

## Warp knits shoulder the problem of comfort

Warp knitted textiles win through as outer materials in the winter sportswear sector



Fig. 1: The three-layered ALVIER HS jacket undergoing product tests in Norway (© Sebastian Fiedler)

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Warp-knitted textiles provide style and comfort in a wide range of sportswear, from swimwear to football jerseys, but they are now making their way into winter sportswear. Light, warp-knitted mesh fabrics have been used here for many years as lining materials, but woven fabrics were mainly used as the outer fabrics. High-tech warp knitting machines offer a variety of possibilities for creating innovative material constructions and designs. Some examples of these were on show at the ISPO 2018 trade fair in Munich – on the stands occupied by Mammut and Kjus.

At this international winter sportswear fair, Mammut was showing hardshell and soft-shell jackets and pants from its ALVIER ski collection with PHASEknit. Stretch, abrasion-resistant, waterproof, breathable, 3-layered materials were developed under the name of "PHASEknit", the outer layer of which is made from a warp-knitted textile. "The concept of using warp-knitted textiles as a functional outer material in SKI/OUTDOOR wear is something very new and inno-

vative. I have been looking into this subject for five years now and am convinced that the warp knitting process will take off in the performance sports industry," says Markus Rindle, the Head of Product Design & Innovation at Mammut. His enthusiasm for warp-knitted textiles is shared by Uwe Schwarze, the Head of Product Development at Penn Textile Solutions. This Paderborn-based textile producer manufactures PHASEknit products for Mammut and, according to Uwe Schwarze, successfully showcased the technology as "ultimate innovation" at the recent Performance Days fair, held in April 2018 in Munich. The sportswear manufacturer, Kjus, is also focusing on warp knitting. The first "Freelite" product range with jackets made from raschel-knitted textiles, appeared on the market in December 2016. This range will be expanded in the middle of September 2018. The 2018/19 autumn/winter collection includes outerwear featuring jackets and pants, thermal clothing, and a midlayer for men with Freelite materials as part of a ski and golf collection.

### PHASEknit Technology from Mammut: body mapping without seams

The Mammut PHASEknit Technology combines various material characteristics and structures in a single, stretch, seamless, warp-knitted fabric. This enables the specific demands of the different areas of the body to be taken into account when playing sport. "We transferred the principle of body mapping, as used in the functional underwear sector, to functional outerwear materials," says Markus Rindle. For example, mesh zones having a specific mesh size, which guarantees a high level of breathability, or abrasion-resistant 3D constructions can be placed exactly where they are needed. This makes clothing more durable and provides the best climatic comfort.

The various functional zones can be integrated and placed during actual production of the warp-knitted textile. This reduces the number of making-up seams and expensive heat-sealing processes. The jackets and pants, which have fewer seams, also offer increased freedom of movement.

In addition to optimising the construction of the materials and products, the look of the garment is just right, and a new, modern, independent "language of design" is emerging.

#### Perfect function – whether used on its own or in an assembly

With its wide range of textile designs, the PHASEknit Technology also enables a wide variety of products to be engineered. The seamless items, with their functional, multiple zone arrangement, can be produced as 1-, 2- or 3-layered constructions or in a combination of these. Die ALVIER Softshell Hybrid Flex jacket, for example, combines a waterproof, breathable, three-layered construction in the front part of the jacket with a thermal, air-permeable, 2-layered construction in the back and sleeves. The sides and the area under the armpits are made from a highly breathable 1-layered PHASEknit lining material.

#### Maximum function for minimum environmental impact

The PHASEknit Technology scores points in terms of both performance and environmental protection. The PHASEknit outer material for the ALVIER HS FLEX jacket and pants and the ALVIER SO Hybrid Flex jacket is produced, dyed and processed exclusively in Germany. The membrane and other materials used in the three-layered construction also come from Germany or Europe. Production is carried out using energy supplied by wind, solar or hydro power. The effluent and exhaust air are cleaned by passing them through state-of-the-art purification systems. Optimised processing, especially when cutting during the making-up process, generates minimum waste. Virtually all of the unavoidable waste is recycled.

PHASEknit garments from Mammut carry the product label STANDARD 100 by OEKOTEX®. They are produced without per- or polyfluorinated chemicals (PFCs).

Solvent-free membranes based on polyurethane are used to create watertightness, and the outer material is given a durable, PFC-free, water-repellent, protective layer (DWR) based on dendrimers – chemical compounds having a branching, tree-like structure.

#### Freelite from Kjus: warp knits are redefining freedom

Freelite from Kjus was premiered at the end of 2016 as the first ultra-stretch ski jacket made entirely from knitted fabric. This garment is water- and windproof yet breathable at the same time, and can be worn like a sweater, thanks to its elasticity. The stretch is twice that of a conventional jacket made from woven fabric. The knitted fabric immediately returns to its original shape whenever it has been stretched by movement.

The comfort advantages have now been extended to an expanded product range. The new Freelite collection also uses the possibility of incorporating differently engineered zones directly and seamlessly. The aesthetic and functional characteristics are incorporated directly into the textile. A Freelite jacket is made from just three parts, unlike conventional ski jackets, which are sewn



together from eight to twelve individual pieces. With a minimum of seams and optimised thermoregulation, the Freelite garments can be worn like a second skin. The clothing adapts perfectly to suit every movement, and also feels soft and warm even in cold conditions.

"As soon as you put on a Freelite garment, you can feel the innovation. Ironically, you don't actually feel anything, since the garment feels so comfortable you hardly know you're wearing it," says the CEO of Kjus, Nico Serena.

Fig. 2: Picture of the ALVIER HS jacket (© Mammut)

Fig. 3: Freelite warp knit with seamlessly merging functional zones (© Kjus)

Fig. 4: The Freelite jacket and pants for autumn/winter 2018/19 (© Kjus)

