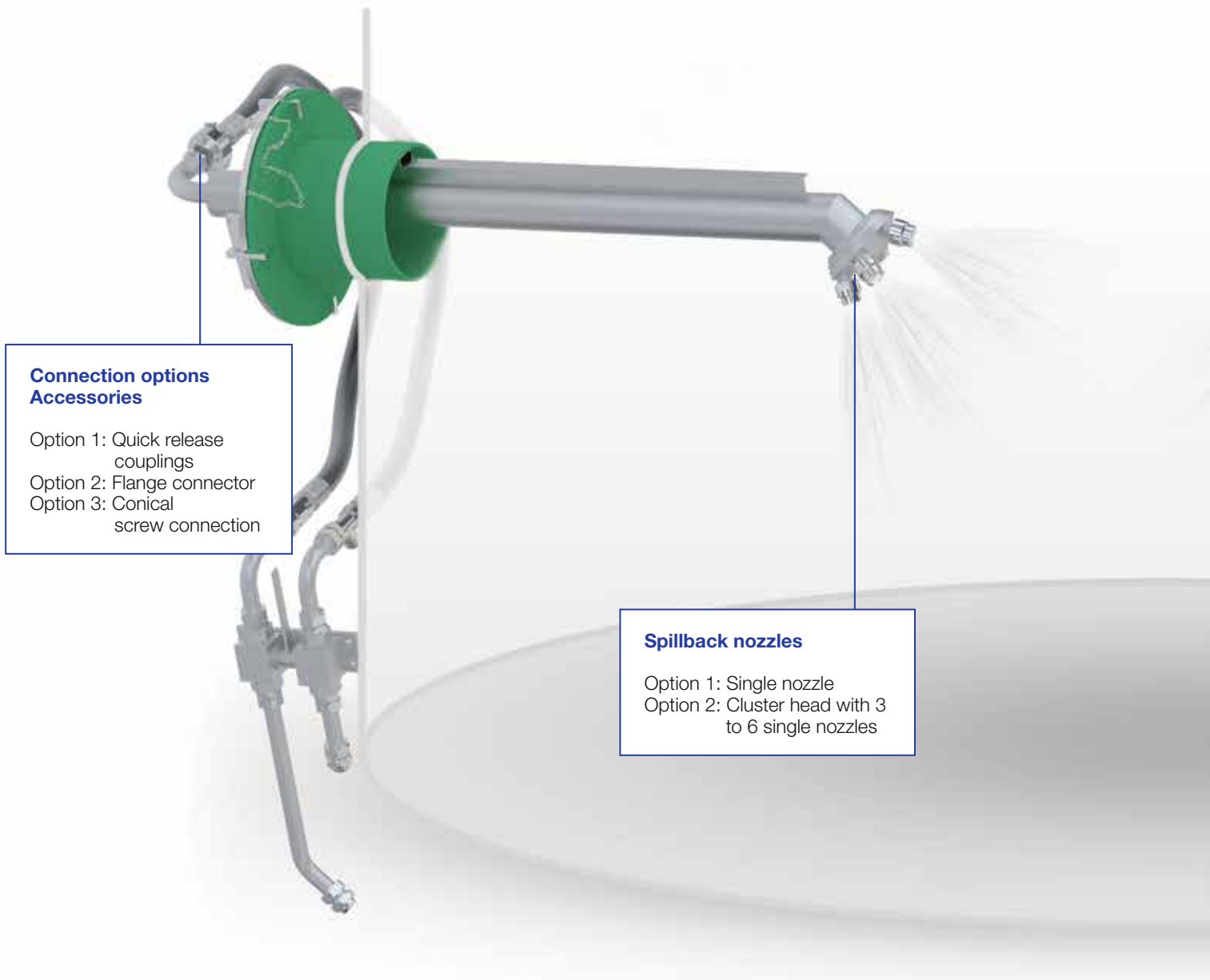
Very fine droplet spectrum



Typical pressure range
Liquid 1-6 bar, g
Atomizing air 1-6 bar, g

Lechler nozzle lances -

Highest spraying accuracy in the flue gas duct



Connection options Accessories

- Option 1: Quick release couplings
- Option 2: Flange connector
- Option 3: Conical screw connection

Spillback nozzles

- Option 1: Single nozzle
- Option 2: Cluster head with 3 to 6 single nozzles

Lechler nozzle lances ensure optimal spray placement and alignment in flue gas ducts. The choice of nozzles and the consideration of local conditions and process-related matters means they can be individually adapted to the respective requirements.

The nozzles themselves have a low-maintenance design and can be quickly cleaned or exchanged with minimal effort.

The robust, high-quality stainless steel construction ensures a high degree of functional reliability. Lances are available in a variety of material to suit specific process requirements.

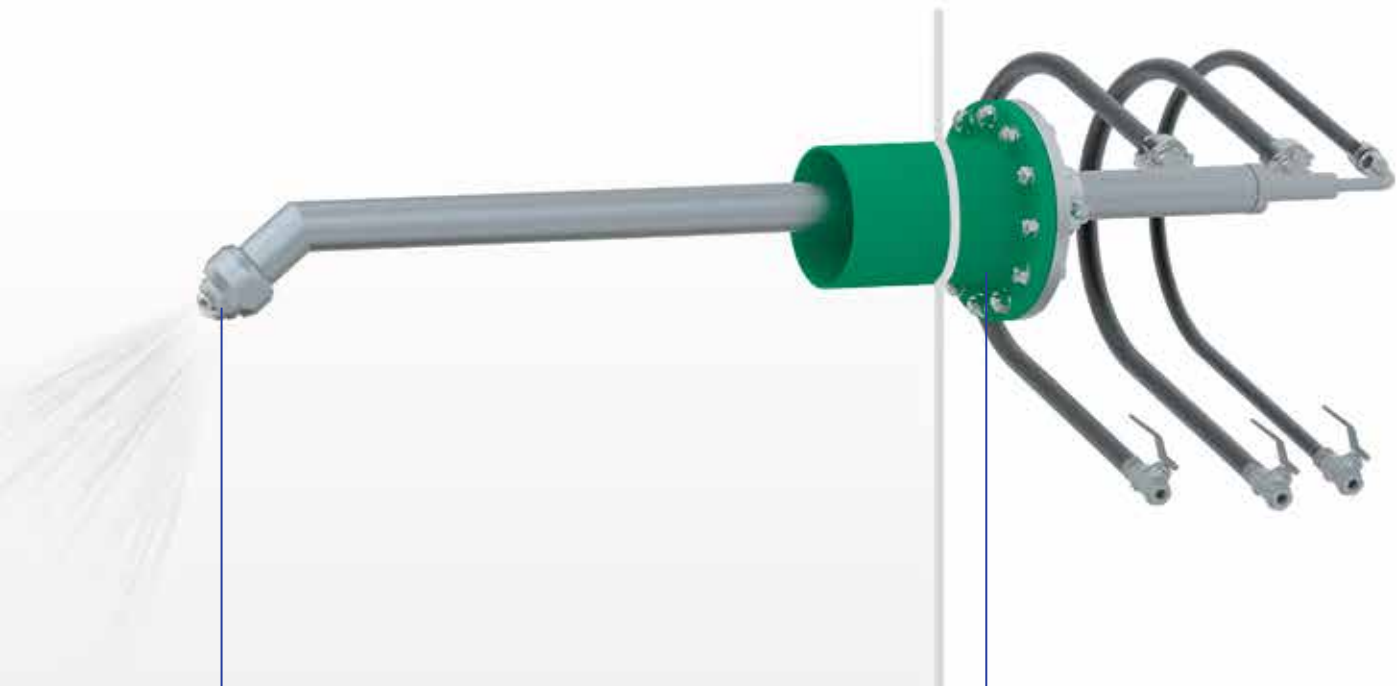
Lechler nozzle lances are available with many options, including but not limited to:

- Protection tube to increase the service life in case of higher temperatures, high dust loads and aggressive gases, with barrier air as an option.

- Wedge flange, standard flange and special flange in accordance with customer requirements
- Guide rail to facilitate lance installation
- Shifting device to change the insertion length – with or without gastight sealing
- Expansion joint or stuffing box for expansion compensation at high temperatures
- Assembly connecting piece with flange connector for welding onto flue gas duct

- Further special customizations including wear protection, insulation, water cooling or coating
- Pre-assembled accessory kits for process media connections (e.g. quick release couplings, shut-off ball valves, strainers)

Lechler nozzle lances are manufactured in line with ultramodern production processes and according to the state of the art.



VarioJet® nozzle

- Option 1: without protection tube and without protection cap
- Option 2: with protection tube and with protection cap

Flange connections

- Option 1: Wedge
- Option 2: Standard flange e.g. DIN, ANSI etc.
- Option 3: Special flange according to customer specification



Material

Lances are manufactured from stainless steel (316/316L) as standard, but depending on requirements can also be made of chemical and high-temperature resistant materials.

Accessories are available in galvanized steel or stainless steel and the hoses are available in rubber or stainless steel.



Talk to us

Each gas cooling tower and flue gas duct is different. Which is why standard solutions do not always make sense. Speak with us and let us work together to find the best solution for your purposes.



VarioCool® gas cooling system – for a perfectly tailored solution

Our pump and control skids for regulating the flow rates of water and atomizing air are individual customer-specific solutions. Based on the requirements in each case, our first step is to design an overall concept and select the best components in order to create a perfectly tailored solution.

First-class engineering

To perform our engineering, we determine all relevant parameters and define the plant's design. This includes determining the nominal widths and pressure levels as well as designing the pumps and control valves. We draw up the P&I diagram and make detailed equipment and signal lists as an option. Of course, the project is fully documented to ensure that technology and processes can be quickly traced even after years of use.

High-quality components

An exact knowledge of the characteristic properties of our nozzles is key here. For only a complete system that is coordinated to how the nozzles function and operate will ensure smooth and economical operation of the gas cooling system. The service life of the products used is key to a cement plant's profitability. Unexpected failures can quickly lead to plant stoppages and costly production outages. Which is why we fit our pump and control skids with high-quality components from well-known manufacturers as standard and the most important functional components are even realized in redundant design.

The components are interconnected with pipes and mounted on a stable base frame with eyelets for crane transportation, at the same time ensuring that all components for operation and maintenance are arranged in an easily accessible manner.

Tested quality

The design (e.g. dimensioning of nominal widths) and production are in line with the latest state of the art and comply with all relevant standards. They are equally subject to the Lechler quality management system certified to DIN EN ISO 9001, as is the final acceptance. Before delivery, the pump and control skid undergoes a pressure and tightness test and is checked by our experienced engineers. This will avoid any problems during commissioning.

Control concept from the nozzle specialist

Numerous installations of VarioCool® systems, years of commissioning experience, plus expertise in nozzle technology all contribute to the constant improvement and optimization of Lechler control systems. By installing a control solution from Lechler you will benefit considerably from this wealth of experience. The flexible and fully automatic concept can be perfectly adapted to your process. You will have start-up and shut-down scenarios and dynamic process conditions under perfect control with our solution.



Option packages for our VarioCool® pump and control skids

Electrical wiring of the components:



Junction box

All components except the pump motors are wired to a junction box within the pump and control skid.

This assures that the customer has a central connection point for all electrical components and measuring devices for further processing in the higher-level control.

Control cabinet with complete PLC

All components including the pumps are wired to a control cabinet. The control cabinet is integrated into the base frame of the pump and control skid.

The complete injection control is tested in accordance with valid electrical standards and regulations and allows all relevant process parameters to be visualized over a control panel on the control cabinet.

Specific configuration and extensive testing make commissioning much faster. Communication and the exchange of signals (setpoint, plant status, error messages) with the customer's logic system is carried out via PROFIBUS or PROFINET.

The control has several modes of operation such as automatic mode and manual mode for tests during plant downtimes. In the event of faults, our engineers can quickly perform a remote diagnosis via the installed modem without the need for an on-site visit.

VarioCool® gas cooling system – for a perfectly tailored solution

Extended scope of delivery

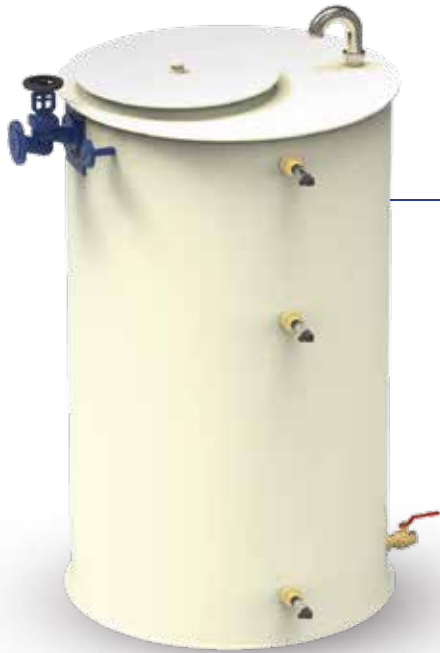


Ring mains

Ring mains are usually used to supply the lances. Lechler supplies ring mains and headers together with the corresponding brackets for welding onto the flue gas duct. Accessories such as pressure transmitters and manometers plus the appropriate connections for the lances and supply lines are also included in the scope of delivery.

Purge air connection

In order to increase the injection turn-down ratio, individual lances or lance groups can be connected or disconnected. If the disconnected lances are in the flue gas duct, the rest of the fluid should be purged. Vaporization and deposits in the lance can be prevented in this way.



Water tank

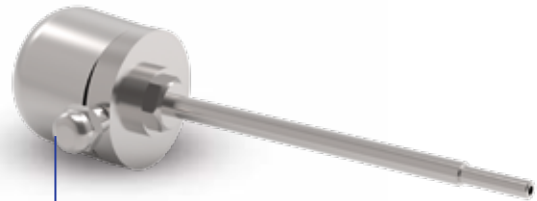
A water tank made of steel or plastic serves as a reservoir for the pump and control skid and guarantees injection operation for a certain period of time in the event of the water supply failing. Its size is adapted to the injection quantity. The components for tank filling and level monitoring are included in the scope of delivery.



Barrier air fan

In order to protect the nozzles and lances from dust deposits and/or high temperatures, barrier air is frequently applied to them.

For this purpose, Lechler supplies fans geared to the specific application with various optional attachments such as a throttle valve, suction filter and silencer.



Temperature measurement

For a constantly regulated outlet temperature, it is very important for the response characteristics of the temperature sensors to be adapted to the ambient conditions. Lechler provides the appropriate thermometers and assists you in defining the installation position.



Talk to us

Do you require an option that is not listed? Or are you having planning issues? No problem. Tell us what your requirements are. We will find the appropriate solution and ensure a seamless integration.

Lechler Online Cleaning (LOC®)

Cleaning-in-Place system for twin-fluid nozzle lances

In the semi-dry flue gas cleaning processes used in power plants, an alkaline washing suspension, usually lime slurry, is injected into the hot flue gas in spray towers. The droplets injected by twin-fluid nozzles are evaporated by the transferred heat. At the same time, pollutants such as SO₂, HCl and HF react with the reactants in the washing fluid.

The washing suspension frequently causes damaging deposits and blockages in the nozzles, nozzle lances and pipelines. In the past, reliable long-term plant installation was often not possible without regularly dismantling and cleaning the nozzle lances. Good process results frequently came at the cost of high maintenance effort.

The Lechler LOC® Cleaning-in-Place system eliminates the need for complex disassembly, unnecessary downtimes and personnel costs.



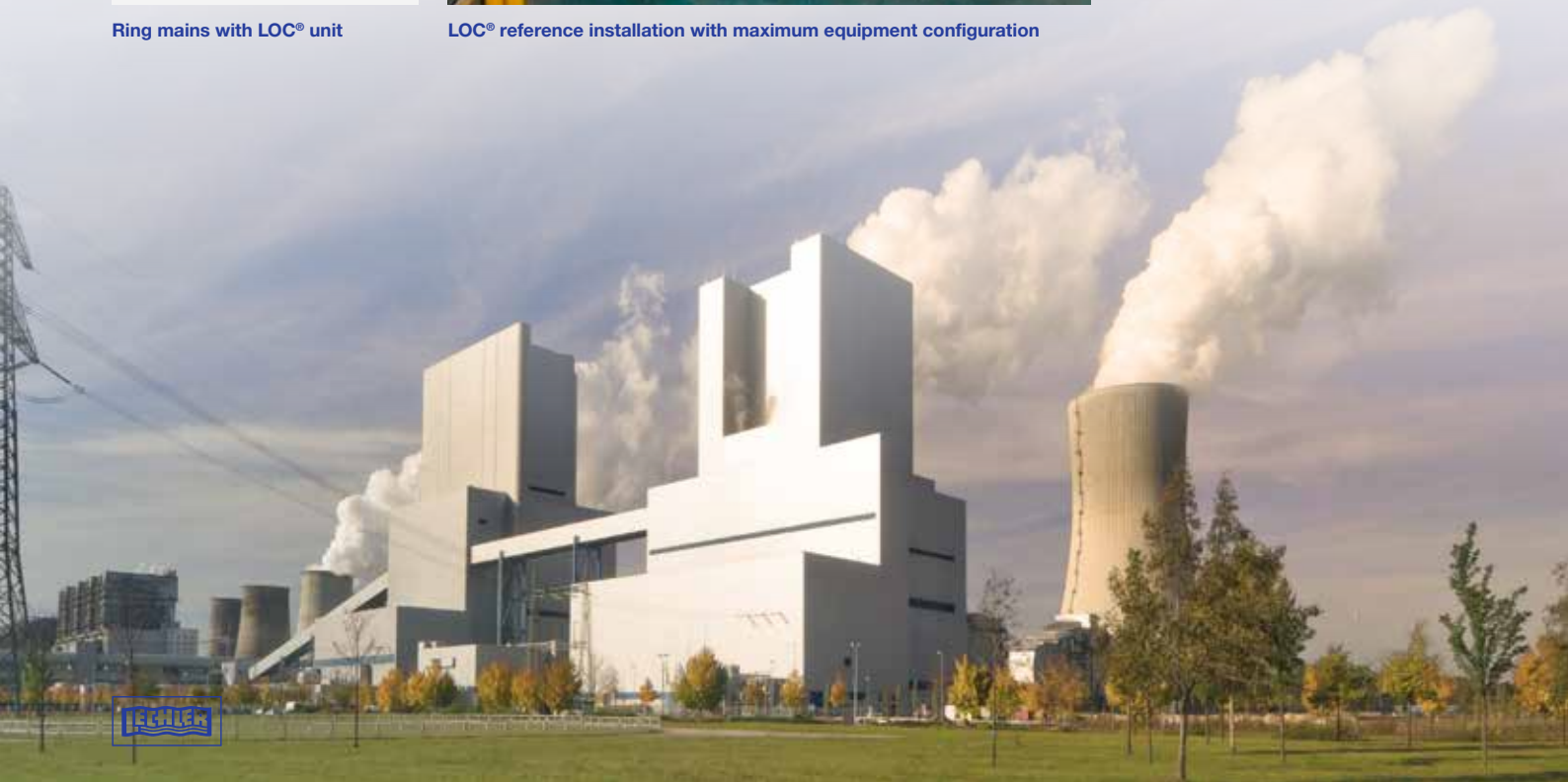
Spray absorbers/dryers

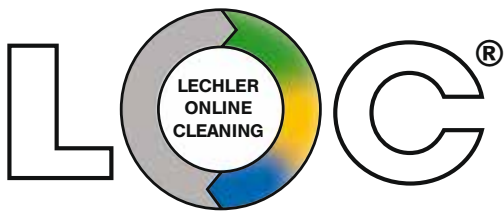


Ring mains with LOC® unit



LOC® reference installation with maximum equipment configuration

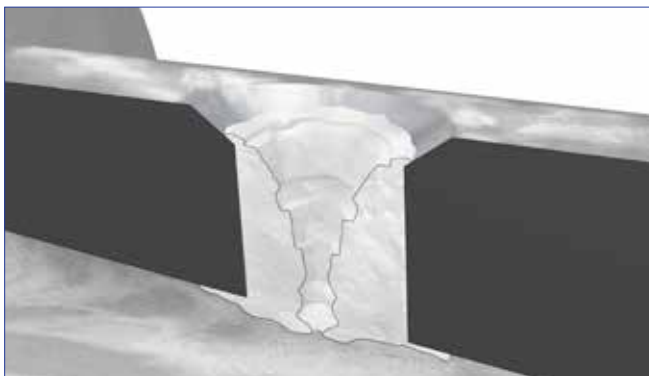




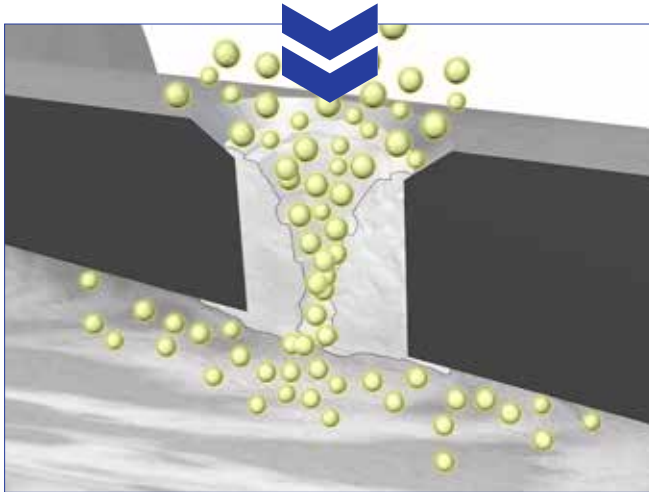
LOC® makes your plant more economically efficient

Lechler offers an online cleaning system tailored to the respective application which allows reliable continuous operation and inexpensive cleaning of the nozzle lances.

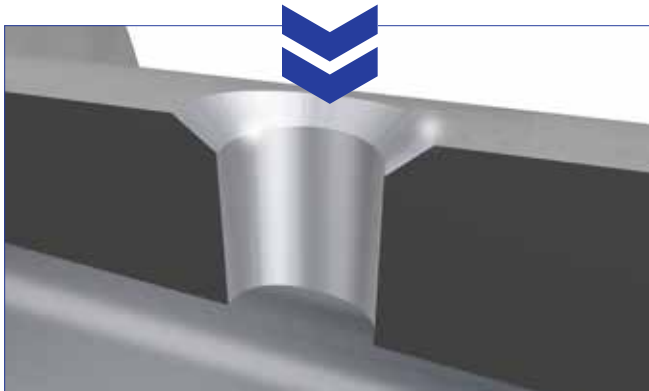
The nozzles are made of wear-resistant hard metal and have been optimized for atomizing suspensions. The individual lances are cleaned cyclically during ongoing operation using precisely metered quantities of cleaning agents. In many cases, minimum use of diluted citric acid (10%) and compressed air is sufficient for reliable cleaning while at the same time ensuring compliance with the process limit values.



Blocked air holes



Cyclical cleaning with citric acid doped in compressed air



Cleaned nozzle



A visible difference:
Nozzles before and after LOC® treatment

Advantages

- High availability of the spray reactor/dryer
- Uninterrupted operation
- Minimum maintenance effort
- Low costs through the controlled use of cleaning agents

Talk to us



Lechler Online Cleaning (LOC®) is a tailor-made solution. The better we know your requirements and operating conditions, the more efficiently your processes will run. Let's talk to each other – about efficiency, cost savings and success.

ENGINEERING AND SERVICE

Our experience for your success

With our experienced engineering team, you have a competent contact for your project at all times – from technical design and detail engineering to commissioning and the replacement of spare and wearing parts. You will benefit from direct contact and fewer communication channels to enable smooth completion of your project.

Exclusive solutions

Lechler offers a system solution tailored to your application and plant-specific conditions. We use only high-quality components from renowned manufacturers for our pump and control skids. If you choose a system with a control, you will get a complete solution for your gas cooling and conditioning requirement from a single source.

Reliable service is part of our agreement

Lechler is Europe's No. 1 nozzle manufacturer. A key factor for this success is our service. For even after your system has been delivered, you are in good hands with Lechler. We offer a worldwide commissioning service provided by employees with many years of experience. A signal and performance test ensures optimal system operation taking all operating and safety aspects into consideration. An important point of commissioning is also the detailed briefing of operating and maintenance personnel in the operation and maintenance of the plant.

We are your competent partner who will provide you with assistance to solve your problems. Our on-site service for preventive maintenance ensures continuous operation. We will be more than happy to draw up a maintenance contract tailored to your needs.

From digital to real

Each individual design of gas cooling and conditioning systems is based on innovative software. CFD calculations are used for flow optimization. Using a 3D tool, we identify the optimum liquid distribution in the duct together with the necessary lance arrangement.

Our drawings are created using state-of-the-art design engineering software.

Extensive documentation

Our nozzle lances and systems are designed and manufactured in line with the current standards and regulations. New plants are always delivered with project-related documentation containing all relevant information for commissioning, operation and maintenance. Lechler will also provide a verbal description of the function and control concept where desired.

Future-proof

Lechler systems are built to withstand harsh conditions and enable reliable and long-term operation. But we too have to lend to the extreme process conditions in the cement industry. Which is why it is all the more important to us to have a guaranteed long-term supply of spare parts for wearing parts – worldwide. With our global network of representatives, we offer a worldwide platform for contact and advice. You will find your competent contacts on the Lechler website.

