PACO WORLD

Information from around the world of wire and mesh for our clients and prospectives

Nr. 1 12/2000

Complete information – online and now in print!

Dear Reader!

What is so interesting about fine wire mesh? When I talk with customers and interested laymen I keep hearing, with more than a hint of astonishment: "What, and you can do that as well?" Whether it be re-usable coffee filters, special filter components in the satellite tanks of the Ariane 5 or anything in-between. "Yes, we can do that and a lot more".
The lesson for us: We can't tell our existing or prospective customers and business partners enough about the wide range of things that we can do with "wire & mesh".
After getting our internet information service up and running I am now pleased to be able to present the first edition of a new information magazine. Its purpose: to provide information at regular intervals about our work and solutions as well as the technical background of our developments and news from around the world about the breakthroughs that we have made. We want "PACO World" to provide you a with a continuous stream of useful ideas and interesting solutions for your individual needs. So, enjoy reading it and please let us know what you think about what you have read and would like to read about in the future.

Best regards
Peter Ruppel
Managing Director

Building for expansion: additional production and storage areas make sure that PACO keeps in step with increased worldwide demand.

PACO Makes Room for Expansion!

Re-sizing our production and storage facilities
Steinau – this has been the birthplace of PACO products ever since relocation from Sannerz in 1955. However, as with everything that quickly grows, there comes a point when the limit is reached. This was case with our factory number 1. That is why three years ago we started building new facilities above the old factory site in the Steinau West industrial estate. On top of wanting to make sure that our manufacturing capacity matched our dynamic growth, we wanted to set-up the basis for further expansion. As a result, work was started on the third building phase during the same year and completed at the beginning of 1999. Finally, in January 2000 a new warehouse complex with a surface area of 850 sqm was put into operation. This expansion of our storage capacity was essential to ensure the efficient realisation of our "just-in-time" supply concept.

A site that underlines that we are looking ahead
The three factories in Steinau and Herolz provide us with absolutely ideal conditions for further dynamic growth into the next century: a total ground area of 27,600 sqm approx. 20,000 sqm of production area – weaving and filter manufacture – as well as a 1,000 sqm storage area underline that we are looking ahead. The generously proportioned storage complex provides streamlined internal handling. The new fabrication facilities for filter production and mesh weaving guarantee short delivery times and high productivity. Our new facilities are geared to the future and are capable of further expansion to ensure that we can serve our customers around the world better than ever before – individually, quickly, reliably and with assured high quality.

PACO manufacturing facilities: the hub of quality and productivity.

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PACONews

An Extremely Sensitive 48-Tonner

PACO calanders reduce fine wire cloths to thicknesses half a hairs diameter.

Commissioning of a new calander to reduce the thickness of fine wire meshes

The rapid development of precision screen printing to keep up with the never ending miniaturization of PCB components or the ever increasing complexity of decorative printing calls for the continuous reduction of the thicknesses of screen printing meshes. This explains the worldwide increase in demand for PACO SD meshes. Additional impetus has been given by the market launch of PACO SD-AM mesh (AM = Advanced Material); this attributes its particular qualities to its superior physical properties as well as the perfect balance between warp and weft.

Reducing the thickness: more than splitting hairs

The human hair is 40–80µ thick, or better said, thin. The starting thickness of the standard range of PACO fine wire meshes for screen printing is 45µ. Calendering reduces the thickness by 20µ to half a hairs width: 25µ!
The sensitivity with which the calendering mill works is astounding. Despite the unit weight of 48 tonnes and an immense pressing force of 2 x 200 t acting on the fine wire mesh, the accuracy of the mesh is in no way negatively influenced!
This impression of strength and extreme accuracy is further reinforced by looking at the precision of the calendering process. The thickness tolerance is just +/-1.5µ along the total width of the currently used 1320 mm.

Leading-edge control technology

The impressive physical strength of the PACO calander is more than matched by the intelligence of its control. The unbelievable responsibility of permanently monitoring the pressure of the rolling mill along the complete working width and length of the mesh makes the use of the latest control technology absolutely essential. This is, nevertheless, just the means to the end of guaranteeing the exactness of thickness reduction that ensures the quality of the fine wire meshes required for a variety of critical applications.

Pacemaker for miniaturization and higher component density

There seems to be no stop to the miniaturization of computer and communication technology components – a trend that can easily be seen by looking at the cell phone in your pocket, which is sure to be smaller and more versatile than the model you had before. This shrinkage is, however, only possible when the amount of meshing points in the metal wire meshes are maximized while, at the same time, the screen thickness is minimized. Taking a look at the component densities now reached – particularly for the fabrication of capacitors – meshes such as the PACO SD 400 mesh, made of 0.019 mm wire with a thickness after calendering of 23µ, will set new standards by working together with other high-tech screen printing products to turn the seemingly impossible into a practical reality.

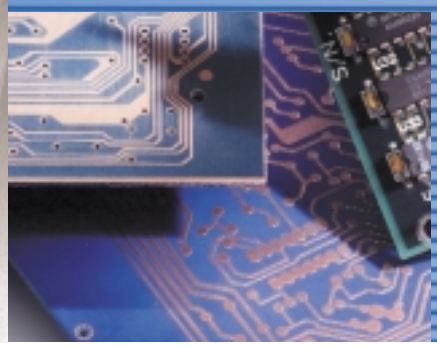
Full range

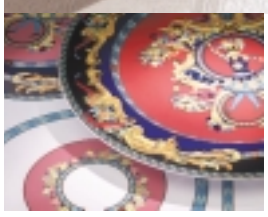
The calendered version of the PACO SD-AM range is a further milestone that reinforces our objectives of continuously setting new standards for the manufacture of screen printing frames. Nevertheless, it represents a big leap forward the market launch, the calendered precision threads were thoroughly examined in our own technical college at our subsidiary T.S.E. France. Particular attention being focused on the capabilities and development of the operational lifetime of the printing frame.
After being sure of the advantages, the PACO-SD-range was extended to include the calendered versions. Of course other fabric thicknesses are possible as long as the thread width doesn't exceed the formula "d+d – (max) 45%". As standard PACO offers three types of calendering:
Ld – thickness reduction of 15%,
Md – thickness reduction of 25%,
Hd – thickness reduction of 40%.

Tangible advantages for both process and economy

The additional expenditure for the refinement of fine wire mesh through ultra-precise calendering is paid back in more ways than one: To begin with, the possibilities for extremely fine and high density precision screen printing for printed circuit boards or decorative printing are considerably expanded. Modification of the coating thickness optimizes registration and resolution. The reduction in the amount of the expensive, high quality inks required reduces costs – particularly when printing with precious metals. And finally, lower squeegee wear and higher printing speeds round up the economic advantages of extra refinement.

Further information
Under www.Paco-online.com
Headword PACO-SD





Demanding applications: industry today demands more and more precise screen printing.

Pulling Together for Total Quality

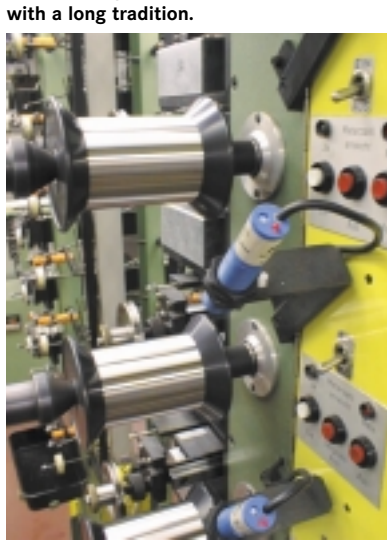
You need a perfect wire to make a perfect mesh

It goes without saying that the metal wire is the most important component of a fine wire mesh – regardless of whether it is to be used in screen printing or filtration.
That is why PACO has built up and continues to develop a long-term, close working relationship with wire manufacturers. An important feature of this co-operation is the transfer of know-how. This can be the experience gained from our own day-to-day production or the latest requirements presented to us by our customers.
To a large part, it is our customers' continual development of ideas and search for innovative applications that provides the incentive for constant optimization of wire quality. A trend that often call for improvements in production equipment, which is usually developed and manufactured to our own requirements. The ideas coming from our own extensive in-house development and engineering department, which gives us a firm basis to provide our wire suppliers with all kinds of assistance and support.

"Disappearing" with diamonds

During the wire drawing process, stainless steel wires that have been brought to a diameter 5–6.3 mm (wire rod) in the pre-drawing processes are drawn to their final dimension in a number of treatment stages. They are pulled at high speed through diamond charged drawing plates and then wound onto bobbins – in exactly the same way as textile threads.
PACO use drawn stainless steel threads with a diameter of 1.4 mm down to 0.016 mm (16 thousandth of a millimeter!).
The technical terms for the different wire grades are: Wire rod, Intermediate wire, Fine-wire, Ultra-fine wire. All grades are further processed and refined by PACO for their various applications from filters through to fine wire meshes.
Wires between 0.065 and 1.4 are processed in the Herolz plant and dimensions smaller than 0.063 mm at the plant in Steinau.

Brilliant feat: wire drawing is an art with a long tradition.



A Division that Keeps Things Flowing

PACO set new standards in liquid and gas filter element technology
The use of filtration as the technology to remove unwanted admixtures from liquid or gaseous media is becoming more and more important – for an ever wider range of applications: the spectrum ranging from the optimization of product quality to the protection of the environment. Running parallel with the continual increase in the complexity of the required solutions, are the demands placed on filter technology. Factors such as the capability to innovate, system reliability, high performance, operational safety, lifetimes and cost-effectiveness are more important than ever before for developers, manufacturers and operators of filtration systems.

PACO Filter Technology Division
Offering a wide range of filter elements made of fine wire mesh, the center of attention of the PACO Filter Technology division is the filtration of liquid and gaseous media: activities that profit from the considerable experience gained in the filtering of virtually all kinds of liquids and gases in a wide range of industries. Notwithstanding this, PACO "practices what it preaches". Our highly developed weaving technology enables us to weave without using any oil, grease or other lubricants. This means that there is no need for subsequent cleaning operations with their inherent aggressive, environmentally harmful chemicals.

Keeping it fine: cartridge filters
The demand for cartridge filters that can provide extremely fine filtration properties at high flow rates with the longest possible cartridge lifetimes presents a seemingly impossible challenge to filter manufacturers. Metallic filter cartridges made of precisely manufactured and processed PACO filter meshes have proven themselves in hundreds of different applications.
This success is based on the three basis materials that PACO offer: PACO woven wire cloth, PACOFIL sintered metal fibre and PACOPLATE mesh laminates.
Cartridge filters can be inserted into the respective filter housings as individual elements or multiple elements. Whereby, the filtering characteristics depend on the structure and quality of the specific filter material used. The choice of the right type of cartridge is, therefore, essential to successful filtration. That is why PACO offers such a wide range of filter cartridges based on differing filtering materials.

Sorting everything: deep-bed filtration
PACO cartridge filters for deep-bed filtration basically consist of a core that assumes the supporting function and a filter mantle. Pushed onto the core made of perforated sheet, slit tube or strong metal wire mesh is a smooth or pleated, combination sintered metal fibre/filter unit. This is sealed on the flush side through welding, soldering, sticking or axial bracing.

Clean solution: surface filtration
With surface filtration, the extracted contaminants remain on the surface of the filter cartridge. Metal wire meshes – chosen in accordance with the application – are used as the filter medium. This can be configured as either a loose combination of different mesh designs or a mesh laminate (PACOPLATE).

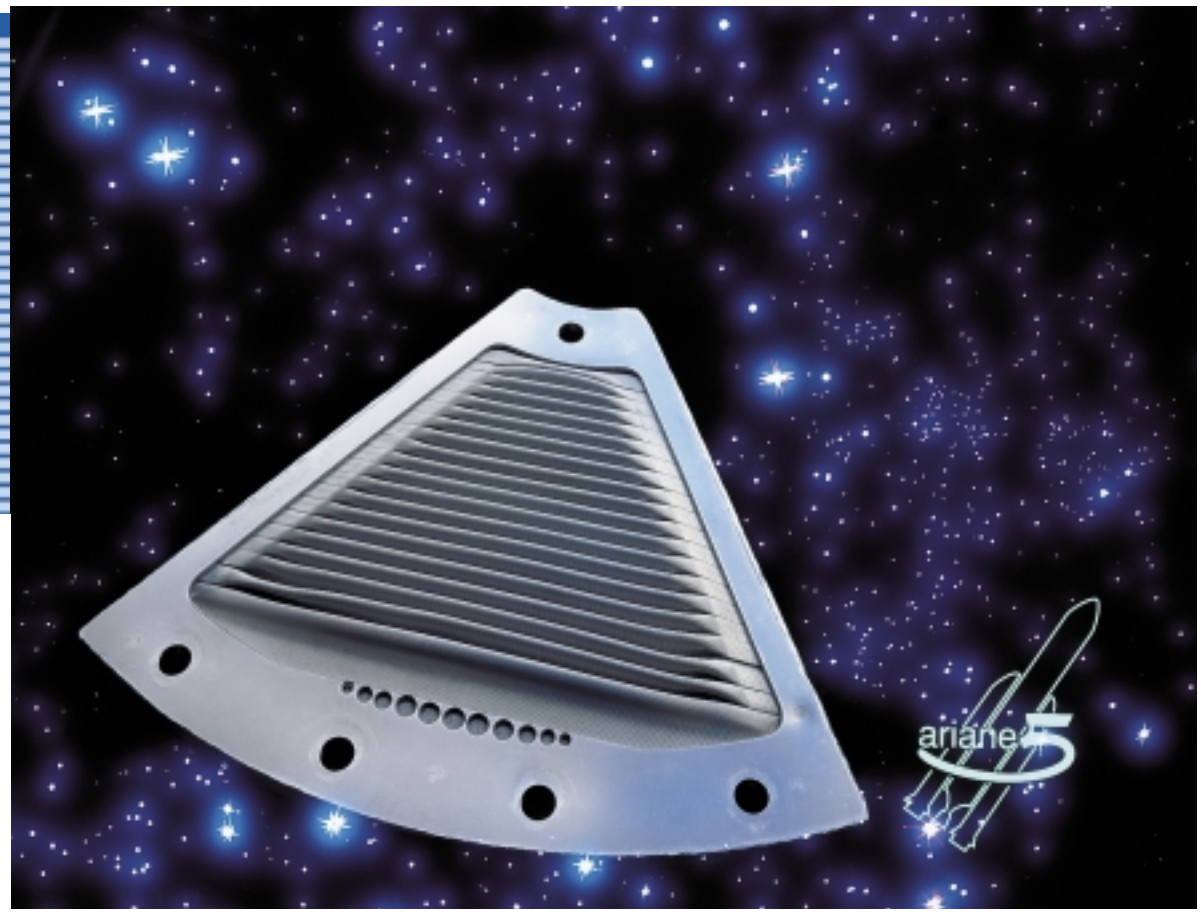
Comprehensive performance
The current range of PACO filter media provide high-end performance by more than fulfilling each of the standard selection of filtration performance chracteristics:

- High operating pressures
- High temperatures
- High differential pressures
- Outstanding flow properties
- Chemical resistance
- High filtration accuracy
- Good regeneration chracteristics
- Optimum price/ performance ratio

Each item in the PACO filter range is the product of close co-operation between the process technology departments at our customers and our own highly-qualified research, engineering and production teams. Our filter products are subject to comprehensive quality assurance checks in each stage of the manufacturing process. This strategy of dedicated "real time" tests ensures that the performance of each filter is within the specifications demanded by the customer.

Up-to-the-minute manufacturing technology
PACO filter products are made using a healthy mix of proven and up-to-the-minute manufacturing technology.
Welding: through resistance, plasma or electron-beam welding.
Cutting: through turning, automatic turning, NC-milling or machining centers.
Forming: through mechanical or hydraulic presses.
Weaving: through computer assisted weaving machines designed and manufactured by our own mechanical engineering team.

Thorough quality assurance
The production of PACO filter elements is monitored and safeguarded by the latest processing control instruments.
This, of course, includes the monitoring of machining and processing capabilities, statistical process control and the thorough documentation of operating and machine data: things that were an integral part PACO manufacturing practice before the arrival of DIN/ISO 9001-2.



Reaching for the stars: the aerospace industry gives a space-age seal of approval to PACO's sure quality.

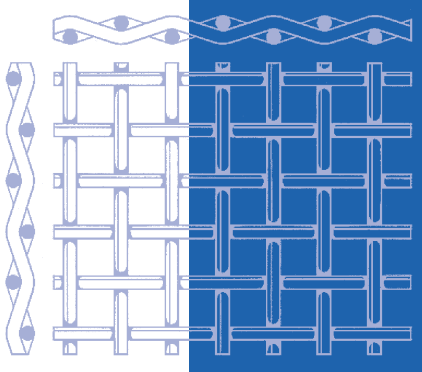
Ariane 5 Puts PACO in its Tank!

Reaching for the stars with special filters made from PACO metal wire mesh
There is no better technological status symbol for a product in the world than launching it into space. Essential for this are three product-inherent qualities: fail-safety, fail-safety and once again fail-safety. That is why special filter segments for the gas-retention systems in the satellite tanks of the "Ariane 5" – the latest European satellite-launching rocket – are equipped with metal wire meshes made by PACO. This confirms that the uncompromising quality assurance policy at PACO provides a sure basis for even the most demanding of applications. And, of course, what is good enough for a space rocket is more than adequate for use on earth – for example, as filter components in automobile airbags.

PACO's Short Guide to Weaving

1. Plain Weave

All weaving starts with warp and weft: Threads that run lengthwise across the complete width of the woven fabric and a single, seemingly never-ending thread that runs parallel to the weaving width and which is "shot through" the warp threads by a picking device (flying shuttle or gripper arm etc.). As the shafts of the loom alternately lift and lower the warp threads, a network results by which the warp and weft threads are interlaced. The result of this is a fabric with a "plain weave" – simple lengthwise and crosswise running threads (square mesh).



Plain weave: Lengthwise and crosswise threads are undulatedly interlaced to become a "fine wire surface formation".

The fact that PACO has chosen to weave with metal wires rather than textile threads makes no difference as far as the art of weaving is concerned. It does, however, place extremely high demands on the performance of the loom and on the quality of the weaving results. When weaving wool or cotton, it doesn't make any difference whether the warp or weft threads run parallel to each other with a tolerance of a fraction of a millimeter. However, with fine wire meshes that, for example, are to be used to screen print electronic components, precision is the most important qualitative characteristic. Nevertheless, the plain weave is one of the easiest weaves in the PACO repertoire.

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PACOMosaic

The beauty of perfect precision: PACO inspires modern jewellery design.

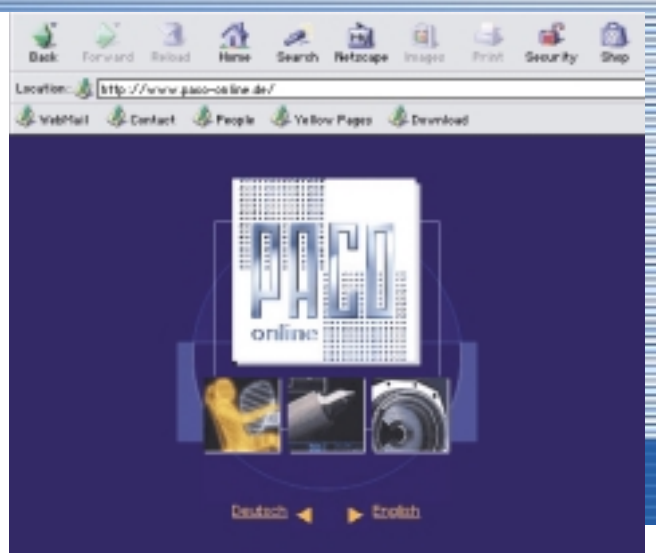
"Precious Mesh"!

PACO fine wire mesh – inspiration for jewellery designers

It's in the nature of being a jewellery designer to be constantly on the look out for the finest materials – and the most revolutionary ideas. It, therefore, comes as no surprise that leading goldsmiths have discovered the attractiveness of PACO fine wire mesh for their jewellery design. After all, it combines a number of attractive attributes: valuable stainless steel drawn to form the finest wires (or strands) and then woven in the same way as precious silk!

Whoever has had the chance of seeing for themselves what PACO looms are able to create, has experienced the fascinating transformation from functional wire into a fabric of perfect beauty.

It's, therefore, no wonder that not just engineers get excited about PACO fine wire mesh, but also artists view it out of a different perspective. The piece of jewellery pictured below is the best evidence.



Visit our web site!
www.paco-online.de

The PACO mechanical engineering team is at the forefront of innovation in the world of wire weaving-machines.

Proud Number!

Commissioning of the 250th loom produced by PACO

What is better proof of the increasing demand for PACO fine wire mesh than the increase in the number of looms that we have? Therefore, as you can imagine, the commissioning of the 250th loom a short time ago gave us good reason to celebrate. We, of course, particularly wanted to congratulate our mechanical engineering team for another piece of excellent work!

Each of the looms contains a considerable amount of know-how drawn from our many year's experience of processing steel wire. That is why from the mid-seventies onward we have been making our looms ourselves; naturally, taking care that nobody takes a close look inside. See what it looks like inside our weaving shed!

A Cosmopolitan Jewel: Steinau an der Straße

One place: double claim to fame! Steinau West industrial estate is a world centre for fine mesh weaving. Steinau's renaissance and half-timbered architecture impresses visitors from around the world!

When business visitors from the USA or Japan visit our company headquarters in Steinau, they first want to look at our production facilities – and immediately after that at Steinau!

We are of course proud to present our guests from abroad one of the finest historical towns in the whole of central Germany. In its way, Steinau is more than a match for the more famous tourist magnets in Germany, such as Rothenburg ob der Tauber – but has avoided turning its historical attractiveness into a fairy-tail stereotype. A guide book contains the following words: "Impressive renaissance buildings and beautifully structured half-timbered houses surround the picturesque group of late gothic and renaissance buildings consisting of palace, town church and town hall." They're right! And when you slowly saunter over the cobbles through the romantic, narrow winding streets of the old town centre, everything in the World is just fine! Whether you're looking for an inn with traditional Hessian fare or a gourmet restaurant, then you're definitely on the right track – without having dodge hordes of camera-wielding tourists!

Steinau an der Straße is looking forward to you!

Bits and Pieces

Selbstkritik (Self Criticism)

Die Selbstkritik hat viel für sich.
Gesetzt den Fall, ich tadle mich;
So hab' ich erstens den Gewinn,
Daß ich so hübsch
bescheiden bin;
Zum zweiten denken
sich die Leut,
Der Mann ist
lauter Redlichkeit;
Auch schnapp' ich
drittens diesen Bissen
Vorweg den andern
Kritiküssen;
Und viertens hoff' ich
außerdem
Auf Widerspruch,
der mir genehm.
So kommt es denn
zuletzt heraus,
Daß ich ein ganz famoses Haus.

Self criticism has a lot going for it.
If I criticise myself;
I first of all profit from me being so wonderfully humble;
Secondly, the people think that the man is pure honesty;
Thirdly I snap the titbit away from the nose of other critics;
And fourthly, I also hope for protests agreeable to me.
So that at the end of the day I come out as a big shot.

Wilhelm Busch (1832–1908) illustrator, painter and poet. He achieved fame through his stories about Max and Moritz. But he also wrote a lot of poems – about subjects, that are still current today.

Imprint
Published by:
PACO PAUL GmbH & CO.
Metallgewebe und Filterfabrik
Industriegebiet West
36396 Steinau a.d. Straße
Editor, copy:
Ralf Geisler, Dietzenbach
Graphic design:
Ursula Knöchel, Gelnhausen
Printed by:
Brönners Druckerei,
Frankfurt am Main

Photos:
Mauritius,
City of Steinau,
PACO GmbH