New study casts doubt on benefits of school uniform stain resistance

For immediate release, 30th July 2018

Environmental charity Fidra, has found that stain resistant uniforms may not bring the benefits consumers expect and could be harming the environment. Many stain resistant coatings are still being made using perfluorinated alkyl substances (PFASs)[1] despite restrictions on some PFAS chemicals and widespread concern about their environmental impact. Results of Fidra's survey of school uniform purchasers suggests that stain resistance does not reduce the frequency of washing or make customers replace clothing less often, and that any stain resistance is lost during the first few months of ownership[1].

Stain resistance leaving a lasting mark on the environment

Many stain resistant coatings use PFASs to make clothing oil and/or water repellent. PFASs are a group of man-made chemicals, which can be released into the environment during production, use and disposal of stain resistant uniforms and other products. They have been found in the air and water worldwide including remote arctic regions and are found in wildlife and humans. For example, concentrations have been detected in polar bears, whales[2] and blood samples across human populations[3]. PFASs do not easily break down in the environment; they can build up in the tissue or blood of animals where they can cause harm[4]. Recent research concludes that the level of technical performance provided by PFASs is not required for most textile applications, and that they should only be used where their need is "unique and critical"[5]. Following growing concerns from the scientific community[6] and restrictions on some PFAS chemicals[7], supermarkets have been taking a precautionary approach and phasing out the use of any PFASs from uniforms and other products. However, analysis of the UK school uniforms market by Fidra reveals that many department stores, high street shops and independent retailers continue to sell school uniforms with PFAS-based stain resistance[8].

Does stain resistance reduce the need for washing or make uniforms last longer?

Stain resistance is marketed as bringing added convenience, but consumers may not be getting the benefits they expect. Often stain resistant finishes on uniforms are only guaranteed for around 20 washes[9]. Fidra's survey of uniform purchasing and washing habits revealed that uniforms (other than shirts, which are washed more regularly) are washed every 4-6 days in term time, which would mean uniforms bought new for the start of the school year will have any stain resistance washed off by the February break if not before. Fidra's study reveals that **stain resistance does not appear to reduce the frequency of washing or increase the life of a garment in real terms**. In fact, Fidra found that the parents who considered stain-resistant finishes important when buying uniforms washed trousers and skirts significantly more often (average 4.5 days between washes) than those who did not value stain

[1] PFASs are sometimes more generally known as Per/Polyfluorinated Compounds or PFCs.

resistance (average 5.4 days between washes). Similarly, Fidra found no decrease in purchase frequency associated with stain resistant finishes on school uniforms[1].

Dr Madeleine Berg who manages Fidra's PFAS Free Uniforms project explains: ''School uniforms are just one of a number of products that can contribute PFAS chemicals to the environment; PFASs are used in everything from blazers to baking paper. If stain resistance isn't really providing the benefits consumers would expect and could be causing harm to the environment, we need to ask ourselves, do we really need stain resistant uniforms? Many supermarkets have already switched to PFAS-free alternatives, but unfortunately, we don't know much about the chemistry of the alternatives used. There are often non-coated alternatives available too, which tend to be cheaper and ultimately use the least chemicals and pose the least environmental risk.''

Dr Christina Jönsson is a co-ordinator of the Swedish Research consortia POPFREE, which seeks to find environmentally friendly alternatives to PFASs in consumer products: ''What makes PFAS chemicals so concerning are their unique chemical properties. The carbon-fluorine bond in these compounds is the most stable known in chemistry, so PFASs will take a very long time to break down in the environment. PFASs are highly mobile and can quickly travel to remote regions of the globe like the Arctic. We know some PFASs are toxic but there have not been enough studies done on all the different chemicals being used, so we don't know exactly how hazardous many of them are. But we know that once PFASs get into the environment they will spread, and stay around for hundreds of years, which is enough to warrant action as a precaution. We also need make sure that any PFAS replacement chemicals aren't just as damaging.''

The supermarket chain Tesco have removed PFASs from their uniform range as part of signing up to the Greenpeace Detox campaign. Rebecca Jordan, Fabric Technical Manager explains "Eliminating PFASs from our back to school range first required the raising of awareness within our supply chain and making it a positive topic of conversation. Together, we gave ourselves the goal of replacing PFASs with an affordable alternative which is better for the environment without compromising the customers enjoyment of garment performance. We achieved this goal last year and now our back to school range is PFAS free. It feels great to be part of a sustainable initiative which is simply the right thing to do."

What can shoppers do?

Read the labels of skirts, trousers, blazers and shirts before you buy and check www.pfasfree.org.uk to inform yourselves before you buy. You **can** find uniforms without PFAS-based stain resistant. Aldi, Asda, Lidl, M&S, Morrisons and Tesco have all recently switched to PFAS-free stain resistant coatings. Unfortunately, little information has been made available about the chemistry of the alternatives used. Ideally you can look for clothing that is free of any added stain-resistance or other technical finish. Fidra has asked retailers for details of non-coated options available but have had limited response. So far, only Aldi has confirmed that they have will have non-coated cardigans, jumpers, dresses and shorts available this year[10].

Find out more at www.pfasfree.org.uk

FIDRA Logo

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[5] https://chemicalwatch.com/68770/eu-project-assesses-critical-pfas-use-in-textiles

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[7] PFOA and PFOS are examples of better known PFAS chemicals that are known to have Persistent, Bioaccumulative and Toxic properties and are therefore restricted (PFOS), or due to be restricted (PFOA), under the Stockholm Convention.

[8] See Who Sells What at www.pfasfree.org.uk

[9] E.g. Teflon™ fabric protector ranges have an advertised durability of between 10 and 30 washes.

[10] https://www.pfasfree.org.uk/current-initiatives/inform-consumers/who-sells-what

NOTES TO EDITORS

Fidra:

Fidra is a Scottish registered charity and SCIO no SC043895. It seeks to engage local concerns over current and emerging environmental issues and use this to contribute to a wider dialogue at national and international levels. PFAS Free Uniforms is Fidra's latest project and aims to stop unnecessary use of chemicals of environmental concern. Visit www.pfasfree.org.uk for further information.

POPFREE:

The POPFREE project is an international consortium of industry, researchers and NGOs with a shared mission to find alternatives to PFAS use in consumer products. It plans to evaluate a range of alternatives for their quality and environmental impact and promote these for different consumer products. This includes textiles, but also paper packaging, ski-wax and cosmetics. Fidra is a partner of the project, which will be running until 2020.

FOR FURTHER INFORMATION, PLEASE CONTACT

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The following 3 pages contain images available for use, and detailed answers to frequently asked questions.

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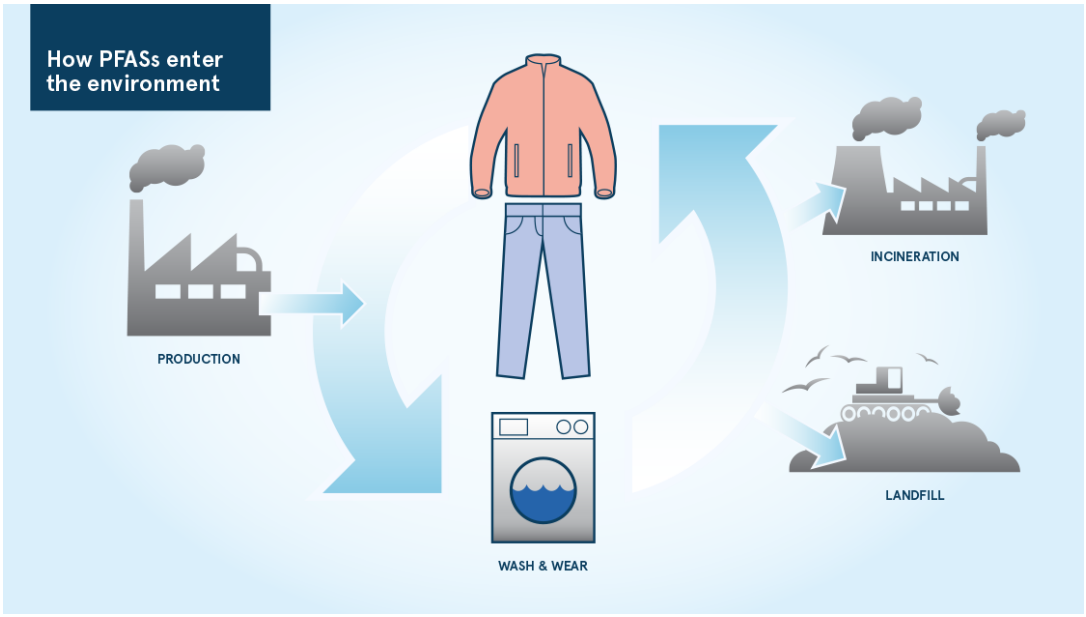
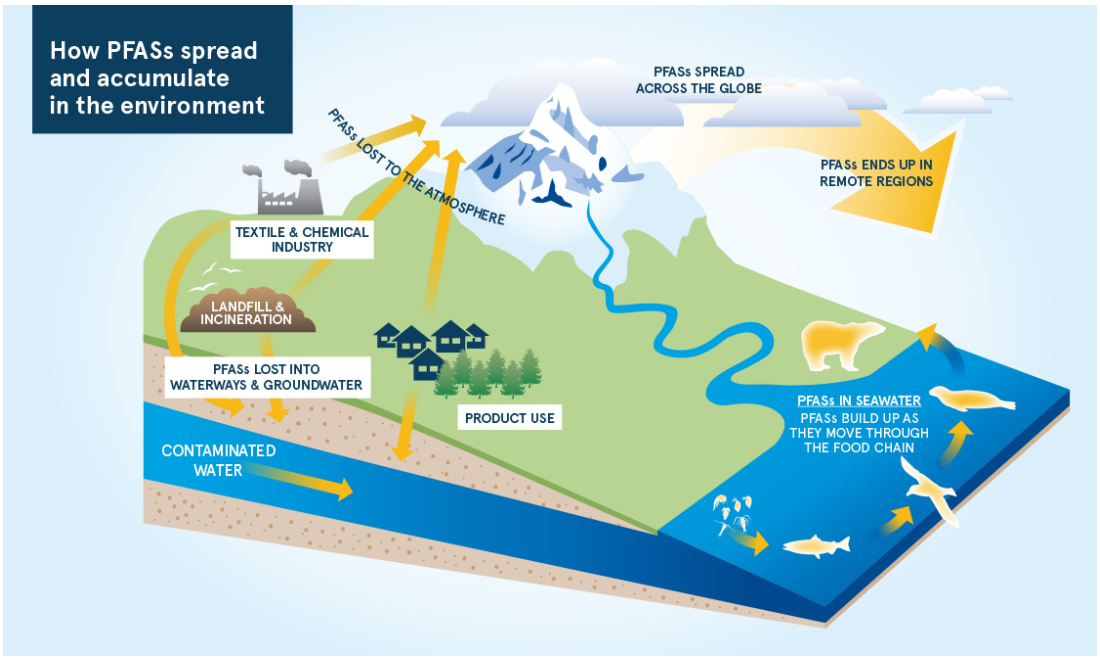
PFAS free ON OUR CLOTHES IN OUR ENVIRONMENT

IMAGES – HIGH RESOLUTION AVAILABE AT: https://bit.ly/2LMUUns



HOW PFAS ENTER THE ENVIRONMENT FROM CLOTHING - MORE DETAILS AT HTTPS://WWW.PFASFREE.ORG.UK/BACKGROUND/ENVIRONMENT-AND-HEALTH - © FIDRA



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CHILDREN IN SCHOOL UNIFORM. PHOTO CREDIT, KERRY DINSMORE.

ADDITIONAL INFORMATION

What is stain resistance?

Lots of school uniforms claim to be stain resistant, this usually means chemicals have been applied to the material to make the fabric repel water and oil. The term 'stain resistant' only implies that stains cannot penetrate the fabric as easily so that some stains wipe off. However, if stains do get onto the fabric, water cannot penetrate as easily during washing and the stain can be harder to get out. Some brands compensate for this by adding chemicals for 'stain release' to allow stains out again.

What chemicals are used to make stain resistant coatings?

Stain resistant finishes are applied to uniforms and can be made of a number of chemicals. Some stain resistant finishes on uniforms contain PFASs (Per- or poly-fluorinated alkyl substances). PFASs are synthetic chemicals of environmental concern, used in a wide range of products, not just uniforms. Alternatives to PFASs do exist for uniforms and many school uniforms are being produced and sold already without using these potentially harmful chemicals. PFAS-based coatings are still the most effective for repelling oil-based stains. However, feedback from major supermarkets making the switch indicate that customer satisfaction remains just as high with alternative coatings that only repel water-based stains.

Are PFAS stain resistant uniforms dangerous to children?

There is no evidence that PFAS coatings on uniforms cause harm to the wearer, as they are made of large polymer molecules that cannot be taken up easily by the human body. However, some PFASs chemicals of concern are used in the production process to make stain resistant coatings and leak from manufacturing plants during production, and there might be remnants of the chemicals used on the clothing in small quantities. Stain resistant coatings are just one of a multitude of uses of PFASs, which leak from production, use and end of life of these products, and build up over time as they don't break down easily – we are all exposed to these background levels to some extent, mostly through contaminated dust, food and water[11].

Are PFAS stain resistant uniforms bad for the environment?

PFASs can wash off clothes, leach from landfill and incinerators, and leak out in production, ending up in our environment. As well as for uniforms, PFASs are used in food packaging, in our homes on stain-

resistant textiles, on non-stick cookware, cosmetics and more. Because the carbon-fluorine bond is so strong, PFAS chemical compounds are very slow to break down in the environment. PFASs of environmental concern are also very mobile, traveling long distances to end up in remote environments. They are found in our workplaces, our drinking water, in wildlife and in our own bodies. We know some of these chemicals can do harm to animals from laboratory experiments, and there are signs they are harming wildlife, including polar bears[12].

How long does PFAS stain resistance last and will it make uniform last longer?
The majority of PFAS-based stain resistant finishes on uniforms are only guaranteed to last 10 or 20 washes depending on the brand used. Based on average washing habits this represents around a third of a school year so if you bought new uniforms at the start of the autumn term and wash them once a week, they will be washed off by the February break. There is no evidence that people who buy stain resistant uniforms wash them any less or replace uniforms less frequently, which throws into doubt the environmental credentials advertised by coating manufacturers[13].

Is there legislation to restrict use of PFASs?
Only for certain specific chemicals within the PFAS group. Perfluorooctanesulfonic acid (PFOS) is restricted under the Stockholm Conventions as a persistent organic pollutant[14], while PFOA and PFHxS are currently being reviewed for inclusion[15]. A number of other PFAS chemicals are on the EUs REACH candidate list of substances of very high concern (SVHCs) with perfluorooctanoic acid (PFOA) due to be restricted by 2020[16]. There are no European-wide restrictions on imports, meaning PFOA can continue to be produced and used on clothing in other countries, such as China, which, as a result, has grown to be the largest emitter of environmental PFASs worldwide[17]. A wholescale ban on imports, as created by Norway[18], is required to reduce global production of these chemicals.
Some companies phasing out PFOA and PFOS have replaced these chemicals with various alternative PFASs, often with shorter chains, as these are thought to be less persistent in the environment. The potential risk of these chemicals has not been sufficiently studied to prove their safety. Initial studies indicate that some of these chemicals could be highly mobile and highly bio-accumulative, as well as equally persistent in the environment as long-chain PFASs. A group-based approach to regulating these chemicals should be considered, with the potential for chemicals to be exempted with valid evidence of minimal hazard and appropriate containment to minimise exposure.

Visit www.pfasfree.org.uk for further information.

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