

UK Governments should introduce legislation that requires washing machine manufacturers to fit microfibre filters in all new domestic and commercial machines, by 2023 and all commercial machines are retrofitted with microfibre filters by 2024.

What is the issue? Globally, more than 840 million domestic washing machines are used¹ and during every wash microfibres are lost from our clothes. In fact, at least 9.4 trillion fibres are released each week from washing in the UK alone² with many of these fibres ending up in the ocean and on our beaches. The advent of technological solutions, in particular the fitting of filters within washing machines, can stop the microfibers getting in the wastewater and ultimately into the ocean.

Currently it is estimated that 12.2 million tonnes of plastic enter the ocean globally every year, 0.95 million tonnes of this entering as primary microplastics³. Primary microplastics are those which are produced as 5 mm or less, unlike secondary microplastics which are the result of larger items breaking down. Models have estimated that 15-31% of all microplastics in the ocean are primary; with the laundry of textiles accounting for up to 35%⁴. This modelled contribution of fibres is likely to be a severe underestimation, as fibres accounted for 70-100% of all microplastics in deep sea sediments.⁵

In the North Sea, 63% of shrimp in the North Sea have been found to contain synthetic fibres⁶. The ingestion of microplastics by organisms shows that it negatively impacts feeding behaviour, growth, development, reproduction and lifespan⁷. Natural and semi-synthetic fibers will also pose environmental concerns due to the chemicals associated with them. The MICRO project⁸ made a first attempt at defining economic impacts of microplastics on UK aquaculture (oyster) industry in the Channel region and indicated a cost of between £1.5M - £500M⁹

Legislating to reduce microplastic pollution in this way would also align the UK with the UN Sustainable Development Goal 14 (Target 14.1) of which we are a signature. Evidence on the impact of microplastics on human health is still in its infancy, but the annual consumption of microplastics is estimated to be 55,000 per year via seafood¹⁰. In 2016, the UK Chief Medical officer was asked to review the effects of microplastics on human health¹¹. The World Health Organisation has called “for a reduction in plastic pollution to benefit the environment and reduce human exposure”¹².

¹ <https://www.sciencedirect.com/science/article/abs/pii/S0048969717310161?via%3Dihub>

² https://www.thewi.org.uk/data/assets/pdf_file/0007/327418/WI_EndPlasticSoup_Report_Stakeholders.pdf

³ <https://www.eunomia.co.uk/reports-tools/plastics-in-the-marine-environment/>

⁴ <https://www.iucn.org/content/primary-microplastics-oceans>

⁵ <https://science.sciencemag.org/content/early/2020/04/29/science.aba5899.full>

⁶ <https://www.sciencedirect.com/science/article/abs/pii/S0025326X1500418X?via%3Dihub>

⁷ <https://www.sciencedirect.com/science/article/pii/S0269749118333190>

⁸ <http://www.ilvo.vlaanderen.be/micro>

⁹ <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environmental-audit-committee/environmental-impact-of-microplastics/written/31827.pdf>

¹⁰ <https://ehp.niehs.nih.gov/doi/10.1289/EHP7171>

¹¹ <https://publications.parliament.uk/pa/cm201617/cmselect/cmenvaud/802/80202.htm> We are unaware of any follow-up publication.

¹² <https://www.who.int/news/item/22-08-2019-who-calls-for-more-research-into-microplastics-and-a-crackdown-on-plastic-pollution>

Why isn't wastewater treatment solving the problem?

Wastewater treatment works are very efficient in removing microplastics from final treated effluent, with removal rates of between 80 – 99%¹³. This still means an estimated that 65 million microplastics particles are discharged every day in the effluent from each treatment plant¹⁴.

Despite being captured in the process, the overwhelming majority of microplastics still end up back in the environment¹⁵. This is because solid materials, including microplastics, are captured and remain within the final treated sewage sludge. Many fibres are high density and therefore, likely to settle out in the sludge capture stages, with analyses from Norwegian sludge of the microplastics, 28.9% were fibres (alongside 37.6% microbeads, 31.8% fragments and 1.7% glitter)¹⁶. It would be expected that fibre contribution is higher in the UK due to the existing UK microbead ban. There is currently no way to remove microplastics from this treated sludge¹⁷. In the UK, the majority of sludge (around 87%)¹⁸ is then applied to agricultural land with repeated applications on soils leading to the accumulation of microplastics over time, resulting in high concentrations¹⁹.

Sludge spreading has the potential to epitomise the circular economy, whereby an unavoidable waste product containing valuable nutrients and organic matter is utilised as an important resource for agriculture. However, sludge needs to be fit for purpose and for use as a product within the circular economy. Ensuring pollutants including microplastics are reduced at source, would allow for a cleaner circularity and therefore support the aims of UN SDGs, in particular SDG 6 (Clean Water and Sanitation), SDG 12 (sustainable consumption and production) SDG 14 (Life below Water) and SDG 15 (Life on Land).

How can we use washing machines to reduce microfibre pollution?

Washing machines provide a point source of pollution at which microfibres can be removed. There are currently a number of proposed solutions including in-wash bags and devices such as Cora ball and Guppyfriend. Filter options for the washing machine include Arcelik²⁰ with an internal filter, and companies offering post-purchase external filters such as Fitol²¹, LINT-LUVR22 and PlanetCare²³, as well as those such as XFiltra by Xeros, internal filters which can be licensed²⁴.

Research on different devices found that the Cora ball had a 31% effectiveness, the Guppyfriend bag reduced “microfibre release to wastewater by around 54%...by reducing

¹³ <https://pubs.rsc.org/en/content/articlelanding/2016/ew/c6ew00207b#!divAbstract>

¹⁴ <https://pubs.acs.org/doi/10.1021/acs.est.5b05416>

¹⁵ <https://www.sciencedirect.com/science/article/abs/pii/S0304389420320604>

¹⁶ <https://www.miljodirektoratet.no/publikasjoner/2018/april-2018/mapping-microplastics-in-sludge/>

¹⁷ ‘Pollution from microplastics, like many other diffuse forms of pollution must be controlled at source in line with the *Polluter pays* and *Producer responsibility principles*, as any further controls in the sewerage and sewerage treatment system are simply unsustainable - carbon hungry, unaffordable, and without huge investment largely ineffective.’ Tony Harrington (Pers. comm), Director of Environment, Dwr Cymru Welsh Water

¹⁸ <https://assuredbiosolids.co.uk/about-biosolids/>

¹⁹ <https://www.sciencedirect.com/science/article/pii/S004896971931366X>

²⁰ <https://www.arcelikglobal.com/en/blog/playing-our-part-to-beat-plastic-pollution/>

²¹ <https://filtrol.net/>

²² <http://www.environmentalenhancements.com/>

²³ <https://www.planetcare.org/en/products>

²⁴ <https://www.hydrofinitly.com/blog/xfiltra-could-stop-microfibre-pollution-in-our-oceans>

microfibre shedding from the clothing during the washing cycle.”²⁵ Reducing shedding, although welcome, cannot replace a capture device fitted to the washing machine which prevents the fibres entering the waste water system. The Xfiltra, an internal microfibre filter, which would be factory fitted, was found to be the most effective, removing 78% of microfibres in a wash²⁶.

Feasibility of washing machine filters

The technology is available. There is evidence of significant environmental harm and the need for action, as well as public support for action. With a number of different options available, the UK government should lead the way by providing the world’s first standard (via the UK BSI PAS standard) to describe the requirements of a microfibre filter. This would facilitate early adoption and significantly lower the barrier to engagement with washing machine manufacturers on this issue.

International colleagues are already ahead of the game. In early 2020 France passed legislation that will require all new domestic and commercial machines to be fitted with a microfibre filter by January 2025, with Luxembourg having preliminary draft legislation to follow suit. A YouGov survey commissioned by MCS²⁷ found 81% of GB adults said they would support government legislation which would require all new domestic washing machines to be fitted with microfibre filters. Furthermore, a quarter (26%) of GB adults said they would be willing to pay an additional £50 or more and over half (56%) willing to pay an additional £5 or more for a washing machine that included a microfibre filter compared to one that didn’t.

The Marine Conservation Society supports the introduction of factory fitted filters, rather than externally fitted filters which puts the onus on consumers. In order to be as effective as possible in preventing microplastic pollution, the system should be easy to access, reusable (cartridges while welcome may become prohibitive due to cost and in the latter part of the machine life, more difficult to obtain) and filter out a minimum of 80% of all microfibres (of all materials).

²⁵ <https://www.sciencedirect.com/science/article/abs/pii/S0048969720339346>

²⁶ <https://www.sciencedirect.com/science/article/abs/pii/S0048969720339346>

²⁷ Total sample size was 2136 adults. Fieldwork was undertaken between 9th - 10th March 2020. The survey was carried out online. The figures have been weighted and are representative of all GB adults (aged 18+).