

# Product quality improved, operating costs reduced

## Automatic backwash filter replaces one-way filter

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Process waters are frequently filtered using one-way filters such as filter bags, filter candles, string-wound cartridges, paper filters etc. Thanks to automatic backwash filters, these one-way filters can in many cases be replaced. As a result of a patented design, the automatic backwash filter from Lenzing Technik is in a position to filter whilst forming cakes at the same time. This technology allows for a very fine filtration down to  $1\mu\text{m}$  with at the same time high contents of solid matter and throughput performances.

In this way the product quality is improved in many applications with at the same time significant savings in operating costs. Thus in many cases investments pay off within a year. The practical example which follows illustrates that as a result of using a suitable automatic backwash filter on the one hand, the product quality can be improved and moreover a considerable reduction in operating costs can be attained. With one leading German company in surface technology it was possible to considerably increase the production capacity as a result of higher sales in the field of eloxal production.

### Example Eloxal bath

To make aluminium resistant to environmental influences in the long-term, an oxidic protective layer is applied to the material surface. This is done with the help of an eloxal process via anodic oxidation. An important step in this process is the concluding sealing in which the porous structure of the oxide is compacted by immersing it in pure, completely desalinated water at almost  $100^{\circ}\text{C}$ . In this respect care should be taken that the purity of the water is guaranteed by removing contaminations brought in from the previous process stages.

The continuous care of the bath – in this application around  $40\text{m}^3$  – by filtration with the highest possible quan-



Hot seal bath: the sealing is always the concluding step in the eloxal process

ties circulated is therefore important for the life cycle of the hot compacting bath. For this disc filters, bag and cartridge filters are frequently used or yarn string-wound cartridges. At the beginning the elements filter very inefficiently with relatively high quantities circulated until a filter cake forms which actually assumes the task of filtration (microfiltration). This is admittedly at low throughput amounts which are not sufficient for bath care.

The delightful increase in sales at the manufacturer's of the anodized aluminium profiles led to – to be able to keep the product quality at the level to which we are accustomed – a shorter bath life cycle and increased the filter material consumption with all the additional operating costs associated with this.

## Automatic backwash filter system

The Lenzing RWF filter is a fully automatic continuous system which works according to the principle of surface, depth or cake filtration. A filter fabric or a metallic fiber felt is used as the filter material which holds the particles back on its surface or in the inside of the fleece. Once a certain grade of contamination has been reached, a backwash procedure commences with a small amount of filtered medium which rinses the filter material.

The backwashing of the impurities is performed by the backwash unit in the filter.

Filter finenesses are possible down to 3 µm with metallic fiber fleeces and down to 10µm with fabrics. With filter cake forming on the filter material, micro filtration down to under 1µm is possible.

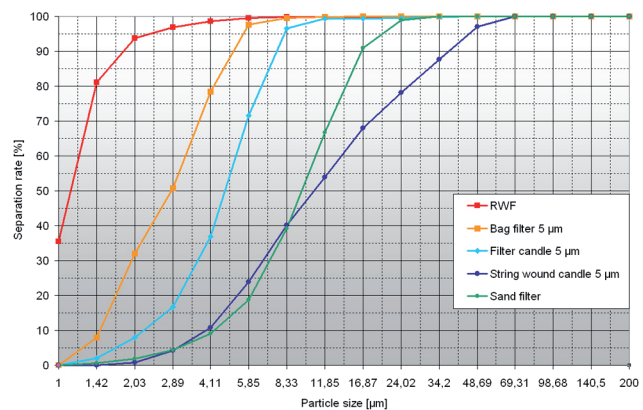


The automatic backwash filter RWF is available for almost all throughput rates

The patented filter has a partial backwash. During this, the filtration is retained on 95% of the filter surface. Depending on the filter type between around 2 and 3 l of backwash amount are required, with a filter throughput performance of around 10 m<sup>3</sup>/h and approx. 20 to 30 l at around 100 to 120 m<sup>3</sup>/h filter throughput performance. The length of

the filtration cycles depends on the respective application. The degree of contamination, the characteristics of the particles, the throughput performance and the filter fineness are the primary factors which define the number of backwashes. As a result of the special filter geometry, filtration can be much finer in comparison to the other backwash filters available in the market, and this is possible with, at the same time, higher shares of dirt.

The particle separation curve demonstrates absolute separation rates at 4 to 5 µm. Even at 1 µm, 35% of the particles are still eliminated. And this is achieved with throughput rates per filter of approx. 120 m<sup>3</sup>/h. Several string-wound cartridges were used for the filtration of the hot seal bath. These had to be exchanged at least once a week as a result of the high contamination load.



The particle precipitation curve shows absolute precipitation rates for the RWF filter already up to 4 to 5 µm.

## Quality comparison of the systems

As a result of the increase in production, the rate of contamination of the bath also became higher. This relates to particles clinging to the surface of the anodized products.

The continuous removal of the impurities is decisive for a high quality cleaning result as well as for the long life of the hot seal bath. The design of the bath filter is decided in accordance with the following factors: part throughput, the type and amount of the contamination introduced, the amount of evaporation and the necessary bath purity and

naturally the volume of the bath.

In the light of these and the fact that the string-wound cartridges originally used were very quickly blocked due to the contamination load and yet the necessary bath quality could not be reached, the automatic filter which was described here was then used. Within a few seconds a filter cake forms on the metallic fabric as a result of the particles of dirt in the unfiltrate. This represents the actual filter layer. After around one to two hours, the automatic cleaning of the filter material takes place as a result of backwashing with the filtrate.

The backwash amount equals between 20 and 30 l for each backwash.

The result of this continuous filtration was and is double the life cycle of the bath and a respectable reduction in the operating costs. No manual change of the filtration systems and no disposal of the one-way filters are now necessary.

## Reduction in waste and operating costs

In addition to a constantly high product quality, the goal of the operating performance is to reduce the costs by lowering the energy consumption, producing less waste and the economic use of consumables such as chemicals and one-way filters. The yearly savings as a result of using the automatic filter RWF instead of one-way filters depends on the respective operating situation. In the following some savings potentials are shown.

### Replacement of one-way filter (practical example)

Replacement of 36 pcs. of string-wound filters à 10 Euros per piece; weekly exchange. Annual savings of around 18 000 Euros – without consideration of the conversion times to change the string-wound filters.

### Chemical savings

In a 40 m<sup>3</sup> hot seal bath, costs are incurred for approx. 350 to 450 kg of chemicals for each bath change. As a result of the efficient filtration of the bath, it is possible to

double the bath lifetime depending on the circumstances. With a bath change cycle change of 50 to 25 per year, saving of around 8 750 to 11 250 Euros are possible.

### Lower energy costs

In many cases the deionised water is produced from well water and an ion exchange system. In this respect the water is to be heated from approx. 10 to almost 100°C.

For a hot seal bath with around 40 m<sup>3</sup> this means energy costs of around 400 Euros per bath. Assuming that the bath life can be raised from one to two weeks, this results in energy cost savings of around 10 000 Euros/a.

In this respect costs were not taken into consideration for the disposal of the waste waters, costs for the deionised water preparation and disposal costs for the one-way filters.



The automatic backwash filter RWF, from Lenzing Technik, can be visited at the 11th World Filtration Congress in Graz from 16 th to 20 th of April.

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