

# Hydraulic Filter Design based on Computer Simulations

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## Abstract:

Four aspects are important in the design of hydraulic filters. We distinguish between two cost factors and two performance factors. Regarding performance, **filter efficiency** and **filter capacity** are of interest. Regarding cost, there are production considerations such as spatial restrictions, **material cost** and the **cost of manufacturing** the filter. The second type of cost is the operation cost, namely the **pressure drop**. Albeit simulations should and will ultimately deal with all 4 aspects, for the moment our work is focused on cost.

In short, the PleatGeo and PleatDict Software allows the interactive generation of three-dimensional computer models of a single pleat of a hydraulic filter, and to compute by direct numerical simulation the pressure drop that will result for the particular design. The evaluation of a new pleat design takes only a few hours on a standard PC compared to days or weeks used for manufacturing and testing a new prototype of a hydraulic filter. The design parameters are the shape of the pleat, the permeabilities of one or several layers of filter media and the geometry of a supporting netting structure that is used to keep the outflow area open. Besides the underlying structure generation and CFD technology, we present some trends regarding the dependence of pressure drop on design parameters that can serve as guide lines for the design of hydraulic filters. Compared to earlier two-dimensional models, the three-dimensional models can include the support structure.

**Keywords:** Liquid Separation, Hydraulic Filters, Design, Simulation.