

A Computational Fluid Dynamic Study on Dust Holding Capacity of Hydraulic Filter

Media

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ABSTRACT

Dust holding capacity (DHC) together with filtration efficiency and pressure drop govern the product development aspect of a hydraulic filter media. Although filtration efficiency and pressure drop have been well characterized through analytical and numerical models, theoretical work in regard to DHC of a filter media is relatively scarce. Here at Hollingsworth and Vose Company we have used computational fluid dynamic simulation method to study parameters effecting DHC of hydraulic filter media. Theoretical knowledge obtained through these simulations was used to further enhance performance of hydraulic filter media.

Through newly acquired high performance computational facility, H&V has been able to conduct large scale simulation to characterize initial retention and time dependent evolution of filter efficiency and pressure drop of a dust loaded filter media.

We have considered the fiber diameter distribution, gradient density of filter structure and particle rebound in characterizing the DHC. A comparison between numerical and experimental results has been made.

Keyword: Dust holding capacity, CFD, simulation, filter media, nonwoven

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