

Lo-P Filter Technology

Commercial Application

The *Lo-P Filter* technology provides particulate matter (PM) emission control options down to a particle size of 10 nanometers (nm) with minimal pressure drop. The *Lo-P Filter* is operable under challenging conditions such as widely varied temperatures, high dust loadings, corrosive scenarios, and a variety of scales from 100 to 1,000,000 acfm.

Urgent Need to Reduce PM Emissions

Emissions of PM are the most widespread air toxic pollutant. Millions of tons of PM generated from anthropogenic activities are released into the atmosphere annually; PM deteriorates the environment and causes sickness or even death in people. For example, it is estimated that 21,000 people die prematurely every year in the United States as a result of exposure to PM, such as soot from mobile diesel sources. The particles emitted are typically in the size range of 100 nm, carrying carcinogenic components to the lungs where they cause significant health hazards.

In order to meet future emission standards, industry needs to turn to advanced emission control devices, such as particulate filters.

Current Approaches

Although current particulate filters can potentially achieve high particulate emission reduction, high back pressure and regeneration remain significant technical problems.

Technological Advantage

The *Lo-P Filter* employs both electrostatic precipitation and surface filtration in a compact package. As a result of two-way interactions between the electrostatic field

and surface filtration, the *Lo-P Filter* attains ultrahigh collection efficiencies (> 99.9%). The electrostatic field facilitates a unique deposition pattern of particles on the filter surface, which provides a low pressure drop across the system and superior cleaning ability for particles with sizes down to 10 nm.

Benefits

- Superior collection efficiency (> 99.9%) for particles in a wide range from 10 nm to more than 30 μm .
- Low operating cost because of very low pressure drop.
- A long, useful life, made possible by being highly cleanable and regenerable.
- Easy to implement and retrofit, as there is little reliance on external control parameters.
- Easily adaptable to different application needs.

Market Information

The current main markets are for diesel emissions, clean room applications, and collective protection from hazardous aerosols.

Industry

The *Lo-P Filter* applies to a wide range of industries that are dealing with or are affected by various PM emissions, including energy, agriculture, pharmaceuticals, food, research, and medical.

Development Stage

The concept is proven, and bench- and pilot-scale demonstrations have been completed. Optimization for individual applications is the next step. This includes the geometric design, materials selection, and engineering of the *Lo-P Filter* for specific applications.

Partners

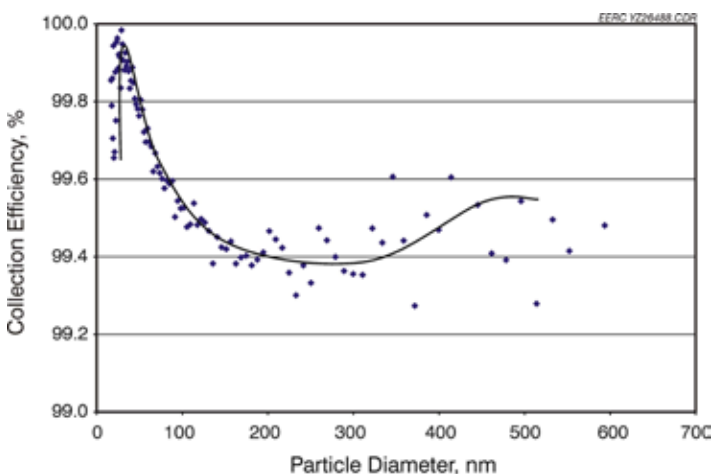
Apart from the U.S. Department of Energy, the Energy & Environmental Research Center (EERC) is collaborating with a variety of private sector partners on different applications.

Type of Collaboration

The EERC is continuously advancing the technology and looking for partners in research, development, demonstration, and commercialization, including equity investment.

Intellectual Property (IP) Rights

Patents on background IP have already been secured for the United States and many foreign countries. Additional patents are in process.



Bench-Scale Results Showing High Collection Efficiency in the Ultrafine Size Range of Particulate Matter



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