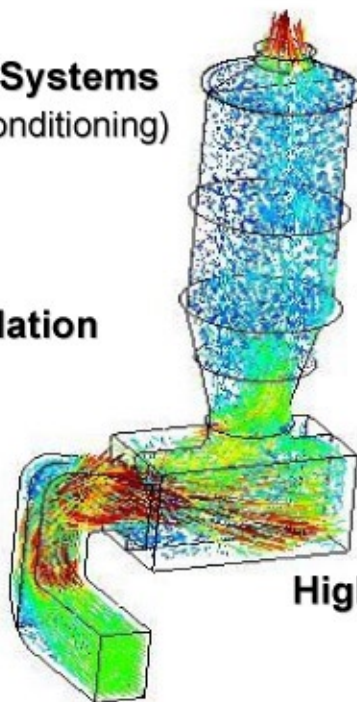


Complete Spray Systems
(Gas Cooling and Conditioning)

CFD Calculation

“Spill Air”™ Lances



Air Assisted Spray Lances

High Pressure Spray Lances

Design and Manufacturing of Water Spray Systems for the main Industries

STEEL



CEMENT



WASTE



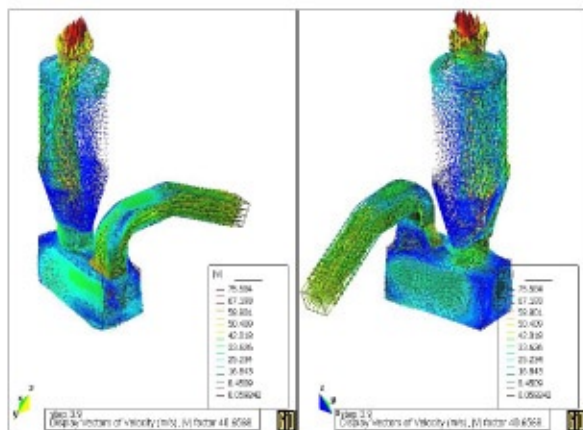
INCINERATION

POWER PLANT

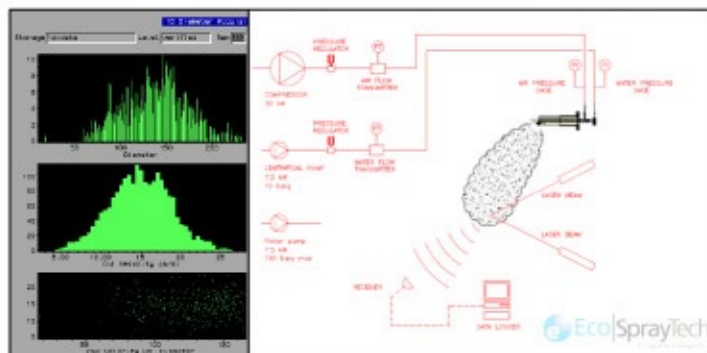
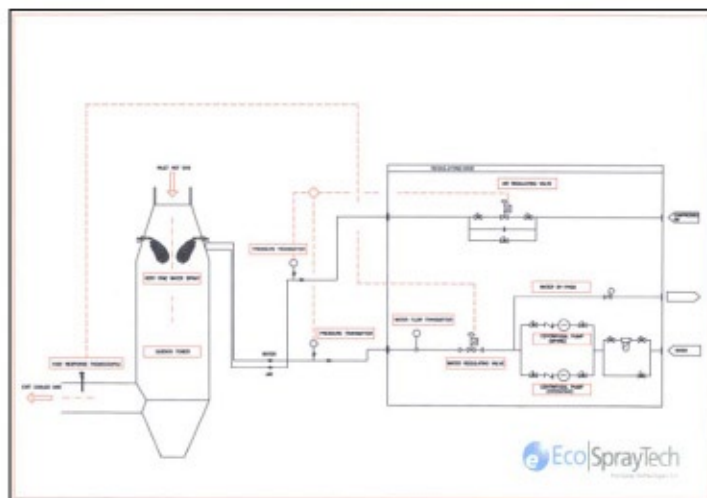


3

COMPLETE SPRAY SYSTEMS



CFD - In House Capabilities



PROPRIETARY SPRAY-LAB / Laser Water Droplet Size Measurement

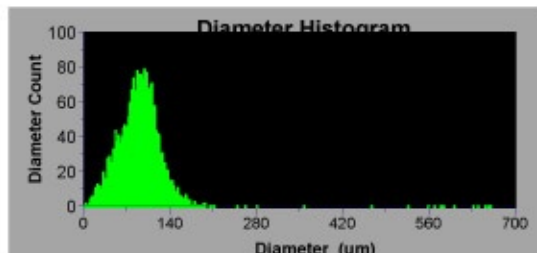
COOLING & CONDITIONING TOWERS

The golden rules for the reliable operation of our Quench Towers :

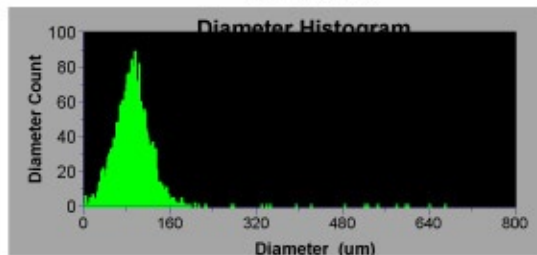
- Top quality nozzles
- Accurate Q.T. Geometry using C.F.D.
- Appropriate Lay-out
- Control System Software
- Top quality material
- Ease of Maintenance



NOZZLE TESTING AND OPTIMIZATION



**Typical Spill Return
spray nozzle at 35
barg**

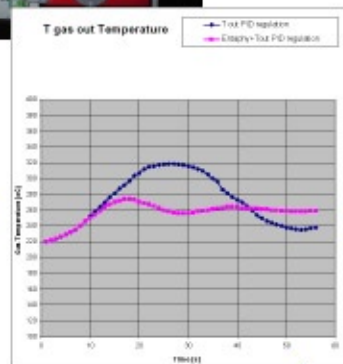


**Typical Laser Water Droplet
Diameter Output**

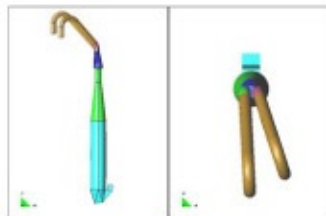


**Typical Air Assisted
spray nozzle at 5
barg**

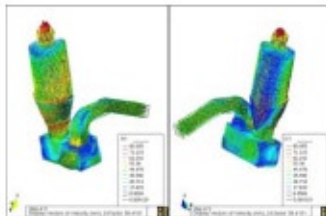
TOWER GEOMETRY & CONTROL SYSTEM



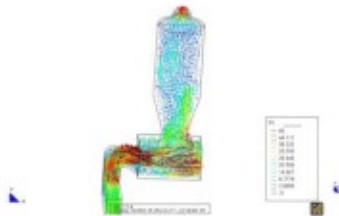
TOWER CFD CALCULATIONS



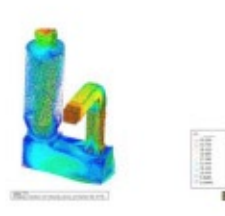
Nazareth – Essroc (USA)



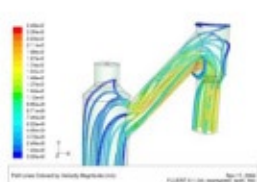
EAF furnace –Catania (Italy)



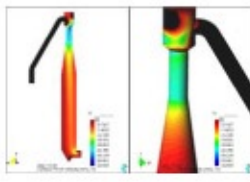
EAF – Valsabbia (Italy)



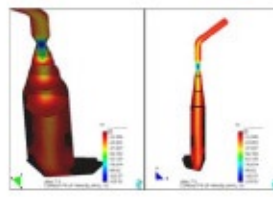
EAF – Riesa (Germany)



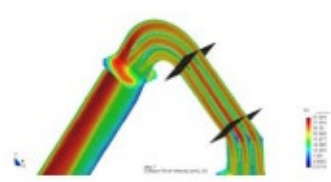
SNCR – Shanghai (China)



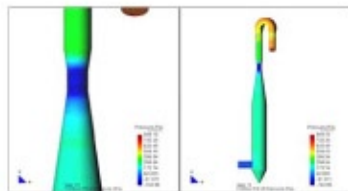
Cat. Regener-Moxba (Holland)



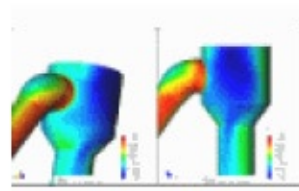
GCT – Redecam (Essroc USA)



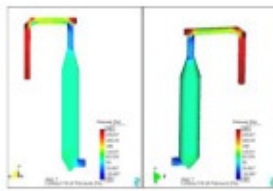
BY-pass tower – Inlet (FCB Cement)



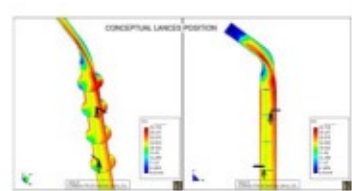
By pass Tower (Speed - USA)



Egypt – inlet tower – No blades

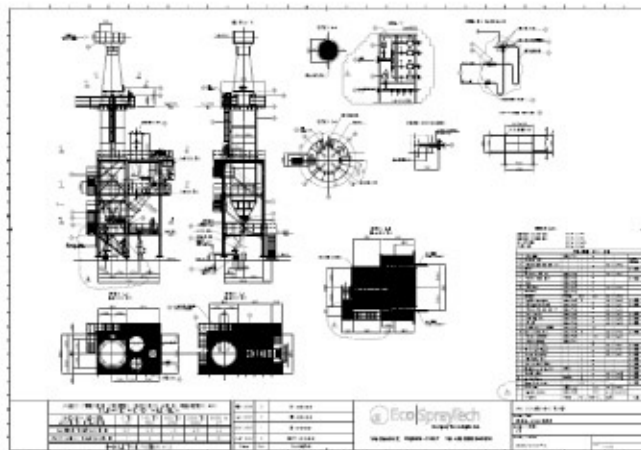


Incineration Plant – Holland



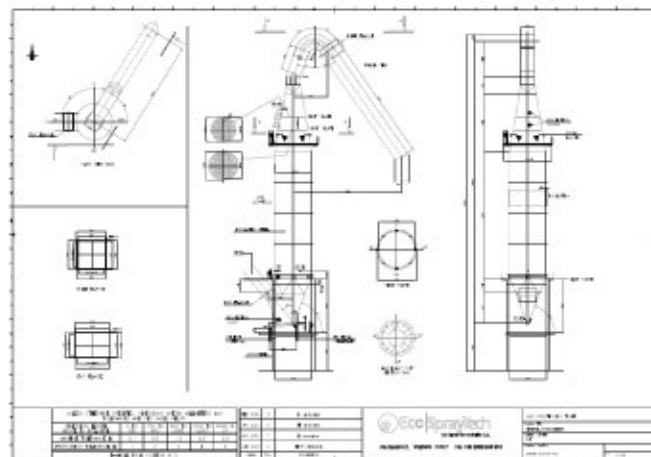
Down comer- two stages

CONDITIONING TOWER DESIGN



DETAIL DRAWINGS

BASIC DESIGN



COMPRESSED AIR ASSISTED OR SPILL RETURN LANCE



Air Assisted spray lances in place



Optivap Spill return spray lance under laser droplet diameter measurement in our lab



Optivap Spill return spray lance during commissioning



Optivap spill return spray lance before installation

TOP QUALITY & EASY MAINTENANCE



**SKID QUALITY FABRICATION
IN ANY MATERIAL**



Field instrumentation is protected in a Stainless Steel box from heat and weather for granting maximum availability

Complete control and easy maintenance of the lances to assure very constant performance along the time. Each lance is provided by quick disconnection fittings, pressure gauges, manual and automatic on/off valve operated by PLC. Lances are protected by removable high temperature alloy pipe air cooled



GAS COOLING – NEW APPROACH

At the Malaga Cement Plant, the customer experienced severe high gas temperature problems and low kiln production. The solution proposed to the Customer was to reduce the gas temperature directly in the pre-calciner. The system proposed was designed for maximum flexibility with spray lances, which are adjustable in immersion length and spray orientation. Furthermore the system would include an Automatic PLC controlled lance, a robust lance cooling and cleaning design using forced ambient air and continuous air compressed nozzle purging.

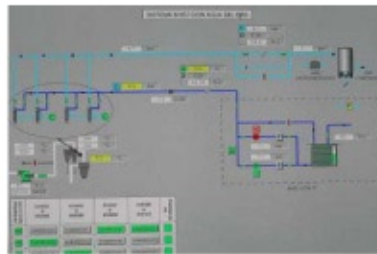
General System Data:

Water flow range required: 3-14 m³/h

Inlet temperature: 450 °C

Outlet temperature required: 340 °C

Installation: At the exit of the fourth cyclone



Pre-calciner water spray system at Malaga Cement Plant



NOZZLE MATERIAL

Because the low water quality (high Cl- content) and the difficult environment, specific parts of the nozzles were fabricated in Hastelloy C22 for a superior operating life, and in order to assure a good spray quality during all the operating life of the lance

The system consists of one pumping skid installed at ground level and one regulating skid installed at lance elevation (abt +105 mt).

The regulating skid consist of air and water automatic regulating valves, compressed air dryer, manual valves, purge lines etc

Two small skid lance headers are installed close to the lances; on this skids are installed two forced air fans. The forced air fans keeps the lances clean in any condition. It further maintains them when the lances are off line



Pre-calciner water spray system at Malaga Cement Plant



The plant was put in operation at end of October. After several months of operation, the Customer was very satisfied of the performance and reliability of the system. The plant is currently meeting and exceeding all the performance guarantees. No lance or nozzle clogging was experienced despite the adverse environment condition in the spray region

SNCR DeNOx Reduction System

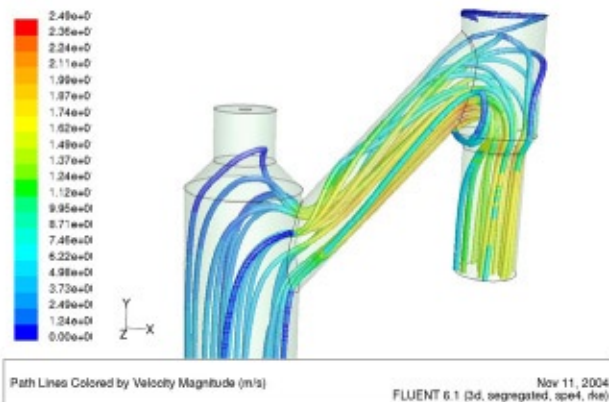
With SNCR technology ECO SprayTech can reach high removal efficiency up to 75% by spraying Urea or Water Ammonia in the post combustion chamber or in the high temperature boiler region.



Accurate and separate regulation of water ammonia, dilution water and compressed air, assure the best spray quality and ammonia distribution in the gas. Top quality material like stainless steel for piping and valves and Hastelloy for nozzles and lances assure long operative life.

With CFD simulation we make an appropriate flow analysis for a superior ammonia distribution in the gas flow coming from the post combustion chamber.

With the reaction simulations, we can predict system's performance in the given data and maximize its efficiency.



Gas Cooling – Energy Saving

There is growing consensus that climate change, also known as global warming, is becoming the greatest threat to our environment. It is caused by increasing levels of greenhouse gases which trap the Sun's energy within the atmosphere. One of the most effective way to reduce this impact is to save energy in all fields.

EcoSpray Technologies, is putting the maximum effort to propose systems with low energy consumption. There are several ways to approach the problem.

- Accurate design (*)
- Nozzles/systems with low compressed air consumption (**)
- New hybrid nozzles using water at medium pressure and very low air pressure (pressure below 0.5 barg) in order to avoid compressors (***)

(*) Multiple pumps approach, using only the pump needed by the system, accurate calculation etc.

(**) Optimizing nozzle air consumption both in desing condition and during regulation. Automatic PLC controlled lance insertion is one of the effective approach to save energy in regulation

(***) Ecospray is developing a new hybrid nozzles using medium water pressure and low air pressure in order to avoid compressors. The performance of the nozzle is very close to the air assisted spray lance but with 30-40% less of energy consumption.

Spill air lance under testing in our lab.



Spill Air spray nozzle – 100% WATER FLOW



80% WATER FLOW



60% WATER FLOW



25% WATER FLOW



15% WATER FLOW

Customer field support

EcoSpray can perform sophisticated analysis on existing conditioning tower in order to correct malfunction due to poor gas flow distribution, low spray nozzle quality etc. Material deposition and incipient wet bottom can be detected using infrared external wall analysis



EcoSpray own a high quality hot wire anemometer. With this instrument it is possible to measure the gas velocity at lance location with the tower in operation. It can resist to dusty gas and temperature up to 500 oC.

EcoSpray has a lot of experience in process analysis. Sometimes a conditional tower can work bad due to the regulation system. EcoSpray can analyze the process variables and understand if there is a problem in the regulation system.



The partnership with PNR Group grants ECO SprayTech an efficient network to support his customers worldwide



For any further information visit our web.site

www.ecospray.eu