

How to convert a regular house to be a healthy house



You got a house or apartment and need to turn it into a healthy home so you can feel well inside. Here's how to do it.

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Convert versus build anew

Building a healthy house from the ground up usually produces the best result, since you can make sure every piece of material is safe, and there are no hidden unsolvable problems, such as mold.

But building a house from scratch can be overwhelming, and it is definitely not something everyone can do. If not done well, it can take years of offgassing before it is livable, or you may have to sell at a loss.

It can also be more difficult to finance than buying an existing house, because it cost more than a regular house and banks may not understand the higher value of a healthy house.

Converting an existing house is less overwhelming. It is often possible to live in it while working on it, and the work is a lot of smaller projects that are more manageable. They can also be done over a longer period of time (years) as money is available.

It is also more possible to give up part way through and sell an existing house, while a half-built house is really difficult to sell.

Most people choose to convert, rather than build.

Getting started

It can seem overwhelming when you start, but there is a method. In the first days, start with:

- Vigorous ventilation
- Keep all cabinets open
- Remove all toxic materials (cleaners, laundry, paint buckets etc)
- Remove carpets and carpet pads.

If you are not fully committed to making the house work, consider delaying removing the carpet. Just in case you have to give up and sell the house again. If it is a rental, the landlord may not allow you to remove the carpet.

Despite one room, garage or shed as storage of furniture, luggage and other things that are too toxic for now.

During this first phase you can do other work, but it is secondary to vigorously airing out the place. Do not try to seal anything yet.

Second phase

After about four weeks of vigorous ventilation and cleanup, it is time to wash down the walls and ceilings. Also wash the floors, if possible.

Use a paint roller on a long broomstick to reach the ceiling and upper walls.

Some wash with diluted peroxide, such as a mix of 50% warm water and 50% peroxide from the store (which in itself is only 3% peroxide). Others have used the AFM Superclean product, or whatever they prefer.

Do it only on warm and dry days, so the surfaces will dry fast.

Keep ventilating.

Third phase

After a month of vigorous ventilation, and a good washing of all surfaces, it is time to evaluate.

Make sure all surfaces are fully dry. Then turn off all the fans. Walk around the house; it should be a lot better now, but some rooms will be better than others.

The rest of the work can be a series of projects you do one or two of at a time.

The least-stinky room should probably be your first bedroom. It doesn't matter which room it is, whether it is a bathroom, the kitchen, the living room, etc. Concentrate your efforts on making that room as safe as possible. Also put effort into making one bathroom more tolerable, though it is less important as you'll be there less time and could use a respirator. People have actually showered wearing a respirator.

Hopefully you can have a safe room to sleep in for winter, though you'll probably need to keep a window cracked.

Remember, this is still temporary. Later on, you can hopefully sleep in whatever room you choose.

Ventilating the house

Start immediately with venting the house. You need a lot of fresh air moving through the house, all day, every day, for months. Cross ventilation is really important.

This helps draw out the toxic chemicals from the walls, ceilings, floors, cabinets, etc. It also makes it safer to work inside.

Do this ventilation even if the house is in a very polluted city. It still works.

Keep open the windows that are protected from rain, such as by a porch or a roof overhang. If burglars are a concern, make sure the windows can only be opened a little. For American-style sliding windows there are clamps available that mount on the tracks to prevent the window from being fully opened.

In the daytime you can also keep the door open (don't worry about insects). Use cheap fans with large propellers, such as box fans. Place a fan in the downwind window, so it blows out the window. Fans are good at pushing air, they are not good at sucking air.

Place fans inside the house so air is blown into closets, corners far from the open windows, etc.

Leave all cabinet doors open. Place a fan so it blows air into the cabinet.

Consider buying fans a project expense. You can throw most of them away later.

The five basic methods

There are five basic methods to detoxing a house:

- Removing
- Replacing
- Scrubbing
- Encapsulating
- Offgassing

Removing toxic materials is always the most effective measure. “Nothing” is safer than “something.” Look around and remove everything that doesn't really need to be inside the house, such as carpets, furniture, paint buckets, toxic cleaners, etc. Some kitchen cabinets may not be needed either.

Replacing is when installing new and safer materials instead of those unsafe or contaminated. Typical examples are replacing drywall, furniture, and cabinets.

Scrubbing is helpful where the contamination is on the surface, but hasn't been absorbed into the material. This works best on hard surfaces, such as wood and steel, though it may also work on painted drywall.

Encapsulating is when you seal the toxins inside, or even on, a building material. This is done by painting it with a sealer, or covering it with an airtight membrane. The sealers are not as tight as a membrane. The standard membrane is aluminum

foil, but there are alternatives. Sealing should be the last of these five methods you try, as it is not very effective.

Offgassing is the slowest method, but it is very easy to do, and it can work on a whole house all at once. You can also set new building materials out in the garage or porch for weeks or months with little effort (as shown on the picture at the start).

Testing building products

You will likely need some building products, such as caulk, paint, drywall, grout, and more. Choose well. Do not rush. This is something you should start on even before buying the house.

People had to delay their move-in for months or years because they didn't test the materials themselves. Do not rely on what other people say works for them, especially not people you don't know well in person.

We have a detailed article about testing building products. It is available through the link at the end of this article.

Windows

Some windows have a plastic film on the inside to reflect solar heat. The heat makes the plastic offgas. Better to peel it off.

Floors

There are several options for healthy floors, but carpet is not one of them. Carpets and any pad underneath are very toxic for many years, and they act as sponges for dust, pollen, mold, pesticides, and much else that get tracked in on people's feet.

Even professional carpet cleaners with heavy-duty equipment can't fully clean a carpet. (If you want proof, pull up a corner after they've been there.)

Some people have removed the carpet and pad and simply used the subfloor as their floor, whether it was concrete or old plywood. You may want to use a sealer, such as sodium silicate, as tiny dust particles may otherwise turn the floor a darker grey after some years.

Others have covered the subfloor with loose ceramic or porcelain tile, or even galvanized steel plates. But the best is to put in a regular tile floor, or at least a genuine hardwood floor.



Apartment with a retrofitted tile floor.

If you install tile, make sure the subfloor is strong enough to hold the extra weight, especially upstairs in a wood-framed house. You may need to replace a wooden subfloor with cement boards to make it stiff enough for tiles, otherwise they'll get loose.

Beware that there are many floor options that are not as healthy as they seem. That includes fake "hardwood" floors, bamboo, and plastic "linoleum."

If you are in a rental unit, you probably have to leave the carpet in place. Then cover it with galvanized steel plates, laminated aluminum foil or tolerable plastic.

Healthy flooring is a large topic which we have two articles about. They are available through the link at the bottom.

Ventilation system

Most successful MCS houses do not have a ventilation system that brings fresh air into the house. They are expensive and not necessary if the house is built or renovated well.

This is nearly heresy to the people who study indoor climate, but have little or no actual experience with MCS housing. Some see ventilation as a way to allow more toxic materials in the house. It doesn't work in MCS housing. That was clearly demonstrated with the Haubitsen MCS apartment building in Uppsala, Sweden. The MCS people were never able to live there.

In offices, clinics, and other places where all sorts of people enter, ventilation will be necessary, as they are not committed to the non-toxic lifestyle.

Air purifiers and ventilation systems can only help a little, they can never be a solution. They are also noisy, which can be a problem for people with environmental sensitivities.

Air ducts

If the house has air ducts for heating/cooling, they should be cleaned or replaced.

There are firms specializing in cleaning air ducts. They should use the cleaning products you specify.

You can also try to clean them yourself. Use an electrician's fish tape to pull a wet towel through several times. The towel can be soaked in vinegar and water, a dish detergent, or similar.

Note that the flexible hose ducts cannot be cleaned, they should be replaced.

Best are air ducts of rigid steel, but they are labor-intensive and costly to install. You may also want to wash each section in hot soapy water before installing them. This is a very big job.

An alternative is not using the air ducts at all, or just using them for cooling the house. Cool air usually doesn't make dusty air ducts smell, but that won't help if they are moldy.

Kitchen

Most kitchen cabinets are made of manufactured wood, and there may be soaked-in toxic spills. In better-quality cabinets the doors may be real wood.

The cabinet under the sink is the most likely trouble spot. There can be mold from leaky faucets, and toxic cleaning products are usually stored there, which often leak a drop each time when the bottle is put back after use.

If you can't replace this cabinet, consider cutting out the bottom of the cabinet. Then cover the hole with a cookie sheet or similar.



Kitchen cabinet with aluminum foil.

The inside of kitchen cabinets can be covered with “heavy duty” aluminum foil from the grocery store to seal in fumes. This should NOT be done under the sink, as it may get wet underneath and then the moisture gets trapped and breeds mold.

You can try to paint the cabinets with a sealer. Sodium silicate or a special sealer may work well, though they will never be as airtight as aluminum foil.

Some cabinets can be removed. New cabinets of steel, intended for hospitals and medical clinics, may be a good alternative. Or put in wire shelving. Or buy metal cabinets from an office supply store.

Bathroom

This may be the toughest room to detox, as the prior occupants used their personal care products here. They may also have had some sort of fragrance device to mask natural odors.

Try to wash the walls with different kinds of detergent, such as AFM Superclean, or vinegar. Or try a regular cleaner, and then wash a second time to get the cleaner off the walls.

If you need to replace the shower stall or tub, acrylic works well if offgassed for a month before installing. Steel bathtubs are still available.

Laundry

Shelves and cabinets in the laundry area will probably need to be replaced. They are likely contaminated by small drips from bottles with laundry chemicals.

Wire shelving is a safe, cost effective, and attractive replacement.

If the house comes with a washer and dryer, they may be possible to clean up, especially if the insides are of steel. But it can take much time.

Fill the washer with hot water and a safe detergent. Let sit for a couple of hours before finishing the run.

The dryer may be cleanable by throwing in a couple of towels that are sopping wet with water and detergent, and then run the machine until dry. Repeat.

Sealing walls and ceilings

If the walls and ceilings are stubbornly toxic, consider sealing them. This can be done by painting them, applying a special sealer, or covering them with aluminum foil. Foiling is the most effective, while anything painted on will still leak some.

A painted-on sealer will not work on walls heavily contaminated with fragrances or tobacco smoke.

People in the United States have successfully used a membrane of polyethylene plastic to seal their walls. They used the brand Tu-Tuff.

Much prettier is to cover the walls with tile, but it is costly.



Walls sealed with tile, while the ceiling is foiled, in this Texas bedroom.

Beware that sealing a wall or ceiling can create a mold hazard, depending on the climate and other factors.

How to seal is covered in a separate article available through the link at the end.

Replacing walls

In really tough rooms, you may have to replace the wall boards. But then you have to detox the new wall boards.

If a wall board is moldy, there is probably no other option.

See our article on testing materials on deciding which brand of drywall to choose.

The roof

You can probably leave the roof in place as-is, unless it is in bad shape.

The typical American tar-shingle roof can be replaced with a steel roof, which often can be mounted on top of the old shingles.

Another option is installing a tile roof (ceramic or concrete). That is expensive, and the roof structure and walls must be able to carry the weight, but such a roof should last at least a century. Such roofs are standard in much of the world.

Crawl spaces

A crawl space under a house is a mold hazard, especially if it has a dirt floor.

Make sure there is drainage so any water that comes in from a heavy downpour will run out again and not pool anywhere.

It may help to put a load of gravel underneath, which raises the level to deter water from puddling there, and also covers the moldy dirt.

Make sure there is ventilation so the space stays dry.

Also make sure it is enclosed so animals and blowing debris are kept out.

The garage

An attached garage cannot be used for a gas or diesel car, as the fumes will migrate into the house. It may be okay for an electric car, if the car is at least a couple of years old.

A garage can be useful for storage, offgassing new purchases, and hanging laundry. Just don't get carried away.

Some people found the garage was initially the most tolerable "room" and lived in it the first year or more while working on the rest of the house.

Gas appliances

Gas should never be used inside a healthy house. Gas appliances and the gas pipes are notorious for leaking gas and combustion products.

Any gas line should be capped before it goes into any part of the house.

Gas appliances should be replaced, or at least moved outside to a garage, shed, porch or outdoor closet. Some people with severe electrical sensitivities use gas appliances to cook outdoors, and heat their homes through radiant in-floor systems with gas heaters outside the house.

Heating

Forced-air heating can work if the ducts are clean of dust and mold. The heater cannot be using gas, no matter any promises of sealed combustion.

Electric baseboard heaters and portable heaters are better. The best models have low surface temperatures, which avoid the fried dust problem.

Mini-split heat pumps are also popular in non-toxic households. They can be installed in existing homes and do not use any air ducts. They can both heat and cool the house.

Best is radiant in-floor heating, but that is difficult and costly to retrofit in an existing house.

Ozone

Ozone is a very powerful oxidizer that comes from an ozone machine. When the ozone hits a surface it reacts with whatever is on that surface, but it cannot penetrate into the material (such as drywall, wood, or carpets).

It can change molecules into something that is less toxic, or it can make things worse. People have ruined their homes by using ozone.

Ozoning a house may help, but it seldomly lasts, as more gases migrate out of the walls, etc.

It is best not to use this tool. If you decide to try it, use it only briefly, say ten minutes, before airing out the house. Never breathe it in.

Building bake-out

Heat makes materials offgas faster. Heating the house for three days to well above a hundred degrees Fahrenheit (38 C) can make a big difference. Provide a small amount of ventilation, but not so much it cools the house.

This can only be done in warm weather. The regular heating system is not able to do this, and can be damaged if you try. Instead, use a lot of portable electric space heaters. Make sure they are on different circuits, and do not exceed the capacity of the main breaker box.

Expect a hefty electrical bill.

This method is rarely used. Consider it a desperate measure.

Where to live during the conversion

Several people had to live in the house while it was renovated, as they needed to live close by and there was no better option, or they could not afford having two places.

They typically camped outside, such as in a trailer, a tent, a car, or on the porch. Some lived in their garages. Some erected a steel garden shed to sleep in.

Some slept in the house, while keeping as much ventilation as possible with fans and open windows.

It is best to start early in the spring, and then hopefully one room will be usable to sleep in when winter arrives. Some closed up the house and went camping in a warmer climate for the winter.

Some people detoxed the garage first, then insulated it with Reflectix (aluminized bubble-wrap) and used electric space heaters the first winter.

If you are concerned about your safety while sleeping outside, keep bear spray and a cell phone handy. Unless you live in a bad neighborhood, you really should be quite safe (it is hard to overcome the hype of American television which makes the danger seem much more than it actually is).

Working with a landlord

If you do major changes, such as pulling up the carpet, replacing cabinets or installing tile, you need to get the landlord's permission.

If your changes are invisible or can be removed when you move out, you probably don't need to involve the landlord.

The landlord is unlikely to help financially unless the work will improve the rental value after you move out. If you have lived there for years and been a trouble-free tenant that also helps. Landlords want to keep good tenants.

Once you move out, all your investments are lost. The landlord is not obligated to compensate you at all.

Keeping your eyes on the prize

Cleaning up a house can be a long process. This writer knows someone who had to work on her house for four years, while first sleeping in her car, then in the garage, before sleeping in the house. That was a particularly toxic house, but she got it for free from a charity. Eventually it became an excellent house that even people with severe MCS felt good sleeping in.

It is easy to lose steam and stop when it is just barely livable, but you really don't feel well inside. The prize is worth it!

It is also very important in every choice to keep your health in focus, and not get lead astray by what are really distractions. Such distractions can be a reluctance to do what you need to do, because it looks different.

A lot of people think carpets are essential, and then they compromise their health keeping one. If you travel around the world and get to see how people live, you'll discover that in most countries they do not use the fixed wall-to-wall carpets that are everywhere in the United States and northern Europe.

If you have to use foil to seal walls and cabinets, you'll get used to it. And maybe later you can afford something nicer.

If you allow other factors to override what is best for your health, you'll likely end up with a house that is pretty good, but not great.

More information

We have a series of articles about testing building products, choosing and installing healthy floors, and much else on www.eiwellspring.org/housingdetails.html.

How to reduce the radiation from wiring and wireless in your house is covered on www.eiwellspring.org/lowemfhousing.html.

For stories about other people's healthy house renovations, go to www.eiwellspring.org/housingcases.html.