Impact of the new European standard on building design

Bernard PAULE / Estia, Lausanne
• Daylight provision
• View out
• Exposure to sunlight
• Protection from glare
• Daylight provision
• View out
• Exposure to sunlight
• Protection from glare
Reference case-study

Walls reflection
- Ceiling : 0.80
- Walls : 0.60
- Floor : 0.30

Openings
- Ti : 0.80
- g : 0.62
- Frame : 25%

Orientation
- South

Localization
- Paris

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Global ranking - Upper floor ($\alpha = 10^\circ$)

(Maximum performance)

Ranking on Median value
(50% of opening hours 100% of the room)

Ranking on Minimum value
(50% of opening hours 95% of the room)
In an unobstructed environment (obstruction angle = 10°):

- The glazing ratio (WFR) should be over 55% to reach « HIGH » level.
- A glazing ratio below 40%, leads to « MINIMUM » level.
Influence of outdoor environment (fully glazed façades / simplified method)

In a dense urban environment (obstruction angle = 40°)

- Even a fully glazed façade can lead to « NO RANKING »
Influence of Indoor photometry
(fully glazed façades / simplified method)

In a moderately obstructed environment (α= 22°)
- A small decrease of the reflection coefficient leads to « No ranking ». 

Simulations: DIAL+ 
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Influence of Additional Layer
(fully glazed façades / simplified method)

Double skin (Tv = 0.7)

500x500

Minimum

No Ranking

With a moderately obstructed environment (α= 22°)
> Any additional skin leads to « No Ranking »

Simulations : DIAL+
Influence of calculation method
(fully glazed façades / Simplified & Detailed methods)

*South Orientation*

Without shading device, the detailed method (based on dynamic simulations) is more optimistic than the simplified one (based on Daylight Factor values).
Influence & Shading device
(fully glazed façades / Simplified & Detailed methods)

South Orientation

The type of shading devices significantly influences the final ranking (detailed method)
Influence of Room localization

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<thead>
<tr>
<th></th>
<th>Athens</th>
<th>Lausanne</th>
<th>Berlin</th>
<th>Oslo</th>
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</thead>
<tbody>
<tr>
<td>Med. Ranking</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
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<tr>
<td>Min. Ranking</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
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The final classification strongly depends on the building location.
Impact on Heating loads

Heating loads [kWh/m²]

- Athens: 0.7 kWh/m²
- Lausanne: 11.9 kWh/m²
- Berlin: 19.0 kWh/m²
- Oslo: 36.7 kWh/m²

Total increase: +7.5 kWh/m².y

Simulations: DIAL+
Impact on Cooling loads

Cooling loads [kWh/m²]

WFR = 24%  WFR = 34%

+5.9 kWh/m².y

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<thead>
<tr>
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<tbody>
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<td>31.0</td>
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<tr>
<td>to</td>
<td></td>
<td></td>
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<td>12.4</td>
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<tr>
<td>(kWh/m²)</td>
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Impact on Electric Lighting Loads

Electric lighting loads [kWh/m$^2$]

-0.8 kWh/m$^2$.y

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</thead>
<tbody>
<tr>
<td>kWh/m$^2$.y</td>
<td>6.2</td>
<td>5.4</td>
<td>6.9</td>
<td>6.2</td>
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<tr>
<td></td>
<td>7.6</td>
<td>6.9</td>
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<td>7.7</td>
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Simulations: DIAL+
General feeling

- EN-17037 addresses a very broad scope of issues 😬
- The requirements are extremely demanding 😬
- It encourages the realization of facade entirely glazed 😷
- It is not really suitable for urban environments 😏
- It eliminates rooms with a Depth / Height ratio > 2 😐
- It eliminates buildings with double skin 😂
- It could result in an overal increase of energy consumption 😱
Thank you!

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