

Strong and Noble.

The Latin words **Valeo** (strong) and **Nobilis** (noble or distinguished) are impressive words to describe screen baskets. Do the new Bar-Tec® screen cylinders from ANDRITZ Fiedler live up to such lofty names?

"We are in the business of *improving*," says Manfred Renner, "not just *replacing*."

And what do you do when there is little room for further improvement?

"*We innovate!*"

Renner is the Managing Director of ANDRITZ Fiedler, supplier of screen baskets and rotors. ANDRITZ acquired the German Fiedler in 2003 and moved forward with its Bar-Tec® series of wire screen baskets, which are very well regarded in the industry.

The two key parameters for any screen basket are strength and accuracy. There has always seemed to be a trade-off between the two. "There are very strong baskets on the market, but the slot width accuracy is not very good," Renner says. "And, there are baskets which were very accurate, but not strong enough for certain applications."

The Bar-Tec® W basket is a welded design. It is produced "in the round" (i.e. drawn wires are set in laser-cut rings) instead of using flat mats which have to be rolled

into a circle. This manufacturing technique eliminates joints and reduces stresses in the support rings. "We have sold thousands of units, and for most applications, this design works superbly," Renner says.

"But our job is to be looking into the future," he says. "We are at the technical limitations where we can't make a welded basket stronger or more accurate."

So Renner challenged his R&D team to come up with new basket designs that would exceed the capabilities of current screen baskets and would also have the flexibility to add other benefits in the future.

In reality, this meant one design for high-pulse, high-stress load applications (like OCC) and one design for applications requiring the narrowest slot widths and the highest slot width accuracy (like deinked pulp).

The other challenge: it had to be cost-competitive.

We accept the challenge

"Every designer and developer likes a big challenge," says Thomas Mickelat, R&D



"Our goal was to design baskets that have the best strength and accuracy in the market."

Manfred Renner, Head of Global Product Management for screen baskets and rotors



▲ One key to the strength of the bond is the large surface area in the connection between profile wire and support ring. The detail above shows the bond of a Bar-Tec® Valeo basket.





"Since metal bonding is done at normal temperatures, we avoid micro-cracks that potentially can originate during a high-heat welding process."

Thomas Mickelat, R&D Manager

Manager. "We wanted to be very open to all possibilities – not just what we knew in-house."

Mickelat took contact with the Fraunhofer Institute, Europe's largest application-oriented research organization which happens to be centered in nearby Munich. "We didn't want to limit the scope at the beginning," Mickelat says. "It could be any material, and any method for connecting the material. Let's just see what the possibilities are."

The research and discussions took about one year. "In terms of materials, it was decided to keep with metal for the moment," Mickelat says. "But after reviewing about 20 different possibilities for connecting the profile wires to the support rings, we decided to bond the surfaces together (as opposed to notching, clamping, or welding)."

With the idea to concentrate on bonding techniques, the development team took shape: with representatives from product management, IT, marketing, and manufacturing each playing a role.

A strong bond

Metal-to-metal bonding is common in certain industries (such as aerospace where strength and flexibility are required), but not in the world of screen baskets. There are definite advantages to metal bonding.

Tremendous dynamic stresses occur inside a screen with each suction and pressure pulse of the stock, and concentrate at the points of connection between the profile wire and support ring. "Since metal bonding is done at normal temperatures, we avoid micro-cracks that potentially could originate due to the high heat of the welding process," Mickelat says. "I am a welding engineer and a mechanical engineer by training, so I have respect for welders. But, while welding is a good way to connect metal to metal, bonding also has its advantages."

"It is a simple, elegant solution," says Michael Reinstein, Product Manager. "But don't confuse *simple* with *simplistic*. A bonded basket is stronger because there is a greater connection area than with a small spot weld on each wire. Also, the bond stays where you put it and will not dissolve in the process."



"A bonded basket is stronger because there is greater connection area between profile wire and support ring when compared to the area of a simple spot weld."

Michael Reinstein, Product Manager for screen baskets and rotors



Markus Schneider, R&D Engineer, recalls, "After we proved the concept, we moved to commercial-scale baskets – not only to test in the field, but also to make sure we had an efficient manual manufacturing process."

In 2008, the R&D team got a green light from management to build up 100 baskets. "That was quite an intense period because we had to design the various profile wires and groove patterns for the different basket styles," Schneider says. "We also had to train our manufacturing specialists how to prepare and produce the new baskets."

If at first you don't succeed...

Early in 2008, the development team built its first prototype – a very small cylinder that was installed in a bypass screen at a German mill (OCC stock prep application at 2.5% consistency with a very high rotor speed) so it would not disrupt production. Within days, the basket self-destructed.

"We learned a lot from that failure," Mickelat says. "We analyzed everything in detail. Okay, we knew going in that we did not have the optimum profile wire/ring combination. But we also found that we had skipped over some steps in producing the prototype, for example, properly preparing and cleaning the materials before bonding."

From this early setback, the progress going forward was remarkable. "Each prototype after that revealed more and more success," Mickelat says. "We made scientific tests with different stocks, liquids, temperatures, and configurations of the profile wire and for the ring support groove in order to have the best bonding surface area possible."

And today?

"We have shipped more than 500 bonded-baskets to mills around the world," Renner says. "We are comfortable that we are shipping a very excellent product." The company just acquired some new manufacturing technology to make the production of bonded baskets more efficient and less mechanical.

So the outcome of this R&D work so far is two innovative screen basket designs – Valeo and Nobilis.

For applications where very high strength is necessary, particularly OCC, the metal bonding technology enables a very robust design. The construction is free of most of the internal stresses created with conventional manufacturing techniques. This new high-strength design for OCC is called Valeo.

For applications such as deinked pulp, where slot width accuracy is critical for stickies removal, the metal bonding technology enables a design with the most accurate slot widths and the narrowest slots in the industry. This new high-efficiency design is called Nobilis.

Do customers notice the difference?

"Yes, they do," Renner says. "Of course they expect that our baskets are strong and stable and will not break. But, they see that we are now delivering baskets with tolerances closer than any competitor. In terms of standard deviation, we used to achieve 20 microns, and now what we guarantee is 10 microns."

What about future development?

"We are limited in the materials that are weldable, but, with bonding, other materials besides metal could be possible," Mickelat says. "Who knows what the future will bring?"

Automated manufacturing: preparation of support rings and profile wires before assembly. ▼

