



Hempcrete Fact Sheet

Composition:	Hemp hurd, hydraulic lime binder, water
Method of application:	In-situ casting, spray application, modular design panels, blocks
Wall thickness:	Typically 9 - 12 inches depending on insulation value required
Curing period:	2 - 5 weeks
Replaces:	Drywall, insulation, house wrap, sheathing
Framing Specifications:	Standard stick built, Post and Beam, or Metal frames are all accepted. Metal must be galvanized or powder coated.
Electrical requirements:	Run conduits inside of walls before wall installation. Electrical boxes must protrude from frame ½” farther than desired wall to accommodate plaster, mgo board or other desired finish.
Plumbing requirements:	Plumbing required to be completed before wall installation.
Interior finish options:	Lime render, white wash, MgO board, Purepanel, and others
Exterior finish options:	Lime render, clay, water-based stucco, and others
Average cost per cb ft:	Starting at \$25

Average installation time: 5 days per 600 cb ft

Insulating Performance:

The R-value varies with the density of the mix – the more binder, the less insulation. Additional binder increases the density of the material and hence its heat transmission properties. The mix that we typically specify has an R-value of about 2.4 For a 12” wall, yielding more than R-28 for the wall.

There are other arguments that are made for the inherent thermal mass and hygroscopic properties of the material contributing to the effective R-value. To our knowledge, there is no test data to support this claim, and it does not enter into energy calculations.

Wall Thickness (mm)	Wall Thickness (Inches)	U-value (K·m ² /W)	R-value (Ft ² ·°F·h/Btu) USA	RSI-value 0.176 International
300	12	0.23	25	4.35
400	16	0.18	33	5.56
500	20	0.14	50	7.14

Acoustics

Hempcrete has excellent acoustic and sound-reducing properties.

In 2002, a test in the UK was performed on a pair of 6-inch (150 mm) walls with a 3-inch (75 mm) cavity between them, which is a standard arrangement for walls separating units within a building. The hempcrete walls offered sound reduction of 57 to 58 dB, exceeding the 53 dB code requirement.¹

It has a mean acoustic absorption coefficient of up to 0.69 NRC (it absorbs 90% of airborne sounds).²

¹ Hempcrete Natural Building Ltd; White Paper; <https://www.hempcrete.ca/white-paper>; August 2018

² Lime Technology Ltd

Moisture regulation

A unique characteristic of hempcrete is its capacity to store air humidity and to affect a tempered release from the inside of a building to its exterior, without being structurally compromised.

A study performed in France found that up to 596 kg (1,314 lbs) of water vapor could be stored in 1 cubic meter (35 ft³) of hempcrete, providing storage capacity for a sustained elevated relative humidity of 93% without overwhelming the capacity of the material to absorb moisture.³

This characteristic ensures a healthy living environment by constantly regulating the moisture content of the living space to between 40 - 60%.

Carbon Sequestration

According to a 2002 study, 717 pounds (325 kg) of CO₂ are stored in one metric ton of dried hemp.⁴ This equates to 6.88 lbs per cb ft hempcrete.

Between 2016 and 2019, approximately 3.5 million houses were built in the US, at an average footprint of 2,500 sq feet. If they were all insulated to code minimum requirements with hempcrete, a total of 21.7 million tons of carbon would have been sequestered. If the same homes had fiberglass insulation, 5.4 million tons of carbon would be *emitted* to create that insulation, so net carbon savings for the planet are significant.

³ Chris Magwood, 2016, *Essential Hempcrete Construction*, 1st Edition, New Society Publishers, Canada

⁴ Muhammad Pervaiz, Mohini M. Sain, 2002, *Carbon storage potential in natural fiber composites*, Resources, Conservation and Recycling 39 (2003) 325/340

Material Strength

Testing at Queen's University in Canada showed that a 2 x 6 wood stud with 313 kg/m³ (19.5 lb/ft³) hempcrete infill could support three to four times the compressive loading of a standard stud wall due to the support the hempcrete provides to the wood stud in weak axis bending.⁵

Compressive strength ranges depend on the casting process, but are between 116 - 145 PSI. Flexural strength ranges between 44 - 58 PSI.⁶

Flammability

At a test carried out by Inertek in February 2020 to ASTM standard E84-19B, hempcrete scored a perfect score of '0' on two indices, "Flamespread" and "Smoke Developed".⁷ The only effects noted were charring.

A 2014 study carried out by Victoria University Melbourne found similar results.⁸

⁵ Mukherjee, Agnita, 2012, *Structural Benefits of Hempcrete Infill in Timber Stud Walls*, Queen's University at Kingston, 21:18:13.842

⁶ Kim Brooks, White Paper, 'Compilation of Relevant Research', Hempcrete Natural Building Ltd.

⁷ HempToday; 2/25/2020; 'Hempcrete scores a perfect 'O' under ASTM fire testing in USA', <https://hemptoday.net/astm-fire-tests/>

⁸ Lubo Gregor, 2014, *Performance of Hempcrete Walls Subjected to a Standard Time-temperature Fire Curve*, ResearchGate

Summary of Hempcrete's Technical Abilities

Density	275 kg/m ³
Flexural Strength	0.3-0.4 N/mm ²
Thermal conductivity	0.06 W/mK
Heat Capacity	1500-1700 J/kg
Mean Acoustic Absorption Coefficient	0.69 NRC
Air Permeability	0.75 gm/m ² /mm hg
μ Vapour Diffusion Resistance	4.84
Fire Rating	1hr BS EN 1365-1:1999
Carbon capture	130 kg CO ₂ /m ³
Airtightness	<2 m ³ /m ² .hr@50pa

We are very grateful to Lime Technology Ltd for allowing us to use this data for hempcrete made with Tradical® Hemcrete® binder. Use of other binders will result in different, if similar, values.