

An industry consensus on the shortcomings of UK furniture fire safety practices and the impacts of chemical flame retardants on product circularity, industry innovation, and public and environmental health

A mattress industry perspective

Abstract

In June 2023, industry experts and policy makers attended a roundtable event to discuss the long-standing reliance on chemical flame retardants in UK mattresses and other furniture and furnishings. Concerns around the use of chemical flame retardants for health, the environment and the circular economy are well documented, but they can also be burdensome for industries wishing to innovate sustainable fire safety solutions and improve product circularity. Discussions outlined shortfalls of current practices and recommendations for future development. Points of consensus were used to develop this industry statement which can be used to inform future policy decisions regarding furniture fire safety and the use of chemical flame retardants, encourage voluntary industry action, and catalyse wider improvements in chemicals management.

Background

The UK's current Furniture and Furnishings (Fire) (Safety) Regulations (FFRs) 1988 have resulted in large volumes of chemical flame retardants (CFRs) being used in mattresses and other furniture items, contributing to the exceptionally high CFR exposure rates recorded amongst the UK public (1; 2; 3; 4). CFRs are commonly added to furniture and textiles to meet specific requirements within the FFRs, such as the open flame ignition test, which aims to delay time to ignition and ensure adequate escape time in the event of a fire (2; 5). However, many other countries with less prescriptive furniture fire safety requirements, such as New Zealand, Belgium, France, and Germany, have demonstrated similar declines in fire fatality trends to the UK without relying on CFRs, casting significant doubt over the effectiveness of the UK's current approach (1; 2; 3). This, combined with increasing evidence of the detrimental health and environmental effects of CFRs, has resulted in a call to amend the FFRs and reduce reliance on flame retardant chemicals.

Human exposure to CFRs often occurs when they are released from household products into air and dust which then collects on floors and other surfaces (3; 6). Many halogenated organic (containing halogens bound to carbon) CFRs have been connected to adverse health impacts, including abnormalities in neurological and reproductive development, and carcinogenicity (2; 3; 7). Numerous brominated and organophosphate flame retardants have additionally exhibited endocrine disrupting properties, meaning they can interfere with normal hormone functions. Some widely used CFRs, such as several Polybrominated Diphenyl Ethers (PBDEs), have consequently been restricted. However, evidence has demonstrated similar concerns for CFRs currently in use, such as Tris(1,3-dichloroisopropyl) phosphate (TDCPP) and Tris(2-chloroethyl) phosphate (TCEP) connected with tumour formation, BFRs 2-ethylhexyl tetrabromobenzoate (TBB) and Bis-(2-ethylhexyl) tetrabromophthalate (TBPH) connected with reproductive toxicity, and melamine and tris(chloropropyl) phosphate (TCPP), shown to exhibit carcinogenic activity (1; 4; 8; 9). A 2023 consensus paper on the environmental and health impacts of CFRs, produced by UK academics and other experts, reported that exposure to CFRs can occur at all stages of a product's lifecycle, from

manufacture and assembly, through to disposal and recycling. Based on peer-reviewed scientific studies, the paper lists numerous adverse health concerns including neurotoxicity and carcinogenicity (3).

Many CFRs have been recorded in the environment, contributing to global chemical pollution. These persistent chemicals contaminate air, water, and soil and can accumulate in organisms (1; 2). Bioaccumulation of BFRs within food chains is well documented, with dose and consequently risk of harm highest for top predators (1; 10). CFRs also have the potential for long-range transboundary transport; the ability to travel far from known sources using oceanic or atmospheric circulation pathways (11). This has resulted in their detection in wildlife species across the globe, including UK gannet and otter populations, seals in the Baltic Sea, Antarctic penguins, Arctic gulls and polar bears, flies in Japan, dolphins, orcas, porpoises and salmon populations, with documented adverse effects to behaviour, fertility and survival rates (12; 13; 14; 15; 16; 17; 18). The United Nations now lists pollution, including chemical pollution, as one of the five main drivers for biodiversity loss (19), and in 2022, new research warned that the Earth's planetary boundary for chemical pollution had been crossed, endangering stable states that have otherwise been maintained for the last 10,000 years (20).

The UK's reliance on CFRs for furniture fire safety also presents a significant barrier to the circular economy. Numerous case studies have demonstrated how use of problematic substances, coupled with lack of chemical transparency, can leave recycling efforts vulnerable to contamination of materials with newly restricted or otherwise harmful chemicals (1; 21; 22). An important example for the UK was recently highlighted in research commissioned by the Environment Agency on waste upholstered domestic seating (WUDS). The study identified decabromodiphenyl ether (decaBDE), a CFR now restricted under the Stockholm Convention on persistent organic pollutants (POPs), at levels significantly above legal waste concentration limits in WUDS (23). Affected items are now required to be incinerated rather than being reused, recycled, or going to landfill, creating significant challenges for waste management and local authorities, and diminishing efforts towards circularity (24). Acknowledging this current oversight, demand for improved chemicals management within a circular economy is increasing globally (1).

Consensus Statement – A Mattresses Industry Perspective

An estimated 6.4 million mattresses were disposed of in the UK in 2020 (25). To stimulate improved waste management, the National Bed Federation are working towards a target of diverting 75% of mattresses from landfill by 2028. Many industry representatives are engaged with this goal and committed to improving product circularity and sustainability. In doing so, many are also aware of the barriers presented by CFR use.

In June 2023, the environmental non-governmental organisation, Fidra, and circular economy consultants, Oakdene Hollins, hosted a roundtable event in which policy makers and experts from across the mattress industry joined to discuss ways forward. Throughout the event, numerous pragmatic and promising solutions were presented, demonstrating a broad desire for innovative products that achieve effective and sustainable fire safety without relying on CFRs.

Points of consensus outlining both shortfalls of current practice and recommendations for future development are given below. It is hoped that this statement will be used to inform future policy decisions regarding furniture fire safety and the use of CFRs, encourage voluntary industry action, and catalyse wider improvements in chemicals management.

Consensus points regarding the current UK Furniture and Furnishings (Fire) (Safety) regulations and chemical flame-retardant use:

- There is a large and growing body of evidence connecting chemical flame retardants (CFRs) with detrimental impacts to public health, the environment and the circular economy.
- The current UK Furniture and Furnishings (Fire) (Safety) regulations (FFRs) have resulted in a reliance on CFRs by many manufacturers, restricting innovation towards alternative methods of fire safety.
- Analysis of available evidence creates significant doubt over the effectiveness of the UK FFRs in reducing fire fatality rates.
- It is not known for how long CFRs are retained in mattresses and other furniture items, and therefore for how long such items are compliant with fire safety standards. This raises further questions over the effectiveness of the FFRs.
- The current FFRs no longer reflect modern-day lifestyles and behaviours pertaining to fire safety (e.g., public smoking behaviours, ownership of smoke detectors).
- The current FFRs do not consider fire smoke toxicity, or the contribution of CFRs to smoke toxicity, despite significant impacts on escape time, fire injury and mortality rates.
- The FFRs in their current form make the phasing out of CFRs from furniture that contains foam impossible, hindering product innovation.

Recommendations for achieving effective and sustainable fire safety:

1. Use of harmful chemicals, including CFRs, should be avoided wherever possible and substances of very high concern (SVHCs) must be removed from product supply chains in a timely manner.
2. Updates to the FFRs should support rather than hinder innovation away from CFR use, and accurately reflect modern furniture construction, fire safety measures, and public behaviour patterns.
3. A shift from component to composite testing for upholstered products is needed within the FFRs for fire safety standards to be more representative of a final product and reduce reliance on CFRs.
4. Where CFRs and other substances of concern are still used, products must be accompanied by chemical transparency and traceability, with digital labelling identified as the most effective option for data sharing. Regulatory support should ensure chemical transparency and digital labelling are progressed in a meaningful timeframe.
5. Fire smoke toxicity, and the contribution of CFRs to smoke toxicity, has a significant impact on product fire safety and should be included within the scope of the FFRs.
6. Extended Producer Responsibility schemes for mattresses and other furniture items should incentivise responsible chemical management. This should include financial initiatives, as well as encouraging a shared due diligence for human and environmental health protection across supply chains.
7. Updates to the FFRs should address the issue of infant exposure to CFRs in children's mattresses and the disposal of smaller mattresses within household waste.
8. Increasing interest in chemical safety amongst consumers must be recognised through increased transparency but with care taken to ensure data is accessible and does not burden consumers with complex chemical information or trigger undue safety concerns.

9. Data collection, investment, and collaboration should continue amongst relevant stakeholders to help improve a shared understanding of sustainable chemical management within mattresses and other affected products.
10. Any solutions taken forward must consider potentially unintended consequences and ensure a holistic approach to safety and sustainability.

Signatories:

British Institute of Interior Design – Matt Freeman, President

Bye Bye Bed Ltd – Paul Beckett, Director

Cottonsafe® Natural Mattress – Rebecca Willis, Director

DFS Furniture Plc – Robin Scott, Head of Quality – External Supplier Partners

Environmental Services Association – Sam Corp, Head of Regulation

Hypnos Beds – Richard Naylor, Group Sustainable Development Director

IKEA of Sweden AB (Inter IKEA Group) – Margareta Björkander, Specialist Functions Manager

National Association of Waste Disposal Officers – Sam Horne, Chair

National Bed Federation – Tristine Hargreaves, Executive Director

Silentnight Ltd – Angela Moran, ESG Director

Sleepezee Ltd – David Morris, Purchasing Director

TFR Group (The Furniture Recycling Group) – Nick Oettinger, CEO



Supporters:

Support from industry stakeholders unable to attend to the roundtable.

Association of Master Upholsterers and Soft Furnishers – Wendy Shorter-Blake, MBE, FAMU, Chairman and Training Director

Delyth Upholstery Richmond – Delyth Fetherston-Dilke, Upholsterer

Mattress Online – Steve Adams, CEO



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This statement was based on discussions held between all attendees of a roundtable event, including representatives of the mattress industry and relevant policy makers. Work completed by circular economy consultants, Oakdene Hollins, also contributed to discussions and formation of this statement.



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