

Super Insulating Materials : SIM *IEA EBC Annex 65 & EU relevant projects*

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Introduction

Why SIM ?

What are SIM ?

Technical Assessment – Certification – Normalization

European Projects



International Energy Agency, EBC Annex 65

Long-Term Performance of Super-Insulating Materials in Building Components and Systems

Report of Subtask 1:
State of the Art on Materials & Components
Case Studies
25 July 2018

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International Energy Agency, EBC Annex 65¶

Long-Term Performance of Super-Insulating Materials in Building Components and Systems¶

Subtask-II Report:~

Scientific Information for Standardization Bodies dealing
with Hygro-Thermo-Mechanical Properties and Ageing¶
10-June-2019¶

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International Energy Agency, EBC Annex 65¶

Long-Term Performance of Super-Insulating Materials in Building Components & Systems¶

Report of Subtask-III:~
Practical Applications ~Retrofitting at the Building Scale~
Field-scale¶

10-June-2019¶

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International Energy Agency¶

Long-Term Performance of Super-Insulating Materials in Building Components & Systems¶

Energy in Buildings and Communities Programme¶

10-June-2019¶

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Subtask-4: Life-Cycle Assessment, Embodied energy
and Life-Cycle Cost Assessment¶

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Authors:¶

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50% of total energy consumption : to provide heating for homes, industrial purposes and other applications.

- 50 % : industry, process heat, drying and industrial hot water uses.
- 46% : space and water heating (60 to 80%) and cooking in the buildings sector.
- The remainder was used in agriculture.

In 2017, only 10% of heat was produced from renewables.

New Buildings

- NZEB : a well insulated building first
- only 10 % to 20 % of additional energy consumption (2050)

Renovation/Retrofitting

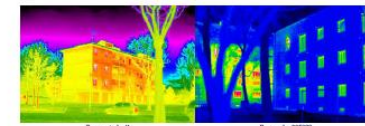
- Building stock : more than 80% of energy consumption.
- About 75% of current buildings will still be standing in 2050



JRC SCIENCE AND POLICY REPORTS

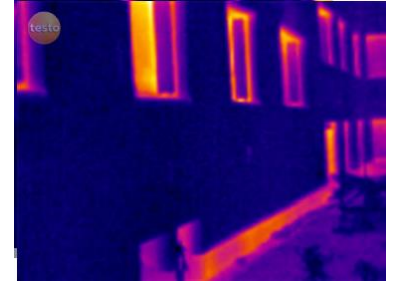
Energy Renovation:
The Trump Card for the New Start
for Europe

Yamina SAHBI
Katalin BODIS
Sándor SZABÓ
Heinz OSSENBRINK
Strahil PANEV
2015



Why new insulating materials ?

1 : still, too much thermal bridges, even for ETICS

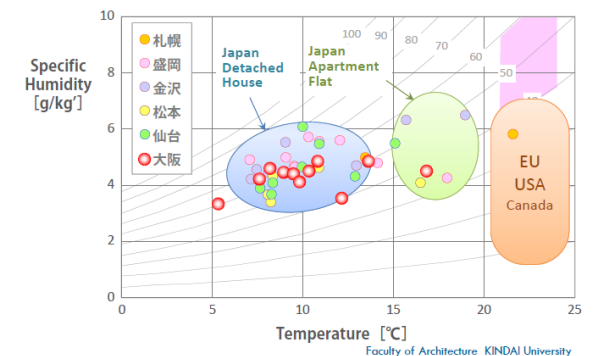


2 : Space savings



3 - Fire risks for ETICS

4 – Low room temperature & diseases



What are Super Insulating Materials ?

**Advanced Porous Materials
APM**



**Vacuum Insulation Panel
VIP**



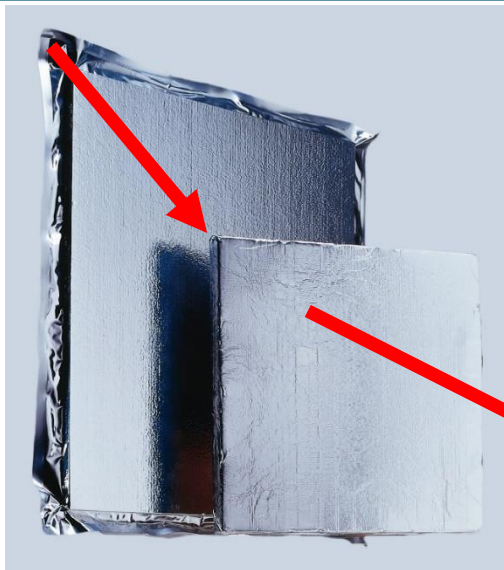
$$\lambda_g = \frac{\lambda_{g0}}{1 + C \cdot \frac{T}{\delta \cdot P}}$$

25 mW/mK for still AIR

Thermal conductivity
of embedded gas

SIM : from mature products

Packaging
Seams &
fringes



Protection
Insulating
layer



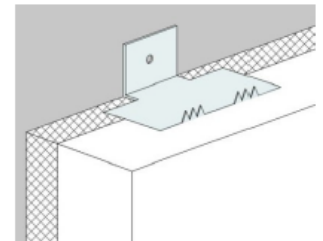
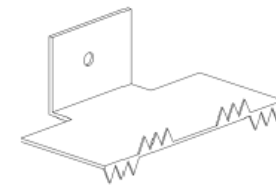
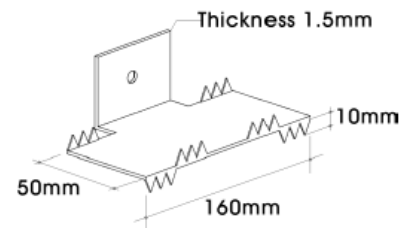
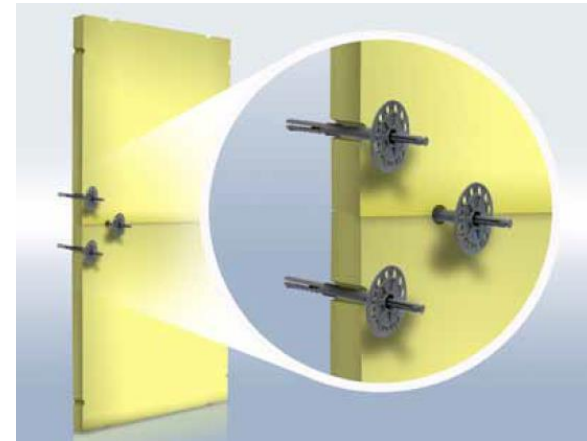
Belgian production facility (Promat)

To system solutions with important innovation potential

**VIP with protection layers for
Handling & Transportation,
Installation & Service Life (T&RH)**

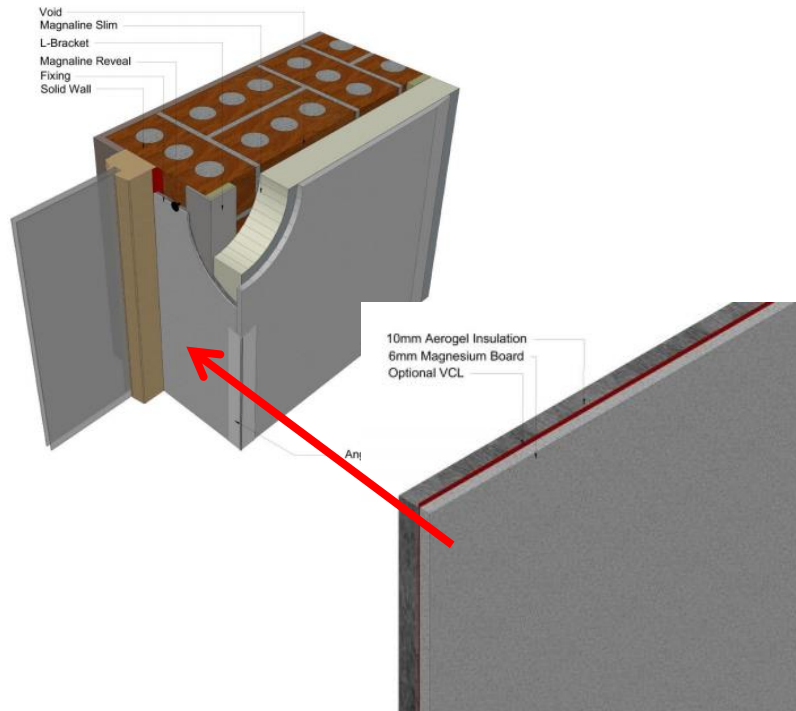


Fixing & Fastening



Evaluation of Mechanically and Adhesively Fixed External Insulation Systems
Using Vacuum Insulation Panels for High-Rise Apartment Buildings - Sihyun Park,
Bo-Hye Choi, Jae-Han Lim and Seung-Yeong Song
Energies 2014, 7, 5764-5786; doi:10.3390/en7095764

Aerogel Blanket for Thermal Bridges Treatment of Window Reveals

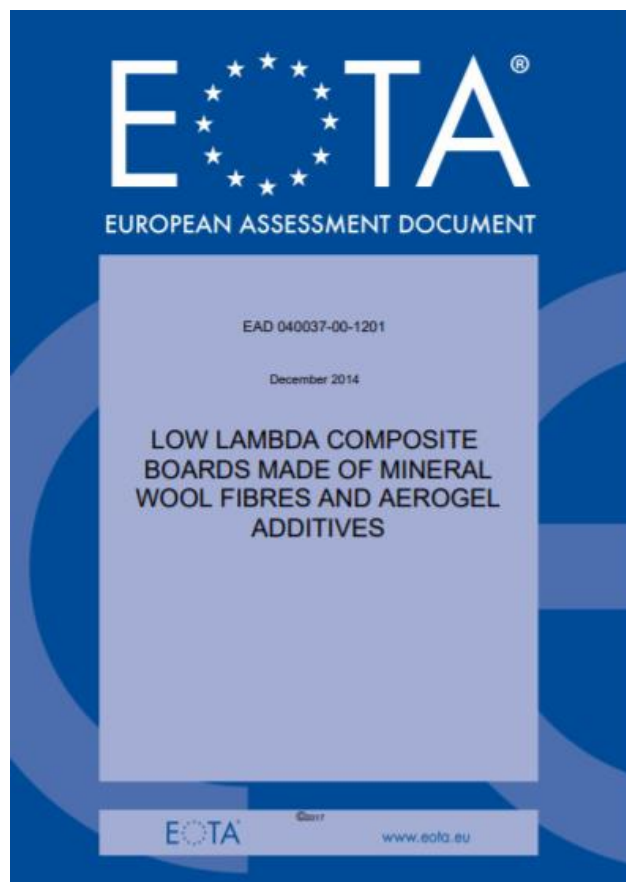


Aerogel Insulating Plaster

- ◆ $\lambda = 0.028 \text{ W/mK}$
- ◆ Commercially sold since 2013
- ◆ Water repellant & diffusion open
- ◆ Swiss environmental award at Swissbau 2014
- ◆ Innovation award „Praxis Altbau“ at BAU 2015

FIXIT







ASSOCIATION POUR LA CERTIFICATION DES MATERIAUX ISOLANTS
ASSOCIATION (DECLARÉE LE 01 DU 1ER JUILLET 1987) ORGANISME CERTIFICATEUR DECLARÉ (LE 04-MAR-82 DU 3-JUN 1984)
CSTB - LNE

CERTIFICAT ACERMI
N° 15/018/1072
Licence n° 15/018/1072



En application des Règles Générales du Certificat de produit ACERMI et du référentiel Tremplin version A du 01/10/2013 de la Certification des matériaux isolants thermiques.

In società:

Raison sociale : SAINT GOBAIN ISOVER
Company :

Siège social : Les Miroirs - 92096 PARIS La Défense - France
Head Office :

est autorisée à apposer la marque ACERMI sur le produit isolant, sur les emballages et sur tout document concernant directement le produit désigné sous la référence commerciale

ISOVTP

et fabriqué par l'usine de : MUNICH (ALLEMAGNE)

Production plant :

avec les caractéristiques certifiées figurant au page 2 du présent certificat

Certified characteristics are given in page 2.

Ce certificat atteste que ce produit et le système qualité mis en œuvre pour sa fabrication font respectivement l'objet d'essais de conformité et d'audits périodiques avec prélèvement d'échantillons pour essais, suivant les spécifications définies par le référentiel Treumlin.

This licence, delivered under the ACERAM Technical Regulations, certifies that the products and the relevant quality system are respectively submitted to tests of conformity and periodical audits with sampling for tests, according to the specifications of the Technical Regulations.

Ce certificat a été délivré le 9 décembre 2015 et, sauf décision ultérieure à la présente certification, due en particulier à une modification du produit ou du système qualité mis en place, est valable jusqu'au 31 décembre 2017.

This certificate was issued on December 9th, 2015 and is valid until December 31st, 2017, except new decision due to a modification in the product or in the (environmental) quality system.

Pour le Président
J. L. LAURENT

Pour le Secrétaire
E. CRÉPON

P. PRUTHON

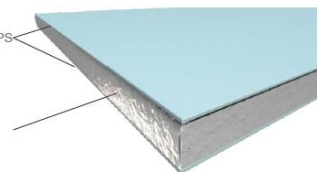
C. BALOCHT

La validité du certificat peut être vérifiée en consultant le base de données sur le site www.aosmael.com

Page 1 sur 2

4. service@bartaux-doincard.fr 75702 Paris Cedex 18 • Tél. 33 (0)1 84 88 84 97 • Télécopie 33 (0)1 84 89 03 45

Mechanical protection with XPS

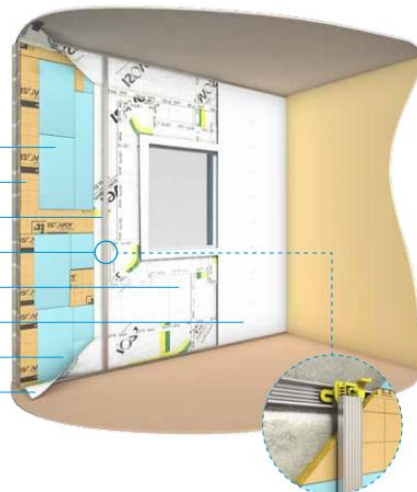


Trimetalized film

Optima VIP,
un système sous Avis Technique

L'Avis Technique décrit la mise en œuvre du système Optima VIP : son respect garantit sa performance et sa durabilité dans le temps.

Panneau ISOVIP
Calfectement isolant GR 32
Fourrure télescopique Optima 240 / 280
Appuis Optima₂ et pastille Optima₂
Membrane Vario® Xtra
Parement plaque de plâtre
Lisse Clip Optima₂
Vario® Xtra Band



Avis Technique 20/15-360

Procédé d'isolation thermique de murs en panneaux isolants sous vide ISOVIP.

Optima VIP application en mur

Procédé d'isolation thermique de murs en panneaux isolants sous vide

Thermal insulation system of walls using vacuum insulation panels
System zur Wärmedämmung von Wänden mit Vakuumisulationspaneelen

Titulaire : Saint-Gobain ISOVER
« Les Miroirs »
18, Avenue d'Alsace
FR-92096 PARIS LA DEFENSE

Tél : +33(0)8 25 00 01 02
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Commission chargée de formuler des Avis Technique et
des Documents Techniques d'Application
(arrêté du 21 mars 2012)

Groupe Spécialisé n° 20

Produits et procédés spéciaux d'isolation

Vu pour enregistrement le 13 janvier 2016

CSTB
le Adas en construction

Secrétariat de la commission des Avis Techniques et des Documents Techniques d'Application
CSTB, 84 avenue Jean Jaures, Champs sur Marne, FR-77447 Marne la Vallée Cedex 2
Tel : 01 64 60 82 82 - Fax : 01 60 85 70 37 - Internet : www.cstb.fr

Les Livres Techniques sont publiés par le Secrétariat des Livres Techniques, assuré par le CITS. Les versions actualisées sont disponibles gratuitement sur le site Internet du CITS (<http://www.cits.ch>)

CEN/TC 88/WG 11 N 148

Thermal insulation products for buildings — Factory made Vacuum Insulation Panels (VIP) — Specification

Produits isolants thermiques pour le bâtiment — Produits manufacturés en laine vacuum isolation panel (VIP) — Spécification

[AEROCOINS](#) : Aerogel-based composite/hybrid nanomaterials for cost-effective building superinsulation systems

[HIPIN](#) : High Performance Insulation based on Nanostructure Encapsulation of Air

[NANOINSULATE](#) : Robust, cost-effective opaque and transparent vacuum insulation panels (VIPs) incorporating new nanotechnology-based core materials.

[VIP4ALL](#) : Highly Sustainable and Effective Production of Innovative Low Cost Vacuum Insulation Panels for Zero Carbon Building Construction

[HOMESKIN](#) : The HOMESKIN project aims at developing a new silica Advanced Aerogel-Based Composite

[GELCLAD](#) : Highly efficient cladding eco-panels with improved nano-insulation properties

[INNOVIP](#) : Innovative multi-functional Vacuum-Insulation-Panels (VIPs) for use in the building sector

[WALL IN ONE](#) : WALL Insulation NOvel Nanomaterials Efficient systems

[EENSULATE](#) : Development of innovative lightweight and highly insulating energy efficient components and associated enabling materials for cost-effective retrofitting and new construction of curtain wall facades.

VACUUM INSULATION PANEL



GLOBAL ASSOCIATION

<https://vipa-international.org/>



Advanced Porous Materials

<http://advapor.org/>

IVIS Paris 2017

13th International
Vacuum Insulation Symposium

September 20-21, 2017

<http://ivisparis2017.org/>

IVIS KYOTO 2019

– **14th** –

International Vacuum Insulation Symposium

September 19 - 20, 2019, Kyoto, Japan

<http://ivis2019.jp/>

- **SIM are mature materials**, even if there is further room for improvement to expand their application areas.
- The development and uses of SIM are spreading around the world. **Market growth remains slow** but is expected to rise within the next decade, especially in Asia.
- Recommendations on how to perform reliable testing of components and buildings integrating SIM are now available and are shared among the actors, while a first standard is expected to be published imminently.

- The SIM sector must now evolve **from a single material or product to a system solution**, rather as the windows sector did by shifting from separate frames and glazing elements to integrated windows.
In other words, a Vacuum Insulation Panel can be considered as an “opaque glazing” element with similar handling & installation constraints to a window system.
Therefore, insulation installers should acquire new skills.

- **Good design is important**, and coupling with traditional insulation materials is recommended in order to improve SIM service life.
- Application guidelines would be very useful for installers.
- In the future, Life Cycle Assessment of SIM needs to be improved; the methodology is ready but reliable data are expected from industry.

QUESTIONS ?