SELECTION CRITERIA OF INSULATION FOR BUILDING CONSTRUCTION
SELECTION CRITERIA – MINERAL WOOL INSULATION

- THERMAL PERFORMANCE
- FIRE PERFORMANCE
- ACOUSTIC PERFORMANCE
- SUSTAINABILITY
Strategic options for climate change mitigation
Global cost curve for greenhouse gas abatement measures

Cost of reducing greenhouse gas emissions by 2030
Euros per tonne of CO₂ equivalent avoided per year

Abatement beyond “business as usual” by 2030
Thousand million tonnes of CO₂ equivalent per year

Strategies sorted by cost-efficiency
- Savings
- Costs

This graphic attempts to show “all in one”: the various measures for greenhouse gas reduction with both reduction (in CO₂ equivalent) and cost (in Euros) quantified.
Read from left to right it gives the whole range of strategic options ranging from low hanging fruit, such as building insulation, in green (coming with economic savings) to the increasingly higher hanging ones, such as afforestation, wind energy, in red.

* Carbone Capture and Storage
SELECTION CRITERIA – MINERAL WOOL INSULATION

THERMAL PERFORMANCE

K Value
(Energy Saving)

Minimum Thickness
(condensation prevention)
Lambda has always to be compared at the same temperature.

In Europe: Value measured at 10°C, USA 24°C & Japan 25°C.

Optimum Density Range:

\[ R = \frac{t}{k} \]
MINERAL WOOL INSULATION - ENERGY SAVING

1. PAHW STANDARD HOUSE (WITHOUT ETICS)
2. + 12 CM MINERAL WOOL ETICS ON EXTERNAL WALLS + 6 CM MINERAL WOOL ON ROOF
3. + 6 CM MINERAL WOOL ETICS ON EXTERNAL WALLS + 6 CM MINERAL WOOL ON ROOF

ROOM TEMPERATURE SETTING: 23 °C

- TOTAL EXTERNAL WALL: 456 M²
- ROOF AREA: 234.5 M²
- WINDOWS & DOORS: 50.7 M²
- COLUMNS & BEAMS: 30%
MINERAL WOOL INSULATION - ENERGY SAVING

ETICS = EXTERNAL THERMAL INSULATION COMPOSITE SYSTEM

AACB
ADHISIVE MORTAR
INSULATION FASTNER
MINERAL WOOL INSULATION BOARD
BASE MORTER WITH GLASS FIBER MESH
DECORATIVE COLORED RENDER
BASE BAR
# MINERAL WOOL INSULATION - ENERGY SAVING

<table>
<thead>
<tr>
<th>Building</th>
<th>B1 (reference)</th>
<th>B2 (12 cm SW ETICS + 6 cm SW roof)</th>
<th>B3 (6 cm SW ETICS + 6 cm SW roof)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Element</td>
<td>Walls</td>
<td>CB*</td>
<td>Roof</td>
</tr>
<tr>
<td>U-Value (W/m².°K)</td>
<td>0.58</td>
<td>2.52</td>
<td>0.31</td>
</tr>
<tr>
<td>Combined Walls (including door &amp; windows)</td>
<td>6.51</td>
<td>18.31</td>
<td>22.3</td>
</tr>
</tbody>
</table>

* CB Columns and Beams.
MINERAL WOOL INSULATION - ENERGY SAVING

THERMAL IMAGE ANALYSIS ON INTERNAL WALLS

Building B1

Building B2

Building B3
KIMMCO - ISOVER

MINERAL WOOL INSULATION - ENERGY SAVING

- B2 WITH 12 CM STONE WOOL ETICS = 41% LESS COOLING DEMAND / PEAK POWER
- B3 WITH 6 CM STONE WOOL ETICS = 31% LESS COOLING DEMAND / PEAK POWER

![Graph showing energy saving comparison between B1 (no insulation), B2 (12cm insulation), and B3 (6cm insulation) over time.](image-url)
• B2 WITH 12 CM MINERAL WOOL ETICS = 46.1% LESS ENERGY COOLING & ELECTRIC POWER
• B3 WITH 6 CM MINERAL WOOL ETICS = 38.9% LESS ENERGY COOLING & ELECTRIC POWER
SELECTION CRITERIA – MINERAL WOOL INSULATION

FIRE PERFORMANCE

- Reaction To Fire (Flash Over)
- Smoke Emission (smoke toxicity)
- Droplets (flammable particles)
MINERAL WOOL INSULATION – FIRE PERFORMANCE

Euro Class –(EN 13501)

**Fire Behaviour:**
A1: No Flash Over
A2: No Flash Over
B: No Flash-over
C: Flash Over between 10 – 20 Minutes
D: Flash Over between 2 – 10 Minutes
E: Flash Over before 2 Minutes

**Smoke emission :** s1-s3
s1: Absent/weak smoke emission
S2: Medium smoke emission
s3: High smoke emission

**Burning incandescent droplets :**
d0: Absent/slow
d1: Medium
d2: High amount of droplets
### The Euroclass system

<table>
<thead>
<tr>
<th>Euroclass</th>
<th>Contribution to fire</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Non Combustible</td>
</tr>
<tr>
<td>A2</td>
<td>Limited Combustible No Flashover</td>
</tr>
<tr>
<td>B</td>
<td>No Flashover</td>
</tr>
<tr>
<td>C</td>
<td>Flashover after 10 minutes</td>
</tr>
<tr>
<td>D</td>
<td>Flashover before 10 minutes</td>
</tr>
<tr>
<td>E</td>
<td>Flashover before 2 minutes</td>
</tr>
<tr>
<td>F</td>
<td>No Performance Determined</td>
</tr>
</tbody>
</table>

### Euroclasses for insulation products

<table>
<thead>
<tr>
<th>Euroclass</th>
<th>Type of insulation product</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Stone wool, Glass wool, Ceramic fiber</td>
</tr>
<tr>
<td>A2</td>
<td>High density &amp; high binder or faced Stone- and Glasswool</td>
</tr>
<tr>
<td>B</td>
<td>Some Phenolic foams</td>
</tr>
<tr>
<td>C</td>
<td>Some PIR foams</td>
</tr>
<tr>
<td>D</td>
<td>Most PIR foams</td>
</tr>
<tr>
<td>E</td>
<td>Flame-Retarded EPS, PUR</td>
</tr>
<tr>
<td>F</td>
<td>Non Flame-Retarded EPS, some Phenolic foams</td>
</tr>
</tbody>
</table>

The table shows test results of typical insulation products tested in the European reaction to fire system. Some products on the market may possess different classes owing to their composition, surface finishing, or mounting and fixing application details. EPS: expanded polystyrene, XPS: extruded polystyrene, PUR: polyurethane, PIR: polyisocyanurate.
## MINERAL WOOL – FIRE COMPLIANCE TO (EN 13501)

<table>
<thead>
<tr>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1,s1d0</td>
<td>Mineral Wool GW &amp; SW (LD)</td>
</tr>
<tr>
<td>A2,s1d0</td>
<td>Mineral Wool GW &amp; SW (HD)</td>
</tr>
<tr>
<td>B,s1d0</td>
<td>Faced Mineral Fiber + phenolic Foam</td>
</tr>
<tr>
<td>C,s3d2</td>
<td>Polyolefin, PIR, PUR, PE</td>
</tr>
<tr>
<td>D,s3d3</td>
<td>EPS, XPS</td>
</tr>
</tbody>
</table>

---

**KIMMCO-Isover**

13 / Selection Criteria
SELECTION CRITERIA – MINERAL WOOL INSULATION

ACOUSTIC PERFORMANCE

SOUND TRANSISION (STC)

SOUND ABSORPTION (NRC)

IMPACT SOUND (IIC)
MINERAL WOOL INSULATION – ACOUSTIC PERFORMANCE

STC up to 70 dB

NRC up to 1.05

IIC Up to 36

Glasswool

Concrete

Mineral wool Insulation

Decorative Finish

Mineral wool Insulation
SELECTION CRITERIA – MINERAL WOOL INSULATION

- THERMAL COMFORT
- ENERGY OPTIMIZATION
- Low EMITTING MATERIAL
- REGIONAL MATERIAL

sustainability
MINERAL WOOL - SUSTAINABILITY

FROM NATURE TO NATURE

- NO STRATEGIC MATERIAL USED
- UP TO 80% RECYCLED CONTENT
MINERAL WOOL - SUSTAINABILITY

150 kWh/m²a
Equivalent to 15 m³ natural gas
or 15 L extra light oil

CO₂ = 30 kg/m²a

U-value = 0.22

Reduction of heating/cooling energy

15 kWh/m²a
Equivalent to 1.5 m³ natural gas
or 1.5 L extra light oil

CO₂ = 2 kg/m²a

U-value = 0.10

U-value = 0.40
Mineral Wool Contribute up to 27 point according to LEED criteria.

VOC ≤ 0.27 g/l
Great Buildings Use Our Insulation Solutions