

HEALTHY FLOORING NETWORK

Guide to Healthy Flooring

Most of us know the particular smell of new carpet, but few realise that the smell, coming from the chemicals in the carpet, is just one of the potential health risks lurking in our favourite flooring. A report for the Healthy Flooring Network (HFN) endorses the idea that the allergens in carpets are important in triggering the symptoms of allergic asthma sufferers.

Wall-to-wall carpeting suggests luxury, comfort and warmth, but the appeal diminishes when we look a little closer. Carpets harbour dust which leads to a build up of dust mites and dust mite allergen - an important trigger for asthma and other allergies. They may also contain chemical residues from their manufacture or treatment. Carpets act as sinks for pollutants and toxins and all these things can trigger allergic reactions. Babies and young children exposed to such allergens can become sensitised to them and develop asthma and allergies in later life.



ONE SQUARE METRE OF CARPET CAN CONTAIN UP TO 100,000 DUSTMITES

One of the most effective things you can do to reduce the risk of allergy is to remove wall-to-wall carpets and replace them with smooth flooring or mats that can be removed for cleaning. Conventional cleaning, even with the newer types of high-powered vacuum cleaners, is not sufficient to remove dust mites and doesn't have the same impact on asthma symptoms as complete removal of the carpet. A variety of healthy alternatives are available, including wooden, linoleum, cork and laminate floors. However, the cheapest smooth floorings are made of PVC, also known as vinyl, which is a major source of toxic, and sometimes persistent, substances in the environment. Some research also suggests the softeners in PVC itself may contribute to asthma incidence.

This briefing explains more about the hazards beneath our feet and suggests actions you can take to make your flooring healthier for your household and the wider environment. A separate sheet of useful contacts and alternative flooring suppliers is available on request.

The Healthy Flooring Network

The Healthy Flooring Network is an alliance of organisations and individuals concerned about health, asthma and allergy, founded in February 2000 by the Women's Environmental Network and Action Against Allergy.

HFN commissioned a review; Allergic Disease and the Indoor Environment by Dr. Jill Warner, Senior Lecturer in Allergy and Immunology at

HFNs statement of concern has also been signed by:

National Eczema Society; Pesticide Action Network UK; Friends of the Earth UK and Scotland; The Association for Environment Conscious Building; The London Hazards Centre; Hazards Magazine; Dr. Vyvyan Howard, Infant and Foetal Toxicology, University of Liverpool; Dr Jill Warner, University of Southampton; Breakspear Hospital; Halton Friends of the Earth; Food & Chemical Allergy Association; British Society for Allergy, Environmental and Nutritional Medicine; The Migraine Action Association; Hyperactive Children's Support Group; Inside Story; What Doctors Don't Tell You.

the University of Southampton. This review highlights for the first time that carpets act as important reservoirs of allergens which trigger allergic asthma.

The network aims to raise awareness of the links between fitted carpets, PVC flooring and health and to encourage and promote alternatives.



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CARPETS: CONTAMINANTS

Carpets and carpet fibres are treated with a variety of different substances in order to achieve the desired qualities. These may include treatments to increase stain resistance, moth proofing, anti-static and anti-microbial properties. The chemicals used have a wide impact on the environment throughout their lifecycle. They also impact on the health of the workers making and installing the product and may contribute towards aggravating asthma and other respiratory problems.

Chemicals in new carpets and carpet backing are known to 'off-gas' (release toxic fumes into the air). Emissions are linked to old carpets as well as new - in fact old carpets may be worse. Carpet acts like a sponge and a filter for airborne particles, pollutants, dust mites, mould and animal dander.

This sponge-like ability attracts fumes from substances such as paint, cleaning products, synthetic fragrances, photocopier emissions etc contributing to a very diverse and toxic mixture which we are all exposed to on a daily basis, in our homes, work places and in public buildings.

Shoes carry outdoor dust and particles into the carpeted environment and deposit them into the fibres. Outdoor air pollutants get absorbed by carpet only to release them back into the air at a later date.

We don't know how ongoing exposure to low levels of chemicals indoors contributes to people becoming sensitised, or tips those already sensitised over the edge. "Increase in exposure to synthetic and pollutant chemicals makes a substantial contribution (to allergic diseases)" Multiple Chemical Sensitivity Recognition and Management, British Society for Allergy, Environmental & Nutrition Medicine, 2000.

Vacuuming or steam cleaning cannot remove these contaminants. Also, unless you use a vacuum with a high efficiency particulate air (HEPA) filter, the majority of the dust collected will blow out the back of the vacuum to resettle itself into your flooring. Wet carpet poses other problems of mould, fungi and mildew build up. These are known to aggravate particular forms of asthma and respiratory problems.

PVC

PVC (vinyl) flooring is the most common type of smooth flooring in the UK. PVC creates environmental hazards throughout its lifecycle, mostly because of its main constituent chlorine, which can lead to the creation of dioxin when it is manufactured, or burned in incinerators. Because PVC products are difficult to recycle they present a growing and costly waste problem.

PVC flooring also contains a number of additives in large quantities, some of which are also toxic. In particular, the softeners known as phthalates can leak out of PVC floors when they are washed or can be emitted into the air and attach to dust. Other hazardous additives used in PVC floors are chlorinated paraffins and tributyl tin. All of these are listed internationally as chemicals for priority action for elimination. There is some evidence that has linked phthalates in PVC flooring to the development of asthma, so although PVC is undoubtedly the cheapest smooth flooring, it should not be recommended as a suitable substitute for fitted carpets, particularly if there is concern about asthma or other allergies.

DUST MITES & FITTED CARPETS

Dust mites are tiny little creatures that make their homes in warm, humid, dusty areas such as carpets, mattresses, pillows, and other soft furnishings. Mite allergens can be found throughout the home environment although the greatest number of mites are found in carpets and the highest concentration is in bedding.

These creatures have adapted themselves to exist alongside us. They don't bite, or live on people but many asthmatics are allergic to an enzyme found in the dust mite faeces. These mite droppings are known as mite allergens, and each mite produces about 20 faecal pellets per day.

They feed on the skin scales we shed and the fungi that grow on that skin. They have a life cycle of up to 3 months and the female dust mite lays up to 300 eggs over this period. No amount of vacuuming or cleaning can remove the mites as they have suckers on their legs and grip tightly onto carpet fibres when threatened with a vacuum cleaner!

CHILDREN & CARPETS

Small children are at particular risk from allergens and/or chemicals in carpets. They spend more time in close contact with the floor, where pollutants settle; their small bodies are more susceptible to pollutants than adults because their systems are immature; and they have narrower airways which means the dose of airborne pollutants they receive is more concentrated than in adults.

In the 1980s, Sweden saw a huge rise in the incidence of allergies - particularly among children. Nobody knew exactly what was causing this increase in allergic reactions, but carpets, damp, mildew, poor ventilation, cigarette smoke, and toxic construction materials were all suspected as contributing factors. In 1989, after much research and consultation with a wide range of public and environmental health groups, one of the recommendations made by the Swedish authorities was that fitted carpets should be avoided in all public and official buildings including schools, nurseries and offices.

Jill Warner's review has shown that dust from schools with carpeted areas contained more cat allergen than the non-carpeted areas, supporting the idea that carpets should not be present in schools as they increase the chances that pet sensitive children will be exposed to cat allergen and trigger allergic reactions.

ALTERNATIVE FLOORING

Natural Cork

Natural Cork is taken from the bark of Cork Oaks, grown in the Mediterranean as part of an ancient sustainable ecosystem. The bark is stripped from the trees every nine years and allowed to re-grow. Cork provides a warm, rich-looking and very durable flooring. It is available in many designs and colours, in tile or rolls, with untreated or sealed surfaces (although care should be taken to avoid cork sealed with PVC). It has excellent insulation and noise reduction qualities. This makes it ideal for any room in the house. Durability is excellent as it can be renovated. Cork underlay is supplied in rolls and sheets for use as acoustic insulation of hardwood, linoleum and laminated flooring.

Wood Flooring

Wood flooring provides an extremely durable, hard wearing floor surface. Increasingly, reclaimed wood or salvaged wood floors are available. If you are thinking of using wood as flooring there are a few important questions to bear in mind.

Make sure the wood is from a well-managed forest and is sustainably harvested this includes tropical and domestic hardwoods. Forest Stewardship Council (FSC) certified wood products indicate to the consumer that the timber has been produced from well-managed forests.

Wood can be treated to protect it against attack from insects, fungi, or mould. Be sure to check if it is treated with any substance. Treatments containing low-toxicity boric acid as a preservative are available so be sure to ask. All the finishes and adhesives selected for installation should be solvent free or low emission.

If you are sanding existing wooden floorboards protect yourself from exposure to wood dust. Check that the contractors installing the flooring are following proper health and safety procedures to protect both you and themselves.

Laminates

Wood laminates are made from pieces of wood glued or bonded together sometimes using formaldehyde resins. These emit formaldehyde gas at room temperature. Ask for low or zero emitting boards.

Natural Linoleum

Natural Linoleum is very durable, flexible and acts as a good sound absorber. It is warm to the touch and available in a wide variety of colours. It is naturally anti-bacterial, anti-static and is resistant to fats and oils. Linoleum continues to get stronger over time and has an expected life span of 30-40 years. It is a low maintenance product that doesn't require regular waxing and is easy to clean.

Linoleum is made from renewable material such as linseed oil, resin from pine trees, wood floor from deciduous trees and cork which is mixed together with inorganic fillers such as clay and chalk.

Bamboo Flooring

Bamboo is a relatively new product on the European market. It is very hard and strong and can be laminated into solid boards. Bamboo shoots are harvested every four to five years then cut and milled into long thin strips. It matures within three years and regenerates itself without the need for replanting. It requires little pesticide or fertiliser application. If installing bamboo check what kind of preservatives are used by the manufacturer. Low-toxicity boric acid is best.

Natural Rubber

Natural rubber is produced from the rubber plant which grows predominantly in Malaysia and is a renewable source of flooring. Rubber floors are particularly effective when great durability is required such as in commercial or public buildings. They are good shock and sound absorbers. Avoid rubber flooring with chlorine based ingredients.

Polyolefin Flooring

Polyolefin floor coverings (PP and PE). The main application for polyolefin flooring is for commercial use but flooring for domestic use is also available. They are non-flammable, sound absorbent, resistant to wear and tear and are a direct substitute for PVC (vinyl) flooring.

RUGS

Jute

Jute is a very flexible vegetable fibre. It is static free so won't attract dust. Its hard wearing, sound absorbent and insulator quality make it ideal on stairwells or for use as rugs. Tight weave rugs are available in a wide variety of designs and patterns.

Natural Grass Rugs

Made of sisal, coir or seagrass, grass rugs have excellent acoustical, thermal and anti-static qualities. Seagrass is considered to be the strongest of grass plants. Sisal fibre comes from the henequen plant, a cousin of the agave plant, native to Mexico. No pesticides or chemical fertilisers are used in sisal production, and although herbicides are occasionally used, even this impact may be eliminated, since most weeding is done by hand. Some manufacturers treat the leaves with borax, and sisal fibres are dyed to the required fashion colours. The fibres are spun into thick yarns, which contain irregularities typical of natural fabrics. Tight weave rugs are preferable.

Adhesives and Sealants

Adhesives and sealants used in the installation of carpets may also pose a risk by emitting hazardous chemicals. Some carpets are laid using systems where the carpet is simply tacked to the floor rather than stuck. Many adhesives and finishes contain volatile organic compounds (VOCs). Low VOC and non-VOC products are widely available. A number of smooth floorings require adhesives or sealants during installation. Some of these contain polyurethane and PVC and should be avoided.

ASTHMA

Asthma is a chronic inflammatory disorder of the lungs and airways, which affects the ability to breathe and causes recurrent episodes of coughing, wheezing and tightness of the chest. This inflammation makes the airways very sensitive to airborne allergens from carpets, bedding, furnishings, animals, pollen, occupational irritants, pollutants and to viral infections.

Over the last three decades asthma in the UK has become increasingly prevalent. More than 3.4 million children and adults carry an inhaler with them on a daily basis. One in seven school children and one in 25 adults suffer from the disease. There is much discussion about the initial cause of asthma, but it is widely accepted that asthma attacks are brought on by many types of indoor and outdoor air pollution.

"Increases in asthma over the last 30 years have been in perennial, or recurrent asthma. The strongest risk factor that has been identified is sensitisation to indoor allergens"

Dr T Platts-Mills, MD, University of Virginia

Asthma can be managed with medication (long-term doses of steroids) to alleviate the symptoms. However, it is most important to focus on prevention - identifying and reducing allergens in order to ease symptoms and prevent sensitisation from developing in the first place. It's a telling fact that 80% of asthma sufferers are sensitive to mite allergens.

The well-insulated, centrally heated, fully carpeted homes that many of us occupy are harbouring a silent and shocking statistic:

"In the last several years, a growing body of scientific evidence has indicated that the air within homes and other buildings can be more seriously polluted than the outdoor air in even the largest and most industrialized cities. Other research indicates that people spend approximately 90% of their time indoors. Thus, for many people, the risks to health may be greater due to exposure to air pollution indoors than outdoors"

The Inside Story, US Environmental Protection Agency

WHAT YOU CAN DO AT HOME

Here are some things you can do to help reduce the allergens in your home. This may help to relieve allergy sufferers of their symptoms and substantially reduce the risk of infants becoming sensitised in the first place.

❖ **Consider alternatives** - especially if you have young children or are pregnant, or anyone in your family has asthma or allergies. Prioritise the bedroom and the living room, where people spend most of their time. Plan to take out the carpets, and as an additional measure try and keep other soft furnishings to a minimum.

❖ **If you are moving** to a new home or considering refurbishing (especially if it's a nursery) choose smooth, non-PVC, flooring.

❖ **Consider smooth flooring at entrances** where dust and dirt is tracked in from outside, and in 'wet' areas such as the kitchen and bathroom.

❖ **Wipe your feet** A good doormat will eliminate some of the outside dust from being tracked inside. Consider removing your shoes before you enter the house.

❖ **Cover mattresses, duvets and pillows** with breathable anti-dust mite covers with zippers.

❖ **Choose washable, non-allergic** bedding, curtains and soft toys and wash regularly in hot water (at least 55°C). Tumble drying will also kill dustmites. Freezing may be appropriate for soft toys.

❖ **Use the sun** to air soft furnishings and bedding. Dust mites will perish when exposed to 2 hours of ultra violet light.

❖ **If you have pets** consider keeping them outside or confined to just one room. As much as we love them they can exacerbate asthma symptoms by shedding an asthma triggering dander, so keep them off soft furnishings and out of the bedroom. Frequent vacuuming with a good cleaner can help remove pet allergens.

❖ **Strong odours and fumes** at home or in the workplace may make asthma worse. Use environmentally friendly products, contact WEN for details. Encourage asthma sufferers to avoid areas being painted or cleaned until the smell is gone. Avoid sprays like deodorants and strong perfumes.

❖ **Dispose of wet carpet** Carpet that has been wet for over a day is likely to have mould and mildew contamination that is very difficult to control. Rather than risk breeding these allergens or exposing people to toxic treatments, most experts recommend removing the wet carpet.

❖ **Ventilation** is important to prevent the build up of toxins.

❖ **Avoid adhesives if possible** You can specify tackless strips at room perimeter. Specify low-VOC seam sealant. If adhesive is needed, use only solvent-free, low-VOC products.

❖ **Occupational asthma** Exposure to certain occupational hazards can exacerbate existing health problems or cause new lung disease. Respiratory problems which you think are due to workplace exposures need to be reported to a supervisor or health and safety officer. If you work in areas where there are fumes and dust, you need to wear proper respiratory equipment.

❖ **If you can't remove carpet** try and clean it often and thoroughly using a good quality high efficiency particulate air (HEPA) filtration vacuum - although it won't remove dust mites it will effectively tackle animal allergens and other dust particles. Traditional vacuum cleaners may just recirculate the smaller particles back into the atmosphere.

❖ **Schedule any necessary carpet installation** to allow as much time as possible for ventilation before the space is occupied again. Try to ensure the carpet has a dense, tight weave, which won't allow the build up of so much dust, and is made of natural materials.

❖ **Dust mites like humid conditions** and damp areas. In order to destroy mite populations, relative humidity (RH) should be kept below 50% (RH) on a continuous basis. To check the humidity in your home you can buy a hygrometer from your local hardware store. You may consider purchasing an electric dehumidifier.

❖ **Clean old carpet** before removal as it will contain dust and dirt which can be released back into the building when it is pulled up. After removal clean the space underneath as dust and contaminants may be trapped.

❖ **If you live near a busy road or polluting industry** you may want to keep doors and windows closed during times of heavy traffic or pollution.

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With thanks to all members of the Healthy Flooring Network and signatories of the statement of concern.