



# Focus

## Gypsum Wallboard Waste

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### **What is gypsum wallboard?**

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Gypsum wallboard consists primarily of gypsum rock (hydrated calcium sulfate) formed into sheets which are covered with paper and starch to become wallboard. New wallboard also contains small amounts of foaming agents, dispersing agents, and other additives to improve its manufacturing properties.

### ***Wallboard Waste from Construction Activities***

Wallboard waste from construction activities is relatively free of paint, asbestos, or other substances that contaminate demolition wallboard over the life of a building. Estimates of waste gypsum generated by the construction industry range from 6-10% of all wallboard used. Up to a ton of waste wallboard can be generated from construction of a new home.

### ***Wallboard Waste from Demolition Activities***

Wallboard waste from demolition of buildings may have higher contaminant levels because of earlier manufacturing processes (asbestos for example) and paint, wallpaper and other substances that may have come in contact with the wallboard over the life of the building.

### **How is Gypsum Wallboard Waste Disposed?**

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Wallboard will not degrade or decompose in a house or other structure. When waste wallboard is disposed of in a landfill with moist anaerobic conditions, the sulfate components can be reduced to sulfide ions which can generate toxic hydrogen sulfide gas and acidic leachate. Hydrogen sulfide gas produces an offensive odor at low concentrations (1 ppm) and can be immediately dangerous to life in concentrations above 300 parts per million. The definitions of demolition and inert wastes found in the Minimum Functional Standards for Waste Handling (ch. 173-304 WAC) excludes gypsum wallboard waste. This exclusion limits where wallboard waste may be sent for disposal. Wallboard may be only disposed of in landfills permitted to accept gypsum waste.

Similarly, when wallboard is incinerated, the sulfate is converted to sulfur dioxide gas. High sulfur dioxide concentrations in stack gases reduces the ability of alkaline scrubbers installed on municipal incinerators to remove other acidic gases such as hydrogen chloride. This results in higher emissions of hydrogen chloride and other acid gases from municipal incinerators. Most waste wallboard is disposed of in landfills. Fortunately, there are alternatives available to reuse or recycle waste gypsum wallboard.

## **Are There Alternatives to Disposal?**

Alternatives to disposal of waste wallboard are recycling to produce new wallboard and land application as a soil amendment. Waste wallboard is a solid waste subject to regulation under the Minimum Functional Standards (ch. 173-304 WAC).

### ***Recycling***

Waste gypsum wallboard can be recycled into new wallboard. Recycling in this way is the preferred option. Waste wallboard can be collected and processed to remove the paper and other contaminants. The remaining gypsum waste is then pulverized, and mixed with virgin gypsum and other additives to form new wallboard. Up to 95% of the waste gypsum can be recovered using this process. Ecology strongly encourages this option for both construction and demolition waste wallboard where feasible.

### ***Land Application***

Clean construction wallboard waste that is not painted and does not contain any metal pieces (nails, staples, etc.) can be shredded and applied to the land for agricultural purposes. Wallboard that is applied to the land can improve the porosity of soils. Both calcium and sulfur in gypsum are essential plant nutrients. Large applications of gypsum may create an imbalance between calcium and magnesium in the soil. To correctly apply gypsum wallboard to the land, soil testing by a qualified soil scientist is necessary to determine the nutrient levels. Applications should be made at agronomic rates appropriate for the soils and crops under management. Ecology recommends that you contact the Natural Resources Conservation Service (formerly the Soil Conservation Service) to determine if applying waste gypsum wallboard as either a soil amendment or a method of reclaiming soils is appropriate for a specific piece of land.

Clean construction wallboard may be ground-up and used as bedding for dairy cows and poultry. Dairy farmers have reported a decrease in foot problems and improved udder health as a result of using wallboard as a bedding material. The gypsum/manure mixture must be applied to the land as agronomic rates and to land owned by the producing farmer. Note: gypsum used for bedding should not be stored in a manure lagoon or tank. When placed in a manure lagoon, gypsum will decompose anaerobically, producing hydrogen sulfide gas.

Wallboard waste from demolition activities should not be applied to the land. Because of the uncertainty over levels of contamination in older wallboard and its impact on the environment, Ecology does not recommend that demolition wallboard be placed on the land unless further studies are available to demonstrate that levels of contaminants are not present that would harm human health or the environment.

## **Regulatory Requirements**

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### ***Recycling***

If the recycling of gypsum wallboard is conducted within a totally enclosed building, the facility is not regulated by the Waste Recycling Facility Standards set out in WAC 173-304-300. Storage of waste wallboard outside may require a pile storage permit if the local health authorities believe that ground or surface water contamination will occur. All waste recycling facilities must comply with applicable local, state, and federal laws and regulations.

### ***Land Application***

Land application requires a solid waste permit from the jurisdictional health department. Waste wallboard applied to agricultural land is waste utilization and requires a solid waste permit from the local jurisdictional health department. Land application at or below agronomic rates is regulated under Waste Recycling Facility Standards (WAC 173-304-300). If application exceeds agronomic rates, it is then regulated as land spreading disposal subject to WAC 173-304-450.

### **For More Information**

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If you would like more information concerning gypsum wallboard recycling or the name of your jurisdictional health department, please contact the Washington State Department of Ecology Solid Waste and Financial Assistance Program at the Regional office nearest you.

Northwest Regional Office	(206) 649-7000	TDD (206) 649-4259
Southwest Regional Office	(360) 407-6300	TDD (360) 407-6306
Eastern Regional Office	(509) 456-2995	TDD (509) 458-2055
Central Regional Office	(509) 575-2490	TDD (509) 454-7673

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