

S3.4.1 THREE DIMENSIONAL HIGH PERFORMANCE FILTER CLOTH NEW DEVELOPMENTS IN WOVEN WIRE FILTRATION MEDIA

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Compared to other filter media, the specific properties of a woven wire mesh may be precisely described geometrically and defined through the type of weave, wire diameter and mesh count. For the user and manufacturer of woven wire filters, this is a considerable advantage because geometric pore size and permeability can be precisely calculated beforehand. With these “precision pores” it is possible to attain a higher separation effect and shape stability.

Where conventional filter cloths have reached their limits, the new developed Reverse Plain Dutch Weave with High Flow Capacity opens up new dimensions in filtration. Using new weaving technology, a three-dimensional pore geometry is created that increases the number of pores and thus the open surface.

Previous filter cloths with small pore sizes lead to reduced flow rates and significant pressure loss in the production process. The cloth structure of RPD HIFLO-S increases the number of pores and thus the open surface over the same area. For a given pore size, the flow rate is more than doubled compared to conventional Dutch Weaves. The pore size within a batch can be calibrated as desired from 5 μm to 40 μm .

Filter performance of RPD HIFLO-S compared to a conventional DTW-S, both with 15 μm pore size: Conventional woven wire filter clothes can cause turbulence that affects the filtration process at high flow rates. Turbulence around the filter cloth of RPD HIFLO-S is effectively avoided.

Flow behavior of RPD HIFLO-S (left) compared to a conventional DTW-S (right), both with 14 μm pore size. The pore size of RPD HIFLO-S can be calculated precisely in advance and adapted to the respective requirements. The mathematical formulae for determining permeability were developed in cooperation with the University of Stuttgart within the scope of AVIF projects A224 and A251, and experimentally validated by glass bead tests and air flow-through measurements.

The precisely predictable pore sizes can achieve extremely high cut-points and dimensional stability. The independent institute Whitehouse Scientific has tested and confirmed these properties. As an additional quality assurance measure, the RPD HIFLO-S woven wire filter clothes are bubble point tested. Specifications according to customer requirements: 1st bubble, mean pore size or both.

The depth structure of RPD HIFLO-S facilitates high separation efficiency without rapid blinding. This leads to longer filtration processes between cleaning intervals and longer service life for greater production reliability. The verification of these properties is carried out in collaboration with the “Institute for Mechanical Process Engineering”, IMVT.

The new filter cloth can be manufactured from standard diameter wires. This has a positive effect on cost. Moreover, it is possible to weave special materials such as Alloy 310 S, Hastelloy C 22, Inconel 600 or titanium even in the small pore range. Thus, for the first time, filter cloth with pore sizes below 40 μm can be manufactured in corrosion- and temperature-resistant alloys.