

An Analytical Expression for Predicting the Pressure Drop of Bimodal Filter Media

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Abstract

In this work, permeability of bimodal filter media is computed by solving the Stokes equations in the 3-D void space between the fibers. Our simulation results are utilized to establish a unimodal equivalent diameter for the bimodal media thereby taking advantage of the existing expressions of unimodal filters for capture efficiency prediction. Our results indicate that the *cube root* relation of Tafreshi *et al.* (2009) offer the best predictions for the most practical range of coarse fiber number fractions, $0 \leq n_c \leq 0.2$, with fiber diameter ratios, $1 \leq R_{cf} \leq 5$, and solidities of 5 to 15 percent.

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