ENVELOPE SYSTEM
BIOMATTONE®

Real estate value guaranteed over time

NEW

NEW CONSTRUCTION

TECNO CANAPA

SENINI

THE ENVELOPE AS A STRATEGIC INVESTMENT

In recent years, building efficiency has often been reduced to thermal transmittance value alone, but a building envelope is not a static parameter. It is its dynamic nature that makes it a decisive factor in the long term: every design decision affects the building's performance for decades.

This is our promise of permanence:
a promise rooted in the building culture of lime and plant fibers over time, and in the durability of biocomposite materials when they work in balance with the environment

The envelope is a dynamic system that must manage:

- energy storage and release
- summer thermal peaks
- seasonal variations
- moisture exchange

and ensure performance is maintained over time.

A building can be insulated and unstable at the same time.

When mass and hygrometric regulation are lacking, the following increase:

- internal fluctuations
- dependence on building systems
- maintenance risk
- the need for corrective interventions over time

The BIOMATTONE® envelope system was created to reduce the technical and maintenance risk of the envelope over the long term. The value lies in the stability of performance and in optimizing the building's overall cost, including its systems.

STRUCTURE AND COMPOSITION

The BIOMATTONE® envelope system is a mineral-plant construction solution composed of:

selected and certified hemp shiv

natural dolomitic binder

a blend of symbiotic microorganisms

Brevetto Europeo
EP3121156A1

The BIOMATTONE® envelope system is a mineral-plant masonry with hygroactive behavior, providing insulating and stabilizing function for indoor thermo-hygrometric conditions.

Thermal insulation
Energy savings
Humidity regulator
Sound-absorbing
Living comfort
Fire resistant
Frost resistant
No insects or mold
Durable over time
Eco-friendly
Carbon negative
Recyclable

THERMAL PERFORMANCE AND THERMAL MASS

- Conductivity λ = **0.044 W/mK**
- Density = **310 kg/m³**
- Specific heat = **1280 J/kgK**
- Vapor resistance μ = **4.5**

The combination of insulation and mass enables dynamic behavior of the envelope.
It is not just insulation, it is the ability to delay and dampen the thermal peak.
Insulating with mass means stabilizing.

Performance by thickness:

Thickness	U (W/m²K)	Rt (m²K/W)	Phase shift (without plaster)
20 cm	0.21	4.71	11h 19'
30 cm	0.14	6.99	18h 14'
40 cm	0.11	9.01	25h 08'
50 cm	0.09	11.53	32h 04'

The stated performance figures refer to the envelope's steady-state behavior: beyond transmittance, the layer buildup must ensure adequate summer phase shift and the ability to dampen the thermal peak, in line with the principles of building physics

SIZES AND PERFORMANCE

BIOMATTONE® sizes for every need: BA30 for high-performance infill walls, BA36 for advanced single-layer walls, BA40/BA50 for maximum thermal mass and summer comfort, BA8/BA12 for internal linings and partition walls.

NB. [height] +/- 1 cm	BA8	BA12	NEW BA20	BA25	BA30	BA36	NEW BA40	NEW BA50
Dimensions - Length Height Thickness - cm	50x20x8	50x20x12	50x40x20	50x20x25	50x20x30	40x20x36	50x20x40	40x20x50
Density - dry Kg/m³	310	310	310	310	310	310	310	310
Thermal conductivity - W/mK LAMBDA λ	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044
Thermal transmittance - W/m²K U	0.5	0.34	0.21	0.17	0.14	0.12	0.11	0.09
Total thermal resistance (Rt) - m²K/W	1.99	2.9	4.71	5.85	6.99	8.35	9.01	11.53
Thermal phase shift without plaster	3h 00'	5h 44'	11h 19'	14h 46'	18h 14'	22h 23'	25h 08'	32h 04'
Specific heat - J/KgK	1280	1280	1280	1280	1280	1280	1280	1280
Vapor resistance - μ	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Acoustic absorption (aw)	1 - CLASS A	1 - CLASS A	1 - CLASS A	1 - CLASS A	1 - CLASS A	1 - CLASS A	1 - CLASS A	1 - CLASS A
Sound reduction (Rw) - dB					40	42	43	45
Compressive strength - N/mm²	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Shear tensile strength with embedded anchor - kN	2.067	2.067	2.067	2.067	2.067	2.067	2.067	2.067
Orthogonal tensile strength with embedded anchor - kN	2.734	2.734	2.734	2.734	2.734	2.734	2.734	2.734
Reaction to fire	B - s1, d0	B - s1, d0	B - s1, d0	B - s1, d0	B - s1, d0	B - s1, d0	B - s1, d0	B - s1, d0
Fire resistance without plaster - min		EI60			EI180	EI180	EI180	EI180
Total GWP - kg CO_2eq/m³	-44.2	-44.2	-44.2	-44.2	-44.2	-44.2	-44.2	-44.2

HYGROMETRIC REGULATION AND COMFORT

The porous structure of the lime-hemp matrix allows controlled moisture exchange.

The system helps to:

absorb excess moisture

release it gradually

stabilize indoor relative humidity

eliminate the risk of surface condensation

Living comfort is thermo-hygrometric balance, not just temperature.

absorption

release

The system is made up of mineral- and plant-based materials with breathable, hygroactive behavior, free of synthetic components with harmful effects on people's health.

DURABILITY AND THE LIME CYCLE

Air lime is derived from limestone, a geologically stable material. During the progressive carbonation of the lime matrix, the mineralization of the plant component and the breathability of the system contribute to the durability of the material over time, provided the design and installation are carried out correctly.

The plant fiber is progressively mineralized by the lime matrix, becoming an integral part of a system that is:

- inert
- incombustible
- rot-proof

DECARBONIZATION

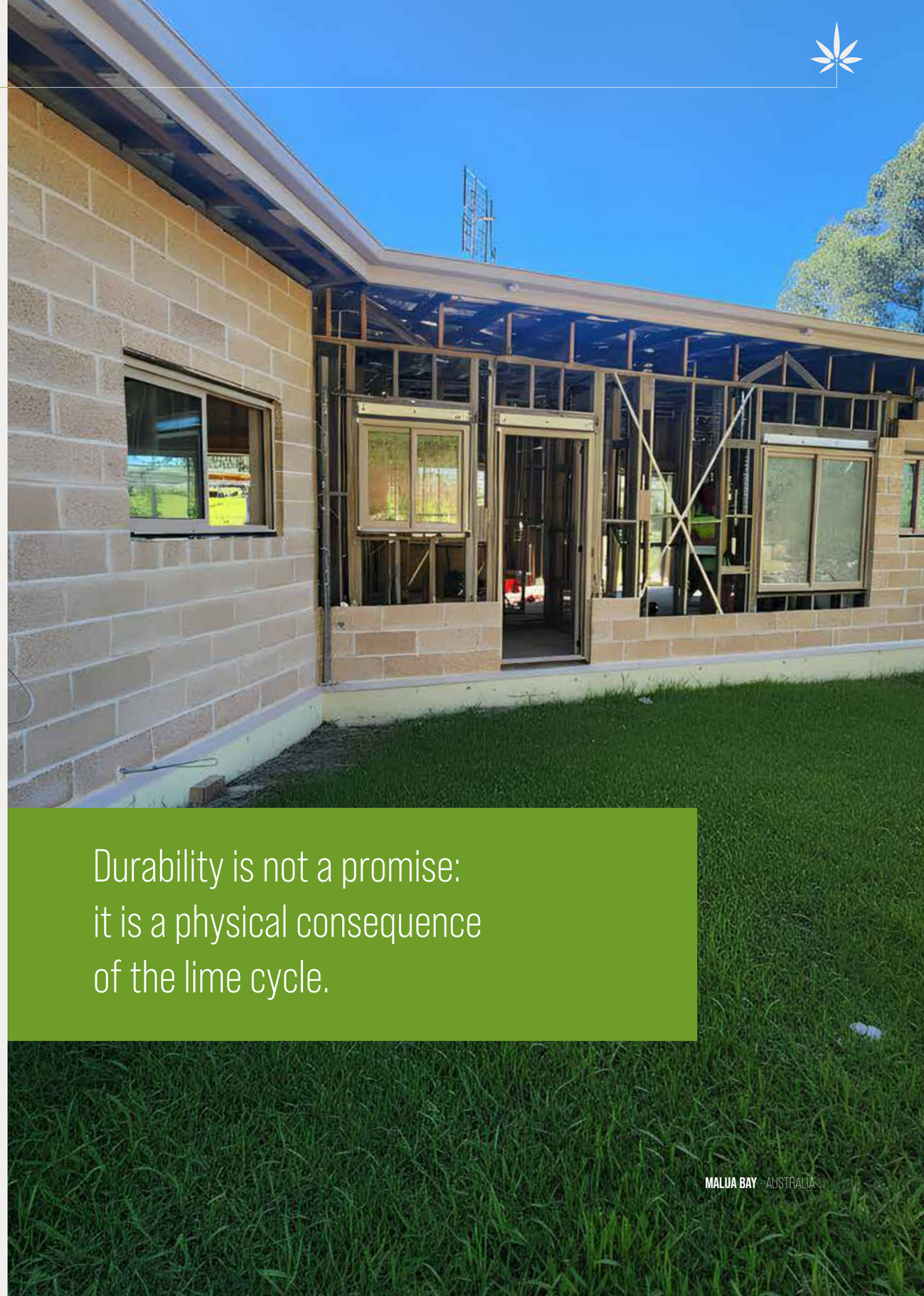
The BIOMATTONE® envelope system contributes to the building's environmental balance through CO_2 storage certified by an Environmental Product Declaration (EPD). The study assesses the environmental impact of the entire life cycle of BIOMATTONE®, from raw material production to end of life, including transport, installation and disposal

Carbon-negative regenerative footprint:

-44 kg CO_2/m^3
removed from the atmosphere

EPD VERIFIED

Download EPD certification



Durability is not a promise:
it is a physical consequence
of the lime cycle.

MALUA BAY AUSTRALIA

SYSTEM APPLICATIONS

- Insulating and breathable infill masonry
- Acoustically insulating internal partitions
- Insulation of existing building walls
- Lightweight, insulated structural floor slabs

The system enables simpler, less layered construction assemblies, reducing workmanship and execution complexity.

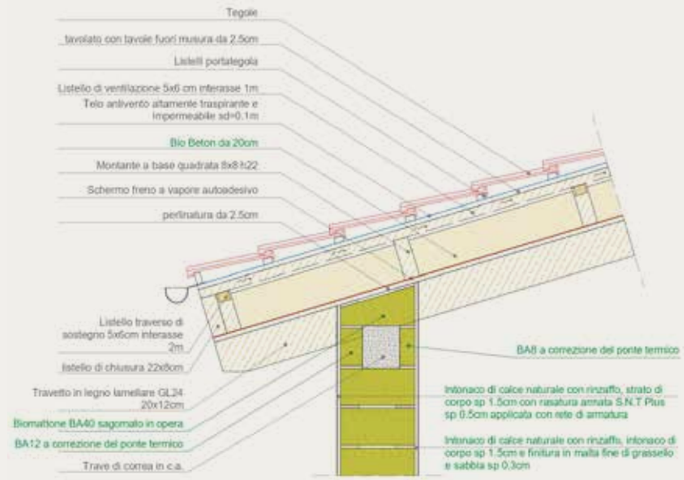
Low-stratification envelope solutions are recommended, with high physical consistency of the building assembly, in order to reduce the risk of performance discontinuity.

CONSTRUCTION DETAILS AND SPECIFICATION ITEMS

Real performance is measured in the details. Every junction — ground connection, wall-to-floor, window sub-frame — determines the continuity of the system. Tecnocanapa by Senini provides construction drawings to reduce design uncertainty and ensure durability over time.

Typical applications:

- ground connection
- window and sub-frame junction
- wall-to-floor junction
- wall-to-roof junction
- external insulation (ETICS) details
- internal insulation details



The BIOMATTONE® envelope system can be specified in public and private tenders and is aligned with current CAM Edilizia criteria. The specification items cover all applications of the system, ensuring descriptive accuracy and technical and regulatory defensibility.

Download area
PDF and DWG
construction drawings

Download area
for specification items

INSTALLATION

Clear, shared and reliable procedures to support designers, contractors and installers in the correct installation of the BIOMATTONE® envelope system.

Download installation manual

INDOOR HEALTHINESS AND THE BIOSAFE PROTOCOL

The BIOMATTONE® envelope system contributes to indoor healthiness thanks to the hygroscopic and breathable performance of the hemp-and-lime biocomposite.

The material's ability to absorb and release moisture promotes a stable hygrometric balance, reducing the conditions favorable to condensation and mold formation.

The BIOMATTONE® envelope system has obtained the Biosafe Validation Seal, which certifies its total healthiness, zero emissions of Volatile Organic Compounds (VOCs) and the absence of health risks.

Contributes to:

- **thermo-hygrometric comfort**
- **indoor healthiness**
- **reducing conditions favorable to condensation and mold**
- **air quality monitorable according to the BIOSAFE protocol**

Biosafe Certification

CAM READY:

The construction system helps reduce the building's environmental impact through the use of natural, breathable, low-embodied-energy materials.

The material has CO_2 absorption and storage properties, contributing to the overall environmental balance of the building.

The construction solution is consistent with the principles of durability, maintainability and reduced passive energy demand.

The BIOMATTONE® envelope system is designed for full environmental and regulatory validation through:

- **Environmental Product Declaration (EPD)**
- **certified quantification of the CO_2 balance**
- **integration into LCA protocols and environmental certifications**
- **full alignment with current CAM Edilizia (Italian green public procurement) criteria**

This allows the system to be:

- **specifiable in public tenders**
- **usable in CAM-compliant design**
- **integrated into ESG strategies**
- **technically and regulatorily defensible**

TECHNICAL POSITIONING

Solutions for designers, contractors and real estate developers

The BIOMATTONE® envelope system is not a material, it is a construction system that:

Reduces technical risk

Simplifies the layer buildup

Stabilizes performance over time

Integrates measurable environmental value

The advantage comes from both competitiveness and the reduction of risk and the increase in the building's overall value

INFILL WALL SOLUTIONS

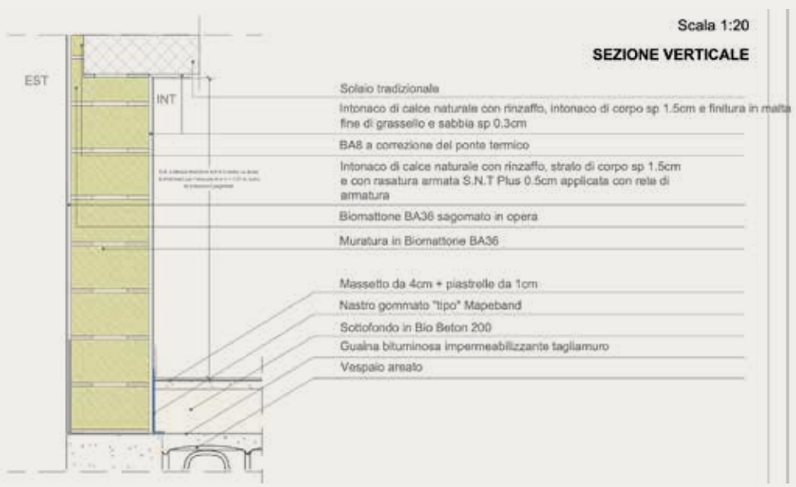
BA36 single-layer solution

execution simplicity and material consistency

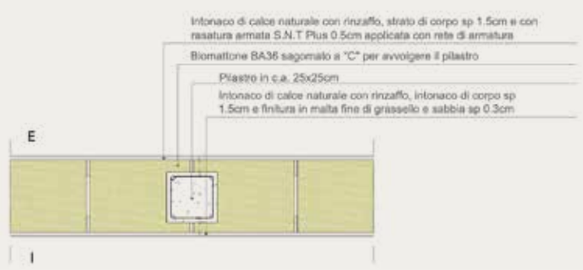
BIOMATTONE® infill wall, 36 cm thick (0.044 W/mK), complete with finishing plaster cycle on the interior and exterior side (base-coat plaster 15mm + skim coat approx. 4mm), with the following performance:

Transmittance (U):
0.119 W/m2K

Thermal Phase Shift:
23h 38m



SEZIONE ORIZZONTALE



INFILL WALL SOLUTIONS

BA30 + Bio Beton® Pronto + board layered solution

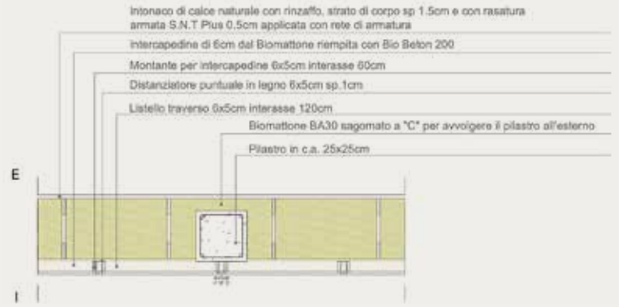
systems integration, internal dry-layer assemblies, or specific finishing requirements

BIOMATTONE® infill wall, 30 cm thick (0.044 W/mK) + Bio Beton® Pronto, 6 cm thick (0.053 W/mK) + fiber-gypsum board, complete with finishing plaster cycle on the exterior side (base-coat plaster 15mm + skim coat approx. 4mm), with the following performance:

Transmittance (U):
0.123 W/m2K

Thermal Phase Shift:
21h 17m

SEZIONE ORIZZONTALE



SELECTED **PROJECTS**

LIVIGNO (SO)

UNIVERSITY OF PISA

LONDON - UNITED KINGDOM

PORTO RECANATI (MC)

OSAKA - JAPAN

SAN CATALDO (LE)

SENINI

Lavoriamo per il benessere dell'Uomo e dell'Ambiente®

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