

Fibre-Cement

Fibre-cement – which is manufactured using sand, cement and cellulose (wood) fibre – is used in a number of cladding applications in domestic buildings. The most common exterior uses are as stucco plaster substrate, cladding sheets, cladding planks, weatherboards, and pre-finished soffit lining.

Fibre-cement is also designed for internal use as a rebated edge sheet for flush stopping and finishing, typically with ceramic tiles and as square-edged sheet for use over an existing floor as a tiling underlay.

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Extraction and manufacture	
Impact of extraction	<p>Quarrying for aggregate may create dust, noise and a significant visual impact. However, less aggregate is needed than for concrete.</p> <p>Removal of sand has possible visual impacts and ecological impacts (also see the www.level.org.nz factsheet on plaster).</p> <p>Cement is a small but important component of fibre-cement. Industrial waste products such as fly ash, ground blast furnace slag and silica fume can be incorporated into specifically designed fibre-cement mixes to reduce amount of cement used.</p>
Use of Energy and other resources	<p>Embodied energy of fibre-cement is quoted¹ as 9.3 MJ/kg. Significant amounts of water are used in fibre-cement manufacture.</p> <p>Fibre-cement uses cellulose from sustainable (radiata pine) forests as reinforcing.</p>
By-products/emissions	<p>Cement manufacture releases significant amounts of carbon dioxide to the atmosphere.</p> <p>Cured fibre-cement sheet is inert.</p>
Sourcing	
Material sources	<p>Fibre-cement sheets and planks are made in Auckland from local sand/cellulose and from cement manufactured in NZ or imported. Fibre-cement sheets and planks are also imported from Australia and China.</p>
Availability	<p>Fibre-cement is readily available throughout New Zealand.</p>
Cost	<p>Initial costs are low to medium for standard sheets or planks. Maintenance costs (repainting) medium.</p> <p>Pre-finished material (generally for soffits) has higher cost but lower maintenance.</p>
Transport to site	<p>Fibre-cement is heavy to transport. Specialised truck-based lifting equipment is needed for palletted material.</p>
Construction/installation	
Health and safety during construction/installation	<p>Safety equipment is required when cutting with a masonry saw (ear muffs, safety glasses, mask and overalls) to eliminate risk of skin irritation and lung damage.</p>
Ease of construction/installation	<p>Fibre-cement is relatively quick to install. It requires supporting framing. Individual sheets and planks can be handled by workers on site.</p>
Adaptability	<p>Installed wall claddings are moderately easy to replace.</p>

Performance	
Health and safety during life of building	Fibre-cement is inert, non-toxic and not prone to off-gassing of volatile materials. However, it will support toxic mould growth when wet (see below).
Structural capability	Fibre-cement sheets can be used as structural bracing for timber frame construction– when used on the exterior of the building most products must be painted. Fibre- cement becomes more brittle with age.
Expected durability (assuming correct installation and maintenance)	Typically 25+ years – 50 years is required when used as structural bracing.
Maintenance rating	Medium for painted materials – cladding will generally require recoating every 8-10 years. Low for pre-finished material – a yearly wash down is all that’s needed.
Moisture resistance	Unpainted fibre-cement will absorb moisture.
Rot, mould and corrosion	Lichens and mosses will grow on damp, weathered surfaces. Moulds such as the toxic stachybotrys may form in framing cavities behind wet fibre-cement.
Thermal performance	Thin sheets provide little thermal insulation or thermal mass.
Sound insulation	Thin sheets provide little sound insulation benefit – they can be used to add mass to a composite system.
Fire performance	Fibre-cement will not burn but does not perform well when exposed to fire.
Waste disposal/recycling/re-use	
Re-use	Fibre-cement can’t generally be re-used as the sheets are usually damaged when removed.
Recycling	Not currently recycled.
Waste disposal	Fibre-cement is non-toxic to dispose of – it will ultimately degrade to its individual components.

1. Embodied energy figures taken from work © J. Andrew Alcorn, 2010. (Alcorn, J. Andrew, *Global Sustainability and the New Zealand House*, a thesis submitted to Victoria University of Wellington in fulfilment of the requirements for the degree of Doctor of Philosophy in Architecture, Wellington, 2010.)