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Wool & Interiors

Volatile organic compounds (VOCs) absorption joins natural flame retardancy in the list of advantages of using wool in the design of interiors. Wool fibre in interiors has been found to ameliorate growing concerns surrounding Sick Building Syndrome (SBS).

VOCs & The Right to Breathe Healthy Air

The role of VOCs in accumulating indoor contaminants is of increasing concern. The quality of indoor air has also achieved international attention: the World Health Organisation (WHO) has issued statements emphasising the right to breathe healthy indoor air, and with that, the obligations which rest on responsible authorities.

VOCs are organic compounds with boiling points from 50 to 260°C. All other organic compounds with boiling points below 50°C are called very volatile organic compounds or vVOCs. Familiar VOCs include benzene, formaldehyde, and toluene.

99% of exposure to VOCs comes from directly breathing them in. One US survey indicates that people spend 87% of their time in enclosed buildings and 7% in enclosed vehicles. The European Respiratory Society states that 'pollutants may have an important biological impact, even at low concentrations, over long exposure periods'. This is popularly recognised as 'sick building syndrome' leading to feelings of malaise and instances of ill health among residents and workers.

In response, industry has introduced a wide range of air cleaning treatment products, endeavouring to get rid of both chemical and biological indoor contaminants. The drawback is that they are energy intensive and have a limited lifespan.

A simpler solution is wool fibre, which is known to manage the problem when used as furniture, carpets, clothing, or insulation.

Wool can absorb a range of harmful chemicals which occur in the indoor environment



Science Finds Wool as an Answer to VOCs

Studies have shown that common VOCs, which occur in the indoor environment and are implicated as a cause of SBS, can be absorbed and chemically bound by wool, improving ambient air quality. A recent paper published by scientists in the UK, headed by Dr Graham Ormondroyd, tested wools from various sheep breeds, selected to measure possible differences in absorption of VOCs in their wool. These were British Swaledale, Welsh Mountain, Light Herdwick, Blackface and Drysdale, the latter a New Zealand breed, all commonly used for home furnishings or insulation. Tests were carried out on gaseous formaldehyde and also the VOCs Limonene, Toluene and Dodecane.

The wool of different breeds of sheep and also the way the fibre is processed were shown to have differing effects on the rate of absorption of the VOCs. The data showed that wool, as a natural and sustainable product, can absorb a range of harmful chemicals from the environment, demonstrating its potential as a solution to the problem of indoor air contamination.

Wool's Advantages in Reducing Interior Fire Damage

Gas, smoke, and toxic fumes are the most common cause of death following domestic fires. Fatalities are more likely to occur in rooms where soft furnishings are found, making it vital to choose the least flammable materials.

Research indicates that wool used in apparel and furnishing textiles can provide a greater level of fire safety than other fibres.

Wool is the most flame resistant of fibres commonly used in interiors (cotton, rayon, polyester, acrylic and nylon) and is harder to ignite than other fibres. Wool fibre has a high Limiting Oxygen Index (LOI), the amount of oxygen needed to sustain combustion. Wool does not melt, unlike polyester and nylon, which melt at 252-292 and 160-260°C respectively, nor does it stick to the skin. It has a low heat combustion level, meaning the amount of heat released in burning, and it extinguishes itself.

Wool Safety in Furnished Interiors

Wool carpets have inherently low flammability, and fire chars on the surface pile, protecting the lower surfaces and backing. Even with a non-wool underlay, wool maintains its CRF (Critical Radiant Flux). The lower the CRF the greater spread of flame. Tests show that in nylon and polypropylene carpets CRF drops significantly as they melt onto the underlay, involving this layer in the fire, producing higher smoke levels and toxic substances.

Wool can also slow down combustion and flame spread in bedlinen, and furnishings, even when other fibres are also involved. Fire spreads slowly in a wool blanket or duvet, with low heat output and relatively little smoke, even over a longer period. VOC absorption, combined with flame resistant chemical structure, makes wool the safety fibre of choice for interior design.

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About IWTO

With a world-wide membership encompassing the wool pipeline from sheep to shop, the International Wool Textile Organisation (IWTO) represents the interests of the global wool trade. By facilitating research and development and maintaining textile industry standards, IWTO ensures a sustainable future for wool. To learn more about IWTO and its activities, visit www.iwto.org.

