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 pollutions 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
- SiO₂ dust
- oil mist
- salts
- paint mist
- odours
- tar and resin aerosols
- softener aerosols
- hydrocarbon vapour
- blue haze
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.

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.
Facts and Data

Separating Capacity

<table>
<thead>
<tr>
<th></th>
<th>typical crude gas values</th>
<th>achievable separation degrees</th>
<th>achievable clean gas values</th>
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<tbody>
<tr>
<td>Particles</td>
<td>200-2000</td>
<td>90-99.7</td>
<td>&lt; 1-10</td>
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<tr>
<td>Org. C</td>
<td>200-600</td>
<td>60-80</td>
<td>50-120</td>
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<tr>
<td>Aerosols</td>
<td>200-2000</td>
<td>80-99</td>
<td>1-10</td>
</tr>
<tr>
<td>Blue Haze</td>
<td></td>
<td>&gt; 95</td>
<td>invisible</td>
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<tr>
<td>Odour in Units</td>
<td>4000-8000</td>
<td>60-75</td>
<td>1000-2000</td>
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</table>

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-chamber exhaust
- Smith industry: graphite-oil mist from forging press
- Grappa Distillery: dryer exhaust

Heat Recovery Systems
Examples of heat exchanger sizes and achievable heat capacity

<table>
<thead>
<tr>
<th>System</th>
<th>primary side m³/h</th>
<th>secondary side m³/h</th>
<th>°C</th>
<th>°C</th>
<th>MW</th>
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<tr>
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<td>40,000</td>
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<td>45</td>
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<td>60</td>
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<td>65</td>
<td>60</td>
<td>0.58</td>
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<tr>
<td></td>
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<td>65</td>
<td>60</td>
<td>1.16</td>
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<tr>
<td></td>
<td>200</td>
<td>100</td>
<td>65</td>
<td>60</td>
<td>2.30</td>
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</table>

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

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

Water/air heat exchanger for preheating combustion air; 71,00 m³/h; 1.56 MW
Sample Applications

- Exhaust forging press; 2 x 35,000 Am³/h
- Waste oil incineration for textile cleaning; 6,000 Am³/h
- Mineral wool industry; each 100,000 Am³/h
- Grappa Distillery; 182,000 Am³/h
- Grappa Distillery; 68,000 Am³/h
- Waste incineration with WESP after Dry EP and Scrubber; 2 x 90,000 Am³/h
- PE foam production; 40,000 Am³/h
- Chip Dryer for Pellets; 78,000 Am³/h; 4 MW heat recovery
- Exhaunts of liquid waste incineration with 2 DUAL WESP; 4 x 118,000 Am³/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

### Subsidiaries

EWK Anlagentechnik AG
Winterthur
E-mail: umwelt@ewk.de

### Representatives

**SWITZERLAND**

Walter Sonderegger
Klosters/Pany
Phone: +41 (0)81/422 54 53
Fax: +41 (0)81/422 54 63
E-mail: ewk.sonderegger@bluewin.ch

**ITALY**

PRO.TEC. srl
Giussano (MI)
Phone: +39 (0)362/85 29 11
Fax: +39 (0)362/85 37 61
E-mail: protec.srl@tin.it

### Branch Offices

**SWEDEN**

Bo-E. Sjöberg
Phone: +46 (0)36/16 76 00
Fax: +46 (0)36/17 64 41
E-mail: bo@sjoberg.com

**AUSTRALIA**

Hartmut Orth
Phone: +61 (0)3/95 93 15 20
E-mail: hartmut@ispdecor.com.au

**NEW ZEALAND**

Mason Engineers Ltd.
Phone: +64 (0)9/525 05 30
Fax: +64 (0)9/525 05 25
E-mail: geoff@masonsc.co.nz

**POLAND**

EWK Polen
Phone: +48 (0)22/621 18 91
Fax: +48 (0)22/621 18 90
E-mail: ewk@coolnet.pl

**SOUTH KOREA**

ATC Korea Co., Ltd.
Phone: +82 (0)2/628 03 25
Fax: +82 (0)2/628 03 26
E-mail: atc@atckr.com

**CHINA**

RGL Group Co., Ltd.
Phone: +86 (0)10/84 47 59 18
Fax: +86 (0)10/84 47 59 16
E-mail: ganjb@chinargl.com