FIBERGLASS INSULATION - 07200

Materials / Manufacturing Process

Choices for fiber insulation products include fiberglass, mineral wool, cellulose, and cotton with fiberglass batts being the most common insulation material. Fiberglass is manufactured from sand, dolomitic limestone (for calcium or magnesium) and borax (for boran). The molten glass is spun to create thin glass fibers. The fibers are coated with a binder (typically phenol-formaldehyde), cured, and then formed into insulations products.

Recycled Content

Recycled glass cullett, either post-consumer or post-industrial, can be used in lieu of raw material. Ottawa Fibre has batt insulation with 60% recycled content. The U.S. products typically contain 25-30%.

Mining Impacts

The sand, limestone, and borax are all open-pit mined (or sometimes dredged in the case of sand) and generate associated environmental impacts including: habitat disturbance, overburden waste, suspended solids in mine runoff, erosion, particulate emissions, and emissions from fuel powered equipment. Sand deposits are found in New Jersey, the Allegheny Mountains and the Mississippi Valley. Limestone is quarried at prehistoric ocean sites found throughout the Midwest, the Ohio Valley and the West. Borax is prevalent in Utah, Nevada and California. All of these materials are considered to be abundant.

Manufacturing Pollution

Processing sand for glassmaking generates particulate waste from screening and wastewater containing suspended solids from washing. During curing, emissions are generated by the formaldehyde binder which need to be captured by pollution control equipment. The remaining pollution is generated from fuel burned to power the various processes. Any solid waste, such as cutoffs, are recycled in-house back into fiberglass insulation.

Embodied Energy

12,000 Btus per pound or 4,550 Btus per insulating unit. “Insulating unit refers to the mass of insulation required to provide R-20 over one sq. ft. at standard density.” (Wilson 1995; p. 15)

While embodied energy is an important consideration, the energy saved in operations over the life of a building far outweighs the energy required to produce the insulation itself. For instance, the manufacture of fiberglass and rock wool insulation uses 33 trillion Btus annually in manufacturing energy, but saves 400 trillion Btus annually in energy needed for heating and cooling. (Wilkinson 1999, p. 30)

Indoor Air Quality

There is concern with fiberglass that the individual glass fibers released from the batts can be inhaled and cause cancer, similarly to asbestos. The concern is primarily an issue during manufacture and installation; once the batts are enclosed in the wall cavity contact with the fibers is eliminated. In 1987 the International Agency for Research on Cancer (IARC) classified fiberglass as "possibly carcinogenic." Recently, the IARC, after reviewing additional studies since 1987, designated fiberglass as "not classifiable," which means there is inadequate evidence of carcinogenicity.

A second indoor air quality concern relates to the use of formaldehyde. However, insulation manufactured with phenol formaldehyde has minimal off-gassing for the following reasons: much of the formaldehyde is burned off during curing; phenol formaldehyde has a relatively small offgassing impact (the chemical bond is tighter than that of urea formaldehyde); and the insulation is encapsulated within the cavity wall. Regardless, the formaldehyde may be a concern for sensitive individuals. Johns Manville produces a formaldehyde free product that uses an acrylic resin binder in lieu of the formaldehyde.

Recyclability

Manufacturing waste is recycled in-house. Job-site waste and demolition waste is typically sent to landfills.

Cost

There are no cost differences between the major insulation product manufacturers. Cost is more related to type of product and R-Factor.

Suppliers

Manufacturer	Recycled Content	Manufacturing Location	Notes / Certifications
Johns Manville	Total: 25% Post-Consumer: 18% Post-Industrial: 7%	Santa Ana, CA	SCS Certification Have formaldehyde free product, uses acrylic resin binder; all fiberglass batt to be formaldehyde free by 8/02
CertainTeed	Total: 39% Post-Consumer: 23% Post-Industrial: 13%	Chowchilla, CA	
Owens-Corning	Total: 30% Post-Consumer: 4% Post-Industrial: 26%	Santa Clara, CA	SCS Certification
Ottowa Fibre	Total: 35%; 60-80% All Post-Consumer	Redcliff, Alberta & Ottowa	Distributed through Insulwest in Vancouver; stock from Redcliff. Redcliff: 35% recycled. Ottawa: 60-80% recycled.

Johns Manville

Building Insulation Division. 717 17th Street, PO Box 5108, Denver CO 80217-5108. (800) 654-3103. www.jm.com.

Certainteed

750 E. Swedesford Road, PO Box 860. Valley Forge, PA 19482. (800) 233-8990. www.certainteed.com.

Owens-Corning

1 Owens Corning Pkwy, Toledo, OH 43659. (800) 438-7465. www.owenscorning.com.

Ottawa Fibre

3985 Belgreen Drive, Ottawa ON K1V 821, Canada. (613) 736-1215. www.ofigroup.com.

References / Resources

* resource available in the Environmental Works Resource Library

GreenSpec. BuildingGreen.com/BuildingGreen, 2002. www.BuildingGreen.com.*

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