

ALL CREDITS: SYMPATEX



Solving an old problem

Building a membrane into the interior of a boot or shoe to achieve a waterproof and breathable environment has always been a complex and labour intensive process. This is because the membrane-based laminate has until now only been available in two-dimensional form. Cutting it into various shapes and then seaming them to produce a three-dimensional foot shape takes a great deal of time and effort. At the same time, this cutting and seaming inevitably damages the membrane so that water impermeability has to be re-created by applying a heat seal tape to all the seams. This has always been the accepted method used in the industry as up to now there has been no practical alternative.

SOMETHING NEW

It all changed with the launch of Sympatex Technologies' Utmospheric at Lineapelle last September. This is a

thermally moulded three-dimensional membrane-based liner that can be optimised to fit the required final shape and then directly integrated into the existing manufacturing process without the need to cut, seam and tape individual pieces in order to produce the required shape. Using an innovative process, the company has developed a manufacturing technology that allows permanent three-dimensional forming of their laminates. Utmospheric uses this new thermal moulding process to produce a liner that adapts perfectly to the shape of the foot without any seams or creases, and without compromising the quality and functionality of the laminate itself.

Dr. Rüdiger Fox, CEO of Sympatex Technologies claims that it can reasonably be expected that this innovation will open up a completely new chapter in the development of outdoor shoes. "It offers significant improvements both for the

manufacturer on the process side and for the customer in terms of added comfort. We were guided by lean principles in our innovation process and simply refused to accept that you first have to perforate and cut up waterproof materials only to then seal them again by means of complex handicraft. With Utmospheric, the traditional process involved in producing a liner can in future be made redundant when manufacturing a waterproof outdoor shoe. Today, a shoe of this nature is pretty much expected to be not only waterproof but also breathable to ensure that your feet stay dry and comfortable even during strenuous hikes and ascents."

HOW IT WORKS

The technology has taken 18 months to develop. Whilst the principles behind the heat forming process are similar to those used in other industries, it was necessary to resolve

a myriad of details involving materials, conditions, process speed, temperatures and form shape, with a clear focus on robustness and overall efficiency. The actual forming process called for all the materials used in the laminate to behave as far as possible in the same way, particularly where melting temperature is concerned. As a result, Sympatex is limited to using polyester-based materials but, with regard to textile variances, it is actively researching the market in order to offer the full application range.

The moulds themselves have been standardised as much as is reasonably possible as the laminate used already has an inbuilt degree of flexibility. They will therefore be produced as lefts and rights in different sizes in incremental steps and also as specific moulds for each type of shoe. The thermo forming machine has been designed with easy mould changing in mind and the moulds themselves are made using rapid prototyping in order to keep the cost as low as possible. Once the technology is established, the aim is to co-develop CAD tools to link design of the shoe directly to mould making as is the normal practice with sole moulds.

Although last shapes vary enormously across the industry, the shape of the human foot essentially does not and it is the latter which determines the mould shape with this new technology rather than the last. This has made it possible to for Sympatex to offer ready moulded liners in a range of standard shapes that it states will not only offer a perfect fit to the foot but will also be available in a broad range of shoe heights and designs, while at the same time allowing a reasonable level of standardisation. It says that this, in turn, will limit mould costs without constraining design potential as it will simply require cooperation at an early stage with shoe designers in order to familiarise them with all the options.

Questioned as regards any potential cost savings, Dr. Fox says: "As we don't have full transparency about the process as yet, we have only been able to make a first qualified estimation. Furthermore, we are still optimising material usage during the transition from prototype to final series production and are in final price negotiations for the materials, so it is

still too early to disclose fixed numbers. However, our aim is to cut the cost by one third."

CUSTOMER OPTIONS

Prototype machines for the first pilot customers have been in the development phase for some time and will be launched during the course of the year. Due to the overwhelming feedback, production machine development has also already started, with a view to going into full series production within a short time-frame. Plans for modular production facilities in the manufacturing countries concerned are a further possibility. However, launch customers have expressed a clear preference for having their own machines and Sympatex is currently looking at various financial models, including leasing, that would allow this to happen without a major cash investment. The machines are said to have a potential output of up to 500,000 liners per year based on single shift operating.

Dr. Fox said that the launch at Lineapelle was most successful and technical coordination talks were in progress with more than 15 customers. "Of course, some market participants were initially sceptical which is quite understandable. We solve a problem that has been a challenge for decades through a production technology that

has been long established in other industries. The first question people ask is why has nobody come up with this idea before and the second one is where is the catch?" He went on to say, "However, it might well be that in the past there was too much focus on the wrong materials, ones that, due to their chemical composition, were not suitable for such procedures. And, due to the habit of relocation to low-wage countries, manufacturing costs were less important."

Sympatex Technologies has been one of the world's leading producers of high-tech materials for clothing and footwear since 1986. Together with selected partners, it develops, produces and distributes membranes, laminates and functional textiles as well as finished products worldwide. The company says the membrane that is central to all these products is highly breathable, totally wind- and waterproof and is able to accurately regulate climatic conditions within the clothing or footwear in which they are used. It is 100% recyclable, bluesign certified, has an 'Öko-Tex-Standard 100' certificate and is also entirely PTFE- and PFC-free in line with the company's stated policy of pursuing ecological responsibility and sustainability with a minimal carbon footprint.

With its new Utmospheric liner, Sympatex appears to have come up with a radical solution to an old problem. 🌀



The UTMOSPHERIC liner is heat-moulded to shape and has no seams.