EBC

Energy in Buildings and Communities Programme

Annex 65

ADEME

Agence de l'Environnement et de la Maîtrise de l'Energie

CSTB

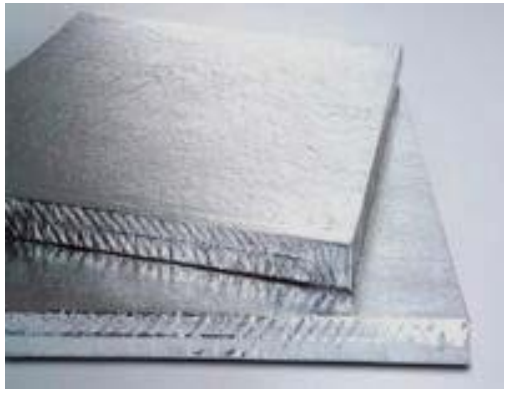
le futur en construction

WORKSHOP QUALICHECK

Performance of thermal insulation in low energy buildings and advanced building renovation projects

BRUSSELS – 15 December 2016

Super Insulation materials : an overview of international activities and new products on the market



IEA-EBC Annex 65:
Long-Term Performance of Super-Insulating Materials in Building Components & Systems

Daniel QUENARD
CSTB Energy & Environment
daniel.quenard@cstb.fr - 33 4 76 76 25 46

Introduction

Why SIM ?

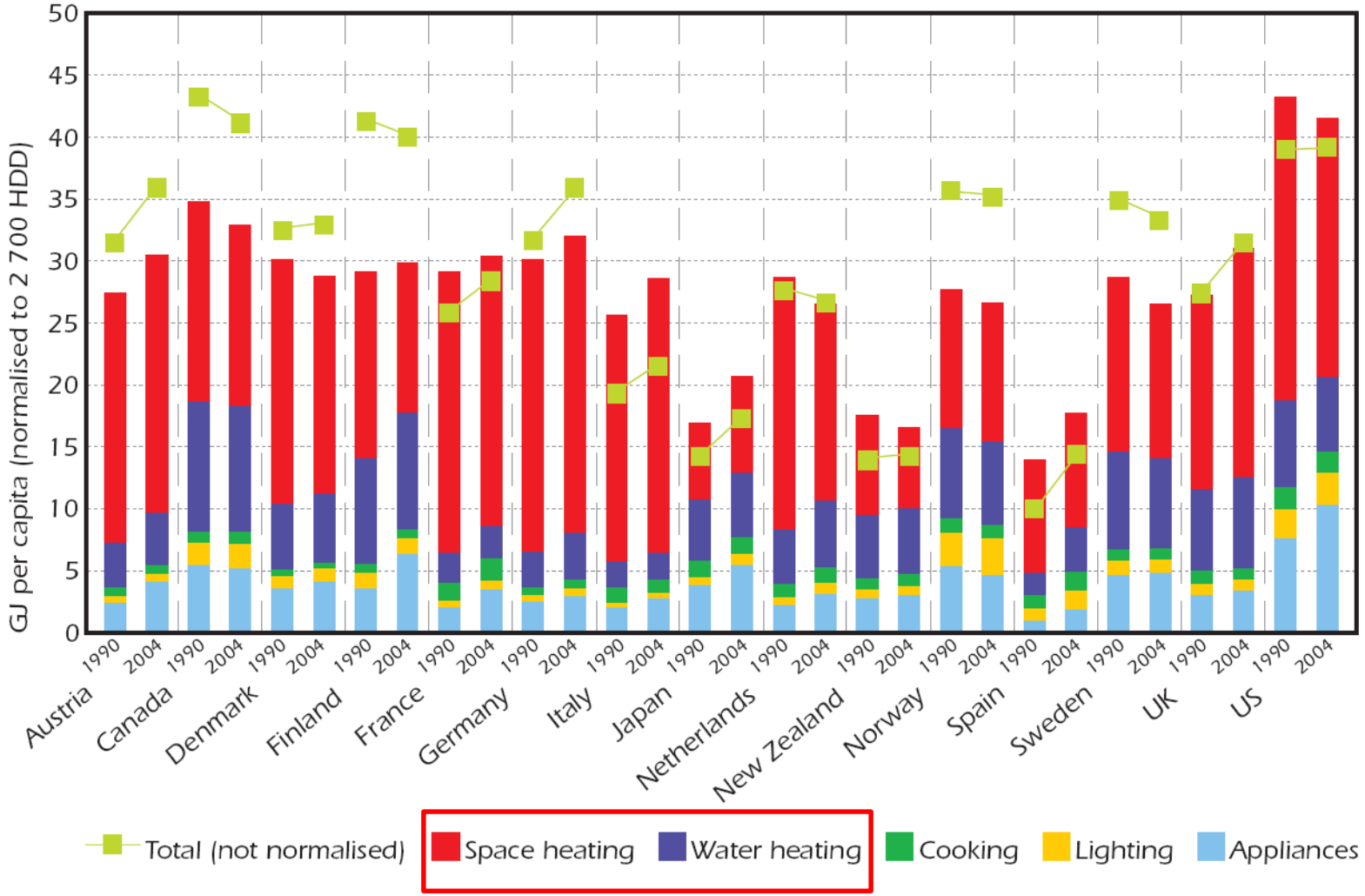
What are SIM ?

SIM around the world

Technical Assessment – Certification - Normalization

“Heatleaks”, the first energy user ?

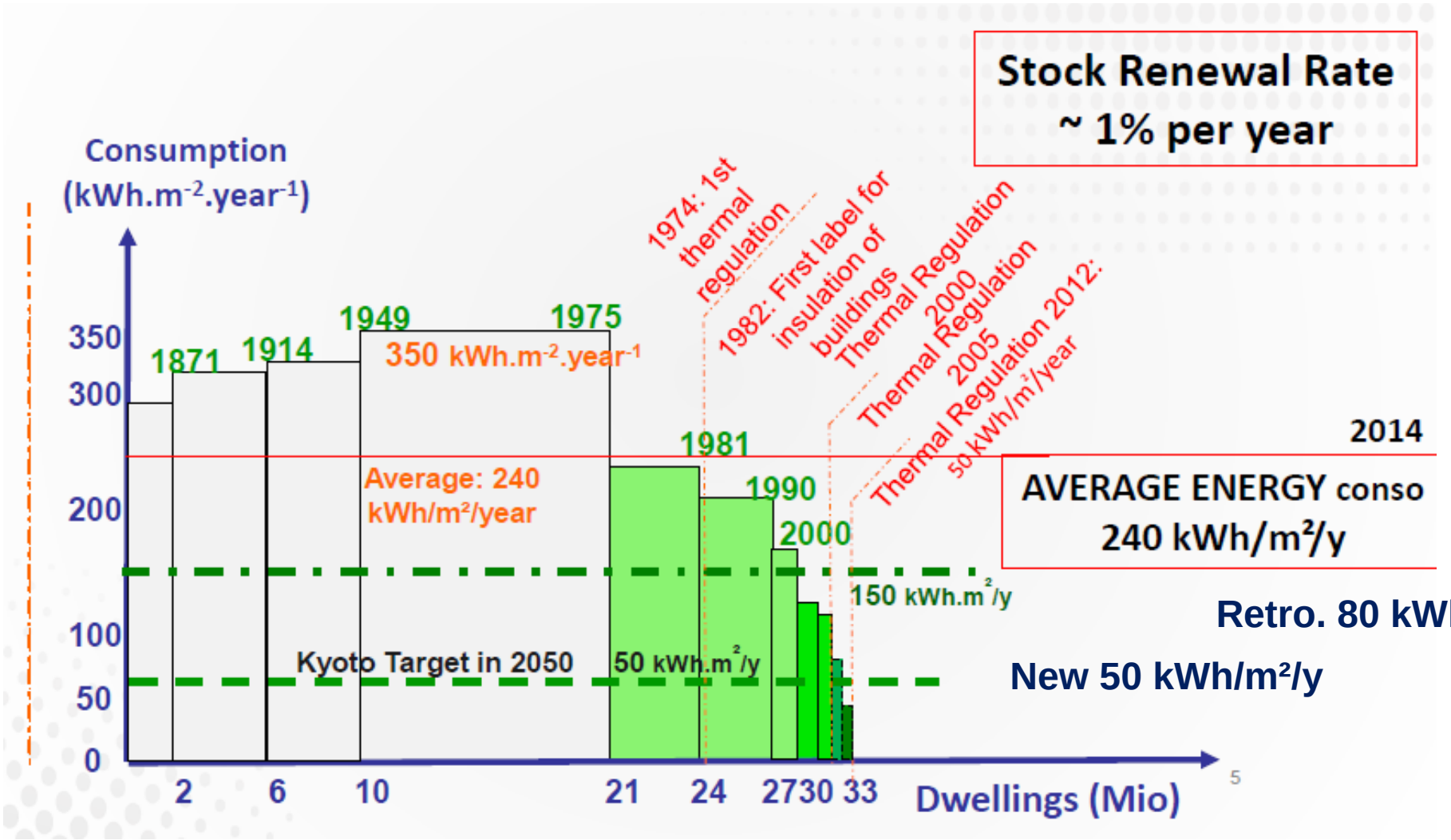
… through building envelope, water tank, pipes …



60 to 80 %

Source : IEA - Millennium

For example, in France …



Buildings of yesterday are the problems of today & tomorrow

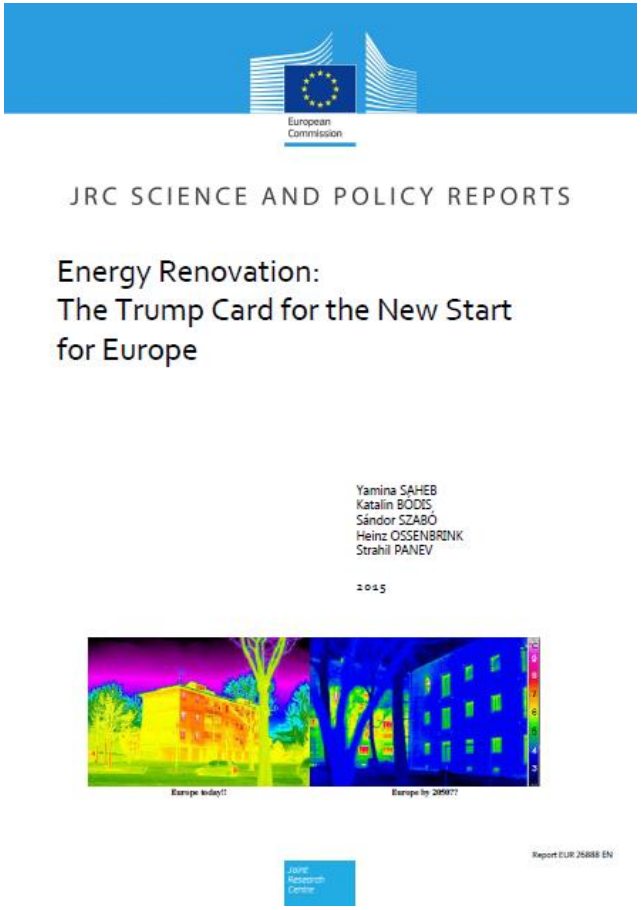
2050 : Challenges in the building sector

New Buildings

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

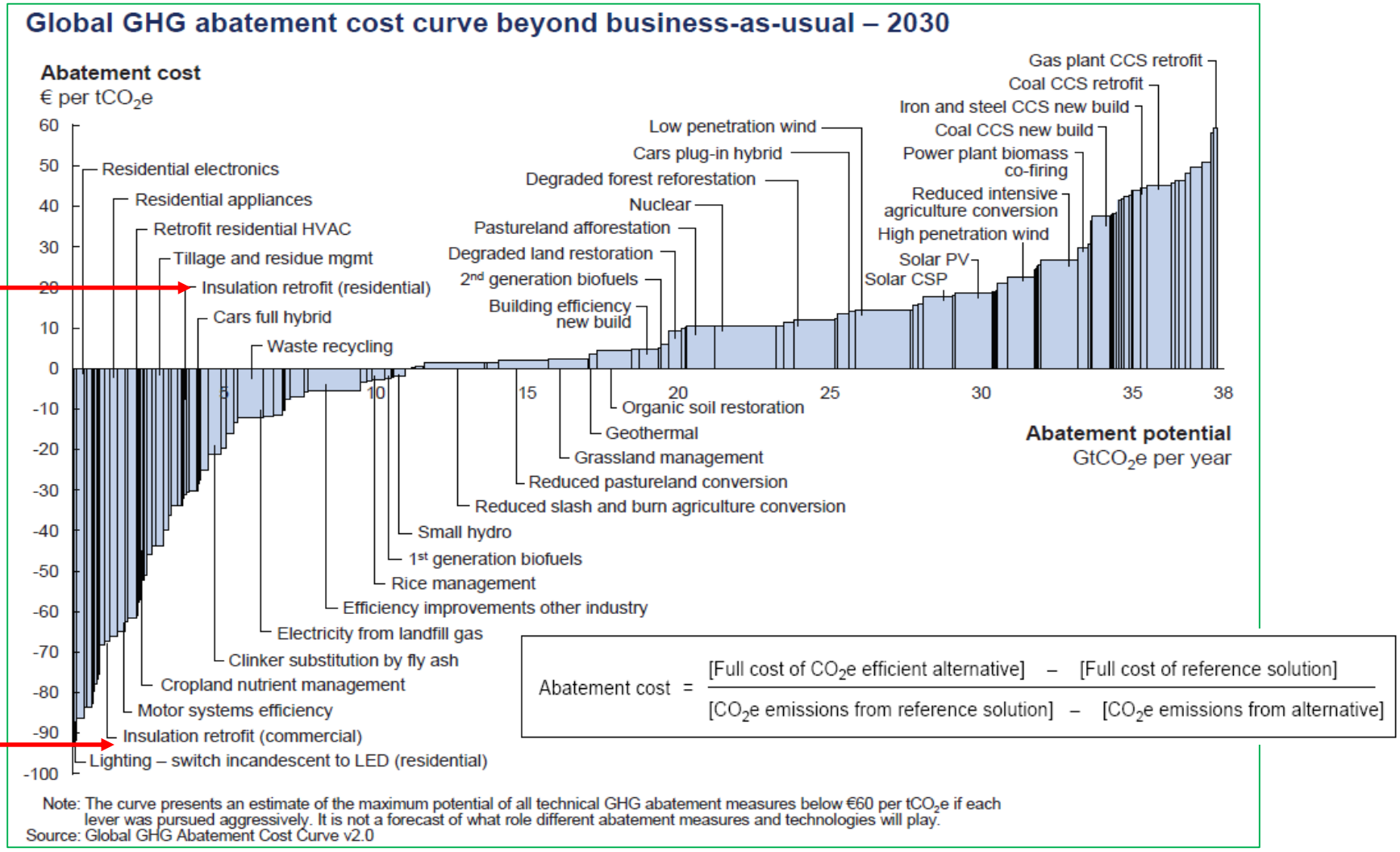
Renovation/Retrofitting

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



Insulation among the most efficient way to reduce GHG

Global cost curve for greenhouse gas abatement measures beyond "business as usual".



McKinsey, "Pathways to a Low Carbon Economy. Version 2 of the Global Greenhouse Gas Abatement Cost Curve", McKinsey & Company, 2009.

Why new insulating materials ?

Already a large number of insulating materials …

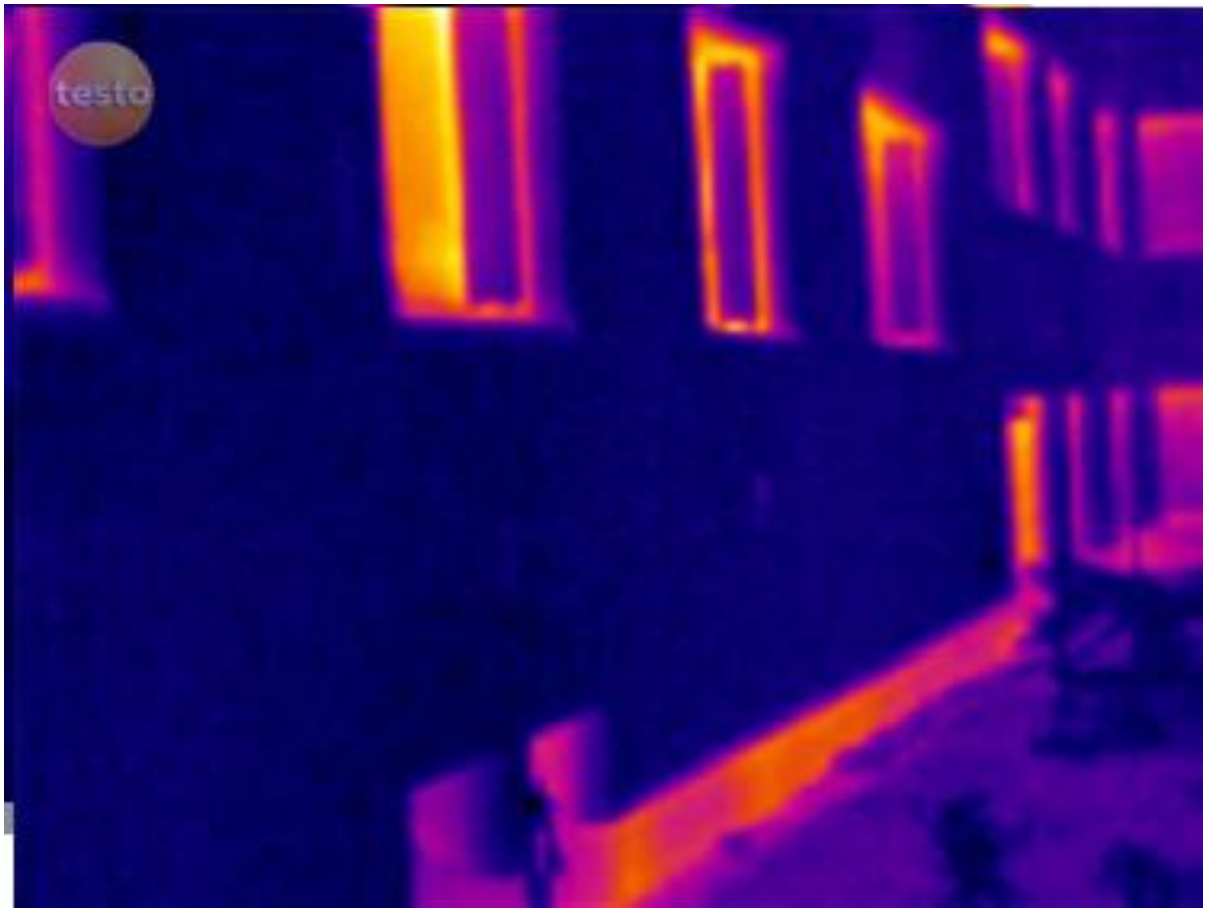
Source FIW

… but still some weak points at the wall & building scales

Insulation requires Continuity

No Thermal Bridges, No “Air Tunnels”

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



The better the insulation,
the more we should care
about thermal bridges

Window reveal
Balconies
Terrace
…

Thermal bridges = “cold spots”
Risk of condensate
Risk of mould growth
Risk of corrosion

Source: POUGET consultant

Retrofitting Downtown

2 : Space savings

Maison de l'Alsace

The choice of SIM comes from the Indoor Designer

3 - Fire risks for ETICS

China : From early 2009 to early 2011

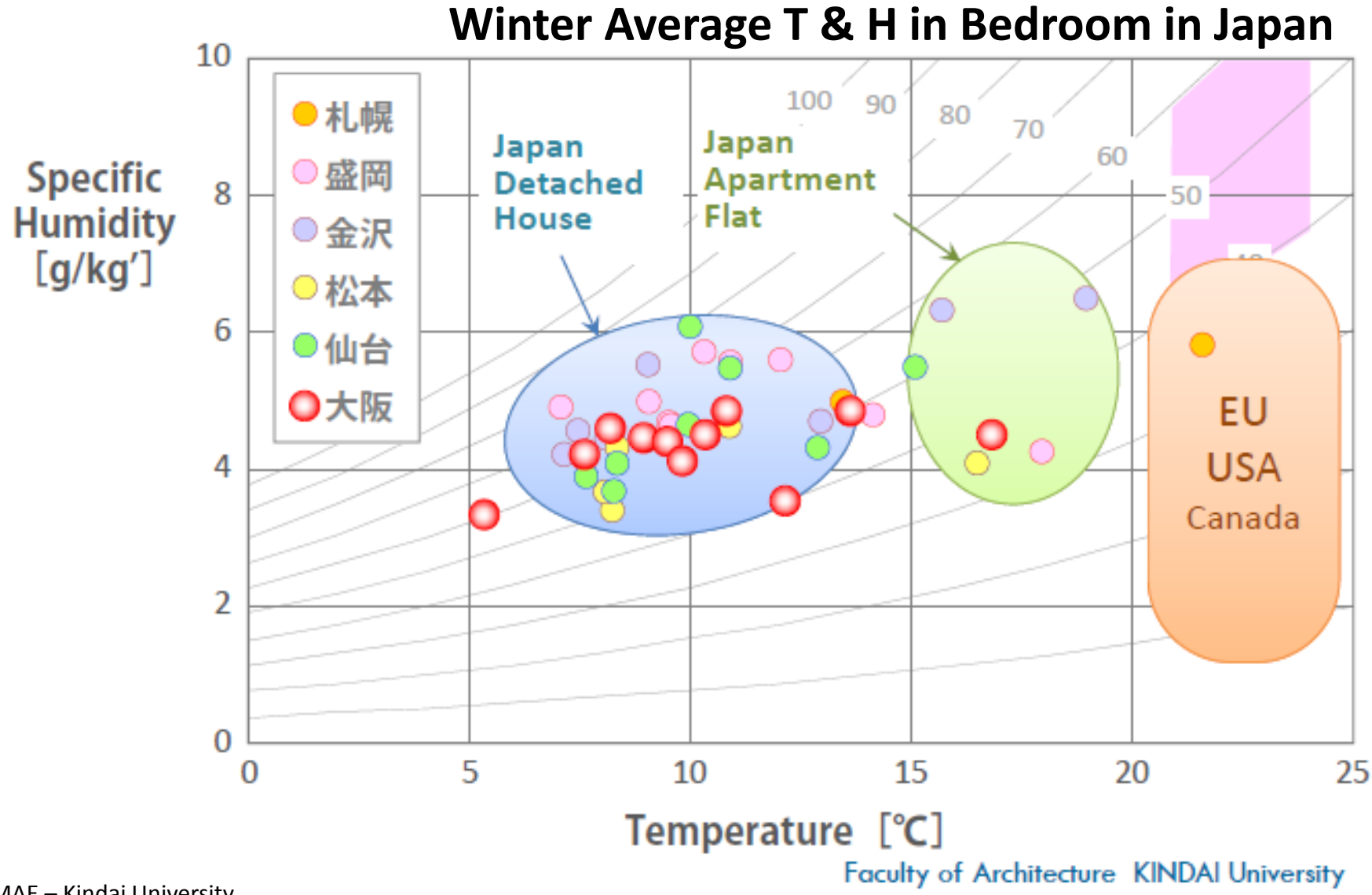
Three major fires of high rise building with loss of lives and destruction of property (millions of USD)

In 2/3 scenarios, traditional insulation materials
- release of huge tonnage of toxic hydrocarbons

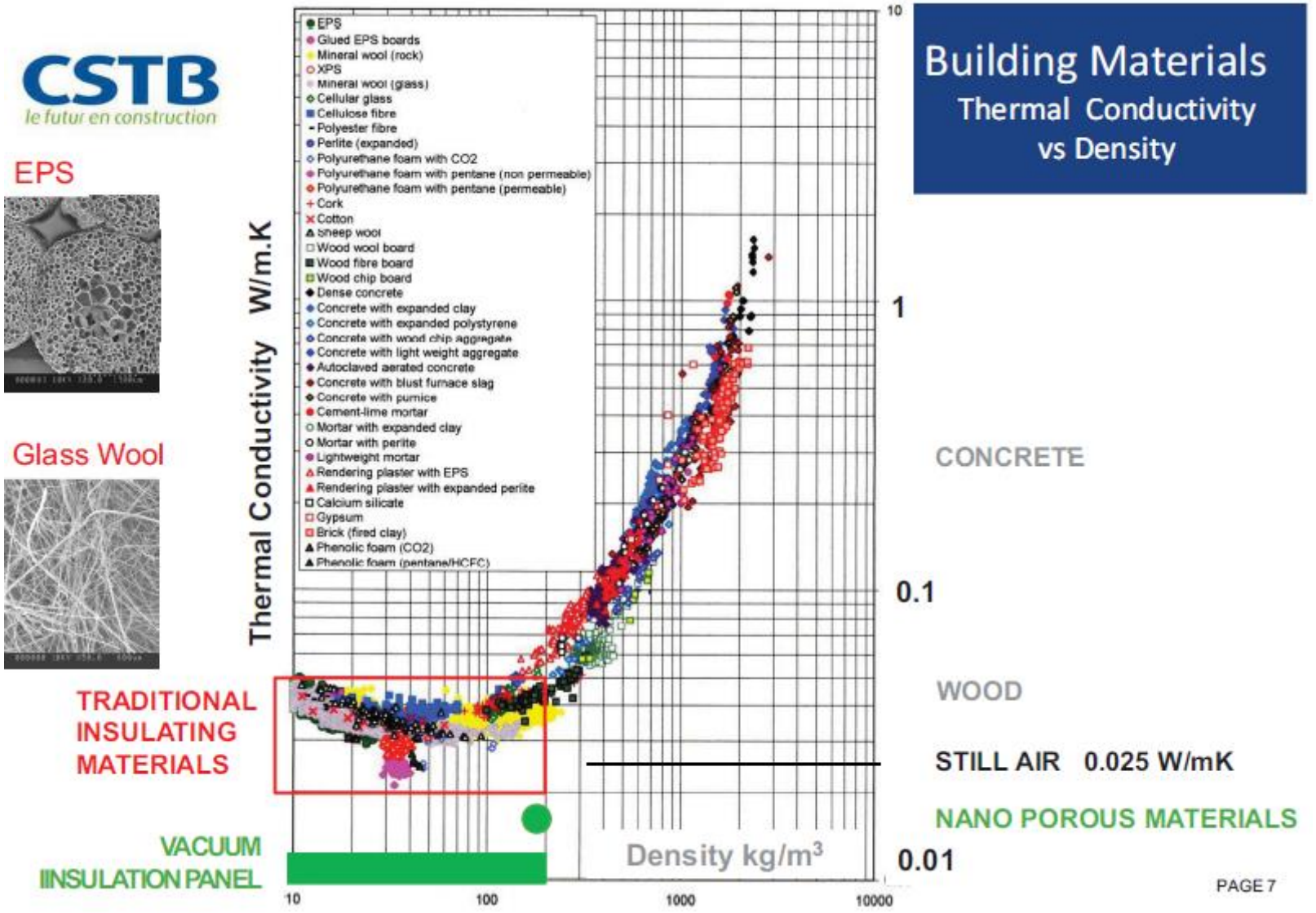
(for illustration only,
not link with fires from China)

Energy and Buildings - Energy and Buildings 85 (2014) 644–653
Structure of vacuum insulation panel in building system
Fred Edmond BOAFA et al. NUAA

4 – Low room temperature & diseases



What are Super Insulating Materials ?



Anderson B.R., Kosmina L., Panzhauser E.,Lechleitner J., Achtziger J., Sandberg P.I., Johnsson B., Pompeo C., Frank T., Mühlebach H., Torroja B., 1999.
Analysis, selection and statistical treatment of thermal properties of building materials for the preparation of harmonised design values – Final Report of the Thermal Values Group. BRE Scottish Laboratory, for Directorate General DG XII of the European Commission, Contract SMT4-CT96-2050, March 1999

What are Super Insulating Materials ?

Advanced Porous Materials APM	Vacuum Insulation Panel VIP
	

Thermal conductivity of embedded gas

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

25 mW/mK for still AIR

Heat Transfer Reduction

Heat flow ϕ (W) through a wall:

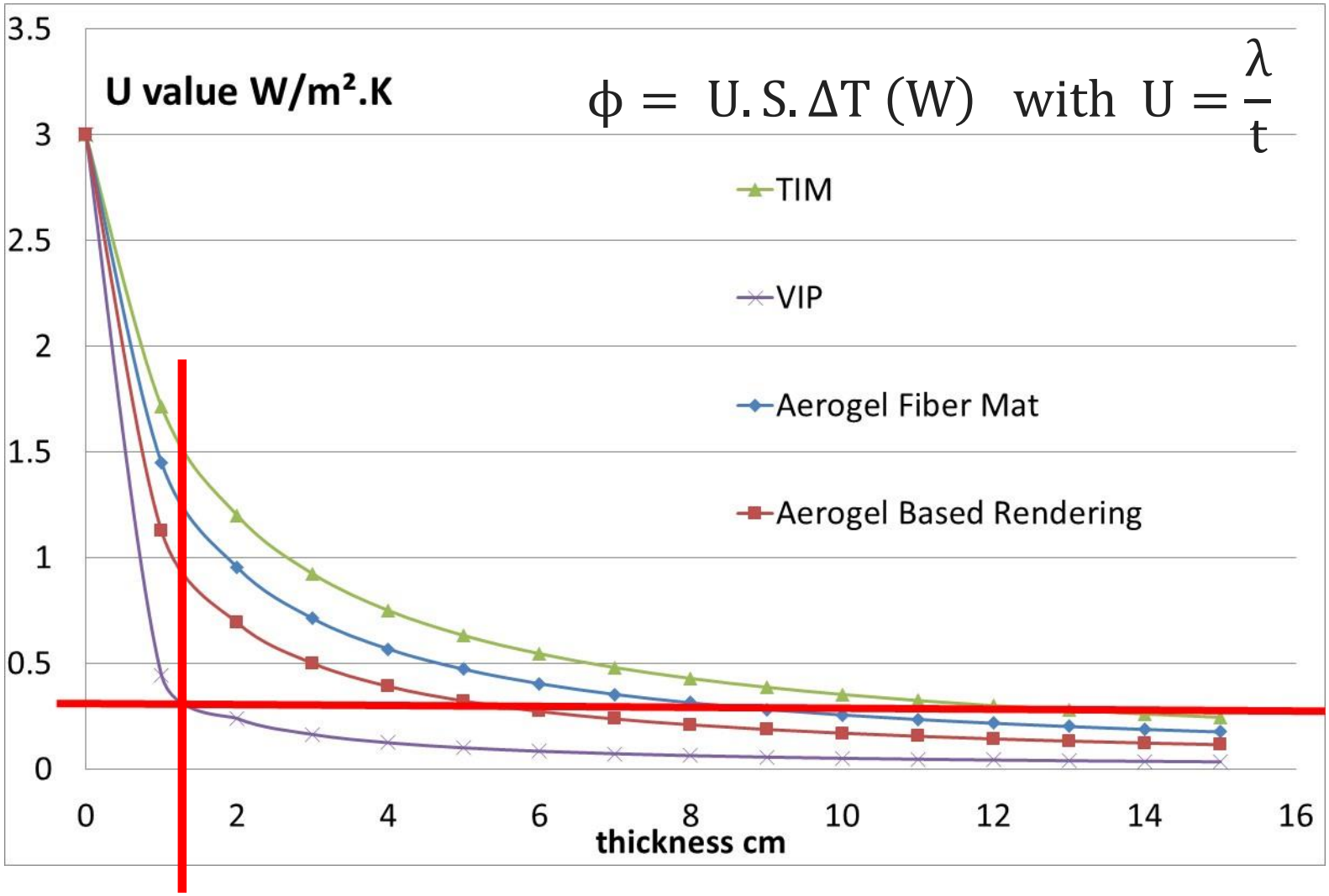
$$\phi = U.S.\Delta T\ (W) \quad \text{with } U = \frac{\lambda}{t}\ W/m^2.K$$

- 1 : **reduce the surface S**: architects and designers , compactness
- 2 : **reduce the temperature gradient ΔT**: climatic conditions and occupant behavior …
- 3: **reduce the U-value** ($W/m^2.K$):
    - increasing the thickness (t)
    - reducing the thermal conductivity λ

How to keep living space without increasing building footprint ?

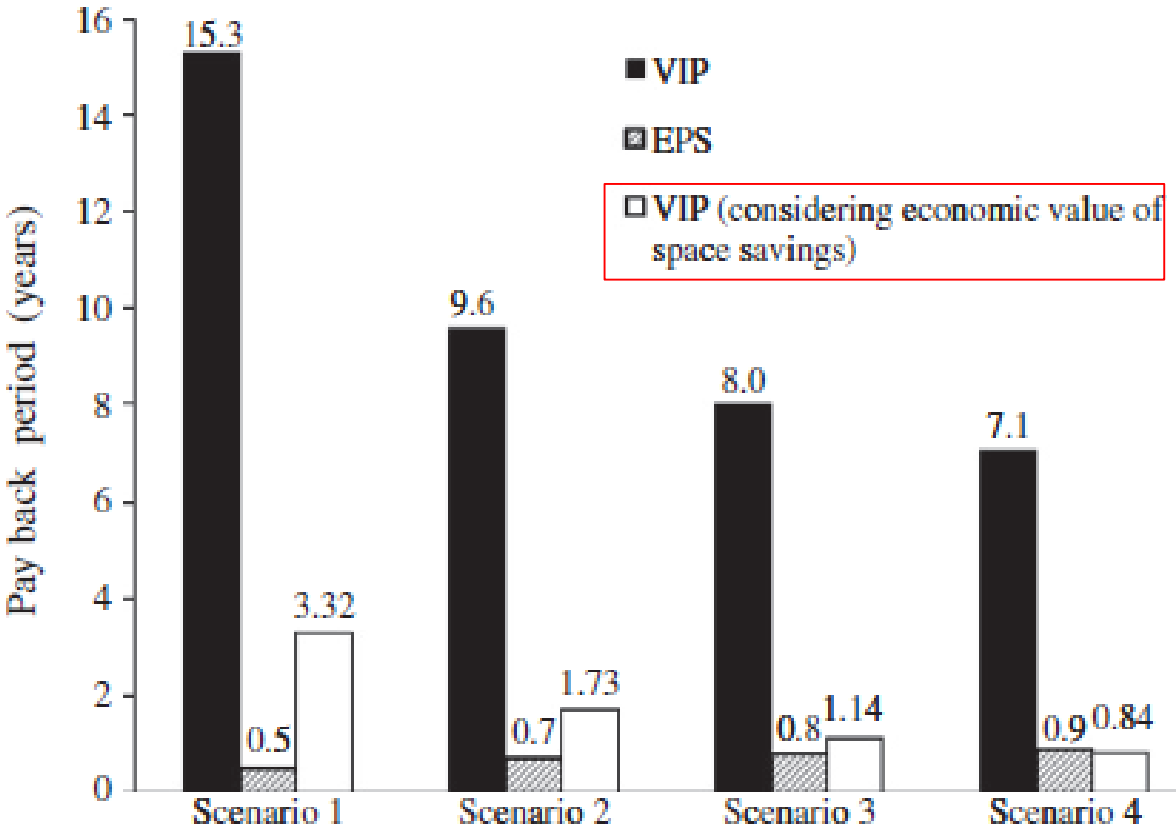
Thin Walls ?

U-value


U value W/m².K
$\phi = U.S.\Delta T\ (W)$ with $U = \frac{\lambda}{t}$
TIM
VIP
Aerogel Fiber Mat
Aerogel Based Rendering
3.5
3
2.5
2
1.5
1
0.5
0
0
2
4
6
8
10
12
14
16
thickness cm

Payback period of VIP and EPS

different scenarios of insulation for buildings



Insulation scenarios and main parameters used in payback period calculation.

		Parameters	Value
Scenario 1		Average building *U*-value	0.40 (W m^{-2} K^{-1})
	(VIP)	Thickness	10 mm
		Cost	£70 m^{-2}
	(EPS)	Thickness	48.3 mm
		Cost	£2.40 m^{-2}
Scenario 2		Average building *U*-value	0.31 (W m^{-2} K^{-1})
	(VIP)	Thickness	25 mm
		Cost	£80 m^{-2}
	(EPS)	Thickness	113 mm
		Cost	£6.19 m^{-2}
Scenario 3		Average building *U*-value	0.27 (W m^{-2} K^{-1})
	(VIP)	Thickness	40 mm
		Cost	£80 m^{-2}
	(EPS)	Thickness	180 mm
		Cost	£8.38 m^{-2}
Scenario 4		Average *U*-value	0.24 (W m^{-2} K^{-1})
	(VIP)	Thickness	60 mm
		Cost	£80 m^{-2}
	(EPS)	Thickness	256 mm
		Cost	£10.78 m^{-2}
Other parameters		Fuel	Natural gas
		Emission conversion factor	0.20
		HDD	1931 °C day
		C_f	£0.40 m^{-3}
		H_v	39.5 × 10^6 (J m^{-3})
		η	0.9
		N	25
		i	10%

average rent of commercial buildings situated in London assumed as £40 ft²

Vacuum Insulation Panels (VIPs) for building construction industry – A review of the contemporary developments and future directions - Applied Energy 88 (2011) 3592–3602
M. Alam ⇑, H. Singh, M.C. Limbachiya Sustainable Technology Research Centre (STRC), Kingston University, Roehampton Vale, Friars Avenue, London SW15 3DW, UK

Profit as function of living area market

Kingspan

Living area 10m × 10m	Market value living area (EUR/m² living area)	Increased living area gain by application of VIPs and reduced wall thickness of 20 cm (EUR/m² living area)	VIP costs 6 cm thickness (EUR/m² VIP)	Traditional thermal insulation costs 35 cm thickness (EUR/m² insulation)	Profit due to VIP application (EUR/m² living area)
	1000	80	200	20	−100
	2000	160	200	20	−20
	3000	240	200	20	60
	4000	310	200	20	130
	5000	390	200	20	210

Profit in EUR/(m2 living area) by application of VIPs as function of living area market value where the wall thickness reduction is 20cm for an example building of 10m × 10 m. An interior floor to ceiling height of 2.5m is assumed

Traditional, state-of-the-art and future thermal building insulation materials and solutions – Properties, requirements and possibilities - Energy and Buildings 43 (2011) 2549–2563 - Bjørn Petter Jelle , SINTEF, NTNU - Norrway

SIM around the world

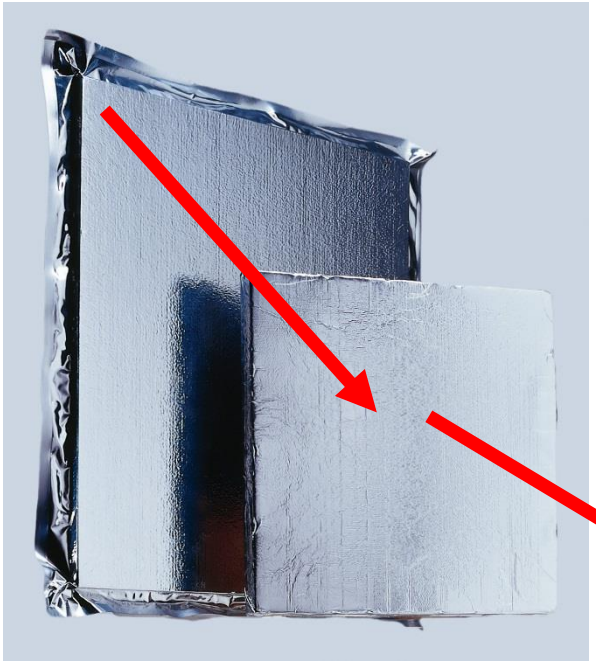
VIP : Vacuum Insulation Panels

APM : Advanced Porous Materials

(aerogel, porous silica)

SIM : mature products but …

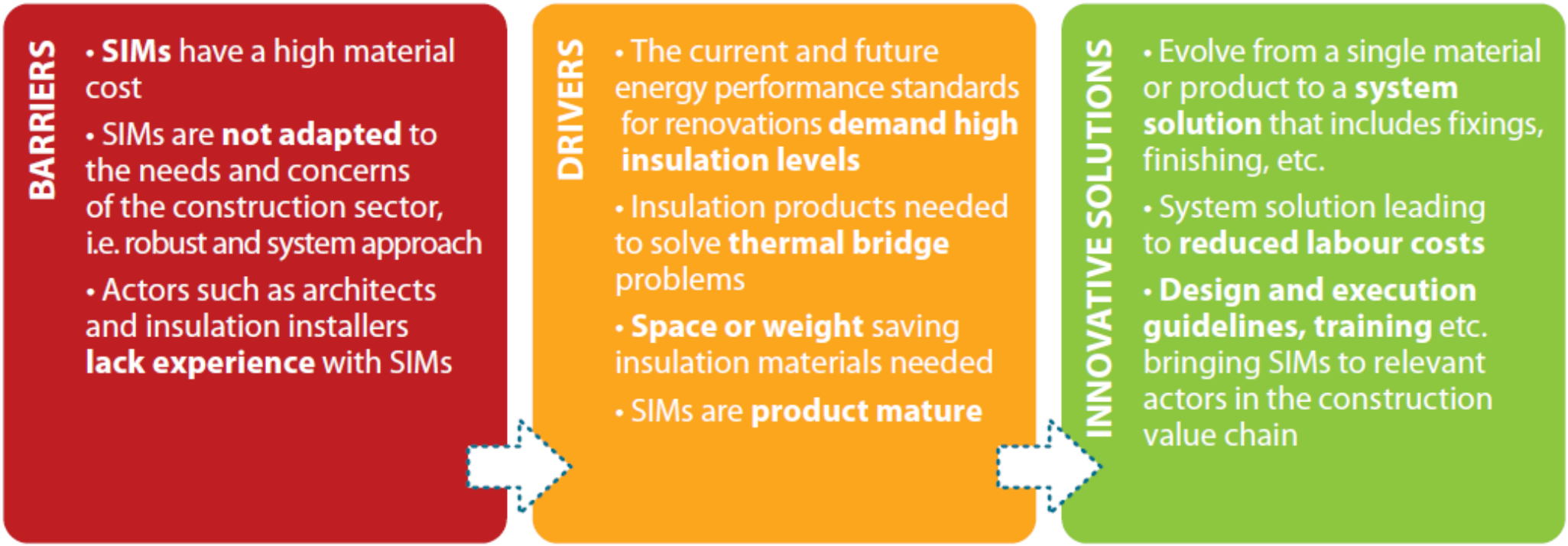
Annex39
HIPTI
2004



Belgian production facility (Promat)

Source : BPIE – PROMAT - MORGAN Plc

… still an important innovation potential



IEA-EBC Annex 65:
Long-Term Performance of Super-Insulating Materials in Building Components & Systems

BPIE BUILDINGS PERFORMANCE INSTITUTE EUROPE
i2C INDUSTRIAL INNOVATION FOR COMPETITIVENESS
ADVANCED INSULATION MATERIALS FOR BUILDING ENVELOPES
Deep-dive #2

The SIM market according IEA

MARKET MATURITY / SATURATION	ASEAN	Brazil	China	European Union	India	Japan / Korea	Mexico	Middle East	Australia / New Zealand	Russia	South Africa	United States / Canada
Typical insulation	★	●	★	★	●	★	●	★	★	★	●	★
Exterior insulation	●	▲	●	★	●	●	▲	●		▲	▲	★
Advanced insulation (e.g. aerogel, VIPs)			▲	▲		▲				▲	▲	▲

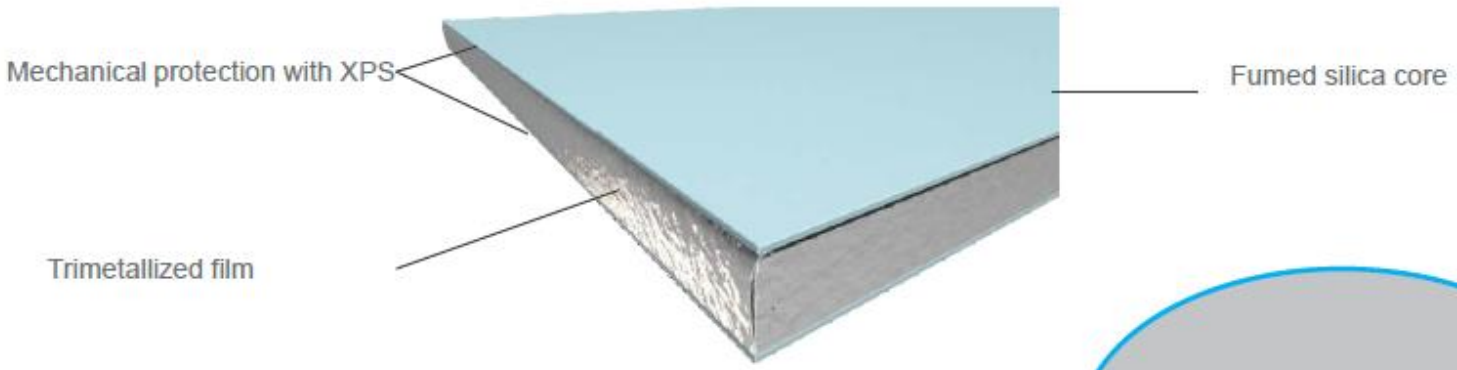
★ MATURE MARKET ● ESTABLISHED MARKET ▲ INITIAL MARKET

??

Certified Products

Description of ISOVIP product

- **Panel core:** Fumed silica under vacuum
- **Envelope** : Trimetallized film
- **Surface :** Mechanical protection for the 2 facings by glueing XPS (3 mm)



- **Panel thicknesses** between 25 and 50 mm
  + 2 x 3 mm XPS protection XPS
- **Two panel sizes**
  - 600 mm x 300 mm
  - 600 mm x 1000 mm

λ = 5.2 mW/(m.K)
Certifié ACERMI

isover SAINT-GOBAIN

OPTIMAVIP(1/7) – Step by step implementation

Accept and prepare the construction site

- Wall dimension measurements, configurator use, order products, prepare the wall surface



Fixation of Clip'Optima upper and lower horizontal rails

- Use a ISOVIP to adjust the rail at the correct distance from the wall. The panel must smoothly slide behind the rail without forcing in order to avoid piercing.


isover SAINT-GOBAIN

Avis Technique 20/15-360

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

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

Thermal insulation system of walls using vacuum insulation panels

System zur Wärmedämmung von Wänden mit Vakuumisolationspaneele

Optima VIP application en mur

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

Tél : +33(0)08 25 00 01 02

Internet : Internet : www.isover.fr

Usine : Fournisseur A : Allemagne, Munich

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

Tél. : 08 25 00 01 02
Internet : www.isover.fr

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

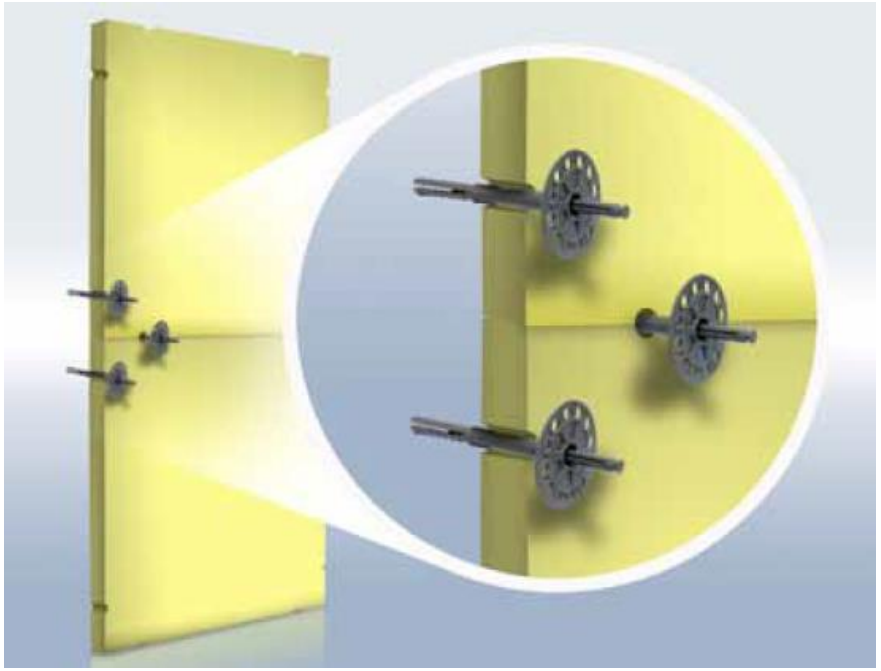
Vu pour enregistrement le 13 janvier 2016

CSTB le futur en construction

Secrétariat de la commission des Avis Techniques et des Documents Techniques d'Application
CSTB, 84 avenue Jean Jaurès, Champs sur Marne, FR-77447 Marne la Vallée Cedex 2
Tél. : 01 64 68 82 82 - Fax : 01 60 05 70 37 - Internet : www.cstb.fr

System Solutions

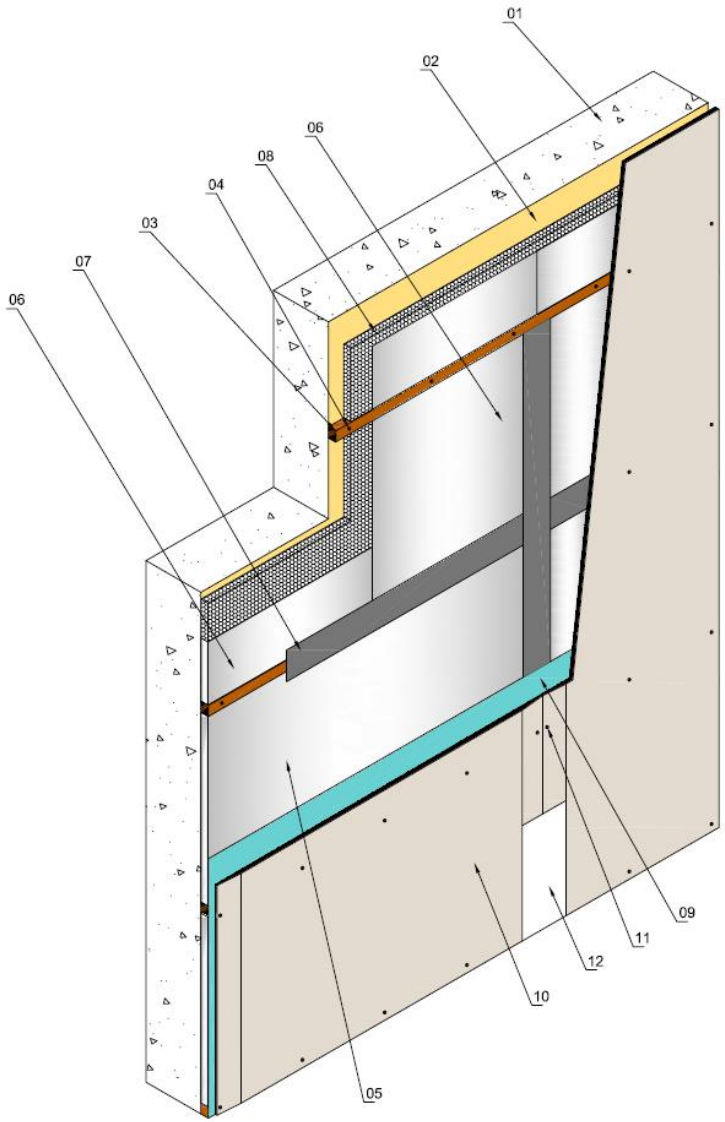
Protected VIP



Handling & Transportation
Installation / fixing

Sources : va-Q-tec – Roland CAPS

System Solutions



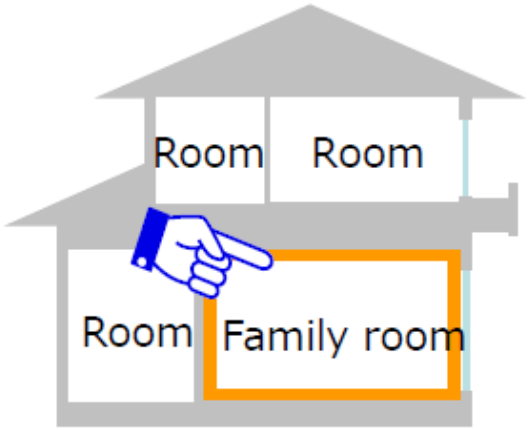
01. Existing wall
02. Optional protection layer (PE foam, PET foam)
03. Stud (wood batten 27x35 mm²)
04. Plug + screw
05. VIP Slimvac 1200 x 600 mm² or 1300 x 600 mm²
06. VIP Slimvac other dimension
07. Tape 100 mm
08. Finishing insulation material for gaps (PSE, PU)
09. Vapor control layer
10. Siniat Plasterboard BA13
11. Siniat screw Prégy TF 212x35
12. Strip + Finishing

Source SINIAT

Insulation Panel Living System

Background

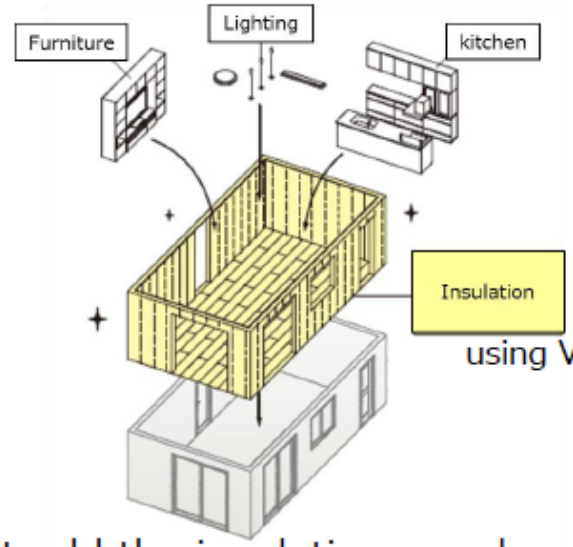
☐Energy consumption in housing



Heat load in F. R. is
70%*
of the whole house
in Japan

Insulation Panel Living System

☐Insulation retrofit



Just add the insulation panel on the existing wall from indoor side

Feature of Insulation Panel Living System

1. Save the cooling and heating cost
2. Easy and Quick install:without scaffolding.

Panasonic

System Solutions in Japan

Installation


Take off wallpaper


Install ceiling panel


Install inner window


Install wall panel


Install floor panel


Installation finished

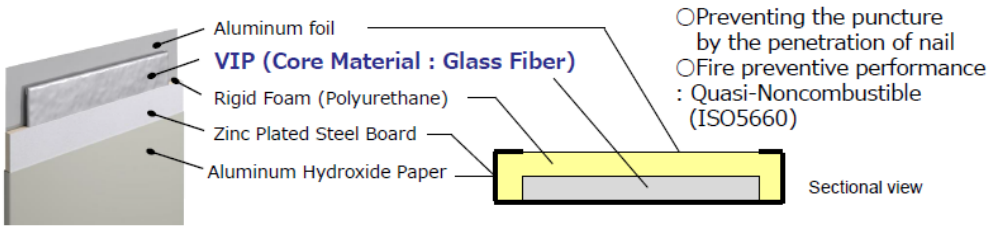

Paste wallpaper and finishing floor

- Only 3 days work
- Keep living during installation

Panasonic

Floor Panel

Wall Panel



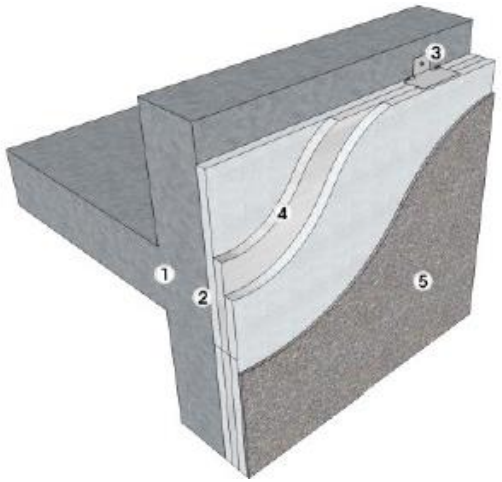
VIP in KOREA

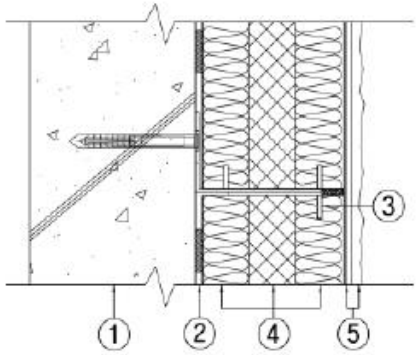
Building type (city)	Insulation system	Insulation layers and thicknesses	Outer wall *U*-value ($W/m^2 \cdot K$)	Pictures
H bank (Jeju)	External insulation	VIP, 30 mm	0.15	 
I office (Iksan)	External insulation	VIP, 15 mm + EPS, 45 mm	0.26	 
N office (Iksan)	Internal insulation	VIP, 20 mm	0.23	 

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

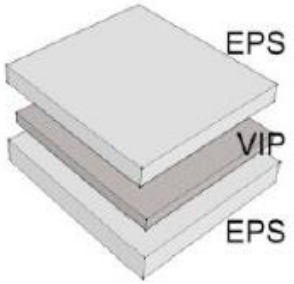
VIP in KOREA

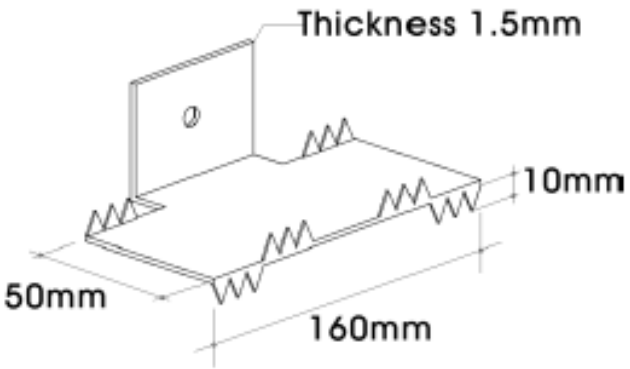
Fastening

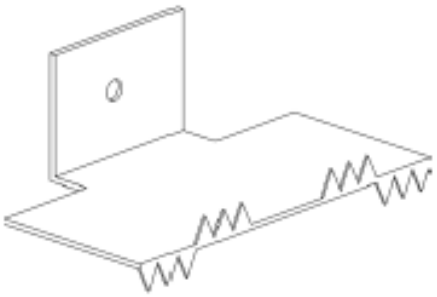


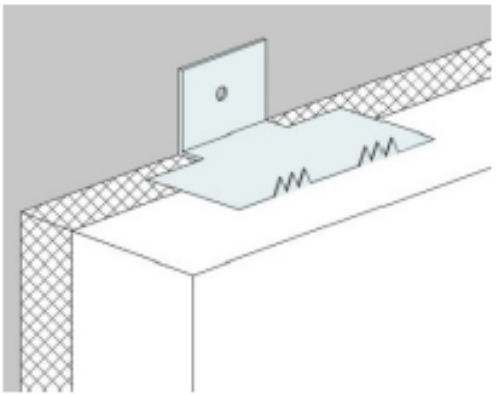


① Reinforced concrete
② Adhesive
③ Steel fastener
④ Covered-type three-layer insulation unit (EPS + VIP + EPS)
⑤ Reinforcing mesh and coat, finish plaster



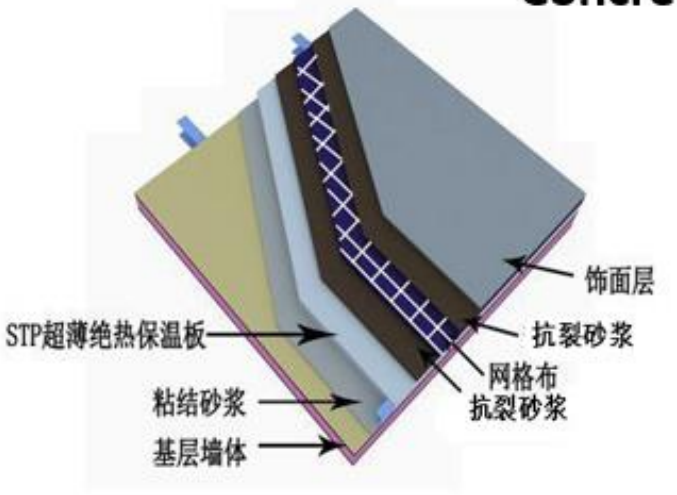


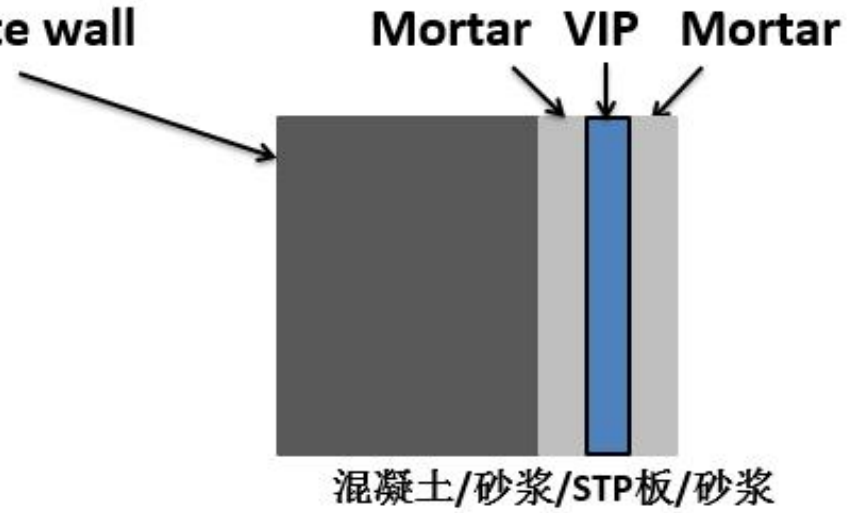


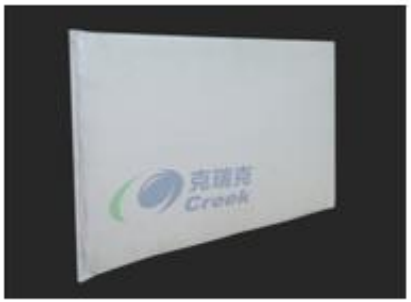


Evaluation of Mechanically and Adhesively Fixed External Insulation Systems Using Vacuum Insulation Panels for High-Rise Apartment Buildings - Sihyun Park, Bo-Hye Choi, Jae-Han Lim and Seung-Yeong Song
Energies 2014, *7*, 5764-5786; doi:10.3390/en7095764

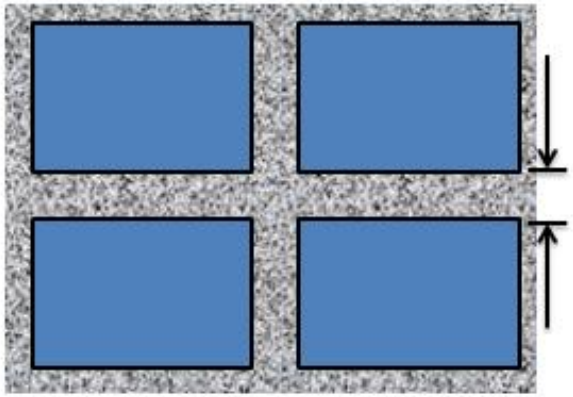
VIP Insulation System in China

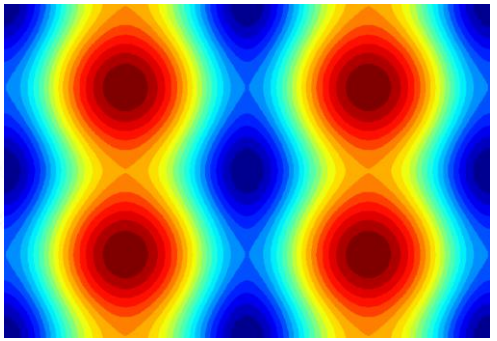






Patented composite film





VIP in China

(a)

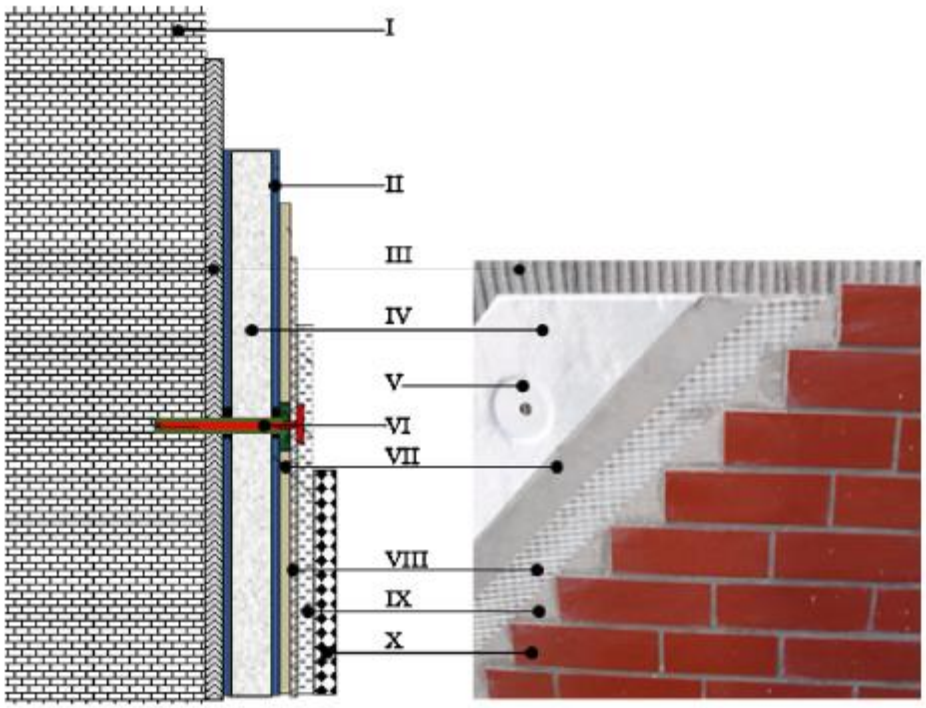
(b)

(c)

(d)

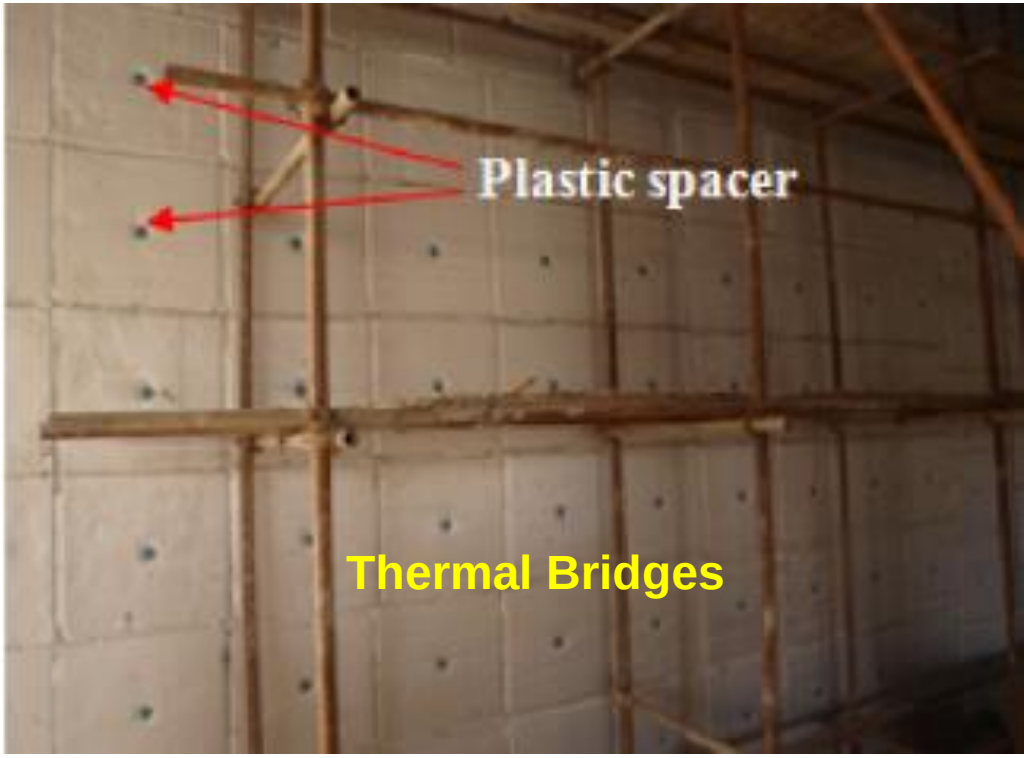
(e)

(f)



I - Existing wall
II - Interface adhesive powder
III - Bonding mortar (with gutters)
IV – Vacuum insulation panel
V - Hole for support
VI - Plastic spacer
VII - Plaster mortar
VIII - Fiberglass mesh
IX - Surface mortar plaster
X - Surface decorations

VIP in China



VIP in China

Suzhou city renovated commercial building

VIP in China

Harbin city renovated residential building.

Aerogel in USA

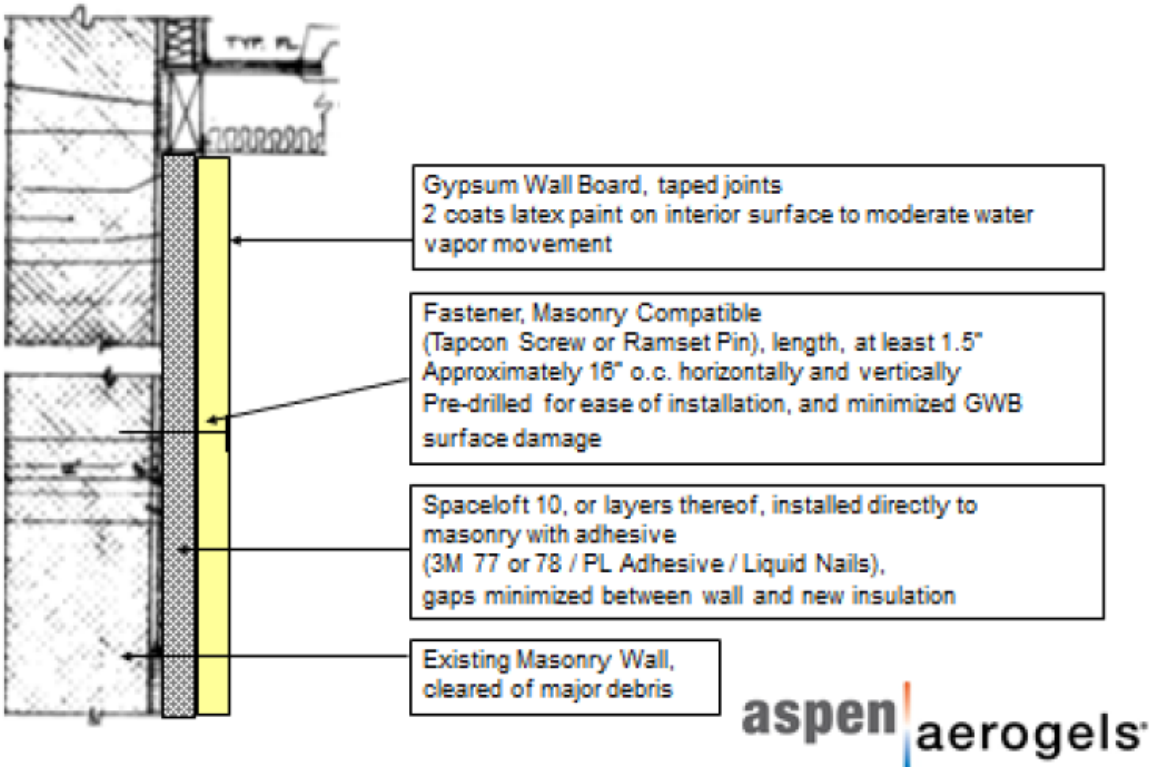
New York State Energy Research and Development Authority (NYSERDA)

1770 (left) and 1780 (right) Davidson Avenue – New York

Aerogel in USA : storage & design

Aerogel Insulation Storage

Proposed Wall Design Detail For Spaceloft Aerogel Insulation
Interior Installation on Exposed Masonry or Concrete



aspen aerogels

Aerogel in USA : installation

Other aerogel Applications

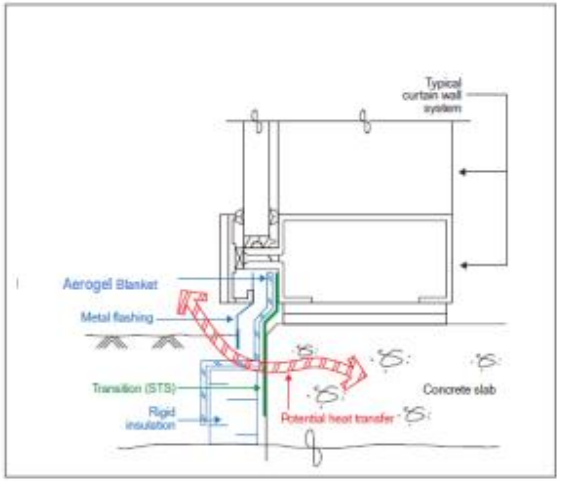
Aerogel blanket used in mobile homes

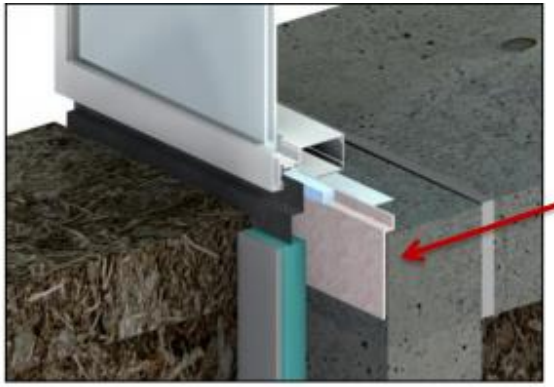
Aerogel blanket used in roofing applications

Aerogel blanket used under heating pipe

A Study on the Architectural Application of Aerogel Young Cheol Kwon *School of Architecture, Halla University, Gangwon 220-712, Korea*
Dec. 2013, Volume 7, No. 12 (Serial No. 73), pp. 1494-1500 - Journal of Civil Engineering and Architecture, ISSN 1934-7359, USA

Aerogel Blanket for Thermal Bridges Treatment





Aerogel Building Insulation Blanket was placed to cover the neck of the curtain-wall to the below-grade insulation

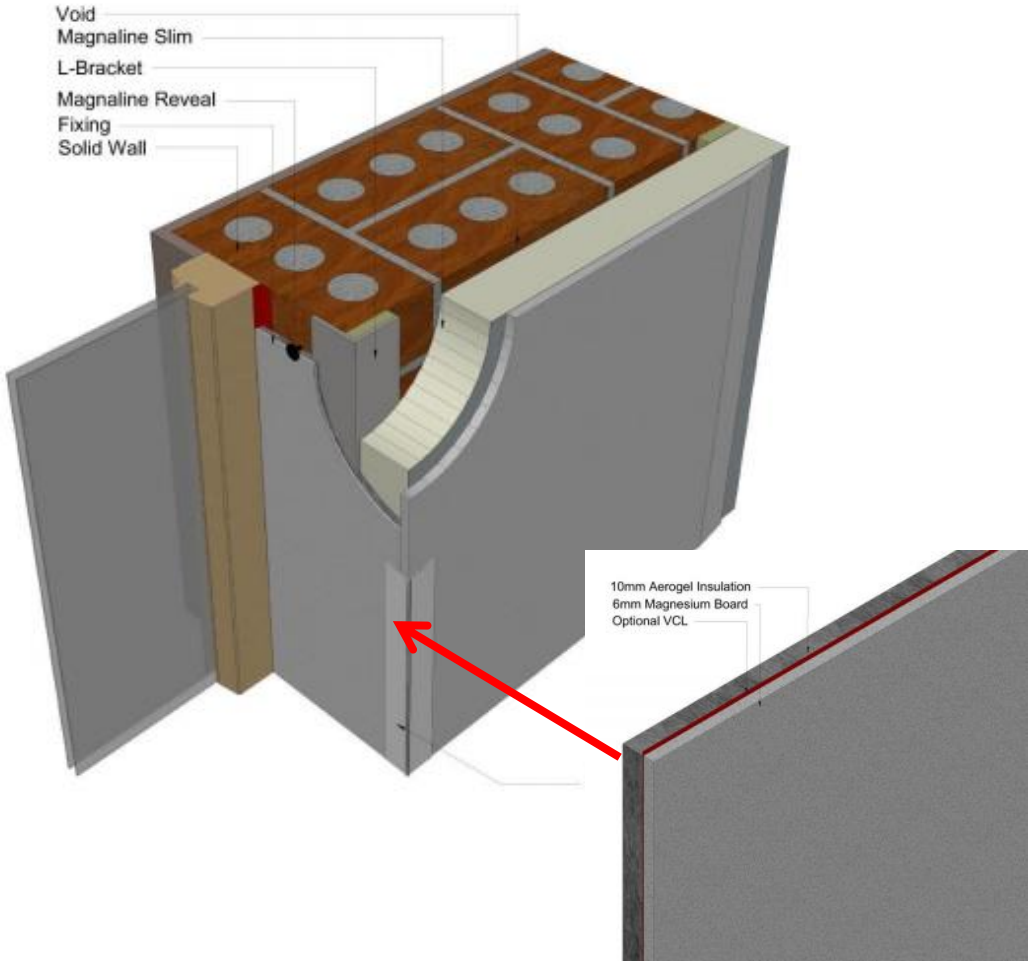
Without Building Insulation Blanket

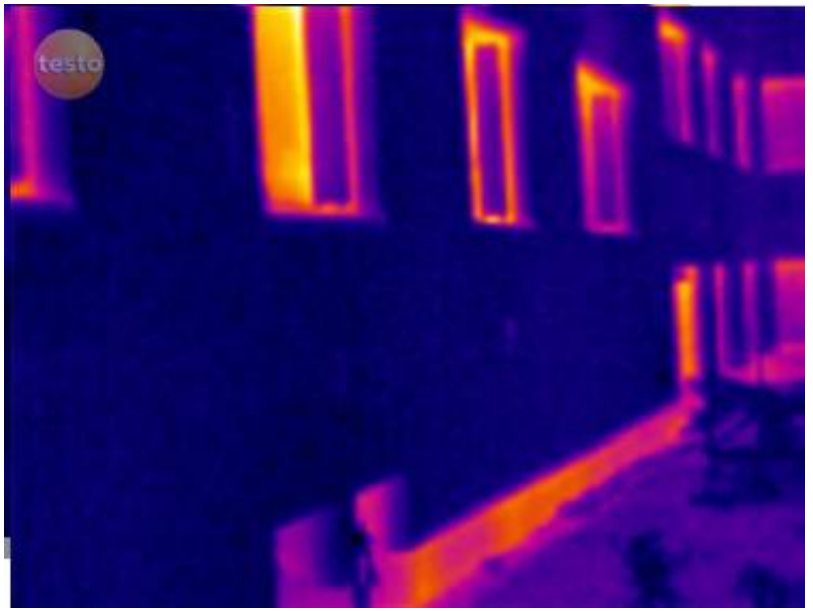
Perimeter heat loss for curtain-wall at-grade by varying U-values

Depth of Insulation	Below Grade Insulation ($hr \cdot ft^2 \cdot {}^oF/BTU$)	Slab Perimeter heat Loss ($BTU/hr \cdot ft \cdot {}^oF$)		% Reduction in Heat Loss
		Without Building Insulation Blanket	10mm Building Insulation Blanket	
24"	R-10	0.495	0.370	25%

Source : DOW CORNING

Aerogel Blanket for Thermal Bridges Treatment Window Reveals





Source : Enviroform

Aerogel for prefabricated buildings

Sea Containers Refurbished For Residential Use

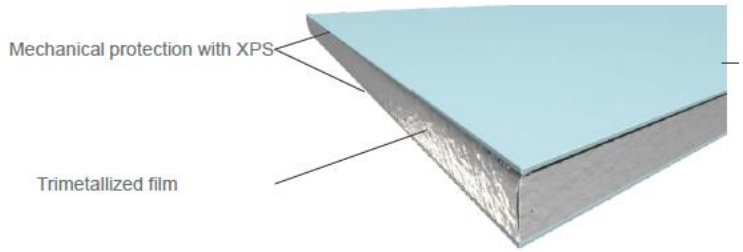
http://www.proctorgroup.com/projects/spacetherm-dundee & Aspen aerogel

Aerogel Rendering

Aerogel Insulating Plaster

- λ = 0.028 W/mK
- Commercially sold since 2013
- Water repellant & diffusion open
- Swiss environmental award at Swissbau 2014
- Innovation award „Praxis Altbau“ at BAU 2015

Technical Assessment
&
Standardisation



ACERMI Certification

ASSOCIATION POUR LA CERTIFICATION DES MATERIAUX ISOLANTS
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,

la société :

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

ISOVIP

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

avec les caractéristiques certifiées figurant en 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 Tremplin.

This licence, delivered under the ACERMI 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 implemented quality system.

Pour le Président
J.L. LAURENT

P. PRUDHON

Pour le Secrétaire
E. CREPON

C. BALOCHE

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

4, avenue du Recteur-Poincaré 75782 Paris Cedex 16 - Tél. 33.(0)1.44.30.49.37 - Télécopie 33.(0)1.44.30.49.45

$$\lambda_{eff} = \lambda_c + \psi.e.2.\left(\frac{1}{l} + \frac{1}{w}\right)$$

CONDUCTIVITE THERMIQUE CERTIFIEE DU PRODUIT SANS PROTECTION : 0,0052 W/(m.K)
Certified thermal conductivity

Epaisseur sans protection (mm)	Epaisseur avec protection XPS (mm)	Dimensions du panneau Longueur x largeur (mm)	ψD sans pli (W/ (m.K))	ψD avec pli (W/ (m.K))	Résistance thermique avec protection XPS (m².K/W)
25	31	600x300	0,0027	0,0044	4,25
25	31	1000x600	0,0027	0,0044	4,55
30	36	600x300	0,0024	0,0039	5,00
30	36	1000x600	0,0024	0,0039	5,35
35	41	600x300	0,0021	0,0035	5,80
35	41	1000x600	0,0021	0,0035	6,25
40	46	600x300	0,0019	0,0033	6,60
40	46	1000x600	0,0019	0,0033	7,10
45	51	600x300	0,0017	0,0030	7,40
45	51	1000x600	0,0017	0,0030	7,95
50	56	600x300	0,0016	0,0028	8,15
50	56	1000x600	0,0016	0,0028	8,80

www.acermi.com

France : Technical Assessment : VIP/PIV & Aerogel

Avis Technique 2/15-1668

Façade légère
Curtain walling
Außenwand

CCV et BFUP

Façade BEPIV

Titulaire : BETSINOR
57 rue du Lieutenant Giard
FR-62710 Courrières

Tél. : 03 21 13 75 57
Fax : 03 21 13 78 98
E-mail : accueil@betsinor.fr
Internet : www.betsinor.com

Usine : BETSINOR
57 rue du Lieutenant Giard
FR-62710 Courrières

Commission chargée de formuler des Avis Techniques
(arrêté du 21 mars 2012)

Groupe Spécialisé n° 2
Constructions, Façades et Cloisons Légères

Vu pour enregistrement le 4 juin 2015

CSTB le futur en construction
Secrétariat de la commission des Avis Techniques
CSTB, 84 avenue Jean Jaurès, Champs sur Marne, FR-77447 Marne la Vallée Cedex 2
Tél. : 01 64 68 82 82 - Fax : 01 60 05 70 37 - Internet : www.cstb.fr

Avis Technique 6/15-2252

Annule et remplace l'Avis Technique 6/12-2035

Vitrage organique
Organic glazing
Verglasung

Lumira™ aerogel

relevant de la norme	NF EN 16153

Titulaire : Cabot International GmbH
Mühlenstalstrasse 36
DE-8200 Schaffhausen

Tél. : 00 49 69 305 48562
Fax : 00 49 69 305 22103
E-mail : Georg.Gertner@cabotcorp.com
Internet : www.cabotaerogel.com

Sites de fabrication : Cabot Aerogel GmbH
Industriepark Höchst,
Gebäude D 660
DE-65926 Frankfurt am Main

Sites de remplissage :
Société Alcaud SAS
Route de Nouan
FR-41210 Saint-Viatre

Société AXTER
ZAC des Essarts
Rue des Herbues
FR-21600 Ouges

Commission chargée de formuler des Avis Techniques
(arrêté du 21 mars 2012)

Groupe Spécialisé n°6
Composants de baie, vitrages

Vu pour enregistrement le 2 juillet 2015

CSTB le futur en construction
Secrétariat de la commission des Avis Techniques
CSTB, 84 avenue Jean Jaurès, Champs sur Marne, FR-77447 Marne la Vallée Cedex 2
Tél. : 01 64 68 82 82 - Fax : 01 60 05 70 37 - Internet : www.cstb.fr

EOTA – ETA VIP & AEROGEL

Zavod za gradbeništvo Slovenije
Slovenian National Building and Civil Engineering Institute
Dimičeva 12,
1000 Ljubljana, Slovenija
Tel.: +386 (0)1-280 42 50
Fax: +386 (0)1-436 74 49
e-mail: info.ta@zag.si
http://www.zag.si

Član EOTA
Member of EOTA

European Technical Approval ETA-11/0471

[English translation prepared by ZAG Ljubljana – Original version in Slovenian language]

Trade name: Komercialno ime:	SPACELOFT
Holder of approval: Imetnik soglasja:	ASPEN AEROGELS INCORPORATED, Forbes Road bldg 30, Northborough, MA 01532 USA
Generic type and use of construction product: Tip gradbenega proizvoda in njegova predvidena uporaba::	Thermal Insulation Product toplotnoizolacijski proizvod
Validity Veljavnost / **from / to:** od / do:	22. 06. 2013 to 18. 01. 2017
Manufacturing plant: Proizvodni obrat:	ASPEN AEROGELS INCORPORATED, East Providence Manufacturing Facility, 3 Dexter Road, East Providence, RI 02914 USA
Issue Nr.: Izdaja št.:	2
This European Technical Approval contains: To Evropsko tehnično soglasje vsebuje:	8 pages 8 strani

EOTA
Evropska organizacija za tehnična soglasja
European Organisation for Technical Approvals

Deutsches Institut für Bautechnik
Zulassungsstelle für Bauprodukte und Bauarten
Bautechnisches Prüfamt
Eine vom Bund und den Ländern gemeinsam getragene Anstalt des öffentlichen Rechts
Kolonnenstraße 30 B
D-10829 Berlin
Tel.: +49 30 78730-0
Fax: +49 30 78730-320
E-Mail: dibt@dibt.de
www.dibt.de

Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-13/0515

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung *Trade name*	Vacupor NT-B2, Vacupeed, Vacupor NT-B2-S, Vacupor PS-B2, Vacupor PS-B2-S
Zulassungsinhaber *Holder of approval*	Porextherm Dämmstoffe GmbH Heisinger Straße 8 87437 Kempten DEUTSCHLAND
Zulassungsgegenstand und Verwendungszweck *Generic type and use of construction product*	Wärmedämmplatten aus Vakuum-Isolations-Paneelen (VIP) *Thermal insulation boards made of vacuum insulation panels (VIP)*
Geltungsdauer: *Validity:* vom *from* bis *to*	22 June 2013 22 June 2018
Herstellwerk *Manufacturing plant*	Porextherm Dämmstoffe GmbH Heisinger Straße 8/10 87437 Kempten DEUTSCHLAND

Diese Zulassung umfasst *This Approval contains*	9 Seiten *9 pages*

EOTA
Europäische Organisation für Technische Zulassungen
European Organisation for Technical Approvals

Z43366.13 8.12.01-41/13

Centre Scientifique et Technique du Bâtiment
84 avenue Jean Jaurès
Champs sur Marne
F-77447 Marne la Vallée Cedex 2
Tél. : (33) 01 64 68 82 82
Fax : (33) 01 60 05 70 37

CSTB
le futur en construction
MEMBRE DE L'EOTA

Agrément Technique Européen ETA-13/1026

(Version originale en langue française)
Edition corrigée le 14 mars 2014

NOM COMMERCIAL: *Trade name:*	SLIMVAC®
TITULAIRE: *Holder of approval:*	MICROTHERM N.V Industriepark Noord 1 9100 SINT-NIKLAAS BELGIQUE
TYPE GENERIQUE ET UTILISATION PREVUE DU PRODUIT DE CONSTRUCTION : *Generic type and use of construction product:*	Panneau isolant sous vide avec un coeur microporeux à base de silice amorphe protégé par un complexe barrière multicouche. Vacuum insulation panel consisting of a micro-porous core of amorphous silica enclosed by a multi-layer film.
Validité (*Validity*) du (*from*): au (*to*) :	30/06/2013 30/06/2018
USINE DE FABRICATION : *Manufacturing plant:*	Industriepark Noord 1 9100 SINT-NIKLAAS (Belgique)
LE PRESENT AGREMENT TECHNIQUE EUROPEEN CONTIENT : *This European Technical Approval contains:*	9 pages et 1 annexe faisant partie intégrante du document. 9 pages and 1 attachment which form an integral part of the document

EOTA
Organisation pour l'Agrément Technique Européen
European Organisation for Technical Approvals

Annex 65/CEN/ISO

CEN/TC 88/WG 11 N 148

ISO/TC 163/SC N

Date: 2014-05-23

ISO/WD 16478.3

ISO/TC 163/SC /WG

Secretariat: SIS

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

Source : Ulrich PASSON

Some preliminary conclusions from Annex 65

About Products & Systems

- SIM can be considered as **mature products**
- Need to move from single product to **system solutions**

About Performances

- Reproducible values for “fresh” products around the world
- Still some deviations for aged panels ?

About Applications

- Avoid severe conditions without preliminary design & SIM protections
- Interior Insulation is fine

Two Associations to promote VIP & APM

VACUUM INSULATION PANEL

VIPA

GLOBAL ASSOCIATION

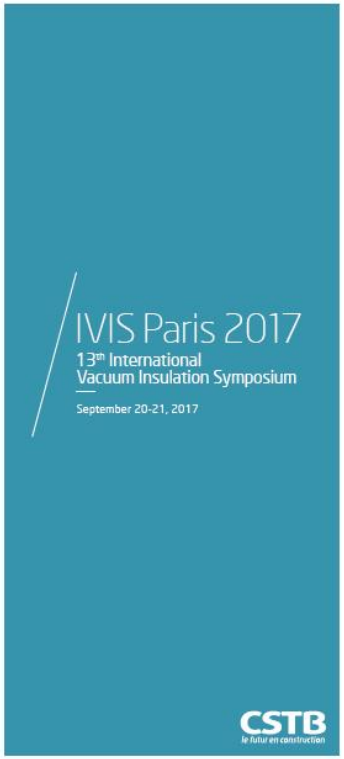
AdvaPor

Advanced Porous Materials Association

Advanced Porous Materials

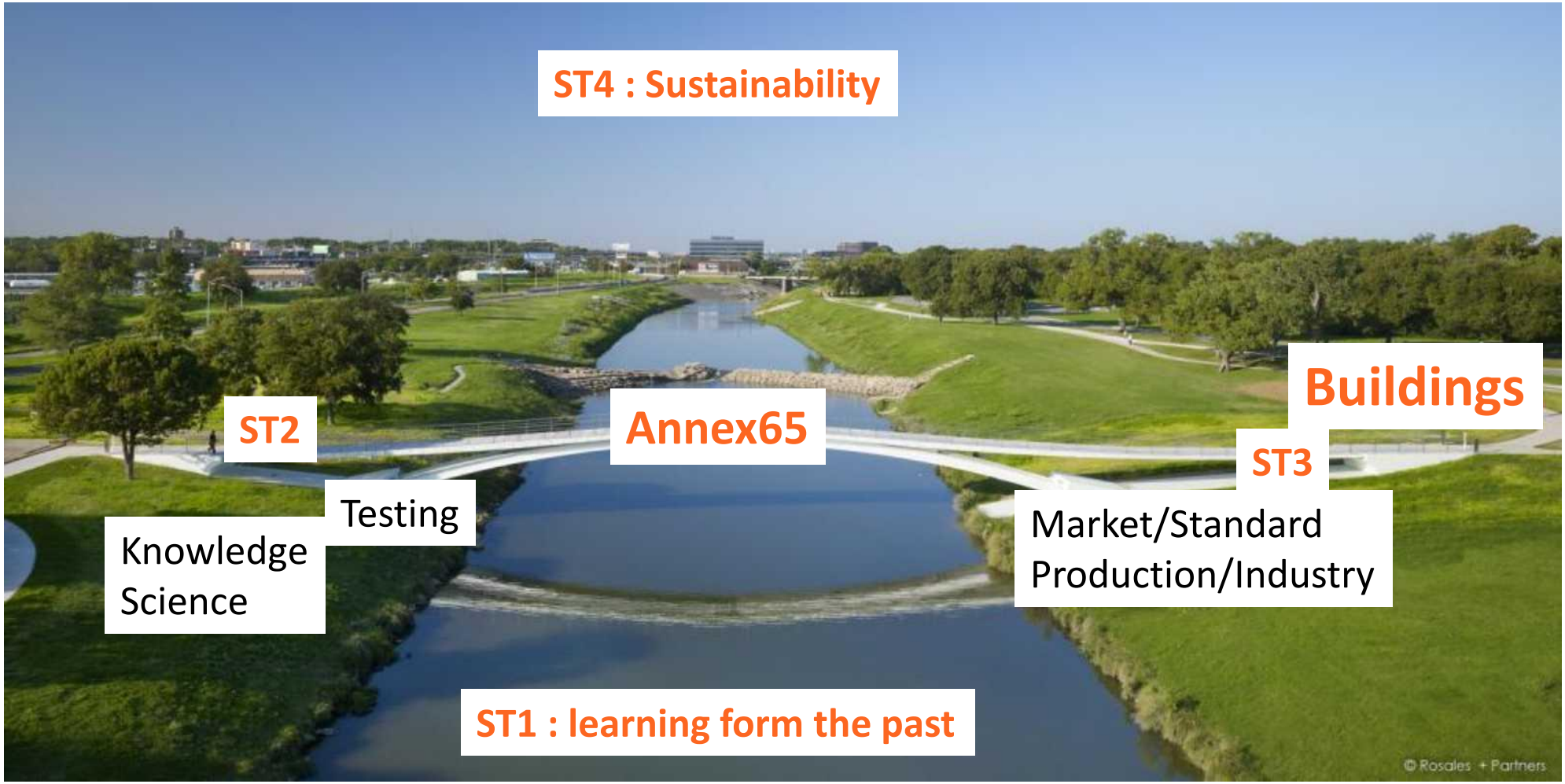
IVIS2017 : International Vacuum Insulation Symposium

PARIS : 20-21 September 2017



http://ivisparis2017.org

Annex65 : a bridge between science & market



Thank you for your attention

http://aasarchitecture.com/2013/03/phyllis-j-tilley-memorial-bridge-by-rosales-partners-architects.html

EBC

Energy in Buildings and Communities Programme

Annex 65

QUESTIONS ?

CSTB le futur en construction

ADEME Agence de l'Environnement et de la Maîtrise de l'Energie