

Trainer incorporating Sympatex Airflow—a special laminate designed for shoes that features an integrated spacer fabric to supply additional climate control.

- low weight; and
- a range of surface effects—from open to closed.

ELASTICITY—ANOTHER OPTION

Another German spacer fabric manufacturer is Essedea (see also, page 7), which is also targeting the seating and bedding markets across a range of sectors.

The Wassenberg-based company's fabrics are made from 100% recyclable polyester and the spacer threads – which can be anywhere between 20 and 55 mm – are elastic monofilaments that make sitting or lying on them extremely



Three-dimensional nonwovens achieved by hydroentanglement at the Nonwovens Research Group, University of Leeds.

comfortable. At the same time, their open structure results in a use-dependent so-called “pump effect” that acts to control heat and humidity.

Essedea's 3DEA range is said to offer climate comfort, with natural thermal and humidity regulation, and good support, responsiveness to pressure and resilience—even in structures with a height between the outer fabric layers of up to 55 mm.

The fabrics can be supplied with a wide range of elasticities – from soft to firm – and different pressure zones within a single product are possible. Integrated textile joints are also possible and the 100% polyester products are fully recyclable.

MULTI-FUNCTIONAL BEDDING

A multi-functional bedding system, meanwhile, has been developed by the Technical University of Dresden, Germany, consisting of elastic spacer fabrics interlocked in layers to prevent them slipping without restricting the flow through the extremely air-permeable construction.

In this special system, air from a decentralized air-conditioning unit is tempered and distributed through channels within the lower layer of the spacer fabric, ensuring that the humidity from the sleeper's body is absorbed and removed.

The mattress protection layer is a textile surface containing silver to prevent the decomposition of skin scale and eliminate bacteria, and essential oils are added to the air circulation system for their positive therapeutic effects.

WATER PURIFICATION

The Technical University of Dresden has also been involved in the development of a range of spacer fabrics for water purification with industrial partners Silvertex GmbH and Cetex, also both based in Germany.

These 3D fabrics also contain yarns that are partially coated in silver, either as the spacer threads or part of the surfaces, and are proven to effectively eliminate bacteria and viruses.

The integral stability of these textile structures is a key advantage, while they can also be flexibly adapted to their intended function. Minimal hydraulic resistance means there is no increase in pressure required when they are employed in water-transporting systems.

Potential application areas for these materials are in hotel and hospital air conditioning systems, as well as technical systems for water transportation.

FOOTWEAR INNOVATION

A recent innovation for the footwear sector is Sympatex Airflow, a special laminate designed for shoes, which features an integrated spacer fabric for additional climate control.

It works by using the rolling movement of the foot to compress the knitted spacer fabric inside the shoe, pushing the excess heat horizontally and vertically toward the shoe's collar. This further boosts the climate control already provided by the Sympatex membrane.

Shock absorption provided by the added cushioning also increases the wearer's comfort.

This laminate is now being used for a wide range of footwear, from lightweight running types to tough trekking shoes. Because the direct laminate is extremely light and hard-wearing, there is no need for leather or other heavy outer materials. This not only reduces the weight, but also increases walking and running comfort. In addition, Airflow can be combined with other Sympatex technologies and adapted to specific uses or sports.

ACOUSTIC APPLICATIONS

Room dividers made from spacer textiles are particularly suitable for use in offices, where they can act as an acoustic barrier. At the same time they have no adverse effect on air-conditioning or lighting systems.

Further, the low weight and 3D construction of the spacer walls enables them to be installed easily. They are also produced as made-to-measure components, so that no further making-up is required. Rods inserted through the lengthwise channels created by the pile-free zones produced during manufacture of the textile are all that is required. The lower ends of these are fitted with circular feet so that the component is immediately ready for use as a room divider.

Karl Mayer's HighDistance technology can process a wide variety of different yarns and it has been discovered that the type of yarn used has a decisive effect on the noise-absorbing and reflecting properties of the spacer fabric. Increasing the amount of space results in higher thermal insulation and so benefits climate control, but adversely affects noise levels, because the structure is less dense.

SAFETY AND PROTECTION

In addition to their ability to absorb sound, spacers can also absorb force. As a consequence, they form the basis of the Active Protection System from Dow, which marries them

with a specially developed silicone coating. Under normal conditions, the silicone's molecules move easily, but on impact, they lock in position and the silicone becomes rigid.

The spacer fabric contributes a cushioning effect, while at the same time being much lighter in weight than a solid padding material of the same thickness.

In this way, the energy of an impact is absorbed, reducing the forces transmitted through to the body. After impact, the fabric returns to its original flexible state.

NOVEL MANUFACTURE

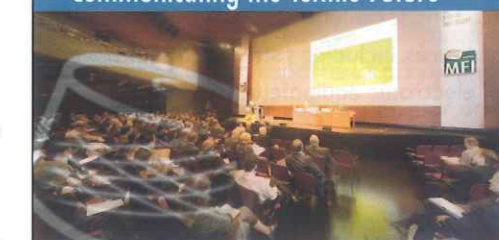
French company Tissavel has also developed a special weaving method for manufacturing spacer fabrics. This approach evolved from velvet manufacturing, in which traditionally a velvet is produced as a double cloth with an extra interlocking warp that is then cut to leave the raised pile.

This method has made it possible to construct a range of products, including a spacer material made from a covered

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