

Filter Facts #2

How is “cake” build-up minimised on surface mode membranes?

Within a cross-flow filter there are several processes that can be implemented to minimise, reduce and/or remove the build-up of particulate, and hence cake formation on the surface of the filter membrane.

Velocity of the “feed” stream.

The non-filtered feed stream can provide some erosive action to remove cake build-up. This erosive action is a function of flow velocity and solids loading within the feed stream. Tubular style membranes are able to take better advantage of this action, over spiral wound membranes due to the ability to handle higher levels of solids loadings within the feed streams.

Back-pulsing.

This is a quick momentary action where clean filtrate is forced under high pressure back through the membrane clearing particulate from the membrane wall. The frequency of the back-pulse will be selected to suit the application. The filtrate flow from the filter has a very short interruption which in most cases will not be noticed in the overall filter output.

This function has been applied most successfully on metallic tubular membrane whose inherent robust design allows it to withstand the hydraulic shock that is induced to provide the back-pulse cleaning action.

Back-flushing.

Back-flushing is when clean liquid, which can be retained filtrate or clean water, is pressured back through the membrane and reverse flushed out of the system. To perform this operation the filter stops processing for a period of time, usually between 30 secs and 5 minutes. This period and the frequency of operation are relevant to the filter construction and application it is applied to.

In situations where down-stream plant require a continuous feed of filtrate, the contents of an extra holding tank that has filled with filtrate during normal filter operations, is used as a supply.

Back-flushing is not an option for many spiral wound type membranes.

Full system clean (CIP).

A full system clean, sometimes referred to as a CIP (clean in place) operation can only occur when the membrane module(s) is taken off-line from filter operations.

The full system clean can consist of a number of cycles. Typically there will be a caustic or alkali clean, followed by a neutralising acid clean and finally rinsed with clean water. The chemical types, concentrations and temperatures will be dependant upon the materials used and construction of the membranes.

Many polymeric based membranes will be sensitive to temperature and have strict high limits that can be utilised.

Ceramic and metallic membranes can withstand much higher temperatures, well above 120 degrees Celcius, and hence can take full advantage of hot caustic washes which are more effective than when caustic is used at ambient temperatures.