Synthetic insulation materials are facing new competition as wool-based alternatives come forward. Innovation is also found in the natural down category with several materials vying to change the rules.

Filling up with nature

The presence of wool has grown steadily in performance clothing in the past decade. After infiltrating base- and mid-layers, the natural fibre is now moving into fibre fill thermal insulations. This time, however, instead of new companies reintroducing a traditional material, as Icebreaker or SmartWool did when they launched merino wool in performance baselayers, we are seeing century-old companies promoting new uses for the natural fibre. H Dawson & Sons, a UK company, was founded in 1888, but waited until January 2015 to launch its sports-oriented range HD Wool. German company Baur Vliesstoffe started business in 1913, but created Lavalan insulation for garments just a few years ago. The down suppliers that are similarly reviving an age-old industry, that of recycled down, have been in the business for more than a century. The Crabos family that controls Navarpluma and Pyrenex was founded in 1859, and Molina, an Italian company, in 1890.

Local sourcing

The revival of wool as an insulation material seems in part motivated by a desire to source local materials. Swiss brand Mover was one of the first to promote locally sourced Swisswool insulation, soon followed by German sportswear brand and performance wool specialist Ortovox. Nicolas Rochat, the owner of Mover, was "the first to ask us to make lighter-weight fillers," says Matthias Boehme, sales manager for Lavalan, the division of Baur Vliesstoffe that makes wool-based insulations. Mover is now lining its garments with alpaca wool, also sourced in Switzerland, because the camelid's hollow fibre can offer a performance edge. Salewa, a sportswear brand based in South Tyrol, is following the same path with its Tirolwool



Tirolwool insulation, developed specifically for Salewa, is found in both its performance and lifestyle collections. The wool comes from sheep raised in the Tyrolean Alps.

Salewa

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insulations, made by Italian company Imbotex, and whose wool comes from sheep that graze on the Tyrolean Alps. A similar line of thinking is seen at Cotopaxi, a brand based in Colorado but, as the name suggests, with strong ties to the Andes. Its jackets are padded with llama fibre fill that comes from Bolivia, where Altiknits, a company based in La Paz, processes this type of wool, which is also hollow.

Lavalan sources its wool in Switzerland, southern Germany and France, all mostly within a 300 km radius of company headquarters, says Mr Boehme. The company buys the entire fleece of the animals and uses the coarser fibres to make blanket and loden fabrics. Marketed as an alternative to natural down, its Lavalan Exquisit insulations are available in many different fibres, including merino, cashmere, yak or camel (and not all come from Europe, of course). For sports, the company recommends virgin wool for its high moisture uptake (up to 33% of its net weight). The natural fibres are bonded together with 12% Ingeo PLA that also provides some elasticity, Mr Boehme says. Compared to down, woollen insulation dries faster, is easier to wash and trace, and does not have the animal welfare issues sometimes associated with down.

At ISPO Munich 2016 (January 24-27), Lavalan plans to introduce Wooldown, a new concept that will make wool compatible with down jacket manufacturing. The wool sliver is designed to be slipped into the baffles of a puff jacket. Weighing 4 grammes per linear metre, it can be used alone for slimmer styles, but also doubled or tripled to fill wider baffles. Depending on client feedback, Mr Boehme says 3- or 6-gramme per metre versions of the sliver may be developed.

Salewa's quest for locally-sourced wool materials resulted in the launch of Tirolwool by Imbotex. Instead of the usual harsh treatments applied to wool, this one undergoes a patented oxygen-based process that "eliminates the scales of the wool without damaging the structure of the fibres; it makes the wool very soft, and it will not need a silicone finish," says Imbotex sales manager Stefania Carniello. The wool fibres are thermobonded with PLA or a bicomponent polyester (without antimony), which accounts for between 8% to 15% of the finished product. This range is part of a pilot project on a responsible wool standard within the Textile Exchange, she adds. A Celliant partner, Imbotex also blends the thermoreactive mineral-enhanced polyester fibre with cashmere or lambswool (selected by ISPO Textrends this year). Nativa Silkpad, another new product selected as a Top 10 by ISPO Textrends, is a silk and polypropylene insulation offering what the company calls "active warmth" meaning it provides breathability and comfort in dynamic activities. Thermal tests are said to have shown high warmth-to-weight values. Ms Carniello says two main trends are driving the market: "Brands are looking for either very technical or very natural materials."



In its A/W 2016/2017 collection, German brand Ortovox is ushering in Swisswool insulations made with the fleece of black sheep, said to be quite rare.

Ortovox

Launched by long-time wool supplier H. Dawson & Sons, HD Wool is a new range of wool fibre insulations that Jo Dawson, CEO, owner of the company and great-grandson of the founder, believes is the next big thing in performance insulations. Launched in early 2015, the HD Wool Thermal Comfort range starts at 75 grammes per square metre (gsm) and goes up to 300 gsm. But H. Dawson tailors its products to the needs of each client. It selects the specific type of wool and the region it comes from for each end-use. "We absolutely know wool," says Mr Dawson, adding that the company supplies 5% of the global wool market.

"Wool is a truly high performance material as it manages moisture far better than anything else," says Mr Dawson. In the long list of the material's attributes, he mentions that wool is flame retardant, doesn't allow bacteria to grow and has good resilience. "It just needs to shrug off its fusty, dusty image," he says. This is what the company intends to do: "We're taking a modern look at a traditional material." But more importantly, he sees wool as intrinsically superior: "We don't only seek to make somebody warm, our job is to make somebody

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warm and comfortable. Clothing made with HD Wool will allow the user to perform longer."

There is one snag though, the higher price of wool compared to synthetics. "We are careful to pay farmers a decent price. We make sure our supply chain is sustainable for everyone involved. Wool is a renewable resource, but it is also a limited resource," says Mr Dawson, who points out that the company's position in the wool industry means it can guarantee high volumes.

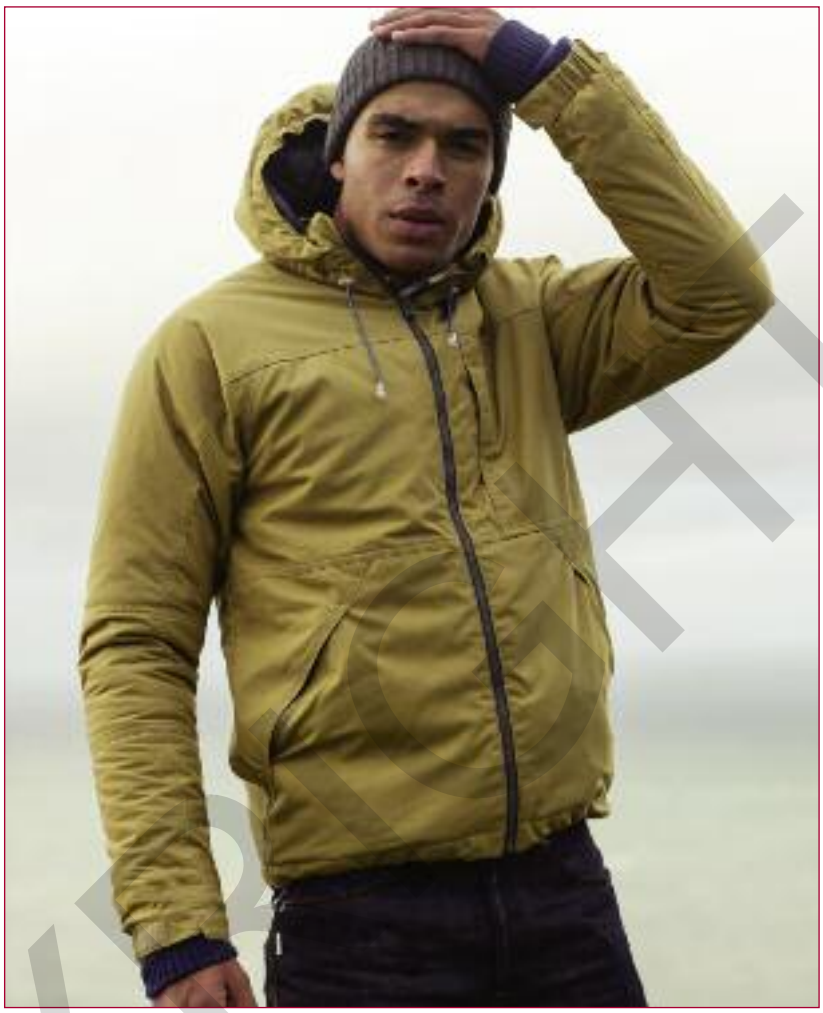
PrimaLoft has addressed the wool trend in performance insulations by creating a Primaloft Gold Insulation Merino Wool Blend containing 60% PrimaLoft microfibres intimately blended with 40% merino wool. Like PrimaLoft-natural down insulations, this represents the best of both worlds for the US-based company as it combines the water resistance and hydrophobic properties of PrimaLoft with the hydrophilic properties of wool. The hybrid insulation is also said to regulate body temperature, remain warm when wet, draw moisture away from the body and deliver anti-microbial properties.

A division of US-based Hobbs Bonded Fibers, Ramtec is another promoter of locally sourced, US-made, natural wool insulation materials. The wool insulation is made with the fleece of sheep raised in the US. At Outdoor Retailer, the company exhibits with Canadian garment manufacturer Spirit West, thereby offering either the wool insulation alone or in a finished garment, made in Canada.

Llama and bison stock

In Bolivia, where the largest population of llamas can be found (some 2.5 million), Altiknits is working on turning the animal's fleece into a material suitable for fashion and sportswear. Llama hair is a mixture of very coarse and very fine wool, which is actually finer than alpaca, says Humberto Böhrt, Altiknits principal. The company has developed a machine that dehairs the fleece to collect only the finer yarns. "It is a complex carding process which now treats 40 tonnes per day," he says. The finest fibres, measuring 21 microns, are used in knitting and weaving. For garment insulation, the company uses medium-fine llama wool measuring around 25-26 microns. It is also working on a new yarn technology that would be used to make performance llama wool fabrics.

South America is home to four camelid species—vicuña, guanaco, llama and alpaca, and, unlike sheep's wool, the fibres of their wool are hollow. This would imply higher insulation and thermoregulating properties. Mr Böhrt further says that compared to alpaca fibres, the holes in llama fibres are larger for the same size fibre. "The scales are also different; alpaca scales tend to protrude out more than llama scales, which will be softer to the touch, and this also makes llama wool shinier." The company, which exhibits at Première Vision, is looking to develop sales abroad.



UK-based eco-label Howies was the first to use HD Wool insulation in its collections.

Howies

In the US, a Philadelphia-based brand, United by Blue, is introducing bison fibre insulation in its Ultimate American Jacket, launched via Kickstarter. The crowdsourcing campaign follows up on an earlier one for the Ultimate American Sock made with finer, bison "down" fibres. The insulation is made with the coarser and longer outer guard hairs, which are hollow, and blended with recycled polyester. Tested by an independent lab, B100 Fill achieved a thermal resistance rating of 1.72 clo alone and of 4.51 for the jacket's four layers together.

The 1,068 kickstarter contributors pledged $370,761 to United by Blue and 1,500 jackets will be produced it says. These will require 5,000 yards of B100 FIll or 1,700 pounds of bison fibre, of which only 1,000 had been produced by early December.

The comeback of kapok

Thanks to Chinese company Flocus, kapok is set to make a comeback as a performance insulation. Reported to be the world's lightest natural hollow fibre, it has many properties similar to those of synthetic fibres, company CEO, Jeroen Muijsers, likes to say. He explains:

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Said to be as soft as loose down clusters, ThinDown is being billed a "down fabric" as easy to cut and sew into a garment as traditional insulation materials.

Thindown

"Kapok absorbs next to no water, is naturally antibacterial and, unlike wool, it is not eaten by moths." Kapok fibres are said to have a natural wax coating that makes them water-repellent. "During processing, the wax will be somewhat degraded due to friction and heat, but though the fibre may absorb some humidity, it still dries fast," he says.

Flocus is introducing several types of insulations, in polyester blends starting at 40 gsm (Flocus Loft or Flocus Light), and in blends with PLA, derived either from sugar cane or corn, starting at 130 gsm (Flocus Green). Mr Muijsers points out that kapok has less loft than polyester, which makes it ideal for fitted styles, and that it offers a very comfortable warmth without overheating. The vertically-integrated company says it can engineer different blends to meet a brand's demands.

New developments in down

Looking to make natural down easier to use, particularly in slimmer garments, Paolo Bodo, a former tennis player and Italian fashion entrepreneur who worked for denim company Group Sixty, has embarked on a new venture with ThinDown, launched at Milano Unica in September last year. This novel format means that what the company is calling a down fabric is delivered in rolls, can be cut like any insulation and does not need to be quilted. The product is currently available in thicknesses ranging from 0.5cm to 8cm and in weights of 20 to 100gsm. Two references have been made, with 90% down and 10% synthetic binder fibres or in an 80%-20% blend. The company has tested the material and says that warmth resistance (RCT) is higher than that of synthetic insulations by a large measure (+200% to 350% depending on weight).

ThinDown is produced on a patented machine, the NIPI R40, housed in a plant in Chieti, Italy, and which produces up to 2.5 million linear metres per year, the company states. The process was developed with the help of Italian down specialist Molina, which supplies the raw material and is in charge of sales. "ThinDown has the same handle and softness as down, but it is much easier to use," Andrea Molina told *WSA*, adding that it doesn't require the manufacturing techniques and cheap labour that are now mostly found in Asia. It may therefore help bring garment production back to Italy.



Ternua is introducing the Ladakh down hooded jacket for A/W 2016/2017. It contains 160g of Neokdun 100% recycled down that is treated with a PFC-free DWR finish made by Nikwax.

Ternua

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Second life down

A few eco-minded sportswear brands have recently taken to using recycled, or rather, second hand down. Ternua, a Spanish brand based in the Basque region, has worked with a local company, Navarpluma, in developing Neokdun, recycled down made for performance clothing. "We were worried about animal welfare issues and wanted to source our down locally," says Eduardo Uribesalgo, Ternua's innovation director. US-brand Nau, now a part of South Korean group Black Yak, has also introduced garments made with down recycled in Europe.

"Second hand down is not new, but it had never been properly recycled to make it a high value product," says Benjamin Dix, sales manager for Navarpluma who started working for the company in quality control and is trained in environmental engineering. He says the company's goal was to develop a "high-performance recycled down for outdoor brands looking for environmentally-friendly materials." The best qualities can reach a fill power of 800, he says. The company washes the used down with a non-aggressive and non-toxic detergent and the feathers and clusters then go through a sorting and regeneration process. Navarpluma has developed a traceability system for Neokdun and is currently working with the European Outdoor Group (EOG) to define best practices and traceability protocols for its recycled down process.

Molina also processes second-hand down. "We recycle bedding from Germany, Switzerland and Austria," says Andrea Molina. The company outsources the bedding opening operations, and then washes and sorts the used down. Mr Molina says it is "a bit of a challenge to achieve a suitable quality for clothing, because the down clusters tend to break down in bedding." He says demand for recycled down has gone up, but brands buying it want to be able to label it as recycled. This requires third-party certification, he says, that does not yet exist. Molina has approached the Global Recycling Standard (GRS) to create a certification protocol that would be modelled on that of recycled beverage bottles.

Molina also makes many down blend insulations, which were popular says Mr Molina when the price of down was high. "Sales of silk and down blends remain high in Korea and Tencel-down blends in German speaking countries," he says.

Demand for down seems to have dropped, industry insiders say, attributing slower sales to a switch back to synthetic fillers and to a fear of media exposure linked to animal welfare issues.

With wool-based insulations and soon-to-be certified recycled down, sportswear brands can now choose from several high performance natural fibre thermal solutions. In addition, both of these materials are recyclable and biodegradable, which may add another perk to their appeal, as Matthias Boehme at Lavalan points out: "Wool could be one of the few materials that truly closes the loop. Our company recycles wool into various types of products. Wool fillers can be reused in housing insulation or acoustic panels. At the end of their life, the acoustic panels can be recycled a second time as geotextiles. Our products could actually come full circle if the sheep graze on land sown with grass seed-embedded geotextiles made in wool." However improbable, it has the makings of a good story.



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