

Lechler Spray
Technology - 1879



Green
Cementech
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Speaker



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Lechler India, Thane
(Wholly owned subsidiary of Lechler GmbH, Germany)

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Lechler Product
Range



More than 20,000 different nozzles

Divisions:

- Plant Protection
- Environment Technologies
- Industry
- Metals



Environmental Division
Products



GCS (Gas Conditioning Systems)

VarioCoo I® Systems

Lechler Lances & Systems for hot
gas cooling and gas conditioning

FGD

Nozzles for Flue Gas Desulfurisation

Burner Lances

Lechler Lances for Spraying Liquid Waste oil into the kiln

DeNox Spray Systems

GCS nozzle types

(from all metals, ceramic, tungsten carbide, plastics)



• **Single fluid nozzles** (Spill back nozzles)

Turndown ratio 10(6):1

Max droplets • 300 µm

Low running costs (no compressed air)

• **Twin fluid nozzles**

– External mixing 2-phase-nozzles (**KSD nozzles**)

especially for overheated steam

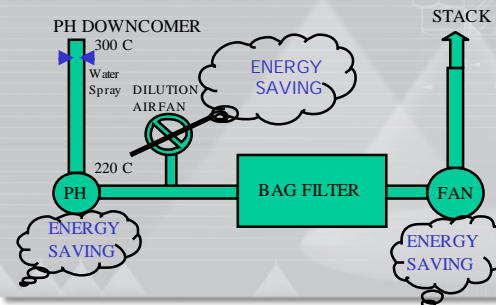
– Internal mixing pneumatic-nozzles (**Laval-nozzles, VarioJet nozzles**)

Laval: Turn down ratio up to 40:1, exhibit fine droplets ($d_{max} << 200 (50) \mu m$),
large free passage

VarioJet: Turn down ratio 12:1, $d_{max} < 280 \mu m$, low air consumption



BASIC LAYOUT



Advantages of Spray before the Ph Fan



- Reduction in Gas volume to be handled at the fan inlet.
- Power saving can be realised by reducing the fan speed for same feed rate or
- More production can be realised by increasing the feed with the same power consumption.
- Water Spray leads to better operational stability of kiln during upset conditions.
- Small amount of savings can be realised in Bag house fan also.

Spray Water Cooling Vs. Air Cooling



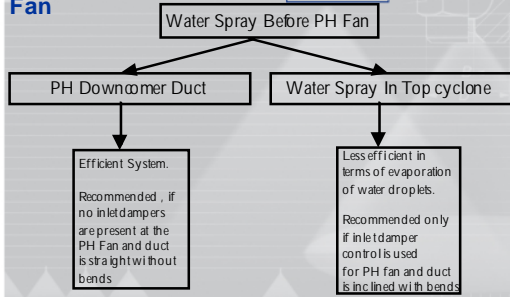
1 Kg of Water 35 → 250 C 670 Kcals

Air 35 → 250 C 45 Kcals

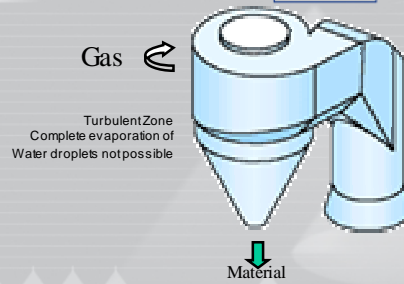
Qty of Air Required : 15 times more than for water



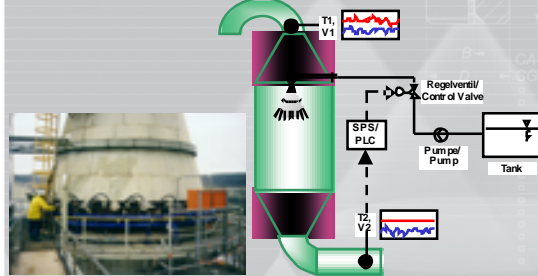
GCS Application: Water Spray before PH Fan



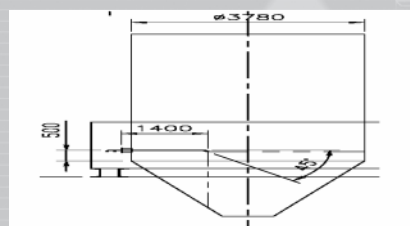
Cyclone Principle



GCS Application: Gas Conditioning Tower Cyclone Water Injection



Lance Location



Water Spray in PH Cyclones



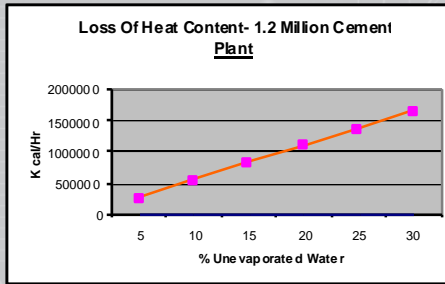
- Advantages**
 - Safe in terms of coating formation in the PH duct or on PH fan blades
 - No compressed air required for water atomisation
 - Relatively simple system
 - Less piping and control systems
 - High pressure water only
 - Good solution if the objective is to increase the production only.
- Disadvantages**
 - Cooling of the raw materials possible
 - Low turndown ratio
 - Water consumption slightly higher than in PH downcomer duct
 - Interlocks to be designed perfectly
 - Not ideal solution, if the objective is to save power by gas volume reduction by gas cooling

Heat Loss



- Heat required for 1 Kg/min (1 liter/min) of water from 30 to 350 C (temp at PH cyclone outlet) needs approx. 730 Kcals
- In one hour,
- $730 \times 60 = 43,800$ Kcal/hr
- Conversion from Kcal/hr to KWH,
- $43,800 \times 0.001163 = 50.94$ KW H (0.001163 is conversion factor from Kcal/hr to KWH).
- Hence, for every liter of water added extra, we loose 50.94 KW.

Water Injection into PH Cyclones



References for the Cyclone Spray System

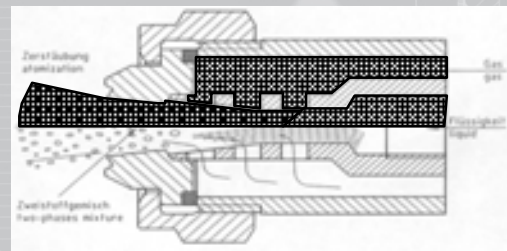


- M/s Binani Cement - China
- M/s Rajashree Cement Unit 1 ,
- M/s MCL Jayanthipuram – Line 1
- M/s Rajashree Cement Unit 2 ,
- M/s MCL Jayanthipuram – Line 2
- M/s Rajashree Cement Unit 2 ,

Rajashree Cement Unit 2



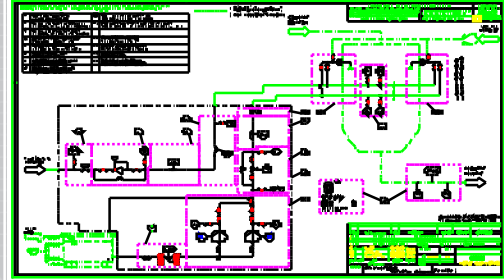
Twin fluid - lav al-nozzle (internal mixing)



PH-Water Spray System



Laval - Flowsheet



Water Spray in PH Downcomer



Advantages

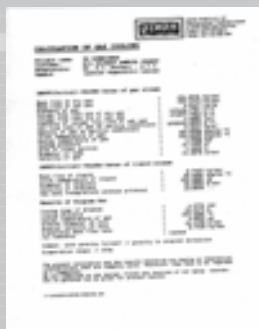
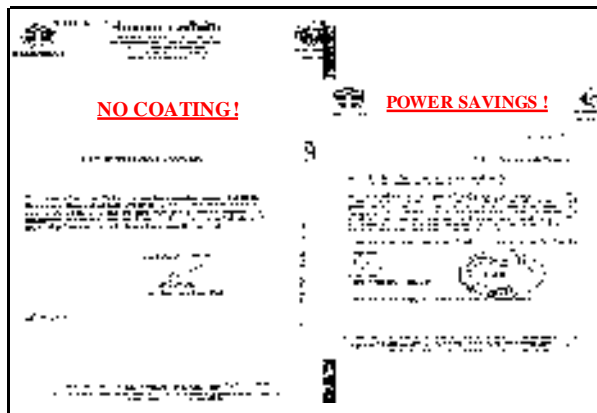
- **Technically correct place** for gas cooling – streamlined gas flows
- No risk of cooling the material itself
- Many references in the world
- Net Power savings possible
- Good solution if the objective is to increase the production or savings in power consumption of PH fan.

Disadvantages

- Compressed air and water is to be handled.
- Complicated control philosophy
- Could lead to coating formation in the duct and fan blade during malfunctioning of spray nozzle/interlocks
- Water injection 3 M3/Hr per sq. meter cross-section of the PH duct

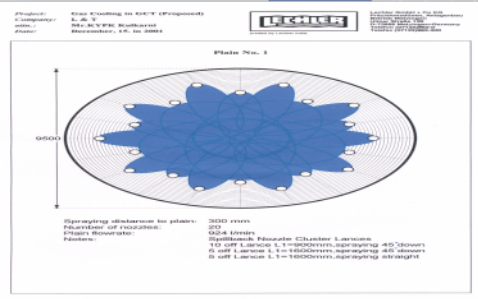
NO COATING!

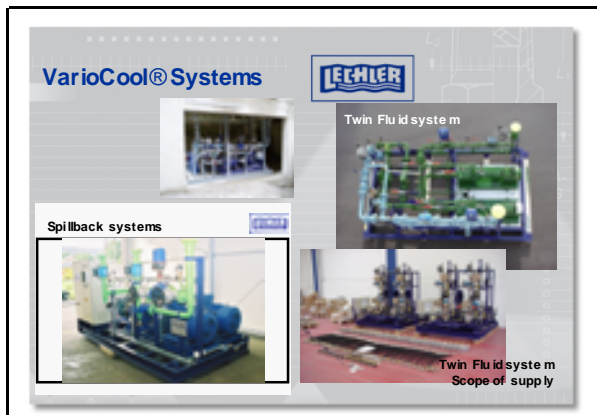
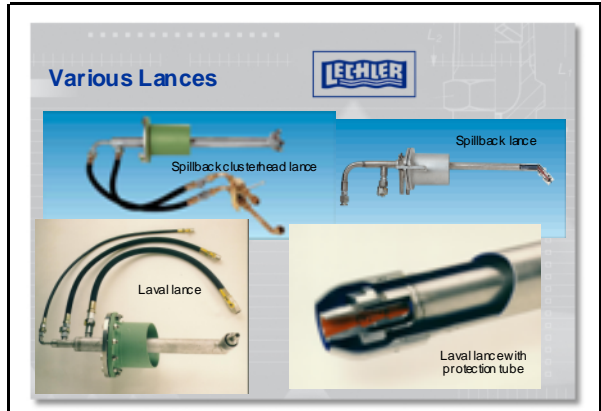
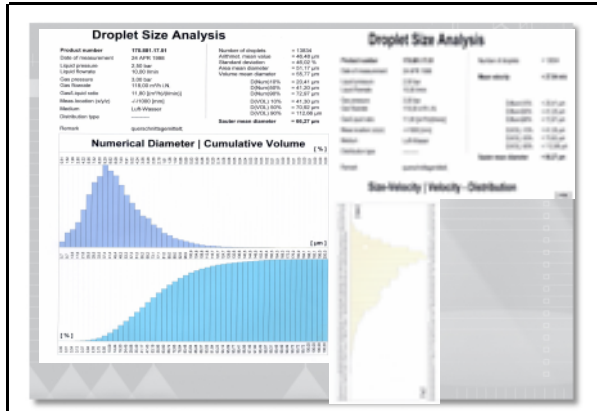
POWER SAVINGS!



Typical Air Cool Sheet From Lechler

Spray Coverage Diagram





- Lechler Performance in GCS**
- Competent consulting for different spray systems on this same high technical level
 - Scope of supply: nozzle lances up to turn key systems
 - Best experience/knowledge in engineering.
 - High quality manufacturing in all Lechler companies (QM syst. ISO 9000)
 - Real modelling of cooling towers (aim: even gas distribution) in India as a supply of complete systems including GCT.
 - Commissioning by project engineers (guarantee for perfect adapted setup)
 - Reliable after sales service ("You never walk alone")

