

# **Investigation of Particle Loading Behavior on High-Efficiency Air Filter Media**

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## **Abstract**

Fibrous materials such as microglass fiber mats, meltblown (MB) electrets, and electrospun (ES) nanofiber webs; and non-fibrous materials such as porous membranes and porous metal and ceramic powder-sintered materials are widely used as high-efficiency air filter media. They have high initial filtration efficiency (FE) and most of them have high pressure drops (DP) as well. In addition, most of their DP increases sharply with the particle loading. Their FE may increase or decrease with the particle loading depending on the particle types. For example, their FEs are increased by the loading of solid particles because the particles cake on the surface of the media and serve as a filtration media. However, their FEs are decreased with the loading of oily particles for most of them except the microglass fiber mats because the oily particles erase the charges in the MB electrets and particles fill up the filtration channels in a porous membrane or in an ES nanofiber web. The FEs in the loading of solid particles on MB electrets can decrease then increase depending on the fiber diameter as well as the porosity of the electrets. There is a running rate between the loss of electrostatic force and the increase of mechanical filtration mechanisms by the particle loading. This paper will discuss the loading behavior of solid and oily particles on several high FE media such as microglass fiber mats, MB electrets, ePTFE membranes, and ES nano-fiber membranes or webs.

[For oral Presentation, Yurong Yan - Presenter](#)