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)

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*Simulations: DIAL+  
EPFL Innovation Park / [www.estia.ch](http://www.estia.ch)*
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 ».
Influence of Additional Layer
(fully glazed façades / simplified method)

Double skin (Tv = 0.7)

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

Simulations : DIAL+

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**Influence of calculation method**
(fully glazed façades / Simplified & Detailed methods)

**South Orientation**

- **No shading**
  - **Static (DF)**
  - **Dynamic (sDA)**

Without shading device, the detailed method (based on dynamic simulations) is more optimistic than the simplified one (based on Daylight Factor values).

*Simulations: DIAL+*

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Influence & Shading device
(fully glazed façades / Simplified & Detailed methods)

South Orientation

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

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Simulations : DIAL+

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Influence of Room localization

<table>
<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>
</tr>
<tr>
<td>Min. Ranking</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
</tr>
</tbody>
</table>

The final classification strongly depends on the building location.
Impact on Heating loads

1m window sill

Heating loads [kWh/m²]

+7.5 kWh/m²·y

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Impact on Cooling loads

Cooling loads [kWh/m²]

WFR = 24%  WFR = 34%

+5.9 kWh/m².y

Athens  31.0  36.9
Lausanne  12.0
Berlin  12.0
Oslo  9.6  12.4

Simulations : DIAL+

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Impact on Electric Lighting Loads

Electric lighting loads [kWh/m²]

-0.8 kWh/m².y

Athens | 6.2 | 5.4
Lausanne | 6.9 | 6.2
Berlin | 7.6 | 6.9
Oslo | 7.7 | 7.1

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Simulations: DIAL+

EPFL Innovation Park / www.estia.ch
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 overall increase of energy consumption 😬
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Thank you!