LEEMA

Low Embodied Energy Insulation Materials

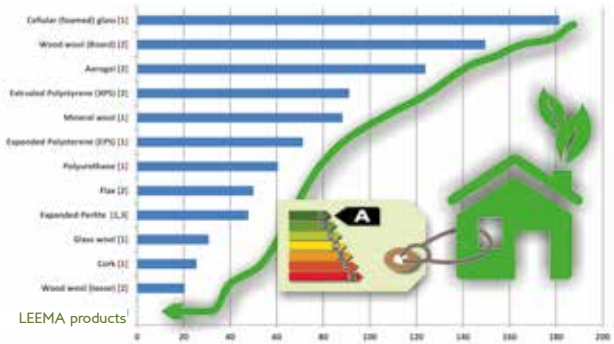
is a four-year long research project that aims to develop novel inorganic insulation materials and building insulation masonry components with low embodied energy. Raw materials are: silicate/alumino-silicate wastes of industrial minerals exploitation, recycled rejects from the glass industry and mineral wastes with high alkali content as alkali activators.

When measuring sustainability, the energy and resources used to create a building material and the building itself have to be taken into account as well. In fact, the overall environmental impact of the building sector can be reduced and the sustainability of buildings improved through the use of advanced building materials with low embodied energy.

THE NEW 3i MATERIALS:

- will be suitable for applications in both new and retrofitted buildings
- will have more than 50% lower embodied energy and at least 15% lower total cost, than the currently available solutions

EMBODIED ENERGY PER FU (FU: m² insulation for Rvalue=1 m²K/W)



Embodied energy per FU was calculated using values of Embodied Energy (cradle to gate), density and thermal conductivity from:
[1] 'Inventory of Carbon & Energy (ICE)' 1.6a, Hammond & Jones, 2008
[2] http://www.greenspec.co.uk/
[3] https://perlite.org/

THE LEEMA PARTNERS:

S&B	Coordinator: S&B Industrial Minerals S.A, GR www.sandb.com
Redco R&D Center	Etex Group (Redco), BE www.etexgroup.com/company/redco-nv-belgium
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ADVANCED MANAGEMENT SOLUTIONS	Advanced Management Solutions Ltd, GR www.amsolutions.gr

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3i

LOOSE FILLING GRANULAR MATERIALS FOR ENERGY EFFICIENT BUILDINGS

iNORGANIC
iNSULATING
iNCOMBUSTIBLE

www.leema.eu

LEEMA

Low Embodied Energy Insulation Materials

LOOSE FILLING GRANULAR MATERIALS

A totally inorganic granular insulation material in the form of lightweight hollow spheres with a multicellular core structure, based on mineral tailings, recycled glass and industrial by-products.

Main advantages

- Lightweight, multifunctional, inorganic, inert and incombustible.
- Excellent thermal performance (Thermal conductivity (λ_{10}): 33-45 mW/mK)
- Due to its synthetic nature, the properties and particle size can be fine-tuned according to application; loose bulk density (LBD) can vary from as low as 15 kg/m^3 up to values higher than 120 kg/m^3
- Sustainable, as it is based on wastes and recycled raw materials and is expanded at moderate temperatures (500 - 600°C) compared to expanded perlite (≈ 1200°C), using a low energy consuming expansion method (Infrared heating)
- Free flowing and easy to install without special training or equipment, using the standard procedure applied for loose-filling insulation materials
- Similar behavior to expanded perlite regarding the corrosion of hot dip galvanized and steel anchor rods

LOOSE FILLING MATERIALS IN THE LEEMA PROJECT

The 3i Loose Filling Materials (LFM) developed within the project are fined-tuned according to the application, and used as replacement of expanded perlite for the development of most of the other LEEMA products.

3i Loose Filling Materials

LFM for Cavity Walls insulation	EPB (Roof Insulation Boards)	Fibre boards	Polymer Bricks

APPLICATIONS

3i LOOSE-FILLING GRANULAR MATERIALS

- Filling cavity walls, covering the space between soil and concrete floors and under flat green roofs in retrofitting works
- Providing thermal insulation and protection from water drainage in new buildings
- Fillers for plasters, mortars, paints and joint compounds
- Lightweight aggregate for concrete or clay based products
- Cryogenics
- Wrapping ducts for thermal insulation and fire resistance

3i FORMED PRODUCTS (EXPANDED PERLITE BOARDS - EPB, FIBRE CEMENT BOARDS)

Thermal insulation, good acoustic insulation, chemical inertia, stability over time and fire resistance.

- Covering roofs and walls (externally and internally) for thermal insulation of new or retrofitted buildings
- Covering ventilation pipes, wire networks, steel constructed buildings, etc.

3i POLYMER BRICKS

With improved thermal and acoustic insulation properties, similar to those of marketable special insulation clay bricks.

- Insulating bricks for new buildings
- Insulating brick facade panels for retrofitting