

Effect of Gravity on Coalescence and drainage channels

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Abstract

In many industrial sectors fibrous filters are used to remove undesirable particles from gas streams. Aerosol filtration is one of techniques used to remove the particles from the air stream using the fibrous filters and so it has many industrial applications like dehumidification, automobile filters; exhaust filters which separates particles as well as liquid droplets from air source which is important in concern with environmental aspect.

The hypothesis of the work is to study the effect of gravitational force on coalescence filtration and separation. It is studied by performing the coalescence filtration experiment by positioning the disc shaped filters in vertical and horizontal orientations. Theory of coalescence filtration says that gravity is one of the important forces which affect particle capture on the fiber. The experimental results denotes that effect of gravity helps in removing drainage of liquid from the filter medium increasing the removal efficiency and reducing pressure drop which is in accordance with the theory of filtration and separation. The gravitational effect study is further extended by positioning drainage channels in the filter medium in different positions and orientation which effects in different porosities at different positions in the filter. The paper discusses different orientation of filter media with and without drainage channels and its effect on the performance of the media.

Key Words: Aerosol, gravity

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