

ECONOMIC IN ECOLOGY

# Wet Electrostatic Precipitator

# System Combination

## Quench, Wet Electrostatic Precipitator and Heat Recovery

For decades EWK Umwelttechnik has built plants for air purification and flue gas cleaning. Proven technology, experience and continued development have resulted in an efficient method of flue gas cleaning in various industries.

### About the System

The waste gases are brought to dew point temperature by the quench (evaporation cooling). At the same time a part of gaseous pollutants like hydrocarbons will be condensed and simultaneously pre-absorbed from particles.

The absorptive separation of water-soluble pollutants takes place in the **wet absorber**. Multistaged scrubbers (acidic/basic) are often placed upstream of the wet electrostatic precipitator.

Solids, micro dust and aerosols, often noticeable as blue haze, are separated in the down-stream **wet electrostatic precipitator**. The precipitation surfaces are periodically cleaned by a brief surge of water during operation.

The **post oxidation stage** effects an additional reduction of hydrocarbons before the cleaned gas reaches the chimney via a spin collector or is led, e.g., into a downstream DeNOx system.

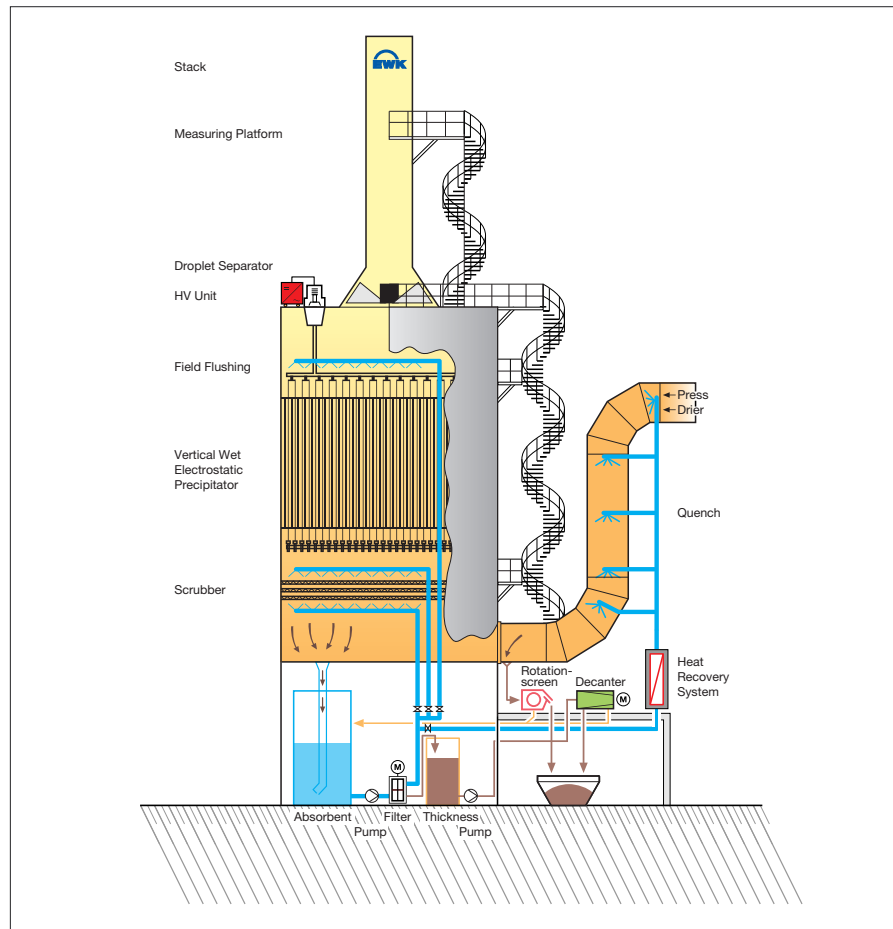
The further application of a **heat recovery** by means of water/water heat exchangers or water/air heat exchangers allows to decouple substantial heat quantities. The recovered heat can be used for:

- preheating of combustion air
- heating of production hall
- feeding into district heating network
- heating of swimming pool
- heating of greenhouse

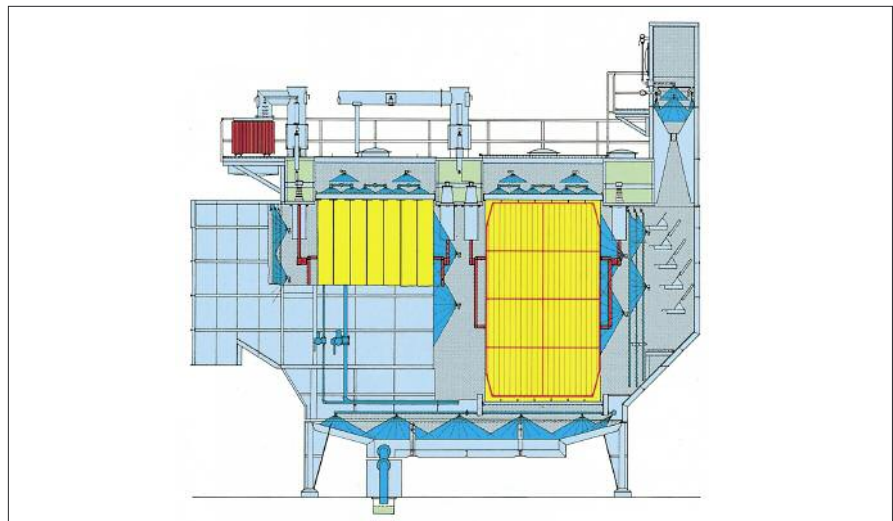
This leads to interesting economical solutions and helps to preserve valuable natural resources.

Wet electrostatic precipitators are especially suited for precipitation of fine dust, aerosols and its mixtures like:

- powdered graphite
- SiO<sub>2</sub> dust
- oil mist
- salts
- paint mist
- odours
- tar and resin aerosols
- softener aerosols
- hydrocarbon vapour
- blue haze



Vertical Wet Electrostatic Precipitator



Horizontal Wet Electrostatic Precipitator

# The Components

## Material

The collected emissions generate organic acids because of their solubility in water. To prevent corrosion, all media-contacting parts are made of coated steel, stainless steel (high-grade alloying if necessary) or glass fibre reinforced plastics (FRP). Fittings consist of stainless steel or non-corrosive material as well.

## Construction

To keep production, transportation as well as assembly as economical as possible, a modular construction is chosen nowadays. The patented central support with integrated spin mist collector bears a key static function. In special cases it serves for devaporisation as well.

A supporting structure of static and dynamic forces on the casing and the central support makes it possible to install stacks up to a height of 65 m directly on the filter roof.

## The DUAL System

Vertical Wet Electrostatic Precipitators can be split in two units by a partition wall. This allows operation with one unit while maintenance works can be done on the other unit.

## Multistaged Precipitators

Depending on the requirements two or multistaged precipitators are constructed. Horizontal electrostatic precipitators are especially suited. As a result a separation efficiency of > 96 % can be reached.



*Two-Line double WESP in glass fibre (FRP); separation efficiency > 99.7 %*



*DUAL WESP in stainless steel  
2 x 266,000 Am<sup>3</sup>/h; 60 m stack height*



*Panel construction in stainless steel with pre-assembled bearing edges on the central support*



*EWK backflush filter*



*Ultrafiltration*



*Oval WESP; 62,000 Am<sup>3</sup>/h*



*Rotation screen and decanter*

## Absorbent Cycle

To operate mostly waste-water free, different methods and system combinations, depending on the industry, are applied. The objectives are always minimum operating costs at most for a chemical-free and waste water-free operation at most.



*Rotation screen*

# Facts and Data

## Separating Capacity

		typical crude gas values	achievable separation degrees	achievable clean gas values
Particles	mg/Nm <sup>3</sup>	200-2000	90-99.7	< 1-10
Org. C	mg/Nm <sup>3</sup>	200-600	60-80	50-120
Aerosols	mg/Nm <sup>3</sup>	200-2000	80-99	1-10
Blue Haze			> 95	invisible
Odour in Units		4000-8000	60-75	1000-2000

## Heat Recovery Systems

### Examples of heat exchanger sizes and achievable heat capacity

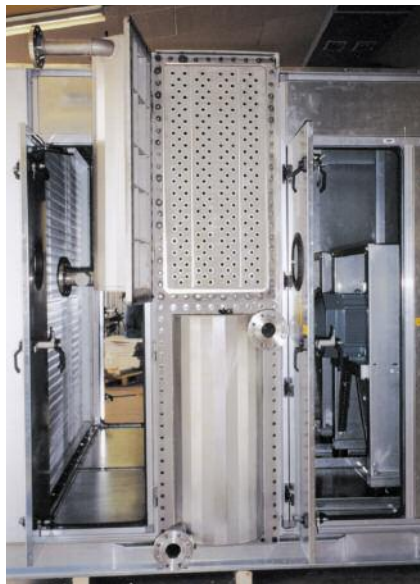
System	primary side		secondary side		MW
	m <sup>3</sup> /h	°C	m <sup>3</sup> /h	°C	
Water/Air	30	65	40,000	60	0.70
	45	65	60,000	60	1.05
	60	65	80,000	60	1.40
Water/Water	50	65	50	60	0.58
	100	65	100	60	1.16
	200	65	100	60	2.30

## Applications

- Coking plants:  
coke oven process gas
- Mineral wool industry:  
forming plenum and curing  
oven waste gas
- Waste incineration:  
aerosol separation downstream  
from wet scrubber
- Plastic and textile industry:  
aerosol and oil mist separation
- Chipboard industry:  
dryer and press exhaust
- Meat smoking plants:  
smoke-chambre exhaust
- Smith industry:  
graphite-oil mist from forging  
press
- Grappa Distillery:  
dryer exhaust



4 MW water/water heat exchanger for district heating with removable covers



1.4 MW water/air heat exchanger; hinged covers on both sides for maintenance works



water/air heat exchanger for preheating combustion air; 71,00 m<sup>3</sup>/h; 1.56 MW

# Sample Applications



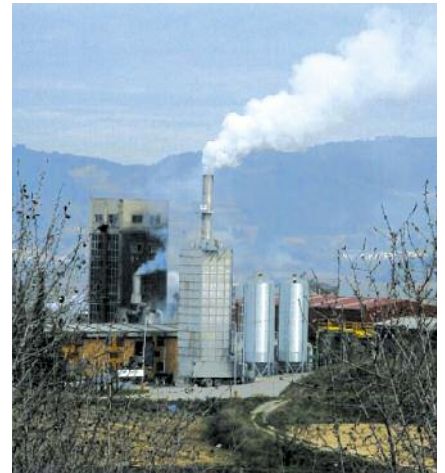
Exhaust forging press; 2 x 35,000 Am<sup>3</sup>/h



Waste oil incineration for textile cleaning; 8,000 Am<sup>3</sup>/h



Grappa Distillery; 182,000 Am<sup>3</sup>/h



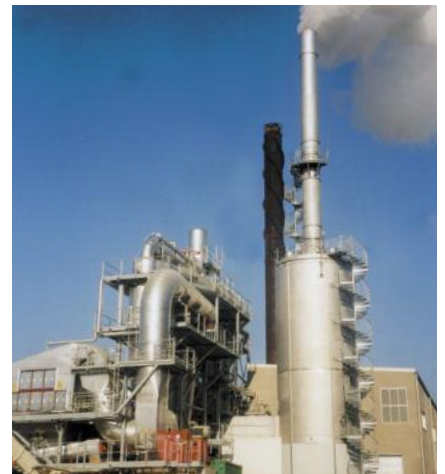
Grappa Distillery; 68,000 Am<sup>3</sup>/h



Exhaust forging press; 2 x 17,000 Am<sup>3</sup>/h



Mineral wool industry; each 100,000 Am<sup>3</sup>/h



Chip Dryer for Pellets; 78,000 Am<sup>3</sup>/h;  
4 MW heat recovery



Exhausts of liquid waste incineration with 2 DUAL WESP; 4 x 118,000 Am<sup>3</sup>/h



Mineral wool industry



Waste incineration with WESP after Dry EP and Scrubber; 2 x 90,000 Am<sup>3</sup>/h



PE foam production; 40,000 Am<sup>3</sup>/h

Environmental protection has got tradition at EWK Umwelttechnik GmbH. Our plants, proven throughout the world in decades of operation, are the best evidence.

Due to this experience EWK develops and offers innovative technologies:

- Plant Design
- Engineering
- Production
- Assembly
- Commissioning
- Maintenance/Service

for:

- Electrostatic Precipitators
- Fabric Type Filters
- Wet absorber/Scrubbers
- Catalytic Gas Cleaning Systems
- Heat Recovery Systems
- System combinations

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