EnviroCare

Patented Technology

Star™

Wet Electrostatic Precipitator

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Breakthrough Patented Technology Replaces Conventional High Energy Scrubbers and Dry ESPs

"When the Star™ WESP is paired with the MicroMist™ Venturi Scrubber, the end result is a highly efficient, cost effective means to meet MACT II regulations and obtain outlet emissions less than 0.002 gr/dscf (<5 mg/nm³). This technology is clearly positioned for today and future regulatory standards."

MicroMist™ Engineered Systems

Over the past several years there has been an increased emphasis, worldwide, on the reduction of respirable particulate and acid mist from incinerators, industrial and power generation plants. As an example, coal fired power plants with Flue Gas Desulfurizaion (FGD) systems can be significant sources of acid mist. This occurs primarily from the condensation of SO_3 gas. Unfortunately, these aerosols create a visible plume and can contribute to acid deposition downwind of the plant.

There are a number of ways to control the emissions from stationary industrial and power generating sources. In most cases sophisticated air pollution conrol strategies are requried including gas cooling, wet or dry scrubbing, chemical injection and fabric filters or electrostatic precipitators may be considered. EnviroCare has supplied gas cooling, wet gas scrubbing and Wet ElectroStatic Precipitation (WESP) technology on applications where stringent regulatory requirements mandate multiple abatement technologies. For economic reasons and operational flexibility, our customers have chosen patented EnviroCare Star™ WESPs for final cleaning of the process gas.

Benefits of the Star™ WESP

- **Proven Performance**
- **Low Power Consumption**
- **High Efficiency on Submicron Particulate**
- **Acid Gas Control**
- **Maximum Collection of Condensables**
- **Stable Fan Draft Control**
- **Minimal Waste Stream Effluent**
- **Modular Design**

Tube bundle staged for shipment

With increased emphasis on respirable particulate, WESP technology has gained recognition over the last few years due to its ability to capture submicron particles. In combination with upstream gas cooling and conditioning, WESPs provide a means of collecting wet condensed acids along with dry submicron particulate. They also have the advantage, over dry ESPs, of achieving higher collection efficiencies, especially for particulate with high resistivities (i.e. greater than 10^{10} ohm-cm) where dry accumulated dust can result in reduced field strengths and diminished collection efficiencies.

Background

In 1976, EnviroCare's Research & Development Director designed and patented the first rigid discharge elctrode design for use in WESPs. This design was the basis for the modern WESP with little design modifications over the years. Recent research has led to the development of the Star™ Discharge Electrode. The Star™ electrode was specifically designed for hexagonal tubes to maintain the same high collection efficiencies of a cylindrical tube design while taking advantage of the small "footprint" attainable with hexagonal tubes.

When the Star™ WESP is used in series with our MicroMist™ Venturi Scrubber, the size of the WESP can be greatly reduced. Because the MicroMist™ Venturi Scrubber has such high collection efficiency, the WESP is designed as a "polishing" unit to catch only the smallest of particles. The Star™ WESP and MicroMist™ Venturi Scrubber can be manufactured as one unit, further saving on space.

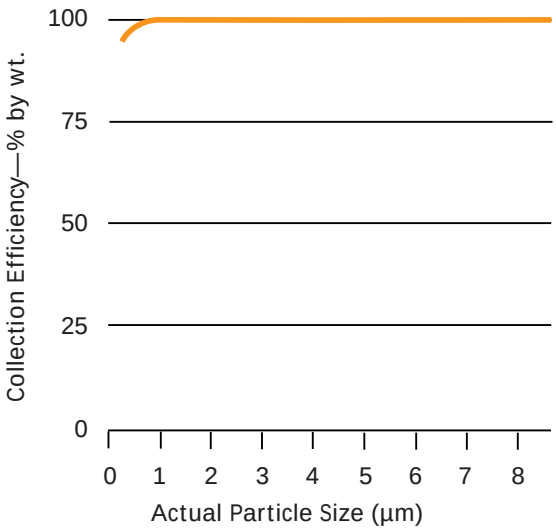
The Star™ WESP has proven performance in the harshest of applications, including:

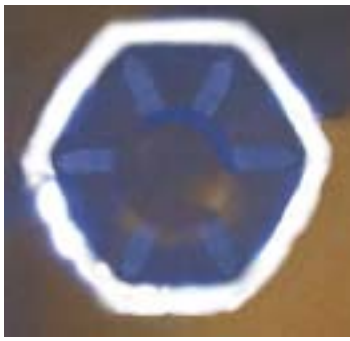
- Submicron particulate and fume
- High concentraton H_2SO_4 mist
- Incinerator emissions
- Wide range of gas flow

Acid Mist Control

Acid aerosols from many processes, including FGD systems are often very high in concentration, i.e. on the order of 0.1 gr/ACF (~200 mg/m^3) with mass a mean diameter from 0.2-0.5 microns. This provides a challenge for any type of pollution control technology. While the WESP is ideally suited for this type of application, the use of upstream scrubbing and/or gas conditioning should also be considered. The review of metallurgy of the electrodes and collecting tubes for the WESP should be undertaken as the pH of the collected acid can be very low.

Star™ WESP Particulate Collection Efficiency





Fine Particulate Control

Fine particulate control with or without acid aerosol is another area where the well designed WESP excels. EnviroCare's hexagonoal honeycomb collecting tubes maximize the collection surface, while minimizing the size of the WESP vessel. The use of our unique Star™ electrode provides collection efficiencies exceeding 99.9% for most processes containing submicron particulate. With the flexibility of down flow or up flow configurations, footprint space is minimized.

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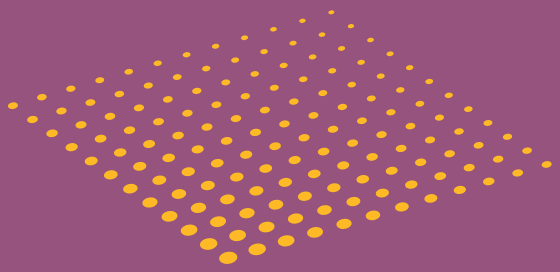

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