

The background of the entire page is a close-up photograph of various wood floor planks. The planks are arranged in a staggered pattern, showing different wood species and finishes, including light oak, medium oak, and dark-stained wood. The lighting is warm, highlighting the natural grain of the wood.

MOTHERS & OTHERS FOR CLEAN AIR

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# HEALTHY INDOOR BREATHING TOOLKIT

## FLOORS

For more information about this research, visit  
[WWW.MOTHERSANDOTHERSFORCLEANAIR.ORG](http://WWW.MOTHERSANDOTHERSFORCLEANAIR.ORG)



## THE PROBLEM



Installation of Vinyl Tiles

Many types of floors are made in a way that releases harmful chemicals into the air. Vinyl is a popular material for building floors because it is easy to install. However, vinyl is made from PVC, a gasoline-based plastic. PVC can produce dioxin, a chemical that causes cancer. Vinyl flooring also usually contains a type of chemical called phthalates that have been banned from children's toys. Growing evidence connects phthalates to birth defects and hormone disorders.

Old vinyl flooring might contain asbestos, a material known to cause mesothelioma, lung cancer, and some other kinds of cancer.



Application of Vinyl Glue

Glue used to make floors can release chemicals that are harmful to human health when breathed in. Many of these chemicals are Volatile Organic Compounds (VOCs). VOCs are a group of chemicals that vaporize easily, causing indoor air pollution. Because VOCs are organic chemicals, they can cause short and long term health problems.

Floor glue also releases formaldehyde. Formaldehyde can cause burning sensations in the eyes, nose, and throat; coughing; nausea; wheezing; and skin irritation. Formaldehyde is known to cause cancer in animals, and growing evidence shows that it can cause cancer in humans too. It has been classified as a known human carcinogen since 2014.

# WHY IS THIS IMPORTANT TO MY OR MY CHILD'S HEALTH?

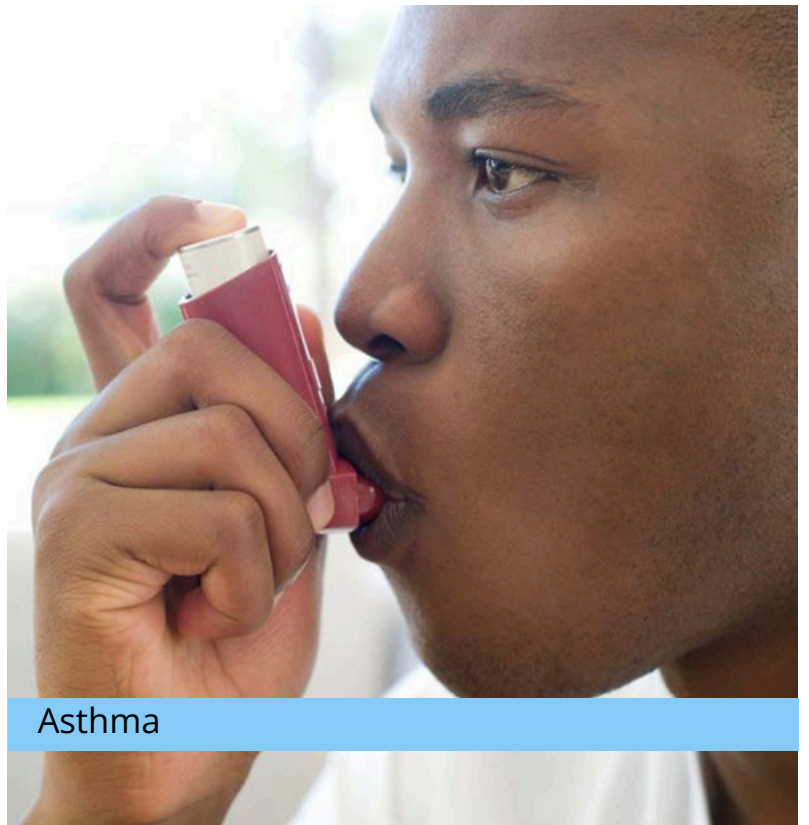
03

Unsafe floors can contribute to...



Allergies

- Allergies
- Asthma
- Hormone Disruption
- Difficulty Breathing
- Irritation of Nose and Throat
- Birth Defects
- Cancer risk
- Skin Pain
- Headaches and nausea



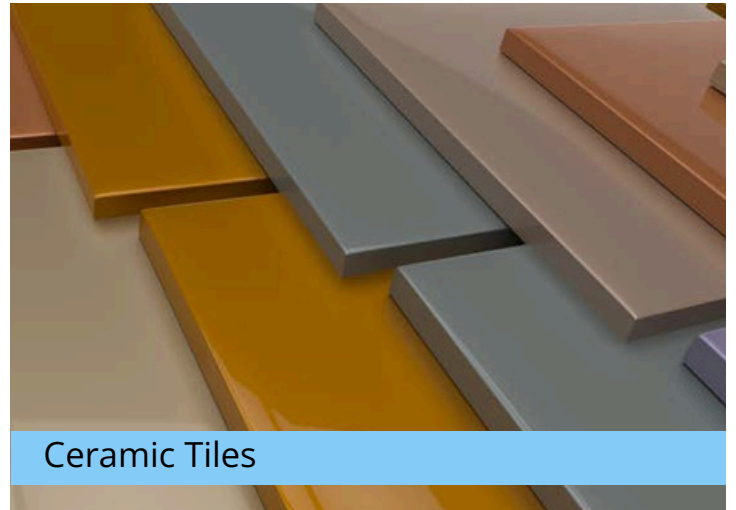
Asthma

Buy flooring that is nailed down or interlocking — floors made in this way do not use glue and release fewer chemicals. Solid surfaces are always preferable to carpeting.

## In bedrooms and living rooms:

- Use solid wood flooring, natural linoleum, ceramic, porcelain, or glass tile.
- Make sure all sealants and other treatments are low-VOC. Green-seal GS-11 certification is ideal.
- Engineered hardwood can be used with minimal risks if it is **FSC certified** and installed with formaldehyde-free glues.

[See page 36 for to learn more about FSC.](#)



Ceramic Tiles

## In bathrooms and kitchens:

- These floors need to be resistant to water damage and mold.
- Use natural linoleum, ceramic, porcelain, or glass tile.
- Make sure all sealants and other treatments are low-VOC. **Green-Seal GS-11** certification is ideal.
- Cork can be used if the material is not mixed with vinyl, PVC, or rubber.
- Make sure that isocyanate or formaldehyde binders are not used when installing it.



Glass Mosaic Tiles



## Buy floors made from sustainable wood.

Some sustainable woods are certified by either the **American Tree Farm System** or **Forest Stewardship Council (FSC)**. Any furniture using woods with these certifications are a good choice for your home.



The mark of  
responsible forestry  
**FSC® A000504**



Additionally, the following woods grow fastest in the wild meaning they are the most renewable/sustainable. Purchasing floors made from these woods are a good choice for your home.

- Pine
- Maple
- Eucalyptus
- Aspen
- Bamboo

## Use linoleum instead of vinyl.

Linoleum repels dust and allergens making it a hypoallergenic flooring option. The manufacturing process for linoleum does not use VOCs. Upon removal, linoleum is both recyclable and biodegradable.

Linoleum comes in many styles and colors and is a relatively affordable flooring option.



Linoleum Tiles

Avoid floors made of laminate, they are made with high amounts of unsafe glues that release formaldehyde. Avoid floors made of vinyl, they are made with plastic that releases harmful chemicals. Avoid floors made with biocides or fungicides — these are used to kill pests but can also be harmful to adults and children. Avoid synthetic carpeting, it can trap chemicals released by other sources of pollution.

## LAMINATED FLOORING



## VINYL FLOORING



## SYNTHETIC CARPETING





A close-up photograph of a person's hands, one resting on the other, touching a vibrant, patterned rug. The rug features a complex geometric design in shades of red, blue, and yellow. The background is softly blurred, showing more of the rug and a wooden floor.

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# FLOOR CARPETS

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## THE PROBLEM



Carpets and rugs cover the floor in nearly half of the buildings in the United States. Carpets are a chronic source of indoor air pollution. Adhesives which are used during carpet installation, the application of stain treatments to carpets, and the use of flame retardants on carpets release volatile organic compounds (VOCs) into the air.



Not only do materials used in carpet manufacturing and installation release VOCs, but carpets can trap years of toxins, dust, and mold spores.

This trapping of toxins takes a toll on indoor air quality. There are over 80,000 chemicals used in fabrics and carpets, most of which have not been tested for human safety.



# CHEMICALS USED

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## ON MANY COMMON CARPETS INCLUDE THE FOLLOWING:

### PFAS

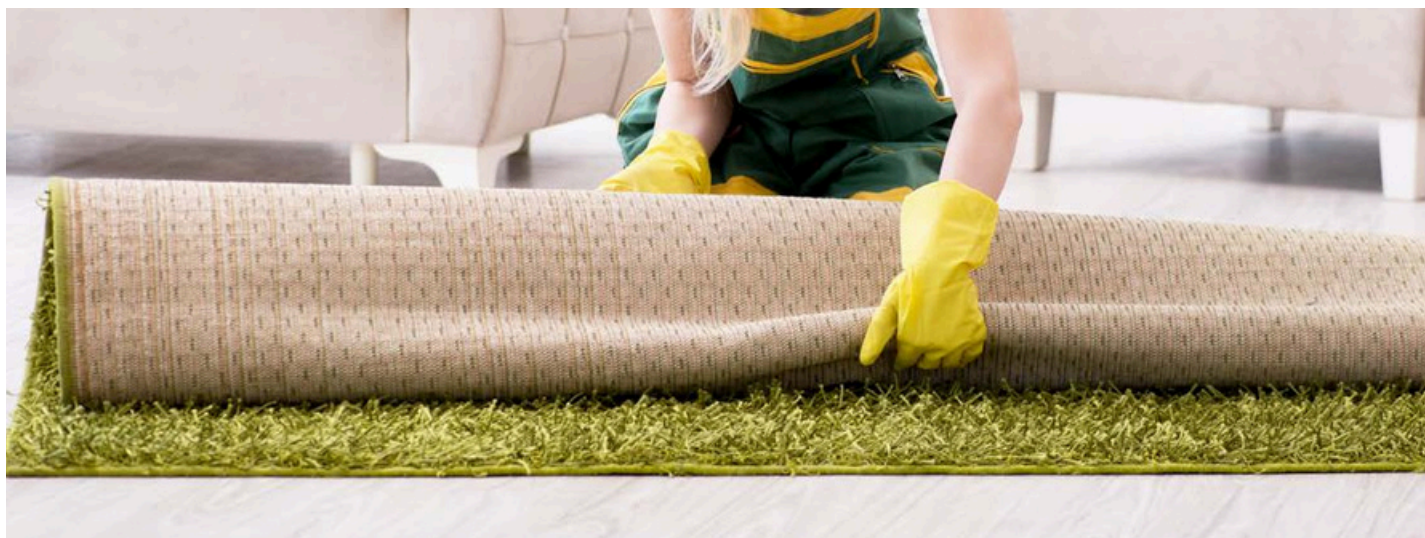
PFAs are a family of chemicals used in many personal care and home products. PFAs are a suspected human carcinogen (meaning they are suspected to cause cancer in humans). PFAs are widely used in carpets as a stain/oil resistant treatment. Due to the unique properties of PFAs they are called a “forever chemical (DTSC).” This means that the PFAs do not break down. Upon being released into the environment, PFAs appear everywhere from soil, to water, to the air. As of 2019, nearly all Americans have detectable levels of PFAs in their blood. Home Depot stopped selling carpets with PFAs at the end of 2019.

### VOLATILE ORGANIC COMPOUNDS (VOCs)

Volatile Organic Compounds (VOCs) include a variety of chemicals released from common products, including carpets, which have negative health effects. In some cases, VOCs inside the home are measured up to 100 times higher than outside the home.

### 4PCH (4-PHENYLCYCLOHEXENE)

4pCH (4-Phenylcyclohexene) comes from the backing or adhesives used to attach the backing to carpets.



[1] [Department of Toxic Substances Control \(DTSC\)](#).

[2] [NRDC](#)

[3] Masten, S., & Haneke, K. E. (2002). 4-Phenylcyclohexene [CASRN 4994-16-5] Review of Toxicological Literature.

## CONTINUED

### FORMALDEHYDE

Formaldehyde is a colorless flammable gas that has a strong odor. Formaldehyde can be released from drying carpet adhesive or through a 4pCH reaction. Exposure to formaldehyde has negative effects on anyone's health but is particularly harmful to those suffering from respiratory diseases or asthma. It has been classified as a known human carcinogen since 2014.

### SYNTHETIC RUBBER (STYRENE AND BUTADIENE)

Styrene and Butadiene are both major components in synthetic rubber (used on carpet backings). Short-term exposure to these chemicals can irritate the eyes, nose, and airways. Long-term exposure to low levels is still being studied. To be safe, it's best to avoid them.



[4] National Cancer Institute

[5] Birnbaum, L. S. (1993). A brief survey of butadiene health effects: A role for metabolic differences. Environmental Health Perspectives, 101(SUPPL. 6), 161-167. <https://doi.org/10.1289/ehp.93101s6161>



## CONTINUED

### PVC

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PVC is used on carpet backing. PVC is the single most environmentally damaging plastic on the market. During PVC's manufacturing process many toxic chemicals are created which then linger in the plastic.

### OLDER CARPETS

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Older carpets trap all sorts of indoor pollutants, viruses, dust, and bacteria. When family members walk on carpets with shoes, they track in all of the outdoor dirt, toxins, and pesticides and trap them in the carpet. When young children spend time on carpets they breathe in trapped toxins.



[Poison Plastic: The Toxic Life Cycle of PVC.](#)

# WHY IS THIS IMPORTANT

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## TO MY OR MY CHILD'S HEALTH?

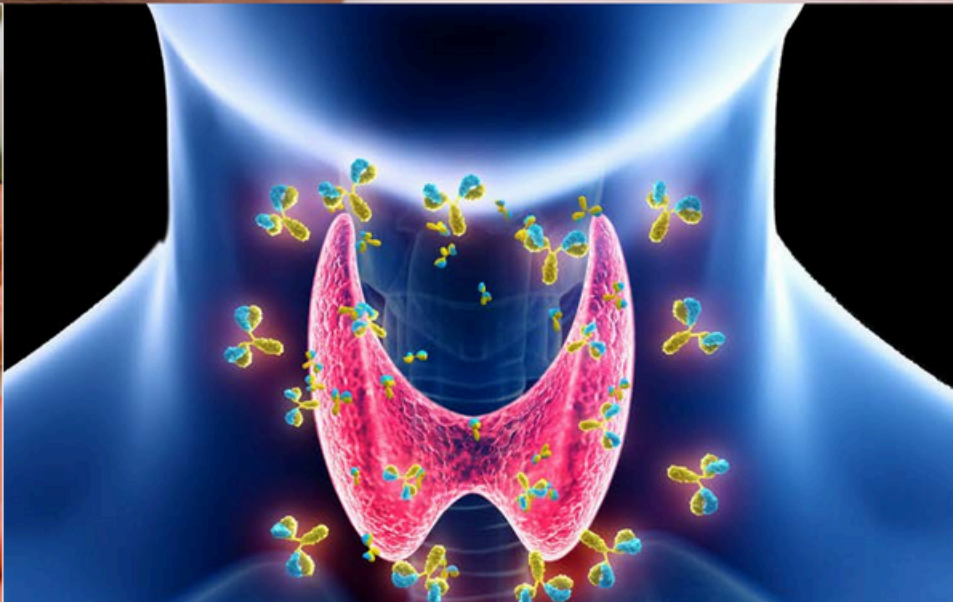
Using carpets treated with toxic chemicals and letting dirty carpets trap pollutants can lead to...



Ear Infection



Low Birth Weight



Thyroid Disease

- Ear, nose, and throat irritation
- Headache
- Nausea
- Fatigue
- Dizziness
- Suppressed immune system
- Liver damage
- Damage to Central Nervous System
- Thyroid disease
- Low birth weight
- Hormone malfunction
- Abnormal fetal and child development
- Cancer



## EXISTING CARPETS SAFE:

Without replacing carpets there is a lot you can do to help reduce the levels of toxins contained in your home.

### ① Keep dust, dirt and pollutants off of the carpet



Place door mats at each door and encourage family members to wipe their shoes before entering the carpeted home.

Better yet, encourage family members to never wear their shoes indoors.

### ② Use a vacuum frequently to remove dust and other particles from floors and carpets.



It is best to use a High Efficiency Particulate Air (HEPA) vacuum with a tight seal. These vacuums are better at removing the invisible particles, and will prevent the toxins from leaking out.

The American Lung Association recommends vacuuming at least three times a week with a vacuum fitted with a HEPA filter to remove dirt and allergens.

- If you have area rugs that are small enough for you to carry, you can take them outside and bang them on a wall to get some of the dust and particles out.
- If you have a fence, you can air out the area rugs periodically to let some of the pollutants go outside.

### ③ Make sure you have proper ventilation in your home.



Your heating/cooling appliance filter should be regularly replaced. Air filters for home use are rated using a Minimum Efficiency Reporting Value scale (MERV).

To successfully keep your home's air clean and safe, try to purchase filters with a minimum MERV 13 rating. 1-inch filters need to be replaced every six months, 4-inch filters can be replaced once a year.

In circumstances where you are not responsible for your heating and cooling appliance maintenance, such as in an apartment complex or at school, portable purifiers can help clean the air of toxins and particulates.

**Look for HEPA filtration vs. ionization,** and as a rule of thumb, portables cover an area of about 500 square feet.



## THINKING OF GETTING RID OF YOUR CARPETS?

Great choice! Removing the carpets from your home requires much less upkeep and is safer for you and your family. Check out our guide for the most sustainable wood floorings to use in place of the carpet.

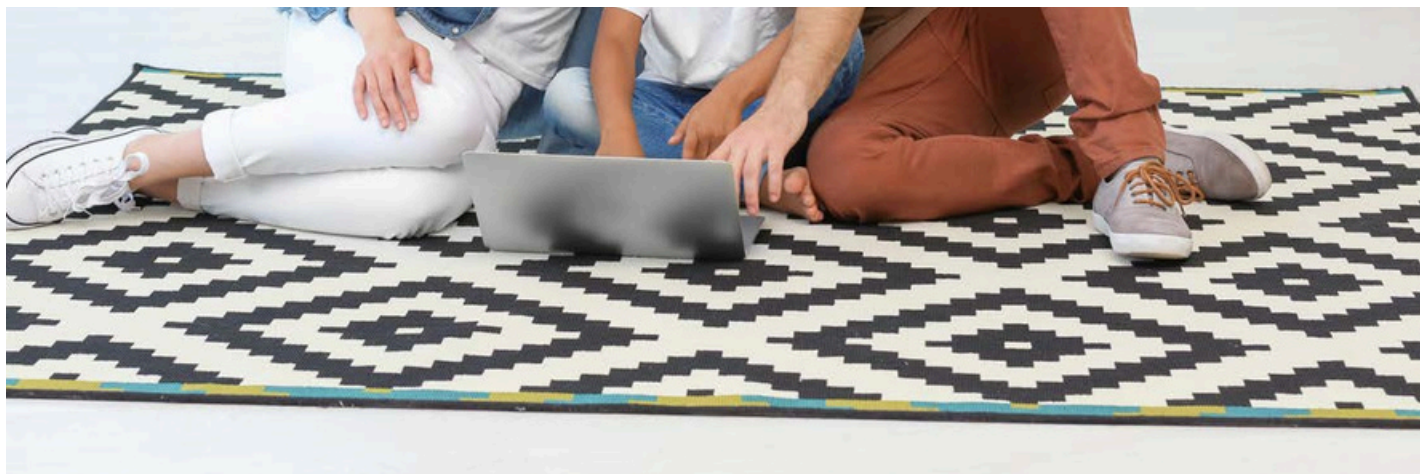
Avoid the carpet removal zone, and make sure windows are open during and for an hour after complete removal. While the carpet is being removed all of the toxins in the adhesive and flame retardants leak into the air. Make sure a qualified professional does the removal.



# HOW TO PURCHASE

## NEW CARPETS:

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There are certain carpets to avoid. These carpets trap more toxins than others. When purchasing new carpets avoid ones made of the following materials. Additionally, try to avoid wall-to-wall carpeting if possible.

- Polyester
  - Acrylic
  - Acetate and Triacetate
  - Nylon
- 
- Stain or Waterproof Treatments
  - VOC adhesives
  - PVC backing
- 
- Flame and Heat Resistant Carpets
  - Antimicrobial Treatments
  - Stain Resistant Carpets



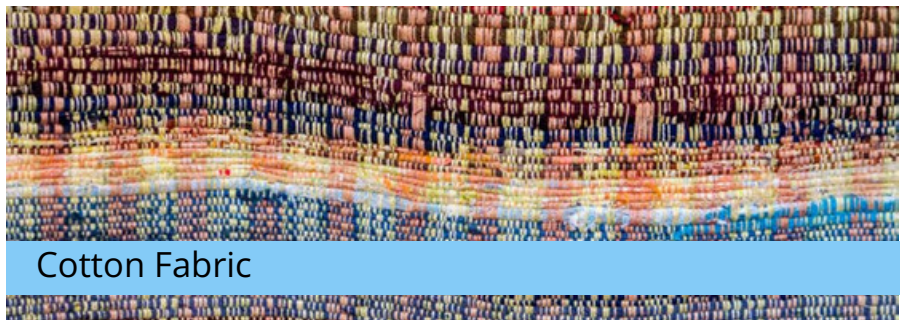
## INSTEAD, OPT FOR MORE SUSTAINABLE AND HOME-FRIENDLY MATERIALS:

If you do need to purchase a new carpet, opt for a wool carpet as a healthier alternative. Wool is less likely to trap VOCs and is natural and biodegradable. If wool is too expensive for your budget, try finding carpets made out of some of the **natural materials** below:

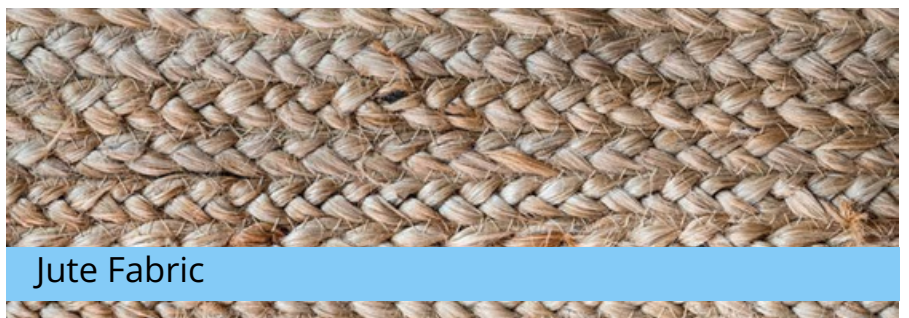
- Sisla
- Sea grass



- Abaca
- Cotton
- Silk



- Jute
- Linen





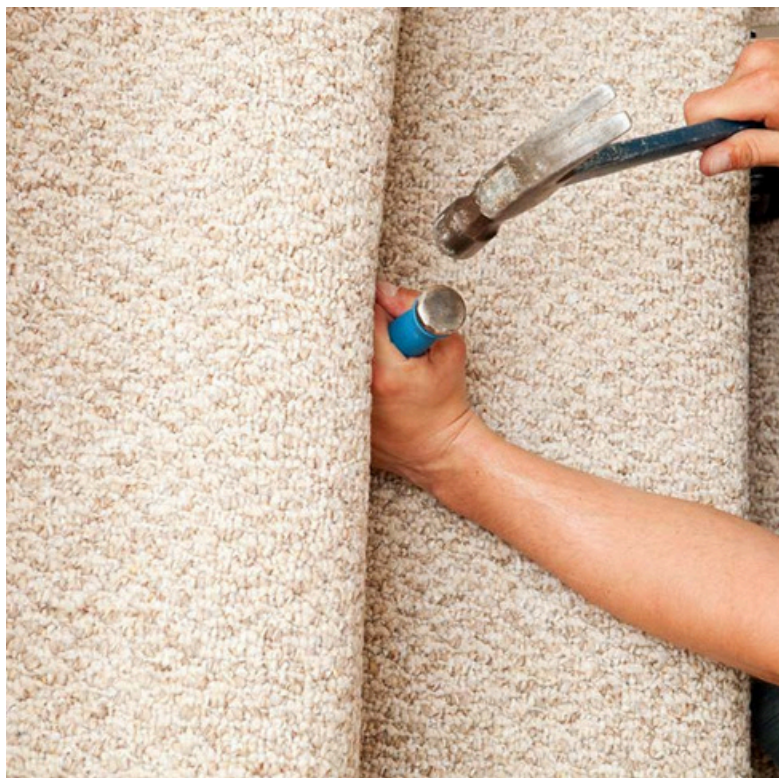
## IF YOU MUST OPT FOR A SYNTHETIC CARPET

Select carpets certified with the **Green Label Plus** or **Green-Guard** to ensure low VOC emissions from the carpet and padding.



[CLICK HERE TO VISIT GREEN LABEL PLUS](#)

## ENSURE LOW VOC ADHESIVES



Ensure **low VOC adhesives** are used during installation.

Alternatively, install carpets using a **hook or fastener** system which requires no adhesive.