

HAYER & BOECKER



DIE DRAHTWEBER

FILTERS AND FABRICATED PARTS. PERFECTION IN DETAIL.



FILTERS AND FABRICATED PARTS.

Whether in a simple part or a complex component – metal woven wire cloth is used everywhere in industry, research, the building trade and many aspects of everyday life. From flow filters in water taps to precision filter elements in space craft, woven wire cloth fulfils a variety of requirements and is fundamental to the area of application.

Haver & Boecker has been a pioneer in the technology of wire weaving for more than 125 years. The company develops and processes woven wire cloth into filters and fabricated components fulfilling the highest standards. Whether it's aerospace and aviation, automotive, electrical engineering, medicine, chemicals, water filtration, machine building or plastics processing – customised solutions from Haver & Boecker offer the basis for efficient production processes, reliable function, optimum quality & distinctive design.

Function in Form

The material, shape and function are closely interrelated in filters and fabricated components made from woven metal wire. Haver & Boecker conceptualises, designs and produces metal woven wire made of steel, stainless steel alloys, and special materials such as titanium, Hastelloy, silver, non-ferrous metals, aluminium, phosphor-bronze, brass, copper, nickel or MONEL.

We fulfil customer requirements for end-products, acting as an innovative partner by offering a wide selection of proven products, or developing bespoke solutions for new applications & developments.

These include new weave types, automation solutions, and conceptualising the optimum production and testing process.

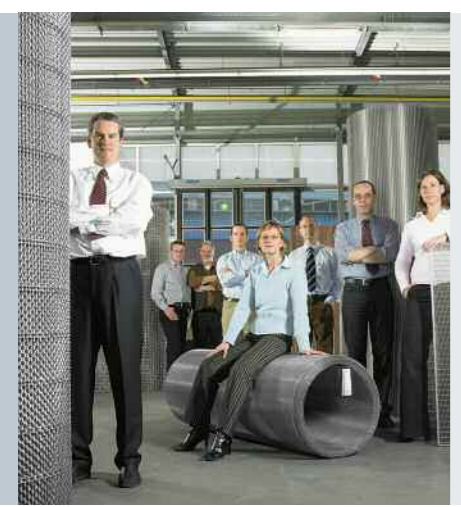
In addition, we are constantly pushing technical boundaries forward in order to produce the ultimate solution for innovative products.

A pre-requisite for this is our in-house expertise in manufacturing, finishing, and processing of wire mesh. Due to our understanding of the entire manufacturing process, we are able to approach our customer's wishes with precision and the assurance of maximum product quality throughout production and after-sales service.

Whether you need single parts & small production runs with short delivery times, or are searching for a partner for large production runs, at Haver & Boecker you'll find customised solutions and reliable service.

Haver & Boecker began producing wire cloth in Hohenlimburg, Germany, in 1887. Today, we are one of the world's leading wire weaving companies with a global network of branches and manufacturing facilities.

Our work is based upon experience, continuous research and development of our products and manufacturing processes, along with the knowledge and ability of our staff. This combination of tradition and innovation allows us to meet and exceed the high expectations of our customers.



SINGLE SOURCE PRODUCTION: ENHANCING YOUR SECURITY.

Experience and expertise

Over its more than 125-year history, Haver & Boecker has become a global leader in the manufacture of wire mesh for industry, technology, architecture and design. These years of experience in wire mesh processing and the expertise of our skilled employees form the main basis of our partnerships with customers.

Metal woven mesh - manufactured in-house

The control of our production process begins with our own design and manufacture of the machines we use, and extends through our controlled production conditions. This includes clean-room conditions and continuous process control. In-depth knowledge of our production processes not only guarantees high product quality, but also allows us to develop special weave types to meet specific customer requirements. High production capacities in connection with a large product range held in stock, gives us the assurance of supply to our customers.

Planning and feasibility studies

Meticulous process planning and technical feasibility studies, e.g. Advanced Product Quality Planning (APQP) methods, lead to quality assurance and precise matching of all processes to given requirements.

Tailored design

Our engineers, technicians and product designers implement the ideas and wishes of our customers using modern 3D CAD systems. Our customer's requests are analysed & implemented, from ideas to final product. This can

involve the construction of any tooling, equipment or special machines, and includes associated production and packing lines.

High level tooling

In addition to drawings, our special machine and tooling design delivers CAM data to our CNC machine tools, e.g. for turning, milling and electrical discharge machining of classic stamping and deep drawing tools - and includes fully automatic special machines, handling systems and injection moulding tools for filter production.

Production on modern machines

Subsequent processing takes place using the most up-to-date systems and machine technology: high-precision cutting machines, mechanical and hydraulic presses, welding systems for welding aluminium and non-ferrous metals, and injection moulding technology. All heat-treatment processes are available in our annealing centre. Cleaning systems assure maximum cleanliness. Our chemical laboratory ensures continuous monitoring.

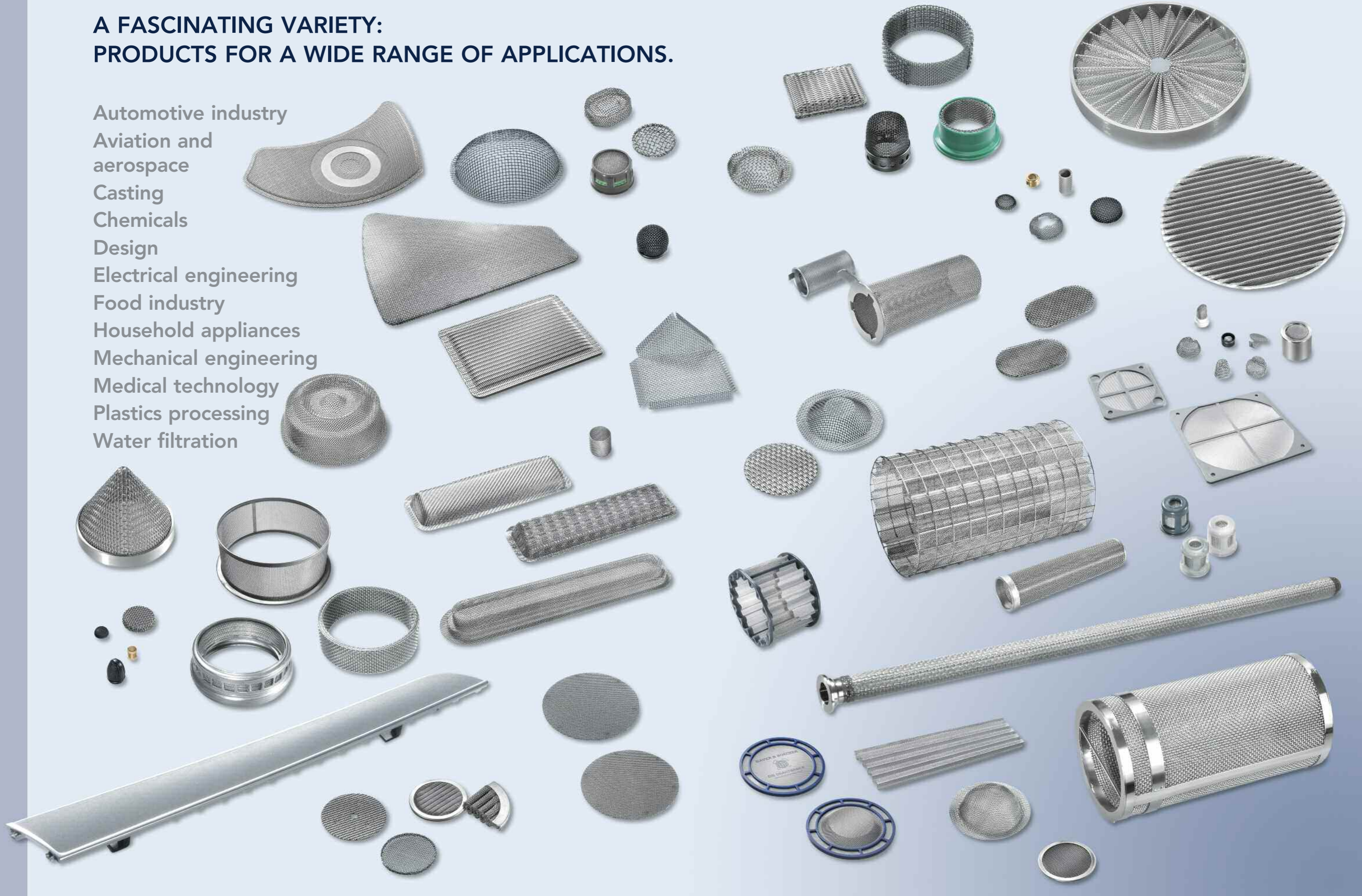
Systematic quality

For step-by-step quality assurance, from incoming wire to finished product, in-house procedures and certified test analyses are available, in addition to standard tests. Our quality management system is certified to DIN EN ISO 9001, and IATF 16949 for the automotive sector.



A FASCINATING VARIETY: PRODUCTS FOR A WIDE RANGE OF APPLICATIONS.

- Automotive industry
- Aviation and aerospace
- Casting
- Chemicals
- Design
- Electrical engineering
- Food industry
- Household appliances
- Mechanical engineering
- Medical technology
- Plastics processing
- Water filtration





Calendering

The cloth is rolled to a specified thickness, simultaneously producing a smooth surface. For fine mesh, this can also influence the filtration criteria of the cloth.

Annealing/sintering

Heat pre-treatment for facilitating further processing: for example soft annealing for 3D forming of parts, or sintering for fixing wire intersections.



Pressing / deep drawing

The manufacture of two and three dimensional products: fully automated for large production runs or as single part production for perforated, embossed or formed components.

Welding

Plasma, TIG, MIG, MAG and resistance welding - with high precision seam and spot welding.



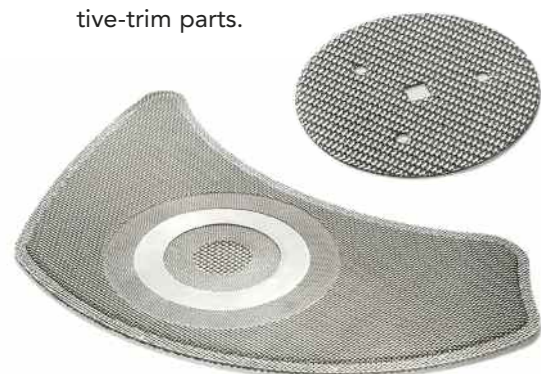
NEW CONCEPTS - MORE INNOVATION.

Cut-to-size pieces and round parts

Single-piece or multi-part production takes place using various cutting processes: rotary or stationary blades, splitting systems, water-jet cutting, laser cutting, plasma cutting, stamping or round cutting. Depending on the requirement, mesh parts can be single or multiple layer, or a pleated design with and without edge bordering.

Typical application areas:

Screening; classifying; filtration / separating of various materials; plastic melt filtration; soil-catch screens; chromatography or automotive-trim parts.



Deep drawn parts

Single or multi-layered mesh is manually or automatically formed into a three-dimensional shape. The domed shape gives a larger filter area compared to flat disks. Careful quality inspection can be either manual or automatic depending on the production quantity and agreed testing procedure.

Typical application areas:

Microphone shields, noise-attenuation screens, inlet screens, oil filters, air filters, protective covers and much more.



Edged parts

A rolled edge assures that parts can be easily separated and are therefore especially suitable for any subsequent automated processes. A solid border also ensures that the edge wires are fixed.

Typical application areas:

Flow screens in water taps, filtration in medical and automotive technology.



Pressed articles

The compression of edges enhances disc stability and prevents the migration of wires. Multiple layers can also be compressed as required.

Typical application areas:

Protective units in switch cabinets, gas measurement sensors, plastic fibre manufacturing.

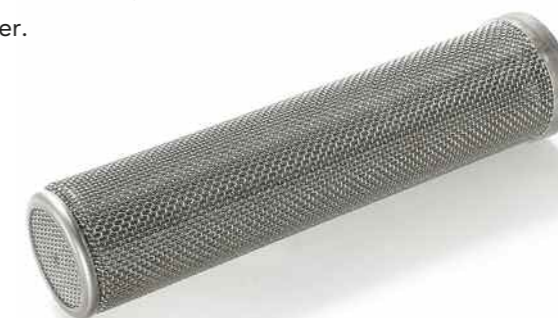


Cylinders and filter cartridges

Single or multiple layers, smooth or pleated mesh in cylindrical form joined together by spot or rolled joint welding. Support cores and connections as required. The longitudinal seam is joined by lapping or butting together. We offer continuous and woven seamless cylinders for large production runs.

Typical application areas:

Screening, classifying, filtration or the separation of various materials, e.g. for filtration of water, hydraulic oil, cooling water.





Cleaning

For rolled, coiled or single parts, various cleaning processes are available: degreasing and aqueous cleaning combined with ultrasonic cleaning as required.



Adhesion

Sealing and protection of welded joints, borders and seams of components. Depending on the application, using high-temperature food-grade adhesives.

Plastic injection moulding

Automatic or manual feeding, also for full integration of stamping and quality checking processes. Selection of plastic is as per customer requirements.

Packing

Manual or fully automatic, loose or single packing. Reusable or disposable packaging: solutions for all automation and process requirements.



Coned and tapered parts

Single or multiple layers, pleated or smooth surface. Components of this type can be produced as single parts or from partial segments, and if necessary, with supports and edge bordering.

Typical application areas:
Screening and classifying, filtration, or separation of various materials.

Packing

Multi-layered, rolled cylinders of mesh, consisting of one or more mesh specifications, as required. Edge bordering and face-side finishing prepared as required.

Typical application areas:
Fuel feeding, exhaust treatment and homogenisation of compressed air.

Plastic injection moulded parts

Wire mesh of various designs combined with injection-moulding for edge protection, sealing, joining, support or assembly elements, or for forming shapes.

Typical application areas:
Speaker covers, fuel filters, oil filters and many more.

Design mesh

Metal or hybrid mesh (metal/monofil) is back-moulded and foil laminated to create an adhesive component. The part can then be deep-drawn, with the possibility of creative back illumination.

Typical application areas:
Decorative applications, e.g. premium automotive interior parts, or elegant packaging.



PRODUCTION POSSIBILITIES

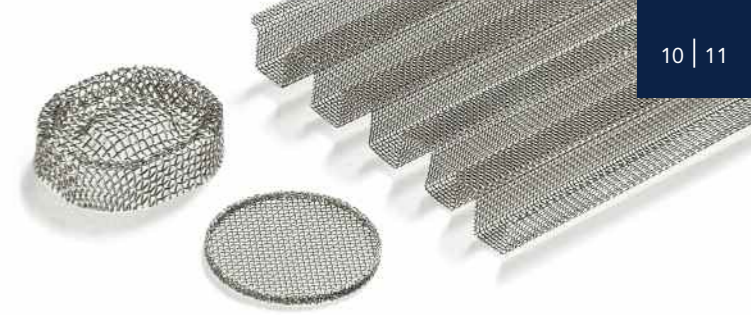
- Cutting (pieces and strips)
- Plasma and laser cutting
- Straightening and extending
- Calendering (rolling)
- Electric discharge machining
- Heat treatment (annealing/sintering)
- Joining technology (welding/soldering/bonding)
- Stamping/deep drawing
- Cleaning (rolled goods or loose goods)
- Forming/embossing/edging/pleating
- Cylinder fabrication (automatic/manual)
- Bordering
- Laminating
- Plastic injection moulding
- Testing (manual/automatic/HAYER Vision Systems)
- Analysing (chemical/physical/optical)
- Marking
- Packing (manual/automatic)

FILTERING, CLEANING, HOMOGENISING.

Wire mesh has a precise geometric appearance & the pore size (and hence material flow-through properties) can be precisely defined. It offers the ideal characteristics for filtering and separating solid, liquid and gaseous media. Therefore, wire mesh is used for draining & sizing solids, filtering and cleaning fuels, hydraulic fluids, water treatment and homogenising molten polymers.

Filter media made of wire mesh covers an extremely broad range, from ultra-fine micron structures up to coarse structures. Wire mesh offers distinct advantages over other filter media. It enables uniform filter performance over the entire filter area, versatility in processing, along with ease of cleaning.

When selecting the type of weave and material, mechanical, chemical and physical properties are also considered with the application requirements. Though not visible at the first glance, the woven wire mesh filter media fulfils its function in numerous areas of application. For example when filtering or treating water, sea water, and waste-water treatment plants. Flow regulators cause fresh water to flow out of the tap cleanly, clearly, and quietly.



FILTERING, CLEANING, HOMOGENISING.



When extruding molten plastic, filter elements made from stainless steel woven wire have proven to be ideal due to their excellent strength, stability and chemical properties. They hold back foreign materials such as metal scrap, which is extremely important when encasing electric wire cables for example. Moreover, they also ensure the

necessary homogeneity for uniform viscosity. Machines, motors, and hydraulic systems all function best when grease and cooling fluids such as transmission oil, are filtered by metal woven wire filters.

Woven metal wire filters from Haver & Boecker assure optimum function for office and household appliances. Nozzles in inkjet printers deliver optimally sized and filtered ink particles; dishwasher filters produce a clean supply of water and clean the wastewater. Haver woven filters are also used for medical technology, in cleanroom conditions.

We also produce filter mesh for inhalators, breathing and dosing equipment, and blood analysis systems. These require extremely high quality parts delivered under the most stringent quality procedures.



FILTERING, CLEANING, HOMOGENISING.



Woven metal wire filters from Haver & Boecker ensure trouble-free function of control systems and engines in aviation and aerospace, clean air from air-conditioning units, and clean fuel at fuel stations.

Metal wire mesh is used for a wide range of applications in the automotive industry. Inlet screens for aluminium castings, air filters for pneumatic systems, mesh for plain bearings, metal mesh filters for exhaust treatment systems and fuel lines. Fuels are optimally dosed by wire mesh, distributed and electrical contacts are enabled.

The chemical industry uses wire mesh for liquid chromatography, or as a filter medium for manufacturing medicines, and many other products.



PROTECTING, SECURING, OPTIMISING.

Wire strength, material type, opening size, and weave type determine the structure of the wire mesh. It can be relatively open whilst still having excellent stability. Thus it is especially suitable for a variety of applications involving the protection of elements without affecting its performance. Wire Cloth can even enhance the function of the application.

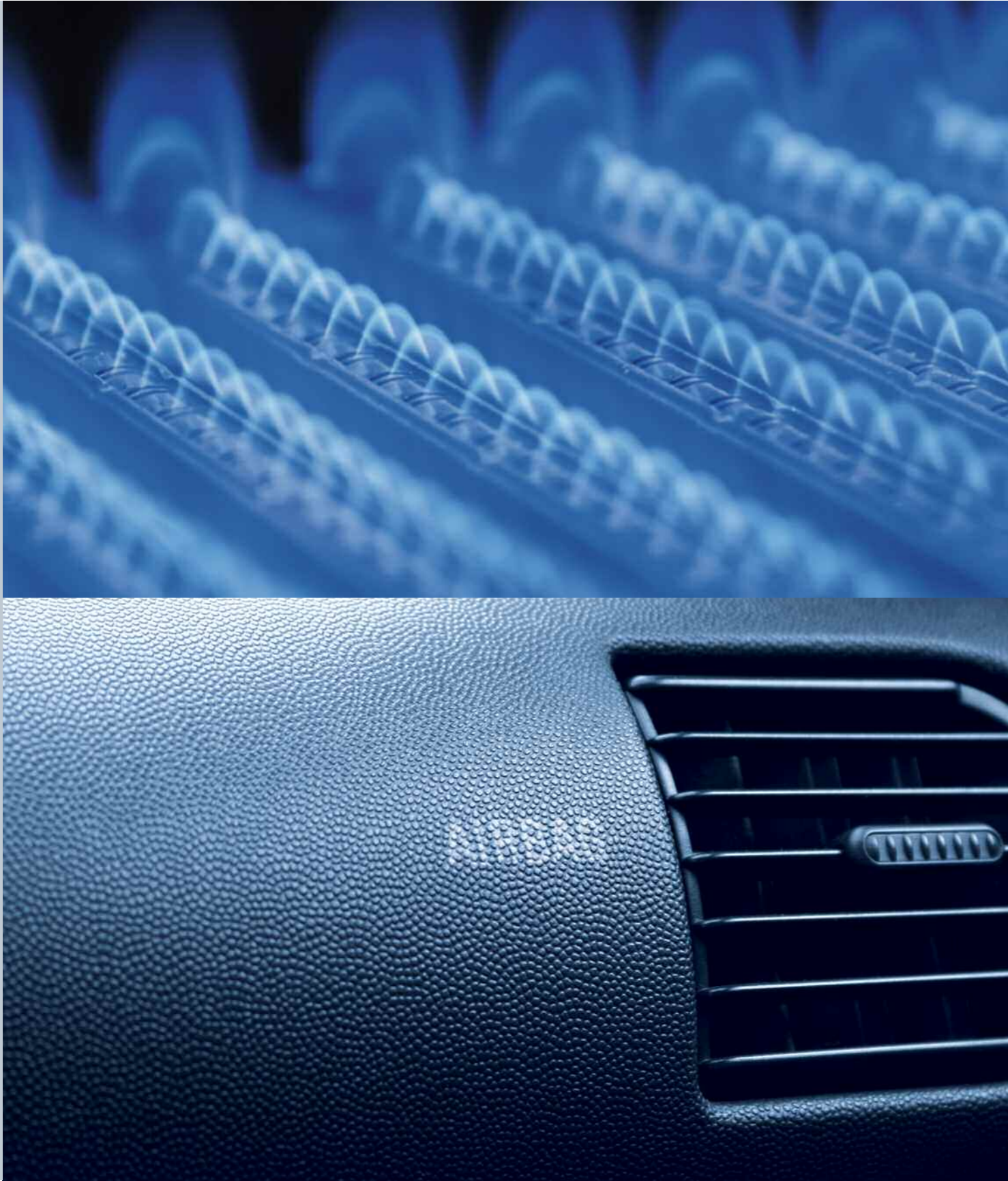
Classic examples include headphones and microphones, where the wire mesh protects the sensitive parts from mechanical knocks, while distributing sound to produce optimum acoustics.

When used in protective helmets, wire mesh can provide ventilation whilst preventing insects and other foreign bodies from entering the air flow.

The individual shape of the woven wire product is designed to suit the required function and application.



PROTECTING, SECURING, OPTIMISING.



Filters and fabricated parts made of wire mesh from Haver & Boecker make a decisive contribution to the safety and function of technical equipment in a variety of ways. For example with electrical switching systems, in the event of an explosion, they provide the necessary pressure equalisation, whilst at the same time preventing sparks and flames from flying out.

In pipe systems, woven wire elements are installed to protect against flash flames. For boilers in modern heating systems, they ensure optimum fuel and flame distribution, thus contributing to efficient and environmentally friendly heating.

H&B wire mesh is used in car airbag systems. When triggered by impact, the filters remove solid particles from the released gas whilst the airbag is being inflated.

In smoke and gas detection systems, the wire mesh protects against foreign particles that may adversely affect sensitivity.



FORMING, ENCLOSING, DESIGN.

Stable, three dimensional shapes offer stunning aesthetic design & appeal. Fabricated parts from Haver & Boecker are used in a variety of applications when it comes to forming, enclosing and designing different products.

The broad range of various mesh specifications, each with its own distinct properties, make it an ideal and versatile design material with exclusive and long lasting appeal.

The aesthetics, texture, and function can be combined in a variety of ways, making woven wire mesh ideal for designers of high-value products. Haver mesh brings your ideas to life.

In addition to the elegant covering of audio speakers and air vents, wire mesh is also used in the automotive industry for door handle enclosures and instrument panels.

By using various illumination ideas, further dramatic optical effects can be created. Open or semi-transparent woven fabric structures can be back-illuminated to create a stunning visual appearance.



FORMING, ENCLOSING, DESIGN.



From planning to implementation, Haver & Boecker helps customers to optimise form and function during the production of prototypes and small production batches, and in setting-up production and testing processes.

We develop and produce wire mesh and fabricated parts with injection moulded plastic elements for a variety of applications. For example, audio speakers and headphone covers, as well as finely woven elements for mobile phones

and smart phones, visible or invisible, and which protect against everyday knocks.

Water-soluble moulded fibres are pressed into packaging elements by pre-formed wire mesh (e.g. egg cartons). The mesh is shaped to match the form of the packaging.



GUARANTEED: OPTIMUM QUALITY.

The selection of material & its quality and processing possibilities, are of great importance in defining the properties of filters and fabricated parts. Certain requirements can only be fulfilled by certain materials.

Customers worldwide can rely on the knowledge and extensive processing experience that the experts at Haver & Boecker possess. We can advise on which woven wire cloth to use, and in what form the required function is best fulfilled in order to provide maximum stability, safety, and economy during production and in-situ use.

Certified measurement and test processes in combination with our own in-house processes for quality assurance ensure that all the woven wire products from Haver & Boecker fulfil the requirements: from supplier selection, to incoming goods inspection, the various wire mesh checks, process checks, random samples and 100% inspection.

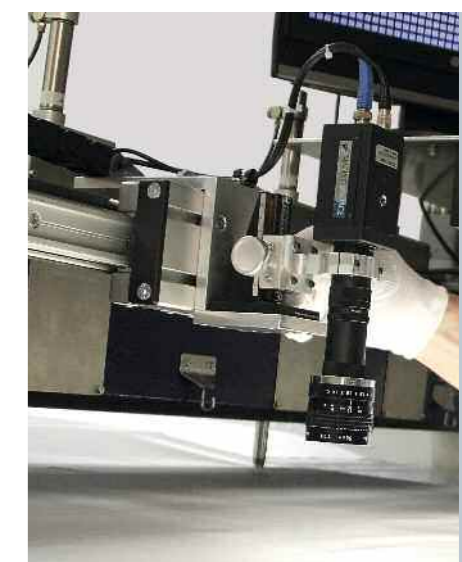
Automatic maximum efficiency
By intelligently linking production processes - from stamping, testing, cleaning and packing - we create the basis for optimum efficiency. Robots for bonding applications, process-oriented work station systems, automatic pressing, testing and packing lines that reliably and automatically pack the product in bubble packs Haver & Boecker also develop individual solutions for the toughest customer requirements.

Our in-house proprietary HAVER VISION SYSTEM plays an important role. It utilises visual inspection and monitoring of large scale production, and is continuously developed to meet the growing demands for quality. Here we are striving to achieve a zero-defect solution to meet the extreme quality requirements of the automotive sector.

Woven mesh and material analyses in our own laboratory
All of our wire and woven mesh manufactured is examined and checked in our laboratory according to National, International and our own standards. Included among the tests are tensile and compressive tests, performed using leading industry equipment. Material testing is done using mobile XRF equipment. Microscopic structures are examined using ground and polished specimens. Pore size and distribution are determined using filter test stations. Digital air flow-through test stations

or customer-specific test stations provide data for determining filter performance. Our photo-optic image processing apertures and wire measurements fulfil the highest standards and is MPA certified.

Self-developed, proven tests are conducted in our chemical laboratory along with standard corrosion tests (e.g. ASTM 262, G28 and others) and compared with customer test processes. This is accompanied by corresponding documentation and the monitoring of all cleaning media and cleaning results. Residual contamination analyses related to the guidelines of VDA 19 assures our processes.



ENVIRONMENTAL STANDARDS AND CERTIFICATIONS.



Modern production methods along with the competence of our employees, and first-rate quality assurance ensure a uniformly high level of quality in our products. Numerous individual certifications from independent test organisations also confirm this, along with our DIN EN ISO 9001:2015 certified process-oriented quality management system.

Haver & Boecker was one of the first companies to be certified as to DIN EN ISO 9001 back in 1997. The company's automotive area is also certified according to the especially high standards of IATF 16949.

With reference to ISO 14001, the company has also installed an environmental management system. We work closely together with the workers' association, our plant physician centre, and the works council, with this aim continuously in mind. It goes without saying that Haver & Boecker complies with all the environmental laws and regulations. Environmental aspects contribute to the initial development of processes and products so that potential environmental impact is avoided early on.



NO SITE IS OUT OF SIGHT.



Haver & Boecker has actively influenced the technology of wire weaving since its beginning. As a result of our successful company history, today we are able to offer our customers the benefit of our unrivalled experience, technology and know-how about wire cloth.

Whether science or research, industry or architecture - wherever Haver & Boecker wire cloth is used, our customers benefit from a broad but still unique individual service

With our worldwide weaving network we offer the comforting certainty to be your competent and reliable partner at any time and any place. So as to continue WEAVING IDEAS in time to come.

Haver and Boecker operates production sites in Germany, Great Britain, Belgium, the USA, Canada, Brazil, India and Belarus. More than 3,000 people work for the Group worldwide.

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