IMPROVED MODELING OF LOADING KINETICS IN DETAILED FILTER MEDIA SIMULATIONS WITH GEODICT

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ABSTRACT

The microstructure simulation of filter media is becoming an increasingly important tool in virtual media development. For virtual evaluation of lubricant oil filter media, it is important to model the multipass test acc. ISO 4548-12 right. In experiments it is sometimes observed that, after an initial rise, filter efficiency decreases in the early stages of the filtration.

Several effects are candidate reasons for this phenomenon. A. Deposited particles may start moving again after the local flow changes during filter clogging. B. Particles may spend a lot of time in low velocity regions of the filter media without depositing before eventually leaving the media. Another explanation, C. is the change of preferred paths for particles due to filling up of small pores while larger pores are still available.

This effect of initially decreasing filter efficiency was not reproduced by our earlier simulations with the GeoDict and FilterDict software. Hence, a number of modifications were made that now allow the software to reproduce all three effects and to judge which one is the dominant in a specific situation.