



HP WET ELECTROSTATIC PRECIPTATOR



AirPol offers state-of-the-art HP Wet ESPs Offering includes improvements in technology for higher collection efficiencies while reducing capital and maintenance costs.

WET ELECTROSTATIC PRECIPITATOR FOR FINE PARTICULATE REMOVAL

The Wet Electrostatic Precipitator (WESP) is primarily used as a final clean-up device for removal of acid mist, sub-micron particulate and toxic condensable.

Stack emission codes, along with more specific regulatory definition has resulted in the reintroduction of the Wet ESP to almost every industry which requires air pollution control of submicron particulate, heavy metal elements, acid mist, blue haze emissions and other condensable pollutants.

AirPol HP Wet Electrostatic Precipitator

AirPol System Improvements include:

- Tubular configuration allows self-irrigation without high water flow rates.
- High secondary power levels produce increased collection efficiency for sub-micron particulate, heavy metals and mist.
- Multi-point rigid discharge electrode design results in intensified corona fields. The AirPol Wet ESP with multi-point electrodes can effectively minimize the adverse effect of current suppression, a common Wet ESP problem caused by high concentration of sub-micron salt particulates in the gas stream.
- No unscheduled downtime or requirement for manual offline cleaning





For over 50 years, we have designed and built over 1,400 systems for all conceivable applications in many different industries.

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TYPICAL HP WESP FLOW PROCESS DIAGRAM

(Shown in down-flow arrangement)



PROCESS DESCRIPTION

Sub-micron particles are often generated in a combustion process, such as incineration, or a drying process, such as particleboard drying.

Unlike dry ESP units, the wet ESP requires saturated gases for proper operation, which makes it ideal as a"polishing" device. AirPol's design uses condensed water vapor to provide irrigation of the collecting tube surface area to maintain the highest power levels. In addition to irrigation characteristics, saturation will also help condense the volatiles for removal in the Wet ESP.

The gases enter the top in the down flow configuration. This enables co-current irrigation, wash down and gas flow direction. Inlet gas distribution devices ensure an equal volume of gas enters each collecting tube. The entire bundle of collecting tubes operates as one unit. In the center of each tube there is a high voltage discharge electrode that, when energized, produces an electric corona field.

Particulate and condensed water vapor droplets, which enter the collecting tubes, are charged negatively by the rigid discharge electrode. As the negative charged elements are repelled from the electrode, they are also attracted to the opposite (positive) grounded collecting tube. Collection on the tube results in a thin film of particulate laden liquid that flows down the collecting tube providing continuous cleaning and self-irrigation of the tube wall.

If the collection rate exceeds the irrigation rate, on-line and automatic wash down/flushing is available to remove collected material from the tubes. Collected particles are flushed into the bottom outlet plenum for discharge from the Wet ESP. The outlet is specifically designed to eliminate flushing water re-entrainment.

AIRPOL HP WET ESP Special Design Features

The AirPol HP Wet ESP has been designed for maximum power output, minimum maintenance, highest operating efficiency and optimized flexibility.

Multi-point Rigid Discharge Electrodes

AirPol uses a rigid-type discharge electrode thereby eliminating the problems with thin wire/ rod-type electrodes. Additionally, the rigid-type electrode requires only one (1) high-tension frame.

The specially designed sharp, multi-pointed discharge electrodes produce a strong corona field, relying on total power drawn rather than just high voltage differential to overcome the detrimental effects of current suppression.



Large Collecting Electrodes

AirPol's design has large, high surface area, collecting tubes that minimize the quantity of tubes, and discharge electrodes and alignment requirements.



AND THE AIRPOL ADVANTAGES

AirPol incorporates independent insulator heating systems (one heating system per insulator). In addition, the HP Wet ESP has proven to achieve high-removal efficiency of sub-micron pollutants at low energy pressure drop (<2"WC). This allows upgrading performance of existing dust collecting systems to meet new requirements with minimal impact on operation cost and lowest possible capital investment.

In many cases, retrofitting a WESP to an existing system with wet scrubber results in reduction of over 50% system energy consumption while achieving an overall removal efficiency of 99+%.

Volatile elements such as heavy metals are typically formed by condensation in conventional wet scrubbers. Due to the sub-micron size of these toxic elements, they penetrate the scrubbing equipment with the resultant blue or yellow haze emitted from the stack.

The Wet ESP has proven to eliminate the haze and achieve less than 5% opacity. Outlet loadings for heavy metals are often reduced to below 10⁻⁵ gr/dscf.

Special Gas Outlet De-Watering Section

The outlet dewater device in the bottom plenum of the down flow design has proven to give a droplet free gas discharge. It eliminates the need of chevron type mist eliminators and mesh pads, which are prone to solids build up and plugging, and will require frequent maintenance.

AirPol HP WESP Advantages:

- Superior performance, even with high concentration of sub-micron particle loading condition. Operates effectively even with high current suppression.
- Very high intensity corona.
- High collection efficiency.
- Low system energy requirements.
- Lower water requirements.

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- Rigid electrodes with precise alignment.
- Flexible designs for either down-flow or up-flow to suit the system arrangement.
- Low maintenance requirements.



SATISFIED CUSTOMER: LENZING FIBERS

Lenzing Fibers, located in Axis, Alabama, was investigating ways to lower the opacity of its exhaust system and increase recovery of solvent from its regenerated cellulose fiber ("Tencel") production process. The performance of existing mist eliminators was not sufficient to adequately impact the very small particulate size.

AirPol was awarded a contract to supply and install a new Wet Electrostatic Precipitator (WESP) system that included inlet and outlet ductwork, control dampers, and a booster (exhaust) fan and exhaust stack, as well as a WESP Control Panel and instrumentation..

The turnkey project was completed using Lenzing's preferred local contractors. The existing mist eliminators were removed and the new system easily provided the expected results. So much so that when Lenzing decided to re-start a second (idle) production line, another companion AirPol WESP system was purchased to ensure similar performance.



Other Products: Venturi Scrubbers
Cyclonic Scrubbers
Packed Towers
Wet Electrostatic Precipitators

Services: Engineering \blacklozenge Design \blacklozenge Consulting \blacklozenge Pilot Testing \blacklozenge Turnkey Systems

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