

INFLUENCING PARAMETERS TO IMPROVE THE REGENERATION EFFICIENCY OF BACKWASHING FILTERS

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In industrial solid/liquid separation, the removal of fine particles ($\leq 10 \mu\text{m}$) in a suspension with a low solids content (0.01-1 v/v %) is a challenging and demanding task. Especially the cake filtration is emphasised as advantageous principle for separation of such kind of suspension. This separation occurs in a wide array of industrial production applications such as metal processing and treatment industries and has some advantages compared to other separation principles. In order to achieve the required purity, different types of filters, such as candle and leaf filters, can be used. The selected filter will be used (semi-)discontinuously and the actual “filtration” process step is just as important as the subsequent “regeneration” of the filter cloth. In case of an improperly regenerated filter, the next filtration process becomes shorter until a subsequent regeneration is required. This behaviour is presented in the well-known filtrate flow – time – plot. In the case of a properly regenerated filter, the filtrate flow at the beginning of each step is still equal whereas the initial filtrate flow decreases in the case of an improperly regenerated filter.

With respect to the field of applications, the removal procedure has revealed that there is potential for improvement. A properly regenerated filter cloth highly depends on the interaction between the particle system and the filter cloth. In order to guarantee the removal of the filter cake, the applied removal force has to be larger than the adhesive forces. Furthermore, to remove the filter cake in large fragments, the removal force has to be lower than the cohesive force. This effect comes out by variation of the filter cake thickness. In case of a low filter cake thickness and/or very porous filter cakes the remaining filter cake on surface is much higher compared to a higher filter cake and/or a particle system with a higher specific flow resistance. The difference between that cases is given through the cohesion by a constant adhesion.

This presentation shows the influence of selected process conditions during backwash filtration. A distinction is made between discharge into liquid and gas phase. Main attention is given to the liquid discharge and in this context the particle system (shape/size) and the different weave types. During the presentation, different types of cake discharge will be described (complete and partial) and their effect on the quality of regeneration.