

Choosing drywall for a healthy house

This article describes the problems with gypsum wallboards when using them in a healthy house, and how to select the safest available. If the drywall is still not tolerable, further measures are listed. Comments on alternative types of wallboards are also included.

The standard gypsum wallboards are the most commonly used wall covering in America. It is also the most common material in less-toxic housing. It covers many square feet that are in direct contact with the indoor air, so any problems become very noticeable.

Drywall consists mainly of two materials: a gypsum plate and a paper backing. The gypsum can come from three sources:

- Mined directly from the ground
- Synthetic gypsum from coal plants
- Recycled wallboards

Gypsum mined directly from the ground should not be a problem, unless one is sensitive to the material itself.

Synthetic gypsum is also called FGD gypsum (Flue Gas Desulfurized gypsum) and is used in about half of all US-produced drywall boards.

Synthetic gypsum is a by-product from the scrubbers (filters) on the smokestacks on a coal fired power plant. It is essentially a waste product, which may be contaminated with various compounds from the coal smoke. There are no government regulations of the contaminants, which may be problematic to sensitive people. Fly ash in cement is a known problem to people with MCS, and FGD gypsum comes from the same source (fly ash filters are usually placed before the scrubbers, but they are not perfect).

Gypsum from recycled wall boards may come with a great variety of contaminants that have been absorbed by the drywall wherever it was in use. These may include pesticides, fragrances, cigarette smoke and a myriad of other poisons found in many households and offices.

The paper backing on a drywall board is usually thick brown paper, which is made from recycled paper materials. This means there can be many sorts of contamination, especially ink.

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Additives

Some wall boards contain formaldehyde to inhibit mold growth during the production of the board. The major manufacturers seem to dry the boards in ovens, so they dry fast and do not need anti-mold treatment.

There can also be naphthalene in drywall, which is the main ingredient in moth balls and very noxious to sensitive people.

The manufacturers are secretive about their ingredients, but according to the National Institute of Standards and Testing (NIST Construction Automation Program Report No. 3, William C. Stone, October 1997) the Sheetrock brand drywall from U.S. Gypsum contains:

gypsum	85 – 95%
paper (cellulose fiber)	3 – 9%
starch	0.3 – 1%
sulphonated naphthalene	0 – 1%
glass fiber	0 – 1%
sucrose	0 – 1%
lignin sulfonates	0 – 1%
polyvinyl alcohol	0 – 0.1%
calcium stearanate	0 – 0.01%
ammonium salt	0 – 0.01%
pentasodium salt	0 – 0.01%
boric acid	0 – 0.01%
glycerin	0 - trace

The content of the other major brands is probably similar.

The table provides a range of how much there is of each additive. This means that the content can vary with the batch, even of the same product.

Note that the above table was published in 1997, today's products may contain other additives.

Some wall boards are specifically made for wet environments (such as bathrooms) and are sold as mold resistant. These are often tinted green in the United States and are referred to as “greenboards”. They may contain fungicides, but not all of them do. Greenboards are not code-compliant in some jurisdictions, anyway.

There have been cases where drywall has been contaminated with sulphur, even to the extent where copper wires, pipes and other metals in the house corroded. This happened with drywall produced both in China and in the US. These incidents have not been fully investigated yet. (as of 2011)

How to choose what to buy

There is no foolproof way to get the safest wallboards. Buying the major U.S.-produced brands (U.S. Gypsum, American Gypsum and National Gypsum) may help, but is not sufficient. What is actually in the gypsum may vary with each batch, so the brand that worked well for a neighbor three months ago may not be safe today.

Each batch of the same brand may come from a different factory or it may be produced with gypsum from a different source. The salespeople are unlikely to know anything about these issues, even though they may confidently assure you there is no problem.

It is very expensive to replace the drywall in a house, and very disruptive. Some people with MCS have had to do it.

The best practice is to test the specific batch of drywall right before buying, as in the day before or the same day you place your order.

The best quick way to test is as follows:

1. Buy a set of large canning jars (1-liter or larger).
2. Wash the jars well and dry them fully
3. Visit every building supply store and hardware store.
4. Buy one sheet of drywall of each brand from each store, even if you end up with three boards from the same company.
5. Cut a similar sized piece from each sheet of drywall and put it in a canning jar.

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6. Screw the lids on tight.
7. Place the jars in a warm place for a few hours, preferably in direct sunlight.
8. Sniff-test each jar. They are all likely to be stinky, but choose the least-unpleasant one.
9. Rush off to buy the same batch you tested.

This test should find the most tolerated of the drywall samples, but it is not a good test to determine whether drywall itself is tolerable. It is quite possible that the brand chosen will be a problem once many square feet of it are installed in the house — in fact, this is very common.

Once the drywall is installed

Many sensitive people do not tolerate any drywall when it is new. It is customary to vigorously air out a new house for months before moving in. Selecting the most tolerable drywall batch can reduce the airing-out period by many months. Some people have pre-offgassed their sheets of drywall by storing them in stacks with dividers between each sheet, so they are exposed to air on all sides.

Very sensitive people may need to seal the drywall, either using a painted-on sealer or a membrane of aluminum foil or Tu-Tuff (polyethylene plastic). The specific details of how to seal drywall are covered in a separate article available on www.eiwellspring.org.

Alternative wallboard materials

Wheatboard is made of straw, which is pressed together under very high pressure to form a permanent bond without glues. It was used in one house this author visited. The house smelled like a hay barn. Several people with MCS checked out the house but were unable to live in it.

Dragonboard is a Chinese brand that is made of magnesium, that appears to have been foamed (like magnesium insulation). It looks like regular drywall sheets. This author knows of three houses that used it. It worked perfectly in the first one, and was a problem in the next two houses. The problem may be contaminated raw materials at the Chinese producer, or the application of pesticides when they arrive in the United States to protect against exotic bugs.

Hardiebacker is a cement board made by the Australian company James Hardie. It is well-tolerated by many people with MCS but costs more and is also more labor

intensive to install (i.e. higher labor costs). Expect to pay three to four times the cost of a drywall installation.

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