After the launch of its Power Shield Pro waterproof breathable fabric last year, Polartec has stepped up the technology to produce NeoShell, offering higher levels of protection against the elements and greater air permeability.

The next level of all-conditions comfort

Performance fabrics manufacturer Polartec has introduced what it claims is the most breathable waterproof fabric on the market.

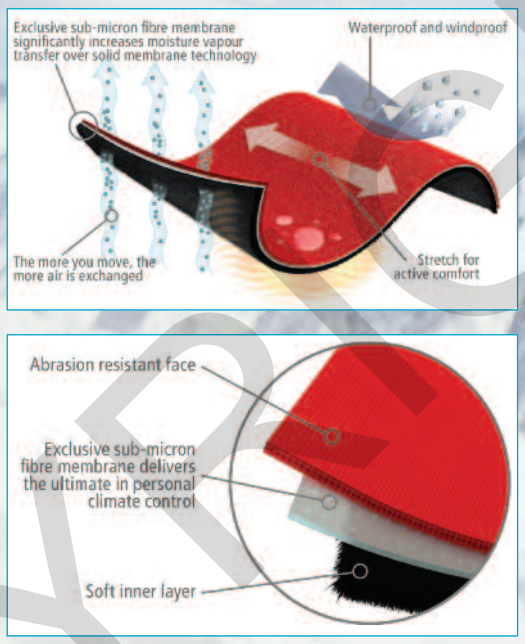
While traditional shell fabrics require heat and pressure to build inside the garment before the membrane begins to work, Polartec NeoShell breathes actively because it contains a sub-micron fibre membrane, produced by a partner, but exclusive to Polartec for use in this industry for at least the next seven years. According to the company, the combination of this membrane laminated between its fabrics allows air permeability of two litres per square-metre per second.

The new product will appear in autumn 2011 collections from a range of outdoor brands including 66° North, Eider, Mammut, Marmot, Montura, Mountain Equipment, RAB, The North Face, Vaude and Westcomb.

"Polartec has offered the most complete layering system of performance fabrics for decades and now we can add a truly revolutionary waterproof breathable solution," says company president, Andy Vecchione. "The Polartec brand only enters categories where we can deliver true innovation and breakthrough performance. NeoShell represents a massive shift forward in all-conditions comfort."

Mr Vecchione explains that NeoShell has been in the works at Polartec for three years and repeats that he regards it as "a breakthrough, revolutionary product". Nevertheless, he says his brand is known as "a go-to company" for product innovation and has a responsibility to "keep coming up with new things".

NeoShell's path to birth began at ispo and Outdoor Retailer in 2007, when the Polartec senior management team told the chief executives of a number of finished garment brands that, while there were no samples to show yet, the company was convinced it had a "revolutionary" (the word keeps coming up) product on the horizon. The feeling inside the company was that if Polartec was already able to offer a complete layering system for everything except the outer layer, it should close the gap and add fabrics that fight the elements face to face to its range. The idea stayed under wraps, with the secret name 'Project Blue'. The first manifestation the market saw of the project was at the launch of Power Shield Pro softshell fabric technology this time last year. Twenty-five apparel brands across the world are now running Power Shield Pro, with men's and women's jackets and pullovers appearing in this fabric in an exciting range of colours in time for the autumn-winter 2010–2011 season. "Power Shield Pro exceeded expectations as a product," Mr Vecchione says, "and won lots of awards. It will continue to take off. But when they saw Power Shield Pro, some people asked us what was next. Well, the answer is NeoShell."



Polartec Power Shield fabrics are designed to replace traditional fleece and shell systems for most outdoor clothing applications, reducing the weight and number of layers needed to insulate and protect.

Polartec

COPYRIGHT



Vaude is one of the brands that will go to market first with NeoShell jackets in autumn-winter 2011–2012.
Vaude

The game changes

His colleague and executive vice-president for sales and marketing, Jon Adelman, calls Polartec's attempts to offer fabrics that are waterproof and breathable "game-changing" and the result of the biggest research and development exercise the company has carried out in a decade. And Nate Simmons, Polartec's global marketing director, says the market-need was there because outdoor enthusiasts have "endured products that don't really breathe" throughout that decade. He adds: "We've basically tightened Power Shield Pro up for more weather protection. This is the same membrane, but modified to provide a truly waterproof solution while allowing air to flow through. NeoShell is new technology in that it does new things. It allows air-exchange at unprecedented levels in a waterproof product. It's not hard, it's not soft; it's somewhere in between. That's fine because consumers don't really know what the terms hard and soft shell mean. A jacket made from NeoShell is not going to be a jacket you pack just in case. It will be a jacket you can wear, pushing moisture away from the body faster while blocking 99% of the wind."

COPYRIGHT



An artist's impression of climber Janet Bergman, who says NeoShell is "incredibly light and durable and definitely keeps wind and water out".
Polartec

User experience (1)

Janet Bergman, climber: "I love the NeoShell fabric. It is an incredibly light yet durable material. I have also worn it mostly ice climbing and skiing, and mostly in snow or sleet. It definitely keeps the wind and water out. The sizing on the one I got was a bit tight for me through the shoulders and arms especially. So I really tested the stretch and durability of the fabric by stuffing it into a harness and then having to really pull on the arms to swing while ice climbing in it (twice now) and I did not feel inhibited, which is great. The fabric is really durable. Back-country skiing through brush and trees, all the sharp implements for ice climbing, and it still looks like new."

User experience (2)

A jacket made in Canada by Westcomb is one of the first finished products to contain NeoShell. The black shell is 40% nylon, 30% polyurethane and 30% polyester, while the silver-coloured inner layer of fabric is a 48%–27%–25% combination of the same polymers. Worn mostly for walking in cold weather so far (as low as -10°C), it performs well, providing a noticeable contrast between upper body and lower body (with just ordinary trousers for protection) discomfort. As with Power Shield Pro, the NeoShell jacket remains comfortable when the temperature rises, for example on board a busy train or during periods of greater exertion, including ice-skating. During light snowfall and one exceptionally heavy shower of rain, the jacket performed well; you could see moisture beading up on the outer shell. A strong zip, extensive taping at the seams and strong hook-and-loop closures on the cuffs helped keep the moisture out. The only other comment would be to say that it's difficult to see (so far and in these climactic conditions) much of a step up from Power Shield Pro; levels of comfort and protection with NeoShell are just as good, but if this is phase two and costs more money, consumers might expect a more obvious boost in benefits. Perhaps our field-testing has been too pedestrian.

Heat and pressure required

Fibres are extruded into a web-like structure and create more airspace on the surface of the woven fabric. This leads to a level of airflow through the fabric that is at least two times greater than that offered by leading competitors, Mr Simmons insists, and says two litres per square-metre per second is two, three or four times greater than many competitor fabrics. "This makes a huge difference," he continues. "Most waterproof and windproof products are closed. Almost all fabrics claiming to be waterproof and breathable work by having moisture vapour moving through a solid membrane, and this has its limits. You need heat and pressure to make that happen, so you need a hot, sweaty, sticky situation for that to work. We add convection, pulling water out before it can create that stickiness."

The waterproof side of things is easy, he says. NeoShell has a hydrostatic head of 10,000 millilitres. There are plenty of products on the market offering a higher figure, but Polartec's position on this is that, for most users in most climates, it makes little sense to go beyond 10,000 millilitres, that to do so would be to try to make the wearer feel drier than dry.

The fabric is washable. It has successfully come through the 24-hour "killer wash" in hot water in the Polartec laboratory and will withstand at least 20 wash-dry cycles in consumers' homes, the company says. Like Power Shield Pro before it, NeoShell has undergone extensive testing in laboratories and in the field.

Test of character

The main characteristics that tests on breathable and weatherproof products seek to measure are as follows. Water resistance is the amount of water pressure (in millimetres) that a fabric sample can withstand before leakage occurs. Breathability is the amount of water vapour (in grammes) that can pass through a square metre of fabric during a 24-hour period. Wind resistance is the maximum wind speed a fabric can block.

An important lab test, and one that the Massachusetts-based company wants to see become more widely used across the industry, is the dynamic moisture permeation cell or DMPC test. The basis of this method for testing the ability of fabrics to transport water vapour is that air at two different relative humidities flows over the two sides of the test sample. By measuring the water vapour concentration at the exits of the cell, it is possible to measure how much water vapour crosses the sample. Results may be shown in terms of water vapour flux, in grammes per square-metre per day. The test measures humidity on the top of the sample, on the bottom of the sample, the difference between them and the mean relative humidity.

The DMPC method, developed by Dr Phillip Gibson, a civilian scientist working on the US Army's material sciences team, has shown that some market-leading materials have much better water vapour transport properties when they are in a humid environment than in a dry environment. Other materials, such as most textiles or microporous membranes, have a nearly constant water vapour diffusion resistance, regardless of the environmental conditions. The reason Dr Gibson's employers like DMPC is that it appears to predict most closely the experience that soldiers in the field will have wearing a particular fabric. Polartec has found that this applies

COPYRIGHT



Polartec says technical users will feel the benefits of its new NeoShell fabric right away.
Vaude

also to athletes carrying out field testing of its products, including NeoShell. "We've been working with the brands and with their athletes on this," Nate Simmons says. "When their feedback came in, it was amazing how close to the lab tests the results were."

He is less convinced by the evaporative thermal resistance (RET) test, which measures microclimate drying time and is widely used in the performance textile industry to compare the ability of different materials to dissipate moisture vapour from the body of the wearer to the outside. The typical way of generating heat for the test is to use a sweating guarded hot plate procedure. Academic studies have confirmed that the measurements gathered using a sweating hot plate are predominantly influenced by fabric thickness, rather than the pore characteristics of the fabric. "According to RET, a 200-weight fleece is less breathable than a hardshell," Mr Simmons continues. "Does that make any sense? How can it say that? It goes against everyone's experience in these garments. As soon as you add pressure, fleece is the most breathable fabric there is. So if you wear it and move around it becomes super breathable. RET is massively impacted by the thickness of the fabric. If you only had the membrane it would be a great test."

The product marketing manager at Polartec, Karen Beattie, feels that finished garments incorporating NeoShell will appeal especially to "heavy users and fabric geeks". Compared to other waterproof, breathable apparel products, prices will be "the same or a little less", she predicts, but they are unlikely to come in at the cheaper end of the market. She describes the membrane technology laminated between the fabric layers as "really special" and the key to NeoShell's waterproofness and air permeability.

Dial M for membrane

Partner company Finetex is the producer of this membrane, but Polartec has an exclusive-use agreement for sports, outdoor and footwear for the next seven years. And the deal is renewable. Nate Simmons explains: "We can produce the fabric very consistently and we can dial it more waterproof, less breathable or whatever the customer wants. NeoShell is a dialling of Power Shield Pro. We want manufacturers to make garments the way they want to make garments. The fabric has got stretch. It can go into some lines as a waterproof softshell, into others as a hardshell and into others as a hybrid. Tech users will get it right away, although it's possible that it could take more time for more pedestrian users."

Nor is NeoShell the limit of the dialling. He confirms that a further offering, still called Project Alpha, is on course to launch in a year's time. There was a feeling in the industry that waterproof, breathable products had begun to appear static. At the start of this new year, after developments such as Columbia Sportswear's purchase of OutDry and Polartec's push for ever higher levels of waterproofness and breathability, this is an exciting subject again.

We can be heroes

Polartec's partner company Finetex is not alone in allowing others to take its membrane technology into the sports and outdoor markets while it, in these segments at least, stays in the background. Towards the end of last year, GE announced that it would make its eVent waterproof, breathable fabrics available for its customers to brand as their own. Outdoor brand Mountain Hardwear is among the first to sign up for the deal.

Glenn Crowther, product line leader for performance fabrics at GE, says Mountain Hardwear and other companies will now be able to use eVent in "never-before-seen" combinations without having to mention the technology's or GE's name anywhere on their branding. "We've never sold eVent on its own in the consumer space," he explains. "We just want to concentrate on developing our products, to focus on what we are better at." GE is a global name often associated with light bulbs and jet engines, but Mr Crowther says he is unsure of how much that name means in the garment industry. He adds: "If we are to be heroes, we want it to be at the business-to-business level, letting our customers be the hero brands at the point of consumption."

It is his view that brands such as Mountain Hardwear deserve all the credit they get from consumers. Brands are now more aware of the variety of different textile technologies that are available to them and, in choosing which ones to work with, are basing their decisions in many cases on what their customers, the end consumers, are telling them, he says. Brands always want ways to differentiate themselves, and listening to customers' views and giving them the functionality they want is one of the best ways to do this.

COPYRIGHT