„We perforate everything that's softer than our tools“

C2 visited Burckhardt of Switzerland and learned a lot about perfecting the most precise perforation and fibrillation tools.

At the hub of three countries and only a stone's throw away from Germany and France, Burckhardt of Switzerland is based in Basel. Founded in 1941 the company established itself as one of the leading suppliers of fibrillation and perforation solutions for a wide range of different applications and industry fields.

Even if we all know the final products, we often don't know much about what fibrillation is and how it works. Fibrillation is a process, where plastic films or tapes are sliced with the help of fibrillating rollers, which are equipped with needle bars. Fibrillated films and tapes boast a wealth of advantages.

They are not only simple to process and cost-efficient to produce but also highly flexible, elastic, tear proof and abrasion resistant. It's no surprise that they cover a wide range of applications including carpet backing, artificial grass, ropes, cords, sewing and harvest yarns, packing cords or tapes for woven big bags.

Burckhardt's fibrillation rollers are installed in the machines of all leading manufacturers and their customers. “We support our customers, not only to define the right kind of fibrillation but also in the use of the perfect tools and how to integrate them into their existing machinery,” underlines Heiner Hausdorf, technical sales manager of Burckhardt when we met him at the company's headquarters.

A detailed view of Burckhardt's manufacturing

Even high precision tools require experienced handwork

Attractive synergies

Especially big bags are said to be a perfect way of showing the interesting synergies Burckhardt has to offer. Bags used in the waterproof storage of cement are made of fibrillated materials, in addition they have to be laminated and, as a result, the material can't breathe. Now the perforating skills of the company come into play. “We perforate the material (most of the time it's PE or a combination of PP and PE) with nano holes with valve function, which allow the material to breathe but keep the cement inside and the water out,” explains Hausdorf.

What sounds simple evolves into a technical challenge. Since the bags are produced in tubular form, they also have to be perforated like that but, by perforating the two layers at the same time, two different holes are created – an inner hole with an inner beaded edge and an outer hole with an outer beaded edge.

Used like that, air would accumulate on one part of the holes and could leak at the other and, finally, the bag would go to waste. However, Burckhardt found an attractive and practical solution for that problem by perforating from both sides at the same time. This way the tube finds its way through two rotating perforation units.

Hot or cold

The decision for hot or cold perforation is defined by the material and, because Hausdorf is a practitioner, he just gives an example by perforating a non-woven wiping

Heiner Hausdorf

cloth cold by hand. It just takes a minute and all perforated holes are closed again. The same happens with PE, often used for bread bags – the holes vanish within seconds. Other materials need a sealing around the hole to prevent them from breaking when we penetrate the material with the pin. "So it's quite obvious that those materials require a hot perforation," the expert summarises.

"We must also be prepared for a later application involving either a hot or cold perforation. Generally speaking, cold perforation allows a finer perforation because the edge of the hole doesn't have to be sealed. To prove it, Hausdorf used a release paper for meat packaging, which the Swiss experts perforated with 150 needles/cm² in a range of 50µm.

Burckhardt processes the complete range from 3mm macro holes (hot) up to nano holes (cold) of only 20µm in diameter. "This distinguishes us from most of the other suppliers, which are limited to perforation holes with a diameter of 50µm", Hausdorf emphasises.

Endless possibilities

With his heavyweight sample folder Hausdorf directly sets out to prove that the applications for the Swiss perforation solutions seem to have no limit, apart from the fact that the material has to be softer than Burckhardt's tools.

One of the main applications for perforated non-woven materials is the top sheets of diapers, which should ensure the permeability of liquids and thereby allow babies and parents silent nights. With one of their latest innovations the Burckhardt experts are able to even create 3D hole shapes. That kind of new

ASSOCIATION OF INTERNATIONAL METALLIZERS, COATERS & LAMINATORS

AIMCAL®

WEB COATING & HANDLING 2012 CONFERENCE

21-24 October • Myrtle Beach, SC USA

AIMCAL's Web Coating & Handling Conference offers a global technical forum for the web coating and converting industry. The conference provides outstanding opportunities to meet and exchange ideas that will enhance your technical and marketing base of knowledge.

Conference Highlights

Three Session Tracks (over 70 speakers)

Go between tracks to attend the sessions that interest you most.

- Web Coating & Laminating
- Vacuum Web Coating
- Web Handling – *New track for 2012!*

Optional Short Courses

Add to your conference registration or register for short courses only.

- How Substrate Quality and Cleanliness Affects R2R Vacuum Deposition
- A Practical Approach to Eliminate Web Wrinkling
- Winding: Equipment, Mechanics, and Roll Quality
- Electrostatics in Web Handling
- Turret Winder Drives

Outstanding Keynotes

Be informed and inspired by two outstanding keynote speakers.

- On a Roll with Graphene, *Dr. Yvette Hancock*
- The Secret Life of Water: E = H_2O, *Dr. Gerald H. Pollack*

Roll-to-Roll Market Overviews

Gain valuable insight into these markets, from top industry experts.

- Release Liner Market Review
- Global Flexible Packaging Market Review and Outlook
- Label Market Review
- Metallizing Market Review
- Thin-Film Battery and Ultracapacitor R2R Manufacturing
- Global Markets for Solar Products

For more information and to register online, visit www.aimcal.org

AIMCAL - Phone: 803-948-9470, E-mail: aimcal@aimcal.org

INFORMATION

Small, smaller, nano …

"What we have been lacking so far was in-house production," Teddy Burckhardt, general manager of the company, stresses. This step has now been taken and Burckhardt now has a new multi-flexible perforation line, which can not only be used for first perforation trials and product tests but also for a wide range of contract perforating. This line, which Burckhardt calls a 'know-how catalyst', has already experienced its first results.

The Swiss experts developed a new generation of perforation tools, where the experiences from the in-house perforation lab and the results of a huge number of talks with customers have been combined.

"We can prove the fact that most of our new developments are based on special customer needs with our latest innovation – the nano holes," Burckhardt emphasises. It's their job to turn light and water resistant films through simple mechanical perforation into membranes.

With a diameter of 20µm these cold perforated micro holes are even smaller than the laser generated ones and offer the perfect solution for vapour barriers and other kinds of ventilation.

"Strictly speaking the name 'nano holes' doesn't fit completely but we wanted to express that these perforation holes are smaller than micro holes," the Burckhardt CEO expresses. "We are really proud that we could achieve our ambitious targets and that our new machine generation named "HotSpeed" fulfils the highest of expectations regarding working speeds, temperatures and handling," Burckhardt points out.

The line allows a working speed of 300m/min and a working width of 1600mm, features, which make the latest Burckhardt innovation especially attractive for film converting processes for food packaging and other industries.

The Hotspeed line from the front view

A dozen diligent helpers check the correct fit of hundreds of pins. Nothing escapes their sharp eyes …

technology provides non-woven fabric with completely new surface properties that are highly appreciated in the manufacture of diaper and feminine care products.

The technical challenge lies in the fact that the counter roller has to be designed as a female roller to allow the pins melting and forming the material in the opposite hole. The high demands this technique turns on the mechanics, synchronisation and precision are obvious. "Just imagine a perforating roller with a working width of 1600mm, equipped with 75 pins/cm², which has to fit precisely to the counter roller while the two rollers need to have different but exactly controlled temperatures," Hausdorf explains.

Additionally, the manufacture of cleaning rags and wiping cloth is another field where the Burckhardt solutions are well established. Artificial leather, used for shoes and car seats, is also easy to perforate. Another widely used application for Burckhardt's perforation tools are micro-perforated roofing membranes, which are essential to let water vapour and moisture leak and to keep splashing water or rain out. From here it's only a small step to a usage the Burckhardt experts had not thought about at the beginning – textured wallpaper – which is very popular in the US, not only because it's trendy and chic but because it offers an easy solution to a widespread problem. As a result of the typical American lightweight construction for any kind of building, it's quite common for air-conditioning systems to cool the inside down up to arctic temperatures while it's tropical outside.

As a result moisture condensates at the back of wallpapers and, without perforation to allow damp and moisture to evaporate, that would have dramatic consequences for the indoor climate and structure.

As aluminium is softer than Burckhardt's needles and pins they also perforate it. Hausdorf provided an example of perforated aluminium 0.5mm thick, which is further processed to become a noise absorber in cars. The metal sheet, which now looks a bit like a cheese grater, takes on a new structure – it's stiff now and harder to deform than before.

The list of applications could be extended indefinitely. Hausdorf's portfolio still keeps a lot of treasures and new ideas at the ready. ■