
best wool
ZQ
PREMIUM FIBRE
Clean Air

WHAT?

We now spend around 90% of our lives indoors[1] and indoor air pollution is now of greater importance to human health than outdoor air pollution. The effects of indoor air pollution on us, whether at home or the workplace, are varied but can include irritation of the eyes, nose and throat, respiratory illness, headaches, dizziness, and fatigue.[2] Indoor air pollution occurs when harmful gases and or particles are released into the air of an interior environment. When the air circulation or exchange is poor, these contaminants can build up to potentially harmful levels.

There are a variety of sources of indoor air pollution such as:

- *Interior furnishings and household chemicals that can release Volatile Organic Compounds (VOCs).*
- *Heating systems and home appliances*
- *Tobacco smoke*
- *Building materials*
- *Allergens from pets, house-dust mites, fungi, bacteria, pollens, etc.*

WHAT ARE VOLATIVE ORGANIC COMPOUNDS (VOC)?

Many new products have a characteristic odour – such as the smell of a new car, fresh paint, new carpet, etc. This odour is due to the release of Volatile Organic Compounds (VOC's). VOCs are gases and vapours that typically dissipate within a short period.

HOW DOES WOOL CARPET HELP WITH VOC'S & INDOOR AIR POLLUTION?

Interior furnishings and textiles can act as 'sinks' to absorb certain particulate and gaseous atmospheric pollutants from the indoor environment. Because of their nature and materials used in their construction, carpets present a much larger area for gas absorption than other interior fixtures and furnishings. 1m^2 painted wall represents little more than 1m^2 of absorbing surface, whereas 1m^2 of carpet containing 1000g of wool 35µm in diameter in the surface pile presents a fibre surface of at least 100m^2. Carpets therefore have the potential to make a greater contribution to the removal of indoor air pollutants than many other interior products.

DOES WOOL CARPET REMOVE INDOOR AIR POLLUTANTS MORE EFFECTIVELY THAN SYNTHETIC CARPET?

Three common gaseous indoor air pollutants with known adverse health effects on humans are Nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and formaldehyde (HCOH) – all of which are removed effectively by wool carpet.

Nitrogen Dioxide Absorption

Work has been done to determine NO_2 removal from indoor air with 35 types of building materials and furnishings[3] found that the highest removal rates were for wallboard, cement block, wool carpet, and brick. Acrylic, polyester and nylon carpets had NO_2 removal rates under one third those of 100% wool carpet, see Figure 4.

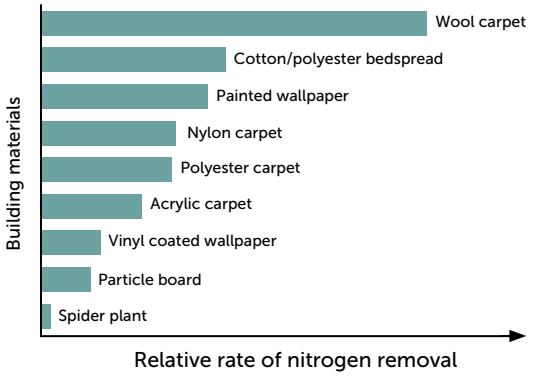

Figure 4. NO2 removal rates for various residential materials (Spicer et al 1986).

Formaldehyde Absorption

Carpet has also been shown to be effective in absorbing formaldehyde. Wool carpets begin to absorb formaldehyde as soon as it is introduced to their surroundings.
Wool carpets have been shown to reduce levels of formaldehyde from 420ppm to 0.5ppm in four hours.[4] In the same study, nylon carpets exhibited a slower rate of absorption, reducing 420ppm to 80ppm in four hours.

Sulphur Dioxide Absorption

When wool, nylon, cotton, and viscose rayon fibres are exposed to sulphur dioxide it has been shown nylon became saturated quite quickly; rayon becomes saturated within an hour, but wool and cotton continue to absorb sulphur dioxide after 1 hour[5]. See figure 5.

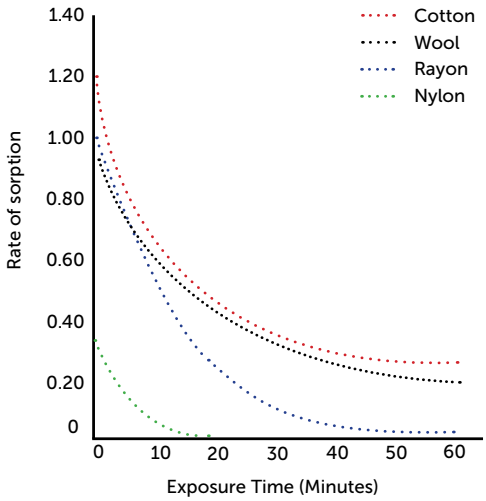

Figure 5. Comparison of SO_2 absorption rates for wool, cotton, nylon and rayon equilibrated at 84% RH and exposed to 2.92 µg/l SO_2 at an airflow of 1 l/min (Walsh et al 1977).

Pollutant Re-emission

It has been shown[6,7] that re-emission of NO_2 from wool carpet and cement block is neglibible, even with moderate increases in temperature or relative humidity.
Previous work has shown that SO_2 and formaldehyde are not readily re-emitted by wool carpet[5,8]
The complex chemistry of the wool fibre enables it to bind pollutant gases chemically in its structure and it has been estimated that wool carpets can continue purifying indoor air for up to 30 years.

Particulate Air Pollutants

Carpeting also has a much-reduced propensity for particulate disturbance compared to hard flooring. This is a key point, as particulate pollutants only become of clinical importance if aerosolised by a disturbance and subsequently breathed in. Thus, carpeting provides a means of actively removing such pollutants from the air, trapping them within its structure until vacuuming can remove them.

Whilst carpeting (both wool and synthetic) both act as sinks for particulate pollutants it has been shown that these particulates are no more likely to build up in wool products than those from other fibres[9] can easily be removed by vacuuming. Particulate pollutants are also a source of indoor air quality issues, such pollutants can include allergens (dust mite, cat, cockroach, etc), pollens, moulds etc and contribute to respiratory problems and other allergic reactions.

SO, WHAT DOES THIS MEAN?

- *Best Wool carpet is an efficient absorber of potentially harmful indoor air pollutants such as formaldehyde, nitrogen dioxide and sulphur dioxide.*
- *Wool carpets outperform nylon carpets in terms of their capacity to purify the indoor air.*
- *Interior textiles such a carpeting can act as filters for particulate pollutants, and their ability to be easily cleaned provides a means of managing human exposure to such hazards.*
- *Particulate pollutants such as mite allergens are no more likely to build up in wool carpet than synthetic carpet and are readily removed by vacuuming.*
- *Carpet has a much-reduced propensity for disturbance of particulate pollutants (allergens, etc) than hard flooring.*

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