

## **Thin Layer Porous Material to Minimize Contaminants to Reduce Filter Pressure Drop**

Technology #13646

### **Applications**

This technology has significant commercial applications related to diesel particulate filter manufacturing and a wide range of additional filtration applications.

### **Problem Addressed**

In many cases, the amount of material trapped on top of the filter's pores can contribute 50% or more of the total filter pressure drop. Increasing filter pressure drop is undesirable as it restricts flow through the system and requires eventual filter replacement or cleaning. Additionally, there is a need to reduce filter pressure drop and extend filter regeneration intervals due to the fact that filter regeneration (burning off the accumulated soot) incurs a fuel economy penalty.

### **Technology**

This invention describes a novel method for reducing filter pressure drop caused by material accumulation in the filter. This is accomplished by distributing a thin layer of porous material along the channel walls. The thin layer of porous material acts as a physical barrier preventing contaminant material from entering the filter pores, and preventing filter depth contamination. The formation of the porous layer is critical to minimizing contaminants entering the porous material in use. With the porous layer in place, the contaminant material immediately forms a filter cake on top of the filter walls. The cake filtration process is characterized by a gradual increase in filter pressure drop as material accumulates on the filter walls.

### **Advantages**

- Reduces filter pressure drop and flow restriction
- Results in linear filter pressure drop response
- Reduces filter-related increase in engine fuel consumption
- Eliminates rapid increase in pressure drop associated with deep-bed filtration regime

### **Categories For This Invention:**

Energy

Hydrocarbons

Diesel Engines

Materials

Thin Films

Transportation

Engines/Motors

## Intellectual Property:

Method for reducing pressure drop through filters, and filter exhibiting reduced pressure drop  
Issued US Patent  
8,889,221

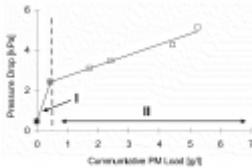
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## External Links:

MIT Energy Initiative  
<http://energy.mit.edu/>  
Sloan Automotive Laboratory  
<http://web.mit.edu/sloan-auto-lab/>

## Image Gallery:



Typical depth (I) and cake (II) filtration regimes for soot accumulation in a DFF with no ash at 20,000 hr<sup>-1</sup> space velocity.