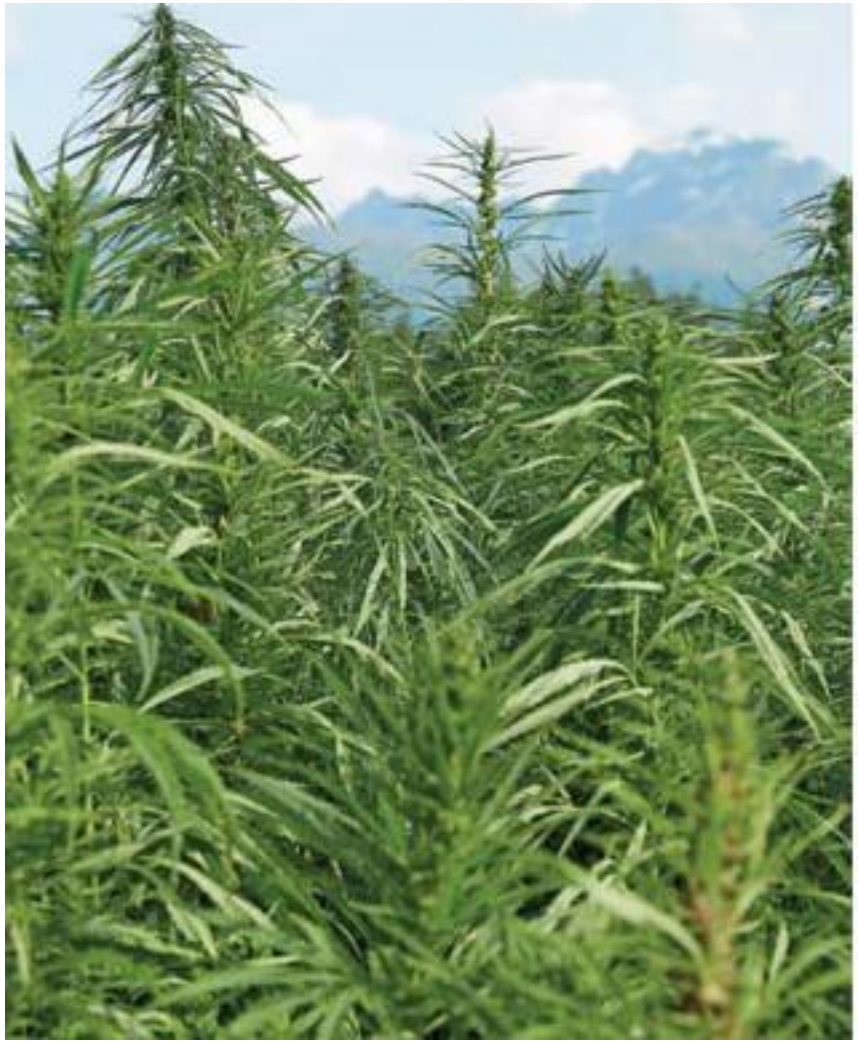
Schönthaler

Producing concrete blocks and building materials since 1964.

The building material of the future: Natural bricks made from hemp and lime.

www.hanfziegel.ch



Ein Unternehmen aus SÜDTIROL

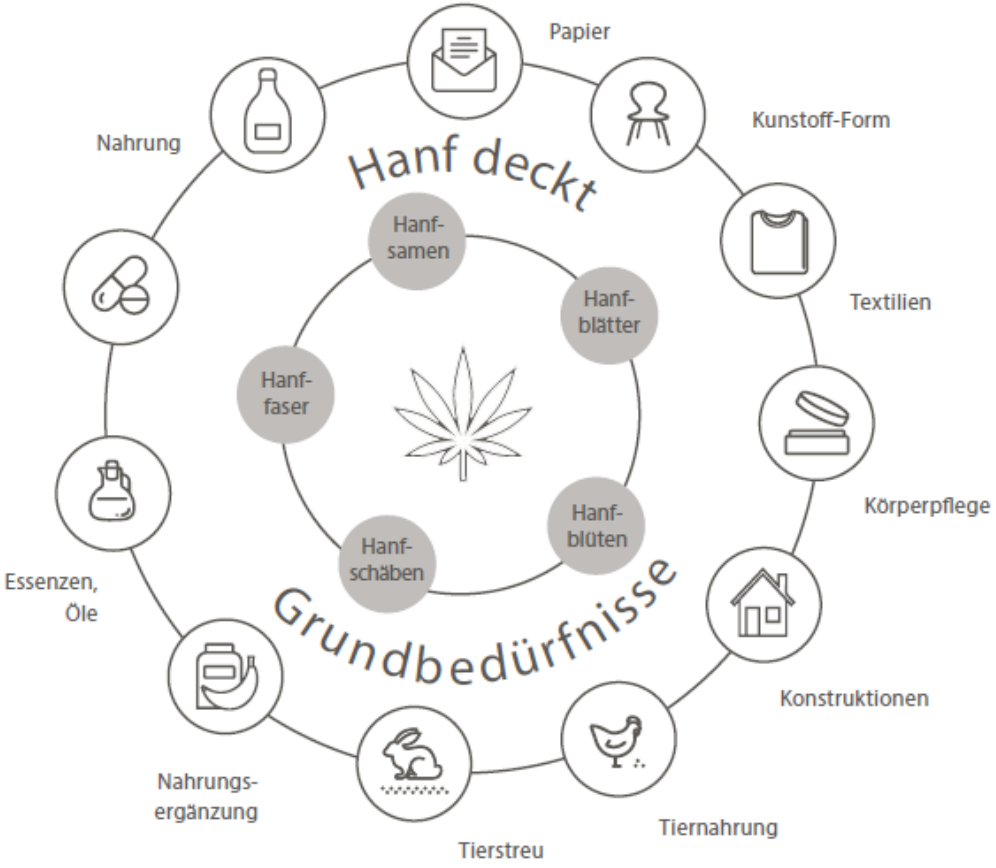
- Hemp
- Water
- Natural lime

Natural bricks made from hemp and lime.

- Regenerates the soil
- Grows without any pesticides

- Covers basic human needs
  Food is produced from the seeds
  Textiles from the fibres
  Natural bricks from the wood
  Medicine from the flowers

- Industrial hemp grows approx. 50x faster than wood
- Industrial hemp also grows in Switzerland
- 2 -3 hectares of hemp = approx. biomass for 1 family house

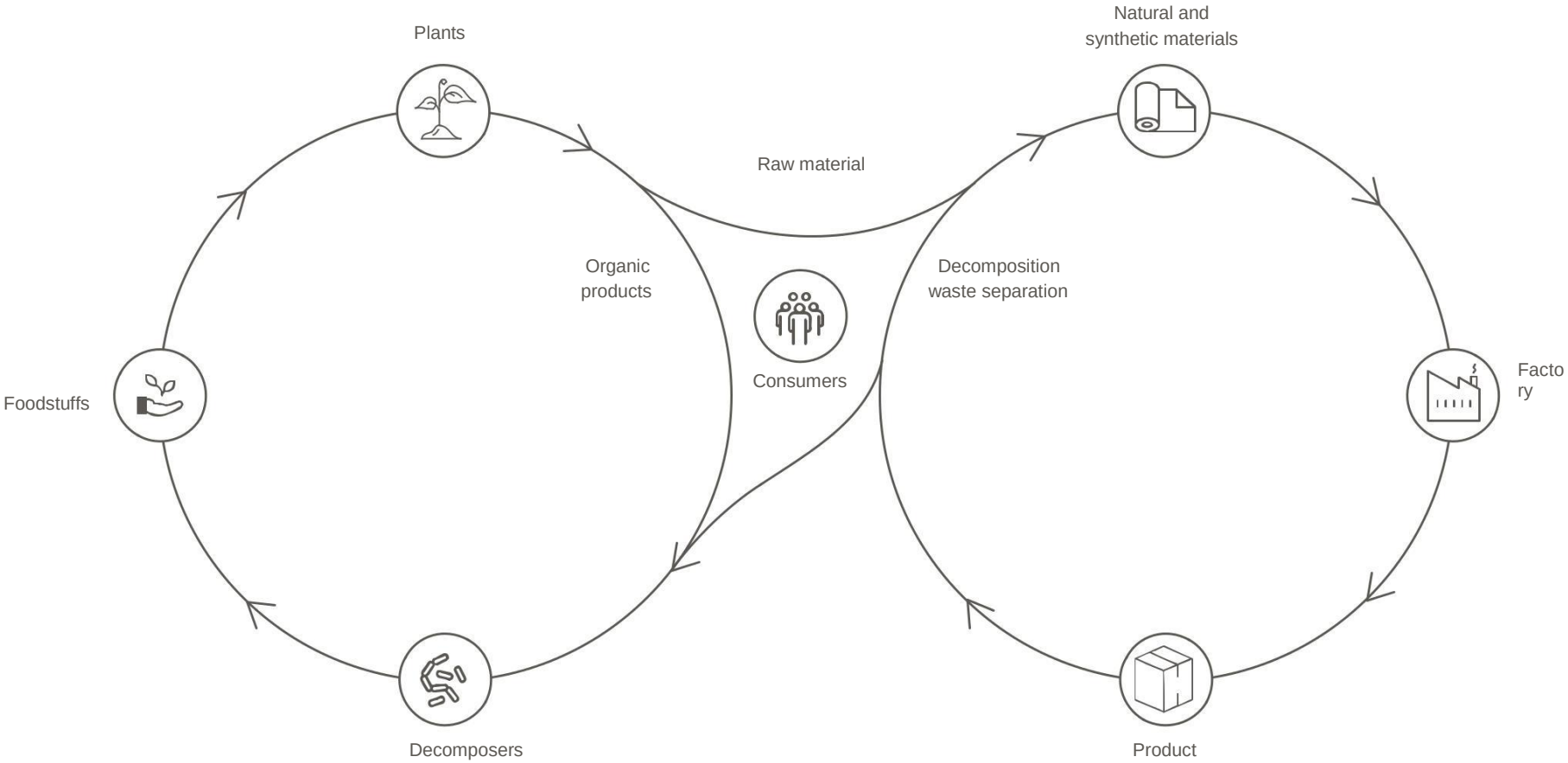


Eco-efficiency -
cradle to cradle

The principle for an eco-efficient approach is: waste equals food. In many natural processes, both energy and material are wasted. Plants and animals produce large quantities of "waste". They are not eco-efficient. Nevertheless they are eco-efficient because they are part of a sustainable system that re-uses every piece of waste, for example as a fertiliser.

"Nature has been producing things inefficiently, but effectively, for millions of years. A cherry tree produces thousands of flowers and fruits without polluting the environment. On the contrary: as soon as they fall to the ground, they become nutrients for animals, plants and soil in their vicinity."
Michael Braungart: quoted in the Berliner Zeitung

Reduction is a topic that is constantly talked about in the sustainability movement.
"Reduction's boring!" Nature doesn't do reduction; it is a continuum of continual creation.
We want to follow this path in the building industry. Instead of applying ecological insulation materials with plastic meshes and cement plasters and then discarding them as waste, hemp-lime is reused - recycled From cradle to cradle. Without waste.



material of the future

Jack-of-all-trades

- Heat insulation, heat storage, heat reflection
- Sound insulation, acoustic regulation
- Insulates even when wet
- Non-flammable
- Humidity regulation
- Air ionisation
- Inhibits mould
- Rodent- and vermin-resistant
- CO^2 negative, 100% natural, without compromises
- 100% compostable or reusable

Durability + simplicity

- Monolithic construction, no additional insulation necessary
- Few different materials, no additives
- Binding agent natural limestone (cf. Roman Empire: bridges, palaces, etc.)
- Many application possibilities:
  new buildings, exterior walls
  Renovation - interior insulation
  Renovation - exterior insulation
  Partitioning walls
  Subfloors
  Packing

4 hours under a flame of 650 °C Still 2 °C

on the outside

No signs of combustion

Oneplantisallweneed.com

Hemp-lime plasters

- Effect similar to clay plaster
- Easy to process, machine-friendly
- Less cracking
- high aesthetic value

Healthy!

"The effect of pure, ionised ambient air is one of the great foundations of our health. Everyone knows the effect of invigorating air in the forest and by the sea. Ancient cultures were well aware of the effect of breathing air, and nowadays this is often massively underestimated. We have the possibility, within our own four walls, to give positive inputs to our own health; it's where we spend a large part of our lives, where we sleep for regeneration. One's house should be like a third skin, protect and envelope us."

Dr. med. Waltraud Lun

Ill!

"In other cultures, the main criterion in the assessment of chemistry and sustainability is whether it appears in breast milk or not."

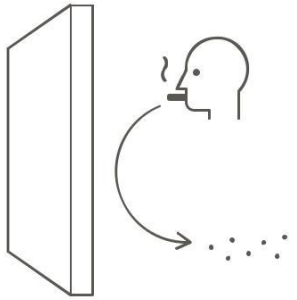
"In the last seventeen years, not a single sample of breast milk that could be marketed as drinking milk has been taken in all the OSCE countries."

"95 out of 100 Austrians have plastic residues in their blood. In current studies, traces of softening agents and flame retardants have been found in the human body. The substances are likely to have entered the human body through the breathing passages and the food chain." Gesundheitsaufklärung.de

Plastics in the sea: according to a scientific study from the beginning of 2015, the result of the calculated discharge of an estimated average of approx. eight million tons into the sea per year would correspond to five supermarket bags full of plastic per 30 cm of coastline! Wikipedia

Ionisation*
Odours - toxins

Natural bricks are capable of degrading persistent odour molecules by absorbing and cleaving them, reducing perception of the smell. Odour molecules that have been removed are only released slowly into the surrounding air, and thus barely perceived.



* particularly effective, certified and tested together with ionising wall paint

Source: https://www.yumpu.com/de/document/view/32159611/wie-lehm-die-wohnqualitat- verbessert/2

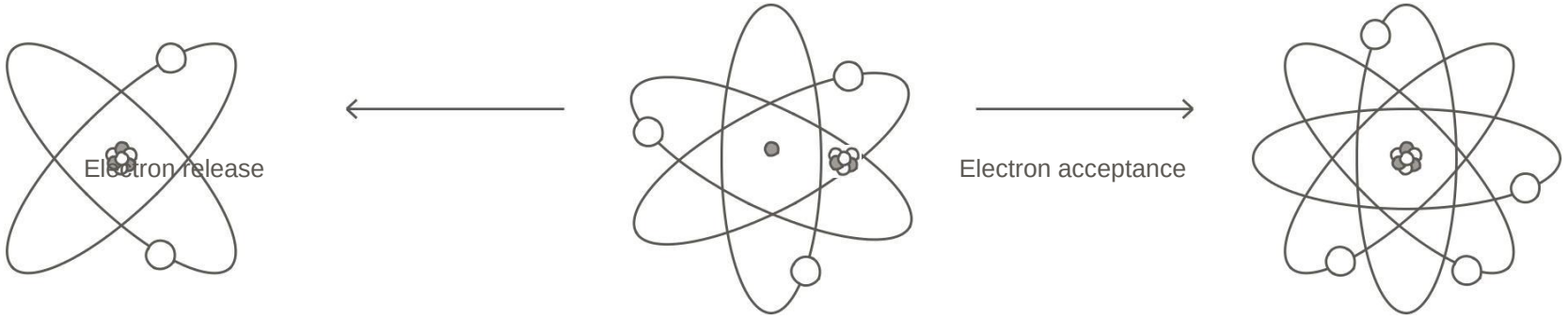
Electrically positively charged ion

(cation)

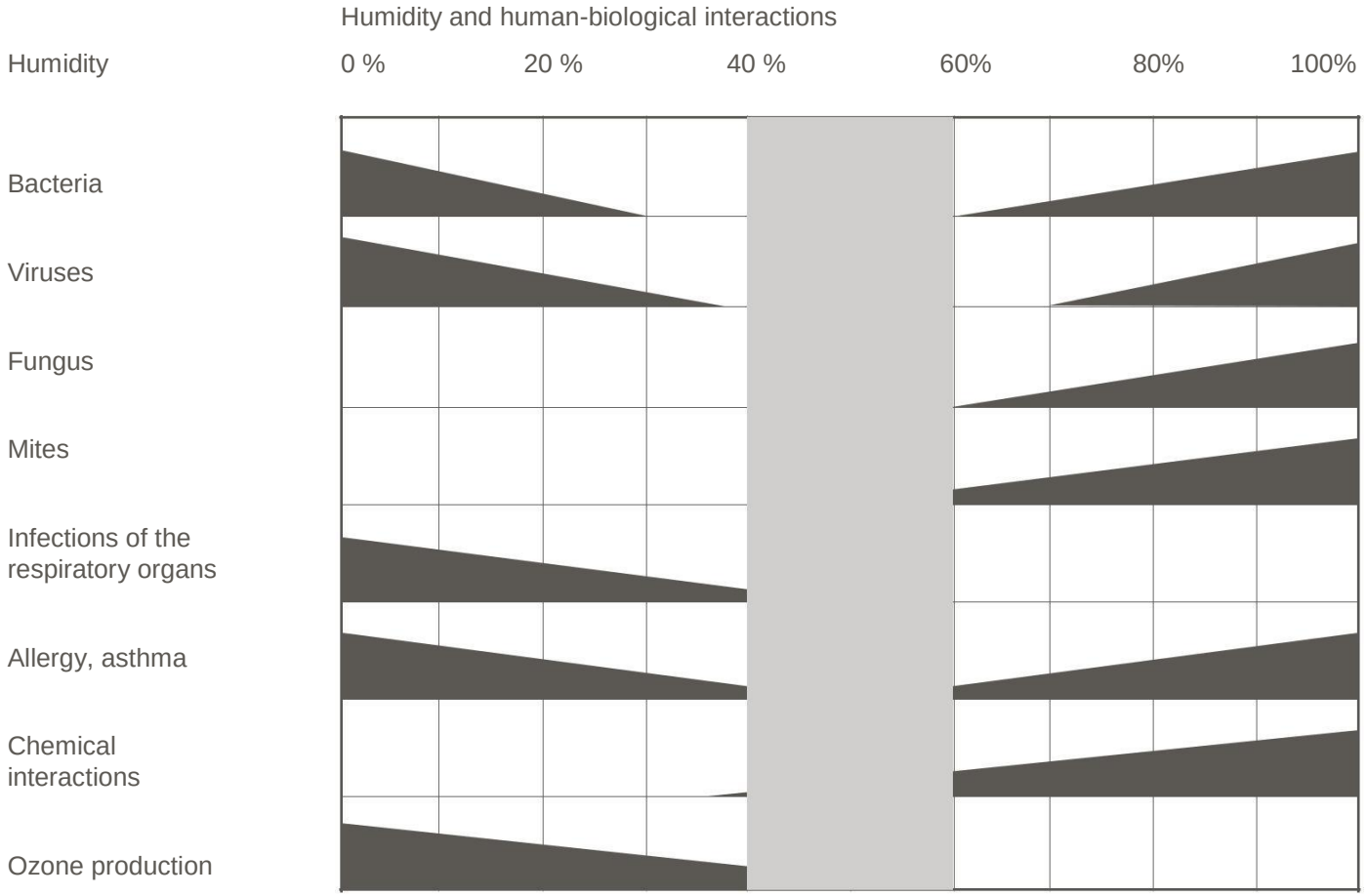
Electrically neutral atom

Electrically negatively charged ion

(anion)



Humidity + interactions

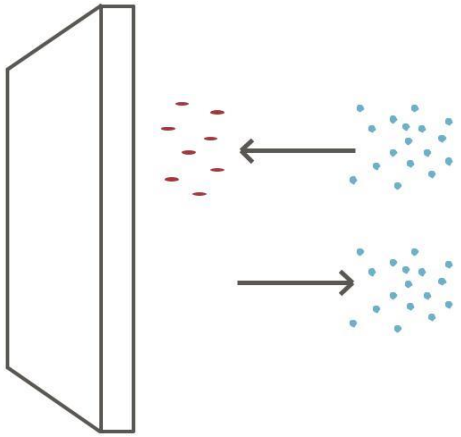


Comparison of the hygienic changes in effect depending on relative humidity. Development of biological organisms and interactions with human organs and the environment.

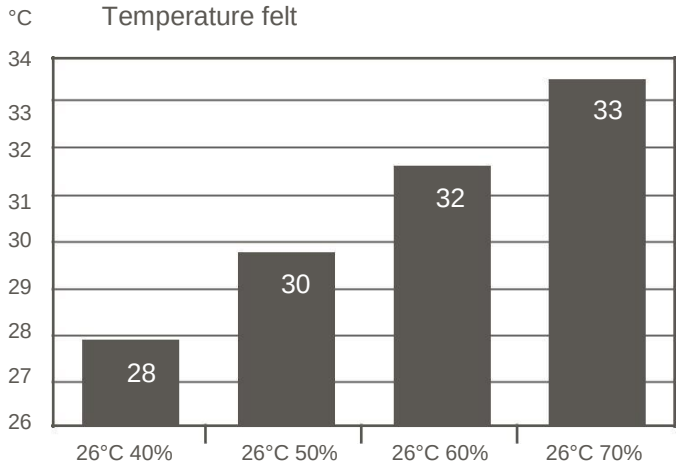
Condensation energy

When hemp-lime absorbs water vapour from room air, condensation energy is released and heating occurs. When water is discharged into the air, the necessary evaporation energy is extracted from the water and
cooling occurs. Hemp bricks cause natural cooling in the summer, and natural heating in the winter.

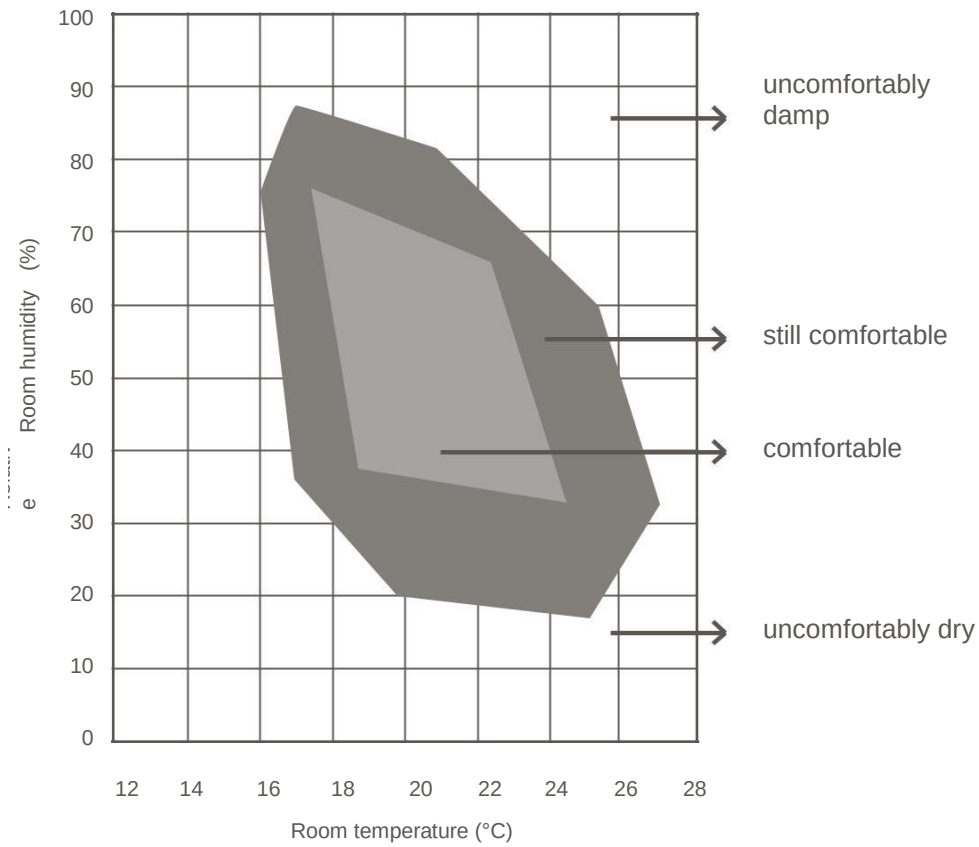
Source: https://www.yumpu.com/de/document/view/32159611/wie-lehm-die-wohnqualitat-verbessert/2



Reduced heating costs through ideal humidity



Comfort



Excellent!

Nearly zero energy building 2020

Green Building Solutions
AwardWinner 2016: Hemp House

material of the future

Jack-of-all-trades

- Perfectly absorbs, stores and reflects heat
- Cools in the summer
- Extremely high phase shift (approx. 24.5 hours at 38 cm)
- Sound insulation
- Regulates room acoustics
- Open to diffusion - permeability without damaging condensation
- Inhibits mould
- Antibacterial - antistatic
- Effect similar to clay
- Absorbs moisture from the room and releases it evenly
- Cleanses and disinfects room air
- Reduces high-frequency radiation
- Extremely long-lasting - build for generations
- Environmentally-friendly production (CO^2 negative)
- Recyclable / compostable
- Rapidly growing, local raw material
- Reusable > cradle to cradle

Applications products

- Natural bricks made from hemp and lime
- Hemp-lime plaster system (basic plaster, fine sanding)
- Hemp concrete (for walls and floors)
- Hemp dry fill material for new buildings
  For renovation
  For rebuilding partitions

Dry density:

my=320 kg/m3 mini 310 kg/m3, maxi 350 kg: m3

Thermal characterisation

Temperature of the test	Relative humidity	Thermal conductivity (W.m-1K-1)	Thermal resistance 30 cm (m2.K/W)
23°C	Sec	0.067	4.48
23°C	50%	0.0794	3.78
10°C	Sec	0.0648	4.63
10°C	50%	0.073	4.11

Sound attenuation index: $R_w(C; C_{tr})$ = 43 (-1; -2) db According to: NF ENISO 140-1 (1997), NF EN 20140-3 (1995) Subdued object on approval: wall built in concrete blocks of hemp of 300 mm with internal plaster of 5 mm and outside render of 15 mm.

Reaction to fire performance: B-s1; d0
According to NF EN 13501-1: 2007

Moisture Buffer Value, this value characterises the ability of a material to moderate changes in the humidity of the surrounding air. It is a characterisation of the hydrothermal behaviour that contributes to well-being. MBV = 2.35 [m^2.%HR)] This value is excellent

Compressive strength: 0.32
MPa Shear strength: 0.12 MPa
Vapour permeability: 2 to 2.3 . 10^{-11} $kg.m^{-1}.S^{-1}.Pa^{-1}$ on cylindrical dry specimen (16x32 cm) at 90 days

The future will be green, or there won't be one.

Thank you!

www.hanfziegel.ch

material of the future

Schönthaler

Producing concrete blocks and building materials since 1964.

Schönthaler Brigitte und Martin
I-39023 Eyrs, Oris (BZ), Vinschgauer Strasse, Via Venosta 33, T +39 0473 739 937,
F +39 0473 739 720, info@schoenthaler.com, www.schoenthaler.com