

Hydro-entanglement Machines

Sinterflo® MC Filter Plate

Customer:	A manufacturer of non-woven fabrics
Application:	Protect the water jet orifices
Products:	Tubes made from Sinterflo® MC Plate Media
Primary Motive:	Product quality and production reliability
Location:	USA
Project Date:	2018 - 2020
Division:	Ashland



Customer Overview:

Manufacturer and supplier of hydro-entangled (spunlace) non-woven fabrics. Their fabrics, typically comprised of polypropylene or polyester fibers, are used for applications across a range of markets for products including wipes such as: facial, flushable hygiene, FDA approved, bleach, germicidal, medicated, baby and more.

Hydro-entanglement machines mechanically bond the fibers and are at the heart of the manufacturing process. Hydro-entangling, sometimes referred to as spunlacing, is applied to carded or wetlaid webs of fibers and uses fine, high pressure water jets to cause the fibers to interlace and entangle.

The individual water jets emerge through very precisely manufactured jet-strip nozzles at speeds up to 280m/s and form a continuous curtain of water. The jet-strip is contained in a high pressure injector which runs the width of the machine, typically 3 - 5 meters wide. The injector, operating at 30 - 400bar, is specially designed to distribute the water evenly, thus protecting the jet-strip from foreign debris, is vital to performance, and each jet-strip is individually protected by a filter.

Customer's Problem:

The customer approached Porvair because it was seeking a more robust, reliable filter. The legacy filter design consisted of a DOE perforated tube lined with an un-sintered mesh. Length-wise the mesh was folded, crimped and spot welded. Then the mesh tube was slid inside the tube and radially resistance welded at both end adaptors.

This design was susceptible to bypass at high differential pressure resulting in shorter on-line run times between cleanings. Furthermore, the loose mesh liner was prone to tearing and damage while cleaning and also material fatigue which lead to premature failures.

Porvair Solution:

Following a full process and engineering review, a drop-in fit and function retrofit design was proposed utilizing Porvair's 5-Layer Sinterflo® MC filter plate media. This rigid multi-layered 316SS sintered mesh media met all the performance requirements in terms of filtration rating, whilst also significantly improving on the durability and cleanability as compared to the legacy design.

Project Overview:

The quality and durability of Porvair's Sinterflo® MC filter plate media was immediately apparent with increased and more consistent on-line run-time between cleanings. While the initial filter cost was higher, the overall benefit of the Porvair 5-Layer Sinterflo® MC filter plate design is, lower cost of filter ownership, longer on-line run times between cleanings and improved and more consistent product quality.

System Information:

Sinterflo® MC filter plate cartridge.

A sintered multi-layer 316SS mesh media design, 100% fusion-welded construction, and fully passivated.

Dimension: 55mm (2.17") OD x 3940mm (155.12") OAL cartridge, DOE Slotted fitting to push-fit O-ring fitting.

Filtration rating: 40µm at 99.9% efficiency

Effective filtration area: 0.6 m²

Process fluid: Water

Max flow: 30 m³/hr

Operating temperature: Ambient

Estimated Clean DP: 1.7bar

Max Operating DP: 10bar

Max System Pressure: 250bar

Other Opportunities:

Porvair manufactures custom engineered solutions for all hydroentanglement applications. The Covid-19 pandemic has called for increased surface cleaning and thus the demand for these types of pre-wetted wipes, causing these machine to be run at higher rates and so replacements are needed more often.