vipur
Purification Solutions

Single Layer vs Double Layer

Before any filtration, it is essential to consider which filter should be used and why. Regardless of the material of the filter, it also plays a role whether it is single or multi-layered.

Justification:

- Regulatory → if, for example, an existing filter needs to be replaced and the same number of filter layers must be used.
- For further tests → if it has already been proven in scientific filtration studies in the past that the product to be filtered achieves better results with a single or multi-layer filter.

Single Layer

Single-layer filters are defined by the fact that the filter manufacturer specifies the number of layers used as "single-layer" in the technical data sheet or validation guide.

The extent to which a single-layer depth or membrane filter offers advantages for filtration must be evaluated by means of appropriate filtration tests.

Due to the design, the effect that the Effective Filtration Area (EFA) is larger with single-layer filters than with multi-layer filters must be taken into account in some cases. This means that in cases where it is necessary to maximize the Effective Filtration Area, a single-layer filter can bring process advantages.

Double Layer

Double-layer filters or multi-layer filters are defined by the fact that the filter manufacturer specifies the number of layers used in the technical data sheet or validation guide as more than one.

As a rule, the degree of retention of the upstream layer is coarser than the degree of retention of the downstream layer. The reason for this is a better fluidic particle distribution.

The double-layer structure of sterile filters is mainly known. These are now offered by all major filter manufacturers with a double-layer membrane combination of a 0,8µm/0,65µm or 0,45µm upstream membrane and 0,2µm downstream membrane.

In order to obtain actual information about the maximum throughput, each individual membrane combination must also be tested on a product-specific basis in this case.

Exceptions to this are, for example, internal specifications or existing regulations.

When comparing single and multi-layer filter media, it is often found that

- the filtrate is purified better with a multi-layer filter
- and can be filtered at a higher flow rate.

Key Message

Both depth and membrane filters are available in single and double-layer designs.

Actual differences in performance between single and double-layer filter media can only be determined by means of a filtration test.