

**HAYER & BOECKER**



**DIE DRAHTWEBER**

# **EFFICIENT FILTRATION IN CHEMICAL AND PHARMACEUTICAL INDUSTRIES.**

**HOW WOVEN WIRE CLOTH LAMINATE CONTRIBUTES  
TOWARDS PROCESS STABILITY AND COST OPTIMISATION.**






# CONTENTS


<b>THE SEARCH FOR THE IDEAL FILTER MEDIUM.</b>	3
<b>FILTER CANDLES USED IN PROCESS GAS FILTRATION.</b>	4
A COMPARISON OF METAL AND CERAMIC FILTERS.	4
<b>FILTER PLATES USED IN NUTSCHE FILTERS.</b>	6
STABLE, ROBUST AND EXCEPTIONALLY SELECTIVE.	7
<b>USING WOVEN WIRE CLOTH LAMINATE IS WORTHWHILE.</b>	7
NO CONCERNS REGARDING DISPOSAL.	8
MEASURABLE SUCCESS WITH JOINT PLANNING.	8
<b>ABOUT HAVER &amp; BOECKER.</b>	11

## THE SEARCH FOR THE IDEAL FILTER MEDIUM.

As filtration processes play a key role in maintaining consistently high product quality, particularly in the chemical and pharmaceutical industries, reliable and durable filter media in all systems are all the more important. When searching for a suitable solution, production managers can choose from a wide variety of different types of filter media. The spectrum ranges from filter cloth and filter bags made of plastic, cotton and cellulose to metal and ceramic filters.



VN  
°C    vel  
dp    pa  
mbar    ... ?



C22    VA  
PP    ... ?

**This variety gives rise to the following questions:**

- Which filter medium is the most suitable for my production process?
- Which type of material and which geometry promise the best results?

A look into practical operation indicates that in many applications in the chemical and pharmaceutical industries, the ideal combination of maximum resistance and highest precision is essential. Concrete examples from process gas filtration and filtration in nutsche filters clearly indicate that by using robust and reliable filter inserts made of metal wire cloth laminate – which you can often integrate into existing systems with little effort – you increase your process reliability and eliminate unnecessary costs in several areas in the process.



## FILTER CANDLES USED IN PROCESS GAS FILTRATION.

There is a demand for filtering gaseous fluids in countless processes in the chemical and pharmaceutical industries. Irrespective of the specific application, process gas filtration is always a matter of separating solids from a fluid. The focus is usually on one of the following two objectives: either the solid material obtained in this way is to be used for further processing steps or the particle load and thus the level of contamination of the fluid is to be reduced.

Filter candles made of textile or cellulose based materials are frequently used as filter media for this process. Even if they are very inexpensive, the additional costs incurred during the process - such as higher energy and disposal costs - often directly offset these savings. Although somewhat more expensive to purchase, metallic filter media are much more robust. Thanks to their high temperature and corrosion resistance, they are ideally suited for process gas filtration, which even if not a high-temperature process, temperature peaks of up to 200 °C can be reached in many filtration applications. Moreover, the possibility of carry-over of hot or smouldering particles from upstream processes can also not be ruled out. In these instances, materials with a high degree of safety and temperature resistance are required - in other words, precisely those properties, which filter media made of wire mesh and woven wire cloth composites have to offer.

## A COMPARISON OF METAL AND CERAMIC FILTERS.

Filter elements made of metal and ceramic are available for the even higher temperatures ranging from 200 °C to about 1,100 °C. Ceramic filter materials have their own unique surface structure. The extremely labyrinthine and uneven pore channels and the thick walls of the ceramic filter, which are necessary to maintain the basic stability, generate a relatively high differential pressure, which in turn is reflected in high energy consumption. At the same time, the flow rate of ceramic filter media is comparatively low, thereby requiring a larger filter surface, which in turn leads to large filter housings and accordingly greater space requirements.

Filter elements made of ceramic are very fragile and are sensitive to temperature shocks. If the breakage occurs during the ongoing process, production must be stopped and the defective element replaced. The consequence: depending on the original operating temperature, which must be lowered to an acceptable level in order to change the filters, this can mean several hours of production downtime. This in addition to costs incurred by the assembly effort involved as well as repeated start-up and heat-up of the process. Repairing or reconditioning the filter elements is only possible in rare cases.





Woven wire cloth laminates are non-flammable and offer two further significant advantages thanks to the largely linear pore channels. First of all, the wire mesh laminate generates a significantly lower differential pressure as opposed to the ceramic filter. This can have a positive effect on the process in that the same throughput can be achieved with a smaller filter area. As a result, the number of filter elements and thus the size of the filter housing can be reduced or the throughput can be increased significantly with the same filter size, which in turn brings about a significant reduction in costs at the same filtration capacity.

Moreover, cylindrical filter elements made of woven wire cloth, in particular, can usually be cleaned extremely well by means of a backwashing cleaning process. In contrast to disposable filters, very durable and reusable filter elements make a tremendous contribution towards protecting our environment.

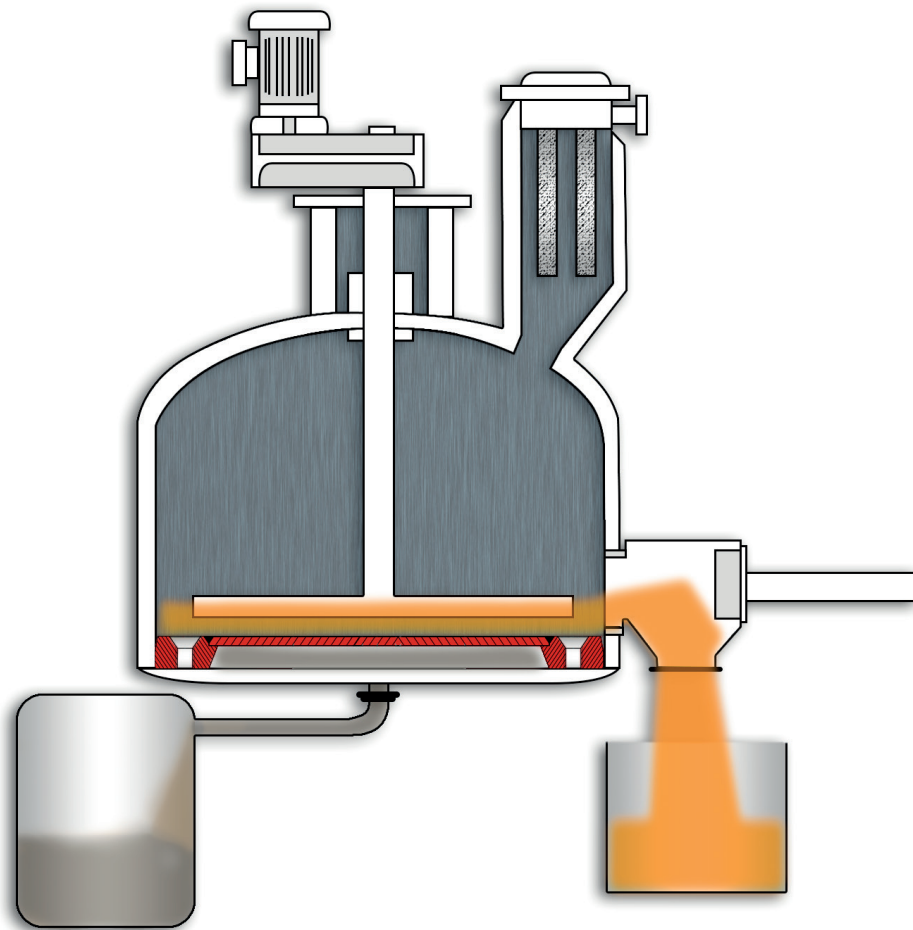


Wire cloth laminate filter candles with various connectors.

## FILTER PLATES USED IN NUTSCHE FILTERS.

Nutsche filters or filter dryers are veritable all-rounders: they are used in the production processes of chemical and pharmaceutical industries for thermal solid-liquid separation, active substance recovery, and washing and drying solids. The example of solid-liquid separation illustrates how these filters work: The suspension is poured into the agitated nutsche filter and the process liquid is discharged through a porous filter medium under pressure. In the subsequent thermal drying process, a rotating agitator smooths the dehydrated solid above the filter medium. Depending on the system design, the solids are discharged manually or automatically after drying.

In many instances, textile filter cloths are used in nutsche filters. They are very inexpensive, but usually have only a limited amount of heat resistance. Although they have a low mechanical strength, they are nevertheless subjected to strong physical influences such as constant pressure during the production process. This can cause the filter cloth to tear. The consequence: an immediate stop of the process, since proper filtration can no longer be ensured, coupled with the risk of losing generally high-priced solids. Additional costs are incurred from cleaning of the nutsche filter and the downstream piping - and replacing the torn filter cloth itself of course.

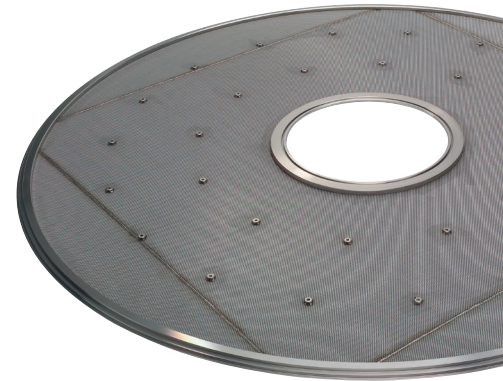


Wire cloth laminates are particularly resistant to the constant pressure in nutsche filters.

## STABLE, ROBUST AND EXCEPTIONALLY SELECTIVE.

Composite panels made of metal wire cloth laminate are significantly more stable than filter cloth with comparable permeability. Unlike other media, wire cloth laminates are also suitable for filtering abrasive products. Moreover, the porosity of wire cloth laminates is equal to that of filter cloth and they can be used extremely flexibly. They can be formed and welded and no wires become loose even when used under maximum operating pressure.

Woven wire cloth laminates also remain very flat. There is none of the wrinkling or excessive unevenness that can occur with filter cloth and the agitator can be spaced very closely in order to obtain a maximum output volume. A clear advantage over filter cloth, where relatively large agitator spacing is required.

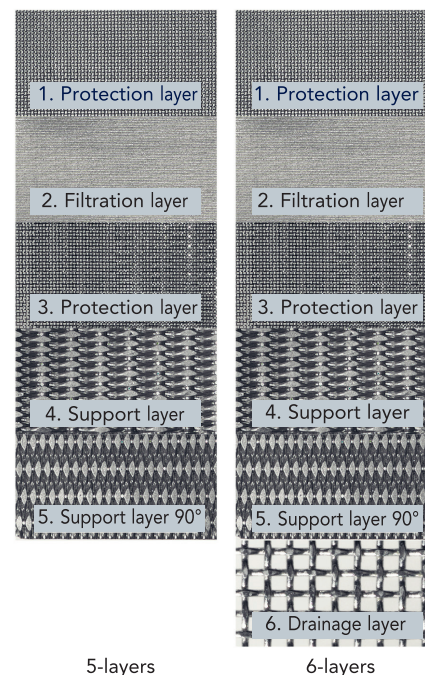


Wire mesh laminate filter plate for the use in nutsche filters.

## USING WOVEN WIRE CLOTH LAMINATE IS WORTHWHILE.

A direct comparison of the different filter media reveals one thing very clearly: The functional properties of metal wire cloth offer clear advantages, especially under difficult production conditions and with regard to the aspect of process reliability. Because metal fabric laminate is much more robust and resistant than the possible alternatives.

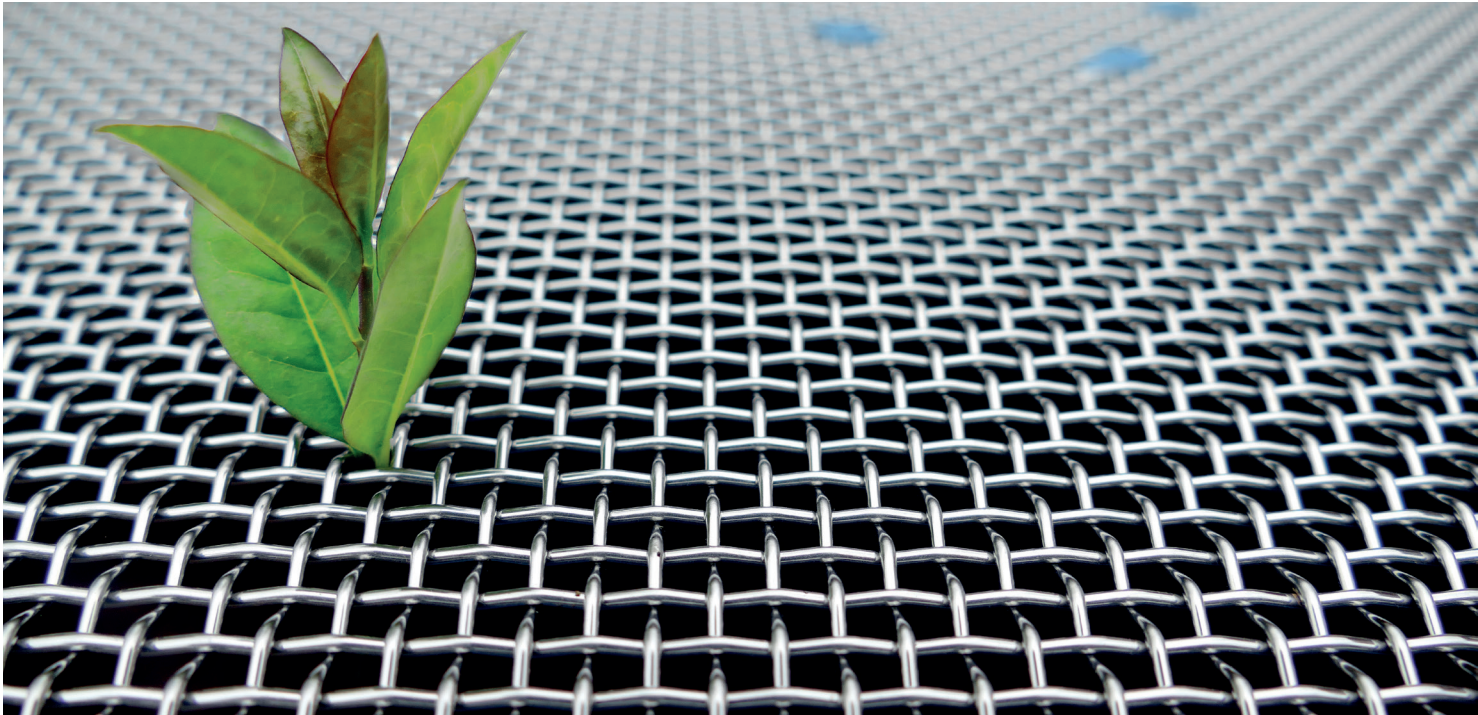
Moreover, filter elements made of wire cloth laminate are veritable all-rounders: due to the largely freely configurable combination of extremely precise filter layers and very robust protective and support layers, the areas of application are virtually boundless. Also thanks to the wide range of metal alloys, temperature requirements of up to 1,100 °C do not present a problem.



Structure of a 5- or 6-layer mesh laminate.



## NO CONCERNS REGARDING DISPOSAL.



### **What actually happens to the filter medium after completion of the filtration process?**

Filters and filter elements made of organic materials can only be cleaned to a certain extent and are therefore disposable products in most cases. As a rule, these materials have to be replaced after product or batch changeover in order to avoid cross-contamination. These filter media must be disposed of as costly special waste, a fact, which is often not taken into account when the elements are procured.

Considering that in today's discussion about the use and application of environmentally friendly resources, the focus is increasingly on the aspect of sustainability. It's well worth taking a look at metal wire cloth laminate. As a much more sustainable alternative, it is easy to clean and can usually be reused without any difficulty after a product or batch changeover. This generates less waste, saves on disposal costs and thus increases the profitability of the production process.

## MEASURABLE SUCCESS WITH JOINT PLANNING-

One thing is clear: intervening in established production processes should be precisely planned and monitored. Especially at the start of a change, learning processes can lead to higher rejection rates and brief production downtimes. Changing the type of filter medium used in particular requires intensive preparation and advice.

If you are considering changing the type of filter medium, you should seek the support of an experienced partner for research and optional implementation.

Haver & Boecker is your competent partner in the field of filter elements made of woven wire cloth laminate.

## ALL FROM ONE SOURCE.

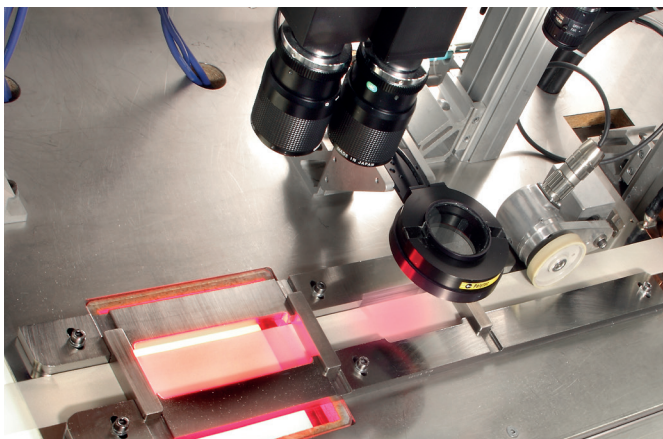
Backed by decades of experience in the production and further processing of metal wire cloth, our engineers know what is important when it comes to manufacturing components for chemical and pharmaceutical applications.

Haver & Boecker combines a **particularly high in-house production depth** under one roof: from weaving individual wires through punching, embossing and welding complex filter elements made of individual layers of woven wire cloth and woven wire cloth laminate up to and including the process-reliable packing of finished components. The complete development and production remains under one roof and can thus be optimally coordinated.



The production capabilities of Haver & Boecker include thermal treatment as well as welding and cleaning of complex filter elements.

## EVERYTHING UNDER CONTROL.



The "HAVER Vision System" is used for quality inspection of finished wire mesh products.

**Thorough and comprehensive quality management** coupled with precise cleaning procedures and quality inspections in every step of production are a matter of course at Haver & Boecker. Comprehensive controls and documentation accompany the whole production process. We offer facilities for 100 % camera inspection with our specially developed HAVER Vision System, which is continuously being developed in line with the growing demand for high quality. With the help of manual in-line inspections, Haver & Boecker pursues a zero-error strategy within its quality management system, which has been certified in accordance with DIN EN ISO 9001.



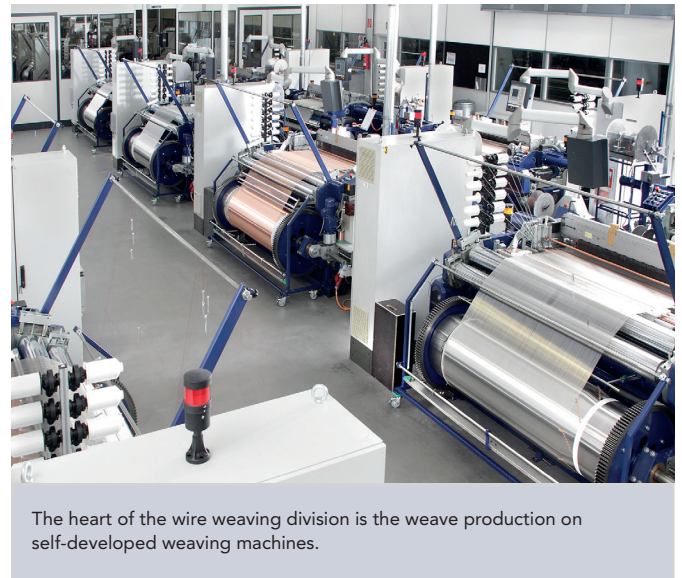
## ALL IN THE INTEREST OF YOUR SAFETY.



The importance of the **reliability of supply factor** increases with the complexity of your production process. Ultimately, each individual component has a decisive influence on a smooth running process. For this reason, Haver & Boecker's Wire Weaving Division operates for the most part independent of international supply chains. The predominantly regional procurement of primary materials and local processing of wire up to and including dispatch of the finished components are embedded in a customer-specific concept for securing supplies, which also provides for other options such as alternative production sites and tools. All of these measures are the basis for providing very reliable statements on delivery times and avoiding production downtimes due to supply bottlenecks.

## ANYTHING IS POSSIBLE.

In addition to maximum precision and diligence, Haver & Boecker's activities throughout all areas of woven wire cloth production are characterised by an **extraordinary innovative spirit**. Our weaving machines and tools are designed and manufactured in our own factory in Germany so that adjustments for process optimisation can be implemented flexibly and at short notice. These weaving machines produce newly developed types of weave and those that have become established on the market for decades, which are then processed further into woven wire cloth laminate. In the search for new challenges and smart solutions, Haver & Boecker relies on the experience of its employees and the use of modern technologies and intelligent software.



The heart of the wire weaving division is the weave production on self-developed weaving machines.

## EVERYTHING AT A GLANCE.



Realisation of your ideas and requests on a modern 3D CAD system.

As proven experts in woven wire cloth products, we always bear your individual requirements in mind during the development and manufacture of suitable filter media. In this way, you not only receive a tailor-made product but also benefit from the experience gained by our experts from process changes they have already accompanied and supported. All this impressively demonstrates that switching to filter elements made of metal wire cloth laminates pays off – above all with regard to your process reliability.



# ABOUT HAVER & BOECKER.

Haver & Boecker began producing wire cloth in Hohenlimburg, Germany in 1887. Today, the company is a worldwide leading manufacturer of woven wire cloth for industry and engineering as well as architecture and design.

For more than 130 years, Haver & Boecker has played a decisive role in shaping the technology of wire weaving. The company develops and has at its disposal manufacturing processes, which enable wire cloth to be processed into filters and fabricated parts that meet the highest requirements.

Whether in aeronautics, aerospace, the automotive industry, electrical engineering, medical technology, chemistry, water filtration, mechanical engineering or plastics processing - Haver & Boecker's tailor-made solutions create the basis for efficient production processes, reliable operation, optimum product quality and distinctive design.

HAVER & BOECKER OHG · Filterlayers  
Ennigerloher Straße 64 · 59302 Oelde · Germany  
Phone: +49 (0) 25 22-30 433 · Fax: +49 (0) 25 22-30 404  
E-Mail: [pf@haverboecker.com](mailto:pf@haverboecker.com) · Internet: [www.weavingideas.com](http://www.weavingideas.com)