

IMPROVED CLEANING AND PERFORMANCE OF TUBULAR BACKPULSE PRESSURE FILTERS

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BACKGROUND

Tubular backpulse pressure filters are used in Kraft mills for the clarification of white liquor and weak wash. A typical tubular backpulse pressure filter contains 250 Gore-Tex™ filter socks. Unplanned filter sock changes are expensive and occur when an acid wash does not restore flow performance. Optimizing the cleaning process for these filters can significantly increase filter sock lifetime, reduce unplanned sock changes or allow the use of less expensive polypropylene filter socks. Depending on the interval between required filter changes, an improved filter cleaning process can provide significant yearly cost-savings and better filter operation.

STRATEGY

It is critical to fully understand the composition of the material that remains in the tubular backpulse pressure filters after the current acid washing procedure. Several different analytical techniques can be performed on used filter socks and acid wash samples to obtain the maximum information about the plugging material. Information on elemental composition, type of compounds present, and size distribution can be obtained. Detailed analysis was carried out on polypropylene and Gore-Tex™ membrane filter socks at mills in both Canada and the United States. Current work suggests that acid-insoluble material is a major contributor to long-term filter plugging, and that acid-washing procedures can be modified to minimize the formation of this material and to remove it.

RESULTS

Calcium sulphate (gypsum), calcium phosphate (hydroxylapatite), metal sulphides, silicates, and carbon were identified as major filter-plugging components. Projects were completed with detailed sampling of both the standard acid washing procedure and a modified procedure, with detailed sample analysis. These projects have resulted in improved acid washing procedures and longer time between acid wash treatments.

Calcium sulphate (gypsum) formation on the filter was shown to result from significant hydrolysis of sulphamic acid solutions used to clean the filters. Modification of the acid washing procedure greatly reduced the amount of gypsum present as a filter-plugging component.

Modifications to the acid wash procedure of a weak wash filter at one mill extended the time between acid washes from 30-60 days to more than 100 days.

Impurities in purchased lime were responsible for pressure filter plugging at one mill. This was corrected with improved purchased lime quality control.

Addition of a surfactant to the acid reduced wash time and was able to mobilize some of the carbon from the filter. With surfactant, acid wash was 95% complete after 40 minutes. Modified acid-washing procedures improved filter washing. Methods to remove acid-insoluble filter-plugging materials are also available.