RISE TO THE CHALLENGE: KJUS AND OSMOTEX

A new ski jacket from Swiss sportswear brand Kjus is the first product to feature an "active" membrane technology that is said to be ten times more efficient at transmitting moisture vapour than a traditional membrane.

An 'off-piste' take on breathability

by Adam Forster

It has been nearly 50 years since Bob Gore, son of the founder of WL Gore, accidentally discovered expanded polytetrafluoroethylene (ePTFE) in a laboratory in the basement of his home. His discovery, which occurred as he attempted to make a cheaper version of plumber's tape, opened the door to the creation of Gore-Tex, the waterproof, breathable membrane technology for which WL Gore is best known.

The creation of a material with pores large enough to allow water vapour from the inside to escape but not so large that liquid water can get in was revolutionary for the outdoor industry and Gore-Tex is still considered a standard in breathable, waterproof innovation.

With its "active" membrane technology, known as Hydro_Bot, electrokinetic technology specialist Osmotex has approached the issue of breathability from a different angle. Unveiling



The product has been tested by cross-country skiers, a high-intensity activity that results in lots of sweating.

Kjus

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the innovation at the ISPO exhibition in February 2017, it said Hydro_Bot could represent "a generational advancement in moisture management".

The technology works via electro-osmosis, Osmotex's chairman Joacim Holter, explains. This involves charging the textile membrane with a small electrical pulse, which effectively turns it into a set of micro-pumps for transferring moisture from the skin to the outside of a garment, where it evaporates. This removes excess moisture, keeping the wearer dry and comfortable.

Mr Holter says Osmotex has spent the last decade carrying out extensive lab research into electro-osmosis. Over the past three years, it has narrowed down its focus to Hydro_Bot, working in close collaboration with technical fabric developer Schoeller, research institute Empa and sportswear brand Kjus.



The two Hydro_Bot panels are located on the upper back of the inside of the jacket as this is a high sweat zone.
Kjus

Collective effort

In November 2018, Kjus unveiled the first product to feature Hydro_Bot, in a ski jacket. Like Osmotex, the brand has its roots in Norway, although both are now based in Switzerland. It took its name from Norwegian skier Lasse Kjus, who has five Olympic medals to his name, including a Gold Medal at the 1994 Winter Games, which were held in Lillehammer, Norway. He helped the company launch its first collection in 2000.

At the official launch of the jacket, Kjus's head of innovation, Ken Kurtzweg, said the brand has been exploring the issue of breathability for a number of years. This work has led to a number of innovations, most notably its AC-Vent ventilation system and its 7SPHERE layering

system, which is designed to allow skiers to dress perfectly for different conditions, activities or exercise intensities. The Hydro_Bot jacket is part of the 7SPHERE product collection.

Schoeller provided the fabric used to make the jacket as well as the material for the two Hydro_Bot panels located on the inside back. This area was selected as it is a high sweat zone. The panels consist of three layers; a microporous membrane surrounded by conductive fabric. The active element of the membrane, which is responsible for the electrical pulse that helps move moisture away from the body, is controlled from a small module concealed within the garment, from which the wearer can turn it on. This triggers the electrical pulse, which begins the process of transferring sweat to the outside of the jacket.

Osmotex claims in-house testing has shown that the technology can move moisture away from the body as much as 10 times faster than a traditional, passive membrane. This is because it begins moving the moisture as soon as sweat forms. "The more you sweat, the faster it works," Mr Kurtzweg explained.

What's more, Hydro_Bot is said to offer consistent performance at very low temperatures, something which he says traditional membranes cannot promise. According to him, while the performance of traditional membranes can drop by as much as 50% when the temperature drops -5°C, testing of Osmotex's technology has shown no loss of performance even at -10°C.

Testing has been conducted with the help of Empa. As well as laboratory simulations, the technology has been put through its paces in the field by cross-country skiers. This high-intensity activity was chosen as it results in very high levels of sweat.

The electronic component can be plugged into any USB socket for charging. Once fully charged, which takes between 45 minutes and one hour, Kjus has said it will work for between 16 and 20 hours. It is also possible to connect a portable battery pack, like those used to charge mobile phones on the go, should the wearer not have access to a suitable charging point. The jacket can be washed once the control module is removed, although a gentle wash cycle must be used. Kjus and Osmotex have said it performed well in simulations of repeated usage, which included multiple washes.

The brand has launched a smartphone application that works in tandem with the Hydro_Bot jacket. As well as operating the active system within the garment, it also monitors how much sweat is passing through the membrane in the panels. This means the app can recommend actions, such as opening a vent or removing a layer, in response to the data it receives so as to keep the wearer cool.

Exclusivity agreement

Kjus has described Hydro_Bot as "the most significant innovation in breathability" since waterproof, breathable membranes were introduced to the market more than 40 years ago. For his part, Mr Kurtzweg says this initial product is "just the tip of the iceberg" for the technology. He believes that it is suitable for any activity in which breathable clothing is required.

Beyond the obvious comfort advantages offered by the removal of excess moisture, the technology also reduces the amount of energy the wearer needs to expend on regulating their core temperature. This offers possible performance benefits as more energy can be diverted towards the activity they are doing.

The 7SPHERE Hydro_Bot ski jacket had limited release in December. It is initially only available for men. At a price of €1,399, it is clearly not a garment for the mass-market but Kjus hopes to eventually incorporate the technology into a wider range of products. The brand has exclusive rights to Hydro_Bot for one year overall and for two years within the skiwear sector, so it will be working hard during that time to make the most of this head start on its competitors.



The Hydro Bot ski jacket is part of Kjus's 7SPHERE product collection.

Kjus

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