Quality framework for internal insulation of existing brickwalls in Belgium

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Belgian building stock?
Risks of internal insulation?
Lots of old buildings in Belgium

4.5 million dwellings

< 1945
Mostly uninsulated solid walls

1946 - 1970
Mostly uninsulated cavity walls

> 1971
Mostly insulated cavity walls
Half of Belgian building stock has **non insulated walls**

4.5 million dwellings

Not acceptable in the (near) future
Three possibilities to insulate existing walls

Cavity wall insulation
External insulation
Internal insulation

Not recommended in the 2000s
Three possibilities to insulate existing walls

Cavity wall insulation  Solid walls

External insulation

Internal insulation
Internal insulation might be the only solution

Cavity wall insulation

External insulation

Internal insulation

Solid walls

Worth-preserving façade, strict building lines …

Image: Lutz Braum
Internal insulation, risky operation in Belgium?

Heavy rain loads
Brick walls
Quite cold climate

Rain penetration
Frost damage
According to current recommendations, application of interior insulation is often unknown

<table>
<thead>
<tr>
<th></th>
<th>Application of internal insulation safe</th>
<th>Application of internal insulation unknown</th>
<th>Application of internal insulation not safe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Visual damage</strong></td>
<td>None</td>
<td>None, but moisture sources which might lead to damage with internal insulation</td>
<td>Damp spots, salt efflorescence, cracks …</td>
</tr>
<tr>
<td><strong>Exposure to frost and moisture</strong></td>
<td>Solid walls (≥ 2 bricks, or thinner with small rain load); cavity walls; concrete walls</td>
<td>Solid walls with thickness = 1.5 bricks (moderate/high rain load)</td>
<td>Solid walls with thickness ≤ 1 brick (moderate/high rain load)</td>
</tr>
<tr>
<td></td>
<td>Concrete floor; wooden beams in wall not to be insulated</td>
<td>Undamaged wooden beams in wall to be insulated</td>
<td>Damaged wooden beams in wall to be insulated</td>
</tr>
<tr>
<td></td>
<td>No frost sensible pipes in wall to be insulated</td>
<td>-</td>
<td>Frost sensible pipes in wall to be insulated</td>
</tr>
<tr>
<td><strong>Material properties</strong></td>
<td>No or a vapour open exterior finish</td>
<td>-</td>
<td>Vapour retarding exterior finish</td>
</tr>
<tr>
<td></td>
<td>Frost resistant brick / mortar (NBN B27-009)</td>
<td>No visual frost damage</td>
<td>Visual frost damage</td>
</tr>
<tr>
<td><strong>Interior climate</strong></td>
<td>Climate class 1 or 2</td>
<td>Climate class 3</td>
<td>Climate class 4 (very humid)</td>
</tr>
<tr>
<td></td>
<td>Properly designed ventilation and heating system</td>
<td>-</td>
<td>Insufficient ventilation</td>
</tr>
</tbody>
</table>
According to current recommendations, application of interior insulation is often unknown.

Frost resistant brick (NBN B27-009) — safe

No visual frost damage — unknown

Visual frost damage — not safe

± 100% of old buildings
Quality framework for internal insulation of existing brickwalls in Belgium
Quality framework for cavity wall insulation since 2012

Prior inspection

- risk of damage → no execution
- no risks
- manageable risks → cavity wall insulation → subsidy

Performed by a certified contractor (exam)

Executed by a certified contractor with a certified product
Improvement of thermal comfort, with a very good quality

97% satisfied about the improved thermal comfort
73,000 dwellings insulated since introduction of quality framework

Average number of cavity wall insulation per month in Flanders

Introduction of quality framework
Additional costs due to quality framework are limited

Global costs for cavity wall insulation

€ 20 / m²

Additional costs due to quality framework

< € 1 / m²
Quality framework for internal insulation of existing brickwalls in Belgium
Quality framework for internal insulation, from 2017

Prior inspection

- risk of damage → no execution
- no risks
  - manageable risks → internal insulation
  - executed by a certified contractor or an involved architect
  - subsidy if $R_{ins} \geq 2$ m².K/W

Performed by a certified contractor or an involved architect
Certified contractor via training and exam

Only given by registered centres
(Ministerial Decree)

Shortened training

Test exam → Training → Exam → Certification

- Basic building physics
- Internal insulation systems
- Prior inspection
- Thermal bridges
- Legal framework

Personal level
Valid for 5 years
Prior inspection, learned in training

Recommendations  →  Diagnosis  →  Solution

Application of internal insulation not safe

Damp spots

When?  Solution?
Treatment of thermal bridges, learned in training
After two years, introduction of a new quality framework

- **Phase 1**
  - 1 Jan 2017
  - Introduction of current quality framework

- **Phase 2**
  - 1 Jan 2019
  - Quality framework based on a new STS
  - Conformity to grant subsidy
New STS, lots of challenges

Lots of uncertainties
- frost
- wooden beams
- thermal bridges
- new materials

Lots of actors

insulation
electrical installations
windows
radiators

Dialogue and research
Thank you for your attention

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