

THE COMPARISON OF THE COALESCENCE FILTRATION PERFORMANCE OF LAYERED SS FIBER MEDIA VS. GLASS FIBER MEDIA WITH SAME FIBER SURFACE AREA AND POROSITY

Yan Geng¹

¹The University of Akron

In this topic, the objective is to evaluate the gas-liquid separation performance of non-woven fiber filter media by doing the comparison of them with the same total fiber surface area and the same porosity but to study about:

1. The effect from different materials, glass fiber or SS fiber.
2. The effect from different fiber size, 2 μm or 6.5 μm
3. Checking the results from point 1 and 2 by multiplying the amount of the fibers in once, twice and three times.

We studied about layered nonwoven fiber filter media in different material – SS (Stainless Steel) fiber and glass fiber, and different fiber size – 2 μm and 6.5 μm . The aerosol used in the experiments is air flow with average 400nm droplets among it. By detecting the coalescence filtration performance of those filters to the aerosol, we wanted to see how the material and the fiber size would affect the coalescence filtration performance. But before that, another thing was considering that the additional variates should be controlled to keep them constant to show out the only effects from the factors we wanted to study. Compared with fiber size, the size of the droplets would let them coalesce a lot on the fiber surface, and then in the avoid space. So, besides the fiber size and the wettability property which would affect the drop moving and coalescing on the fiber, the total fiber surface area and the porosity would affect a lot too. Porosity controls the space available in the filter for the droplets moving. Then finally, the Total fiber surface area and the porosity should be kept constant while the other two factors, the fiber size and the wettability of the materials were studied, and it is found that SS fiber filter media and larger fiber filter media give the better performance in all the comparison.