



# Advanced Filter for Highest Requirements

## Perfect cleaning of emulsion during profile grinding with HOFFMANN suction belt filter SF 3-150

### User report of the company HOFFMANN Maschinen- und Apparatebau GmbH

*For almost 50 years, we at HOFFMANN Maschinen- und Apparatebau GmbH, have been the first point of contact when it comes to the filtration and cooling of cooling lubricants. With more than 200 employees and 24 apprentices, we develop, manufacture and deliver conveyor systems, filter systems and coolers. Our customers are the world's top addresses in mechanical engineering and in the automotive, energy, and supply industries.*

Among these is Schneeberger, who have been designing and developing linear guides for about 80 years. One of the most important work steps in the production of linear guides is the finish grinding to final dimensions. The chips generated during processing must be removed from the cooling lubricant by first-class filters. Since we offer the right solution for every requirement, Schneeberger have opted for a system from our company for the filtration and cooling of the emulsion used.

### Your requirement is our mission

During the finish grinding of the hardened profile rails, an average of about 60 kg of chips are produced per hour at Schneeberger. The filter system must be able to remove this large quantity of chips from the cooling lubricant. In order for Schneeberger to achieve a surface roughness of Ra 0.4 and a shape tolerance from a few  $\mu\text{m}$  up to 6,000  $\mu\text{m}$ , the requirements on the filter quality of the emulsion are very high.

In addition, it must be ensured that the grinding abrasion particles from the corundum grinding wheels are reliably separated.

The filter system must supply the grinding machine with a total of 1,300 l/min of emulsion. A pressure booster station, which is also supplied by HOFFMANN, splits this volume flow into six different partial flows with different pressures.

Despite the high technical demands on the filter system, the system had to be as compact as possible in order to avoid unnecessarily blocking production space. For this reason, the return pump station was placed next to the grinding machine in a walk-in pit.

Best filtration, compact design, high process reliability and reduction of operating costs have been the objectives set by the operator.

### The ideal solution – HOFFMANN suction belt filter SF 3-150

The HOFFMANN suction belt filter SF 3-150 is the ideal solution for our customer in this case. The soiled cooling lubricant first passes into the return pump station via a return line on the grinding machine. From there, the cooling lubricant passes into the soiled tank of the filter system. A filter lifting pump conveys the cooling lubricant into the filter top from there. In order to save space in the system, three filter surfaces and filter chambers were arranged one above the other in the upper part of the filter.



Each filter chamber in the SF 3-150 is equipped with an continuous filter belt. Each continuous belt simultaneously serves three functions: Filtration, chips transport, and chips drying. The advantages are obvious: A preliminary separation is not necessary since all chips are used for the formation of the filter cake.

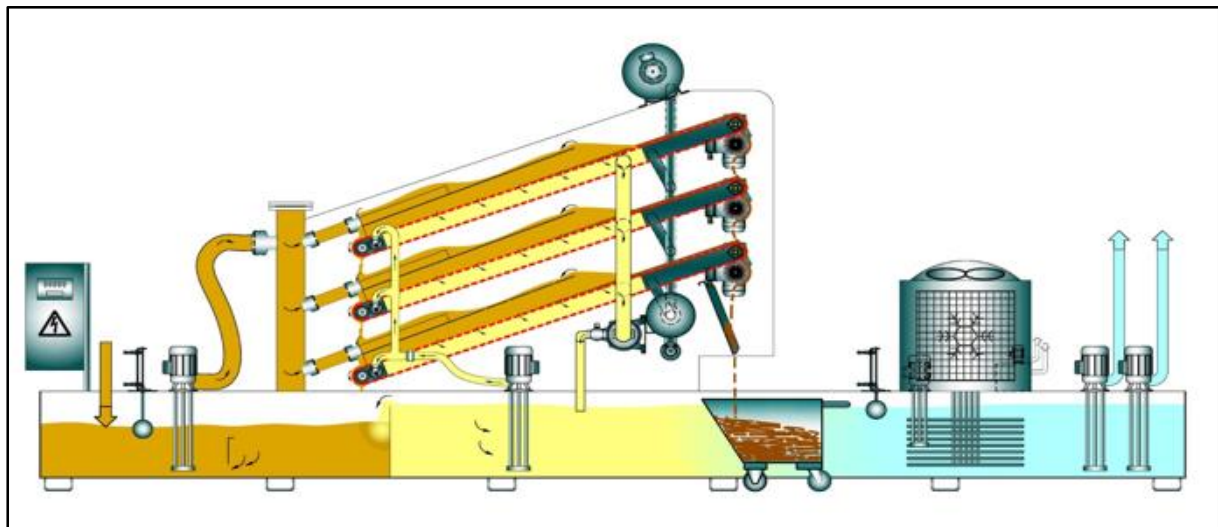
The drying of the chips reduces the weight of the chips to be disposed of and thus the disposal costs. The use of continuous belts saves costs for the procurement of filter aids.

The soiled cooling lubricant is sucked through the filter cake and the continuous belt via a suction pump. In the course of this, the dirt particles are deposited in the filter cake. The cleaned emulsion passes in the clean tank, and low pressure pumps convey it to the pressure boosting station from there, where the increase to the various supply pressures takes place. The pressure boosting station is located directly next to the grinding machine and thus allows an energy-efficient supply of the grinding machine.

**"We have broken new ground with this system, and by now it serves as a benchmark in rail grinding in terms of filtration capacity, operating costs, and handling.**

**The system is convincing because it can adapt so flexibly to our filtration tasks. In the area of profile rail guidance, the highest demands are placed on surface quality, so a good filtration efficiency of the emulsion plays an important role here."**

Marcus Rentschler  
(Project Manager Schneeberger)



HOFFMANN SF 3-150

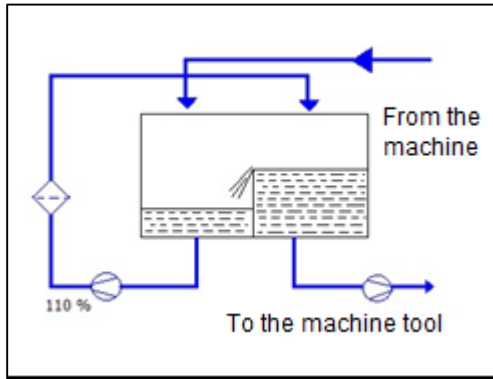
During the filtration process, the filter cake on the filter belts becomes thicker. The negative pressure in the suction nozzle of the vacuum pump increases. Once a maximum value is reached, regeneration is initiated and the filter band pre-clocked by a defined distance.

The drying is carried out by a vacuum pump which sucks a stream of air through the filter cake. The dried chips fall into a chip container and only have a low residual moisture. Here too, the advantages are obvious: Disposal costs of the chips as well as procurement costs of a new emulsion are reduced.

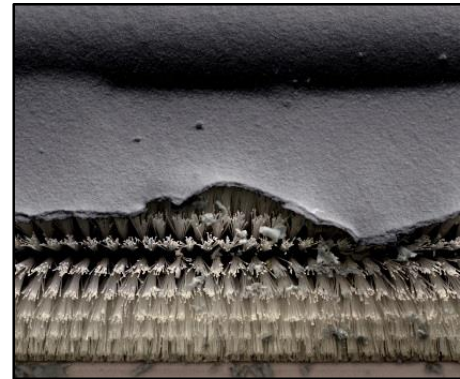
The filter system operates in the main flow shunt and thus filters more cooling lubricant than is required in order to supply the grinding machine. The clean tank is always completely filled and overflows into the soiled tank. This



guarantees a permanent supply regardless of the operating state of the grinding machine. This leads to a significant improvement in the filter grade.



The main flow shunt principle



Filter cake

Since an emulsion is a "living water", it must be aerated to counteract the growth of the microorganisms in the emulsion.

By means of the above-mentioned cleaning in the main flow shunt, the cooling lubricant is constantly circulated and thus enriched with oxygen. The emulsion can therefore be used longer, which in turn reduces both the use of biocide and the procurement costs.

A plate heat exchanger on the filter system serves to temper the cooling lubricant. A constant temperature of the cooling lubricant is absolutely necessary for the dimensional accuracy of the workpiece. A low temperature of the cooling lubricant also reduces the growth of microorganisms present in the cooling lubricant.

The low space consumption, the high process reliability, an excellent filtrate quality, and the reduction of operating costs have convinced Schneeberger. In the future, Schneeberger will rely on the extraordinary HOFFMANN quality.



HOFFMANN suction belt filter SF 3-150 in the customer's plant