

GYP SUM WALLBOARD - 09250



Materials / Manufacturing Process

Gypsum Board is made primarily from gypsum (calcium sulfate), for its core and cellulose for its paper facings. The raw gypsum is pulverized and calcined and then combined with any additives. Water and soap foam are then added to this mixture to create a slurry. The slurry is formed into sheets by being placed between two layers of paper and then passed through a roller. The gypsum is allowed to set and is then dried in a kiln.

Gypsum is a naturally occurring mineral found where ancient seabeds occurred. In areas of the United States, such as the Southwest, where these seabeds existed manufacturing facilities are generally co-located with the gypsum mine. To supply the manufacturing facilities in the Northwest, gypsum is typically shipped from Mexico or Canada.

Recycled Content

Synthetic gypsum can be used in lieu of raw gypsum. Synthetic gypsum is a by-product of coal burning power production from the flue-gas desulfurization. Synthetic gypsum is also created as a by-product in the production of inorganic fertilizer, although no local suppliers of gypsum board appear to use this as a source material. Most of the source material of synthetic gypsum from coal-burning exists east of the Mississippi. However, the Centralia, Washington coal-burning plant is a local source and their synthetic gypsum is being purchased by the G-P Gypsum plant in Tacoma.

The face papers on gypsum board are made from 100% recycled cellulose. Different manufacturers use different percentages of post-consumer vs. post-industrial paper.

Additives to gypsum board include: starch, glass fiber, perlite, vermiculite, and accelerators (gypsum or potassium sulfate). (*ERG 09250*, p. 4)

Mining Impacts

Raw gypsum is primarily mined in surface quarries (open-pit mines), although some is mined underground. Impacts from the mining include: habitat disturbance, overburden waste, suspended solids in mine runoff, erosion, particulate emissions, and emissions from fuel powered equipment.

Manufacturing Pollution

Processing gypsum creates solid waste in the crushing stage and air emissions in the calcining and board fabrication stage. Air emissions include gypsum dust and combustion by-products. (*ERG 09250*, p. 11)

Embodied Energy

Approximately 2,600 Btus per square foot, primarily for calcining the gypsum and drying the gypsum board. (*ERG 09250*, p. 1)

Synthetic gypsum has a higher moisture content than natural gypsum and additional driers therefore need to be added to a manufacturing facility. The synthetic gypsum comes as a powder, whereas raw gypsum rock needs to be crushed and pulverized, so switching to 100% synthetic gypsum eliminates the crushers. (Ken Bloom, G-P Gypsum, March 2002)

Durability/Maintenance

Gypsum wallboard is less durable than a plaster system, which it replaced. Likewise, the paper surface is more permeable than plaster.

Benefits

Gypsum wallboard is relatively inexpensive and is easily installed. Gypsum is an inherently fire resistive material; during a fire the calcining of each progressive outer layer absorbs heat and releases steam which slows the movement of fire through the material. Additionally, reinforcing fibers can be added to the core to increase its resistivity to fire.

Indoor Air Quality

While gypsum board itself may contain additives, especially for water-resistant gypsum board, that offgass, the primary air quality concerns arise from VOC's in joint compound.

Recyclability

Gypsum wallboard can be recycled into new product. James Hardie Gypsum in Seattle and G-P Gypsum in Tacoma both use scrap gypsum board from construction cut-offs and from demolition waste. Contractors can bring their waste to either of these facilities.

Cost

Costs for gypsum board are comparable between manufacturers. Price differences are more relevant to the supplier (i.e. Home Depot vs. Dunn Lumber) than to the manufacturer.

Suppliers

Manufacturer	Recycled Content	Manufacturing Location	Source Material Location	Notes / Certifications
G-P Gypsum ToughRock	Core: 90% synthetic gypsum (flue gas desulfurization gypsum); 10% construction scrap Face Papers: 100%	Tacoma, WA	Synthetic Gypsum: Centralia, WA Scrap Gypsum: Local Contractors	FGD gypsum from TransAlta power plant in Centralia
James Hardie	Core: 5-15% construction scrap Face Papers: 100%	Seattle, WA	Raw Gypsum: Mexico Scrap Gypsum: Local Contractors, Local Recovery Businesses Face Papers: Varies	
USG	Core: 10% of gypsum from cut-offs at plant Face Papers: 100% post-consumer, which is 5% byweight of total product	Rainier, OR	Raw Gypsum: 40% from Mexico; 60% from Canada Scrap Gypsum: Plant Face Papers: Paper recycling	
National Gypsum	Core: 5% post-industrial gypsum Face Papers: 100% total; 5% post-consumer, 95% post-industrial	Richmond, CA	Raw Gypsum: Baha, CA	

Georgia Pacific Gypsum Sales Representative: Ken Bloom
1825 1st Avenue North, Seattle WA 98109. (253) 381-6640.

James Hardie Gypsum Technical Assistance: Rob Davies
(206) 768-3778. www.hardirock.com

United States Gypsum Sales Representative: Scott Finlinson
150 S.E. 10th Street, North Bend WA 98045. (800) 874-8870 ext. 6750.
Manager, Architectural and Construction Systems: Rick Master (national contact for 'green' information)
125 South Franklin St., Chicago IL 60606. (312) 606-4137

National Gypsum Sales Representative: Jim Fly
(360) 901-8206; cell: (360) 901-8206.

References / Resources

* resource available in the Environmental Works Resource Library

Allen, Edward. *Fundamentals of Building Construction: Materials and Methods*. New York: Wiley & Sons, 1999. See especially, "Plaster" & "Gypsum Board," pp. 761-785.

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"Material Report 09250: Gypsum Board Systems," *The Environmental Resource Guide (ERG)*. J. Demkin, ed. New York: American Institute of Architects/Wiley & Sons, 1997.*

Spiegel, Ross and Dru Meadows. *Green Building Materials: A Guide to Product Selection and Specification*. New York: Wiley & Sons, 1999. See especially "Appendix B: Summary of Environmental Issues," pp. 192-193. *

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