New European Daylighting Standard prEN 17037
Process and Expected Impact

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Convenor of EN TC169/W11 “Daylight”
Presentation of calibrated photorealistic images by pairs (Thurstone test)

Video Projection, Full HD, 4K 8K, 12 K screens or Head Mounted Displays
Low power (max 500 cd/m²), High power (up to 20 Kcd/m²), Crowd testing
Process:

Why a daylighting standard for European buildings?

Pantheon, Roma, House common to all Gods, 29-19 BC
Buildings need electric lights (during night-time)

Electric light can be used at day-time, and well adapted to functions

So maybe we do not need so much daylight (energy, costs, ...)?
Reasons for a daylight standard

Window industry, roof top manufacturers: no references to use in comparison to electric lighting industry...

Health organizations: psychological and physiological well-being,

University and research: powerful and well structured daylight community in Europe (Scandinavia, Germany, Austria, England, The Netherlands, Slovakia)
CEN/TC 169 "Light and lighting"

CEN/TC 169/WG 01 "Basic terms and criteria"
CEN/TC 169/WG 02 "Lighting of work places"
CEN/TC 169/WG 03 "Emergency lighting in buildings"
CEN/TC 169/WG 04 "Sports lighting"
CEN/TC 169/WG 06 "Tunnel lighting"
CEN/TC 169/WG 07 "Photometry"
CEN/TC 169/WG 08 "Photobiology"
CEN/TC 169/WG 09 "Energy performance of buildings"
CEN/TC 169/WG 11 "Daylight"
CEN/TC 169/WG 12 "Joint Working Group with CEN/TC 226 - Road lighting"
CEN/TC 169/WG 13 "Non-visual effects of light on human beings"
CEN/TC 169/WG 14 "ErP Lighting Mandate Management Group"
History

CEN TC 169 / WG11 « Daylight »
Created in 2010 (The Netherlands, Denmark, Germany, UK, Czech Republic, Slovakia, Norway, France, Sweden, Italy)
Convenor: Peter Raynham (Bartlett School, UK)

Then from 2014, New Convenor: Prof Marc Fontoynont, SBI - Aalborg University in Copenhagen, Denmark (elected by CEN TC 169 board)
Status 2014

Daylight, View, Sunlight, Glare are the components
Frustration by industry: non applicable
Complexity of document
Relations with Germany (German Standard)
Issue of calculations

So I started to make a critical analysis of the document, launched individual interview of contributors, and started with a number of new proposals
Status 2014 (continued)

Big debate concerning minimum requirements vs minimum recommendations

Strategy: define normative section and annexes, with minimum recommendations (which are indicative)

Also standard focus on spaces not on buildings. Standard should allow a range of minimum recommendations (minimum, medium, high)
About 50 Participants to manage

Registered members:

M. Cyril Chain, France
M. Nicolas Dupin, France
M. Bernard Lepage, France
Mrs. Khadija Loud, France
M. Mohamed Trabelsi, France
Mrs Eloise Sok, France
Mr. Peter Dehoff, Austria
Mr. Oliver Ebert, Austria
Mr. Davide Siciliano, Austria
Mr. Dorin Beu, Romania
Mr. Dimcho Mihailov, Bulgaria
Mr. John Mardaljevic, United Kingdom
Mr. Peter Raynham, United Kingdom
Mr. Peter Thorns, United Kingdom
Mr. Koen Chielens, CEN
Mr. Knud Skovgaard Nielsen, CEN
Mr Wolfgang Cornelius, Germany
Mr Roman Jakobiak, Germany
Mr. Sohéil Moghtader, Germany
MzrsMartina Knoop, Germany
Mr Martin Sengebusch, Germany
Mr. Per Arnold Andersen, Denmark
Mr Jens Christoffersen, Denmark
Mr. Jørgen Hagelund, Denmark
Mr. Levente Filetóth, Hungary

Mr. Arnaud Deneyer, Belgium
Mr. Bertrand Deroisy, Belgium
Mr. Tom Vandamme, Belgium
Ms. Wiene Fokkinga, Netherlands
Ms. Lisette Groeneveld, Netherlands
Mrs G.J. Hordijk, Netherlands
Mr. H.J.J. Meutzner, Netherlands
Mr P.H.M. Vierhout, Netherlands
Ms. Nancy Westerlane, Netherlands
Mr. Tommy Govén, Sweden
Mr. Rodrigo Muro, Sweden
Mr. Björn Nilsson, Sweden
Ms. Ulla Rosenius, Sweden
Mr Grega Bizjak, Slovenia
Ms. Barbara Matusiak, Norway
Mr. Daniel Tschudy, Switzerland
Mr Jan Wienold, Germany / Switzerland
Mr. Stanislav Darula, Slovakia
Mr. Giuseppe Giuffrida, Italy
Mr. Paolo Soardo, Italy
Mrs. Jitka Mohelnikova, Czech Republic
Mr. Marcel Pelech, Czech Republic
Mrs. Martina Sapletalova, Czech Republic

Jørgen Hagelund,
DS, WG11 Secretary

Jens Christoffersen,
Velux, Danish Expert
Organization of the work:

• Two meetings per year +skype/webex,

• 2 webex per year with General secretary of TC169 (Sohéil Moghtader, DIN, Berlin)

• All contribution by members sent 2 weeks before meeting in a written form,

• Compromise to be achieved during meetings. In case of disagreement, next propositions should be made in written form, with arguments
Usually around 20 participants out of 50 experts...
External obstacles:

Building engineers: daylighting cannot be approached independently from energy concern.

Lighting industry: standard should promote use of daylight sensors/controls in luminaires, value combination of daylight and electric light.

City planners: providing daylight at lower levels of buildings and in areas construction is dense / spaces vs buildings
Attention!

This standard do not target the calculation of energy savings due to daylight
_CEN 15193 Energy requirements (LENI)_

It is not defining daylight levels at work places
_CEN 12 464-1 Lighting of Indoor Work Places_

It does not linked to energy regulations which are conducted at the national level

It does not propose calculations methods, just target performance criteria
Levels exceeded 50% of daylight hours per year

Table 1 —Recommendations of daylight provision by daylight openings in a vertical and inclined surface

<table>
<thead>
<tr>
<th>Level for daylight openings in a vertical and inclined surface</th>
<th>Target illuminance $E_T$ (lx)</th>
<th>Fraction of space for target level $F_{\text{plane},%}$</th>
<th>Minimum target illuminance $E_{\text{TM}}$ (lx)</th>
<th>Fraction of space for minimum target level $F_{\text{plane},%}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal</td>
<td>300</td>
<td>50%</td>
<td>100</td>
<td>95%</td>
</tr>
<tr>
<td>Medium</td>
<td>500</td>
<td>50%</td>
<td>300</td>
<td>95%</td>
</tr>
<tr>
<td>High</td>
<td>750</td>
<td>50%</td>
<td>500</td>
<td>95%</td>
</tr>
</tbody>
</table>

* the recommended values of daylight factors to be used for the method 2 for each performance level should be extracted from Table A.3. The minimum target daylight factor ($D_T$) corresponding to the target illuminance level and the minimum target daylight factor ($D_{\text{TM}}$) corresponding to the minimum target illuminance shall be selected based on the geographical location of the considered building.

Recommandations for daylight provision in (pr)EN 17037 - 2017
Table 1 — Assessment of the view outwards from a given position.

<table>
<thead>
<tr>
<th>Parameter*</th>
<th>Rating of view-out</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>minimum</td>
</tr>
<tr>
<td>Width of view window(s), horizontal sight angle</td>
<td>≥ 14°</td>
</tr>
<tr>
<td>Outside distance of the view</td>
<td>≥ 6 m</td>
</tr>
<tr>
<td>Number of layers to be seen from at least 75% of utilized area: - sky - landscape (urban and/or nature) - ground</td>
<td>At least landscape layer is included</td>
</tr>
</tbody>
</table>

* For a space with room depth more than 5 m, it is recommended that the respective sum of the view window(s) dimensions is at least 1 m x 1.25 m (width x height).

Recommendations for view out in (pr) EN 17037 - 2017
A.1 Recommendations for exposure to sunlight

The minimum recommendation is that the space should receive possible sunlight for a duration at least exposure to sunlight after Table A.5 (supposed to be cloudless) on a selected date between February 1st and March 21st.

Table A.5 proposes three levels for exposure to sunlight. See Annex D for further details.

When applying the recommendation to a whole dwelling, the proposal is that at least one room in the dwelling should have at least exposure to sunlight after Table A.5.

Table 1 — Recommendation for daily sunlight exposure.

<table>
<thead>
<tr>
<th>Sunlight exposure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>minimum exposure to sunlight</td>
<td>1.5 hours</td>
</tr>
<tr>
<td>medium exposure to sunlight</td>
<td>3.0 hours</td>
</tr>
<tr>
<td>high exposure to sunlight</td>
<td>4.0 hours</td>
</tr>
</tbody>
</table>

Recommandations for minimum exposure to sunlight in (pr) EN 17037 - 2017
Limitations of access to daylight related to street width and building height
From inside buildings, only sections of sky are visible

Marc Fontoynont et al, Building with Daylight, Construire avec la lumière naturelle, CSTB, 2011
Standard will facilitate sizing of roof apertures
And borrowed light solutions
Exploration on the effect of balcony sizes in relation to daylight penetration in apartments, and duration of sunlight penetrations
Exploration of various alternatives to improve status of roof tops in supermarkets
Assessment of daylight availability in dense urban areas, study of impacts of construction schemes.

Marc Fontynont, 2006-2009
Albany, NY, USA
Wanchai, Hong Kong,
Expected impact

Adjustment and **homogenization** of presentation of performances by window manufacturers

Allowing building clients/owners **to write specifications** with various levels of performances

**Raise interest** around the potential of daylighting

Involve **software developers, labelling** organizations
Actions to conduct

Bring stakeholders together during workshops and present successful and convincing case studies

Establish a monitoring of the impact of the standard on building construction in the next 10-20 years.
Final voting by countries in process until 28 June, Translation in German and French and other languages in process Integration of some aspects of EN 17037 in Danish BR18 – Kjeld Johnsen, SBI-AAU