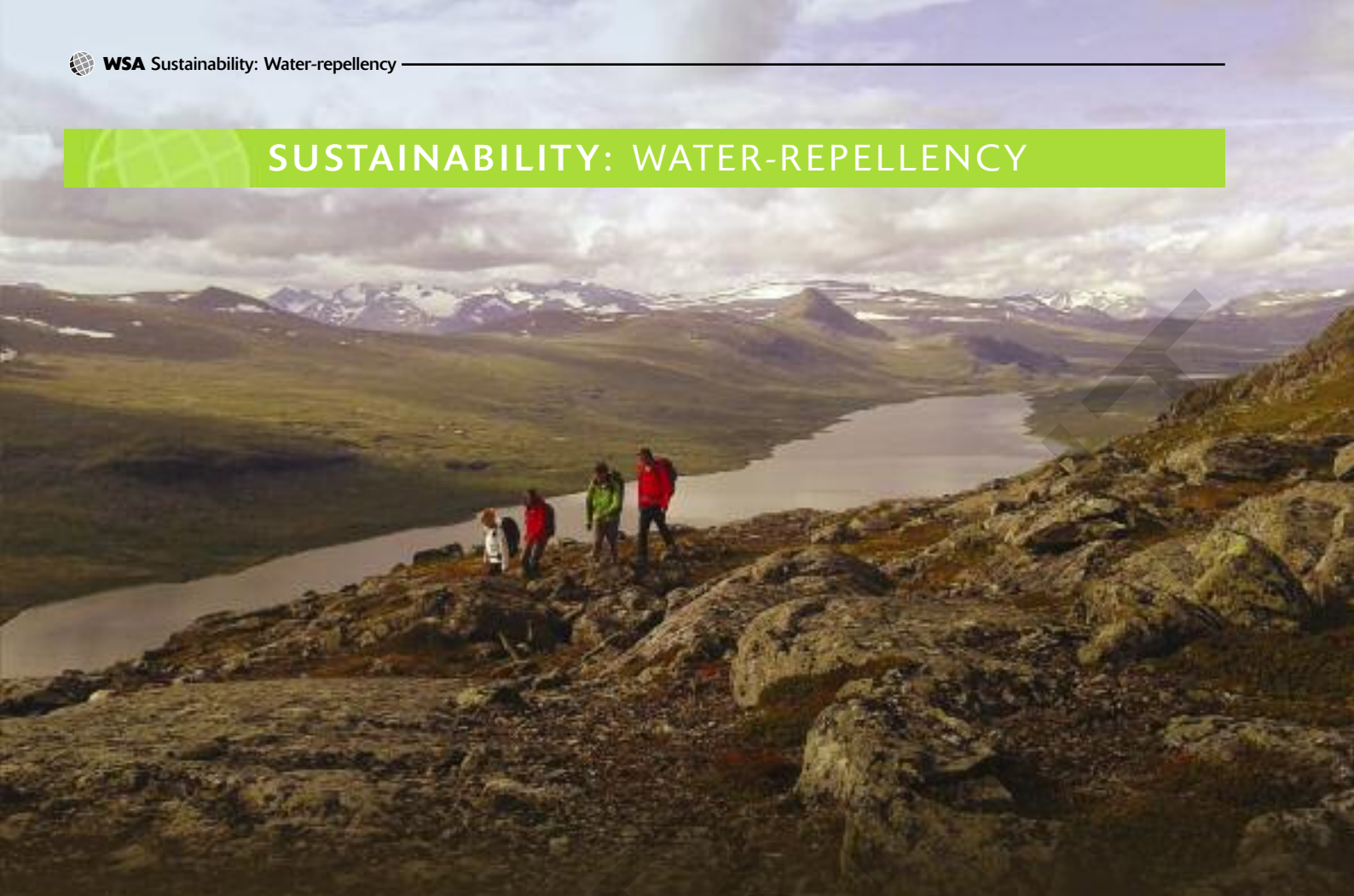
SUSTAINABILITY: WATER-REPELLENCY



With only two years to go now before the 2015 deadline for eliminating PFOA from the supply chain, manufacturers are making progress in offering alternatives. Demand among brands and retailers for PFOA-free options is already strong.

Repellency options reach the market

We have covered the subject of perfluorinated chemicals (PFCs) several times in the recent past, but want to return to it again because of a series of recent announcements from players all along the clothing and textiles supply chain celebrating the success of developing new products that can offer water- and oil-repellent functionality in finished products without using compounds that have become controversial.

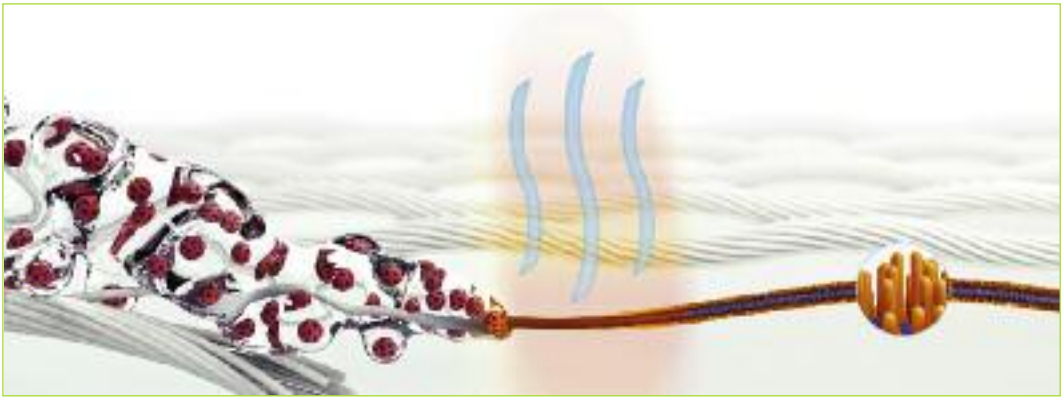
PFCs are chemical compounds that have a lot of fluorine around the carbon in the chain. PFCs have been in use in various industries for decades, with their role in water- and oil-repellency technology in clothing and footwear among the most prominent applications. The US Environmental Protection Agency (EPA) has been examining these chemicals for more than ten years because of complaints it has received about their potential effects on the environment and on people's health. It started with an examination of perfluorooctyl sulfonate (PFOS) in the late 1990s, as a result of which manufacturer 3M reformulated its category-leading Scotch Gard product. Its findings in that case led the EPA to examine related chemicals, including perfluorooctanoic acid (PFOA), which is often called C8.

Under investigation

"PFOA is very persistent and has been found at very low levels both in the environment and in the blood of the general US population," the agency has stated. "Studies indicate that PFOA

A Jack Wolfskin expedition in the Hebrides off the west coast of Scotland, where clothing with water-repellency is particularly useful.

Claudia Cleven/Jack Wolfskin



Clariant is expanding its C6 chemistry-based Nuva N range of products for "sustainable repellency".
Clariant

can cause developmental and other adverse effects in laboratory animals. PFOA also appears to remain in the human body for a long time. All of these factors, taken together, prompted the agency to investigate whether PFOA might pose a risk to human health and the environment at the levels currently being found, or at levels that might be reached in the future as PFOA continues to be released into the environment."

In April 2003, it released a preliminary risk assessment for PFOA, and started a public process to identify and generate additional information "to better understand the sources of PFOA and the pathways of human exposure". At the start of 2006, it set up a stewardship programme with eight chemical companies: Arkema, Asahi, Ciba Specialty Chemicals (now BASF), Clariant, Daikin, 3M/Dyneon, DuPont and Solvay Solexis.

It's important to point out that PFOA is not an ingredient that manufacturers deliberately add in the making of their water- and oil-repellency products, but a substance that appears in small quantities as a by-product of the synthesis that takes place in the making of C8 chemicals.

These eight manufacturers committed voluntarily to reduce C8 content in all their products, including those aimed at textile manufacturers, by 95% by no later than 2012 and to work towards eliminating PFOA and related chemicals altogether by 2015. That's just over two years from now and two years is a short timescale for developing new textile chemicals.

Group of eight

One of the companies in the Stewardship Programme, Daikin, announced earlier this year that it would eliminate PFOA in the manufacture of the water- and oil-repellent products in its portfolio by the end of 2012. "PFOA is not used in the manufacture of C8 protective products, " the Japanese company reiterated, "but it does occur as a byproduct of the manufacturing process. Daikin will voluntarily replace all existing products with [alternatives to meet] the goals of the Stewardship Programme three years early."

Another of the eight, Clariant, is among a group of companies to have spoken in detail in recent weeks about success so far in finding alternatives to C8, often based on products with a shorter carbon chain length, C6. In September, it announced an increase in its capacity to produce its Nuva N fluorochemicals at its plant at Gendorf in Germany.

The company describes these products as "next generation" solutions for fabric-repellency treatments. It has invested €8 million in the Gendorf plant to support the production of these product lines and to "expand options for customers who are increasingly making the switch from traditional C8 products".

C6-based Nuva N technology offers what Clariant has called "sustainable repellency" and solutions that are below the limits of detection for PFOA, while offering comparable performance to established C8 chemistry solutions.

Georg Lang, head of finishing in the company's textile chemicals business unit, said on making the announcement: "We believe these new additions to the C6 product line will convince even more textile manufacturers to adopt Clariant's C6 Nuva line and move away from conventional C8 products, hence the decision to further boost our production capacity in Germany."

Mr Lang insists that C6 chemistry is now as strong as C8 in many fields, but acknowledges that customer organisations still point to weaknesses in the technology in some applications as a reason for dragging their heels. The other argument they offer is that C6 products command a higher price. "In many of these cases it won't be difficult at all for them to make the change," he continues. "Some mills are just waiting for their buyers to insist. But as we have seen recently some brands and retail groups have taken this step already; some are already saying that they will only permit C6-based chemistry [in water-repellency technology for the products they put on their store-shelves]. This is the power of the buyer. This is the way to make the shift happen faster."

Big names, big aims

Some of the consumer-facing companies that have taken steps along this road are big names and some have gone further than others

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(possibly further than they need to). Swedish fashion retail group H&M announced in September that it will no longer allow its suppliers to use any PFCs, C6 as well as C8, for water- and oil-repellency from January 2013. It pulled no punches on making the announcement, saying that fluorinated compounds in garments are "harmful for the environment, for reproduction and for aquatic organisms". To our knowledge, such a statement covering all PFCs, including C6 products, is very much open to question. H&M clearly wants to take no chances; the retail group is also part of the Joint Roadmap towards Zero Discharge of Hazardous Chemicals in the supply chain by 2020, joining companies such as adidas, Li Ning, Nike and Puma. This is an initiative that has generated substantial negative publicity for some of the companies involved thanks to the actions of outspoken campaign groups. Perhaps H&M is erring on the side of caution with PFCs. On October 24, UK-based fashion retail group Marks & Spencer made a very similar announcement, committing itself and its suppliers to removing all PFCs by July 2016.

German sports and outdoor brand Jack Wolfskin made an announcement of its own in September. It said that all of its weather-protection products will be free from PFOA by the end of 2014. Jack Wolfskin says it has been working since 2009 towards offering weather-protection products that are PFOA-free.

"PFOA has been a topic of debate for some time now and represents a challenge for manufacturers of functional apparel, as up to now there have been few adequate alternatives, and phasing it out would involve converting the entire textile manufacturing chain," says chief operating officer, Christian Brandt. "However, we decided to take this step early on, particularly because the insufficient biodegradability of PFOA prevents long-term use."

Jack Wolfskin explains that it started limiting the use of PFOA in its products in 2007 and took the decision to eliminate the material altogether as long ago as 2009. With more than two years to go to meet the deadline it set itself, it says only a few carry-over styles remain in the collection in which PFOA plays a role. Finding other technologies to deliver the same functionality has taken longer than the brand hoped when it took its decision in 2009. "We are close to the goal now," it says, "but the process took quite a while; it wasn't possible to do it from one day to the next."

Real options

Alternatives do exist though, as the Clariant example shows. However, even Clariant's next-generation solutions are PFCs, which means that in the case of H&M, suppliers will be unable to use the Nuva N range. Instead, H&M has encouraged the manufacturers that make its clothes to invest in Bionic-Finish Eco from Rudolf Group. Bavaria-based Rudolf, a specialist in textile auxiliaries and specialty chemicals, says H&M suppliers have been using Bionic for water-repellent finishing on sportswear and children's clothing since 2010. It explains that the product contains "a mixture of 'comb' polymers and highly branched polymers (dendrimers)" and is fluorocarbon-free.



Rudolf Chemie says its PFC-free fluorocarbon water repellent product, Bionic-Finish Eco, can help "open up new perspectives to the clothing sector".

Rudolf GmbH

It says it has made every effort to eliminate PFCs as by-products in its production of Bionic and says it believes its alternative PFC-free fluorocarbon water repellent product can help "open up new perspectives to the clothing sector". Stefan Thumm, the head of Rudolf's effect chemicals division, claims many breathable coatings and laminates on the market also contain solvents such as toluene, methyl ethyl ketone (butanone) or dimethylformamide (DMF). "A lot of brands did not even know that their products are produced with such dangerous solvents," he says. "We are being flooded with enquiries."

Increase in demand

Back at Clariant, the head of marketing for its textiles business unit, Emrah Esder, is confident suppliers will be ready to meet an increase in demand for PFOA-free solutions and will be happy with C6 solutions as the answer. "Most have already evaluated C6 and most are ready," he says. His company made its first C6-based repellency effect product, Nuva 2114, as long ago as 2007 and the range has become bigger with each passing year, with products' ability to meet the needs of clothing brands improving all the time. For example, one of the products in the range now, Nuva N1811, gives a much softer hand to fabrics than earlier versions were able to offer. And it does this without any compromise on water- and oil-repellency. "We want to keep getting better at this," says head of textile finishing, Georg Lang.

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