

Guideline for Lighting Design concerning Facility Implementation

< Abridged version >

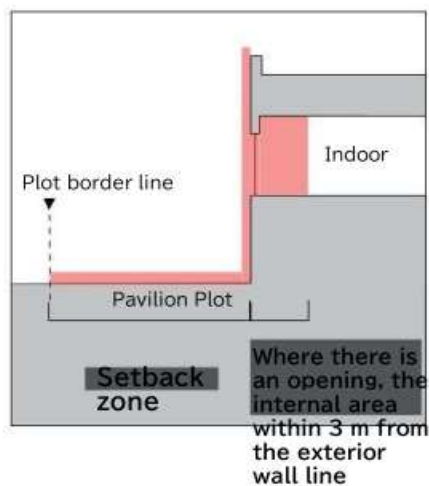
GL5-2-1 June 2023



This Guideline has been prepared in view of the creation of 'New Night' in order to enable the Expo 2025 Osaka, Kansai, Japan to represent a model vision for 2025 and beyond through its nightscape in keeping with the overall harmony of the Expo site intact during the evening and night hours in alignment with its theme 'Designing Future Society for Our Lives'. Lighting can influence people's moods with calming, exciting, and other effects. The year 2025 should mark a time when lighting evolves from just being a means to provide luminosity and become a purpose of carefully creating a light environment that facilitates sustainability for people and other forms of life, as well as the global environment, with a sense of gratitude for having this invaluable energy. The 'New Night' as a concept to be realised entails the creation of light environments that express universal respect for not only human beings but also the entire biodiversity and represent the hope for future society, by making artificial lights change through time like natural light does, and by carefully coordinating illuminated environments according to the time of the day. In order to attain this goal, detailed and easy-to-follow rules are provided as guidelines, addressing individual matters concerning lighting arrangements.

Areas to which this Guideline applies

Where Pavilion Plots are concerned, this Guideline applies to the setback zone and, where there is an opening, the internal area within 3 metres from the building's external wall line. Note, however, that the section on measures against light pollution, 'Preventing light leakage into the sky' applies to the entire Pavilion Plot area.



Control

Lighting equipment relevant to the exterior vertical luminance (illuminance), as well as digital signage, projection mapping, and other arrangements, must not emit the light that ‘may adversely affects the flight’ of an aircraft, as stipulated in the Civil Aeronautics Act (Act No. 231 of 1952). Similarly, light must not be emitted in such ways as it disturbs the considerations for visitors’ physical needs and, also, uninterrupted visits at, and exhibition designs of, adjacent Pavilions. Lighting equipment shall be designed to keep in harmony with the adjacent environment by installing luminance (illuminance) adjusters or adopting dismountable lights so that brightness can be controlled in response to the Organiser’s request in such cases as an excessive amount of light crosses the border with the adjacent plots or illuminates the sky, or the luminance (illuminance) level is deemed excessively high.

Guide1

1. Zero-% luminous flux *1 in the up direction (to protect the beautiful starry sky and eliminate energy wastage)
2. Control of the direct light that crosses the Plot border lines (control the cut-off line *2)
3. Full control over discomfort glare *3 (international-standard light etiquette)
4. Adoption of colour temperature *4 (up to 3,000 K, with some zones up to 2,800 K)

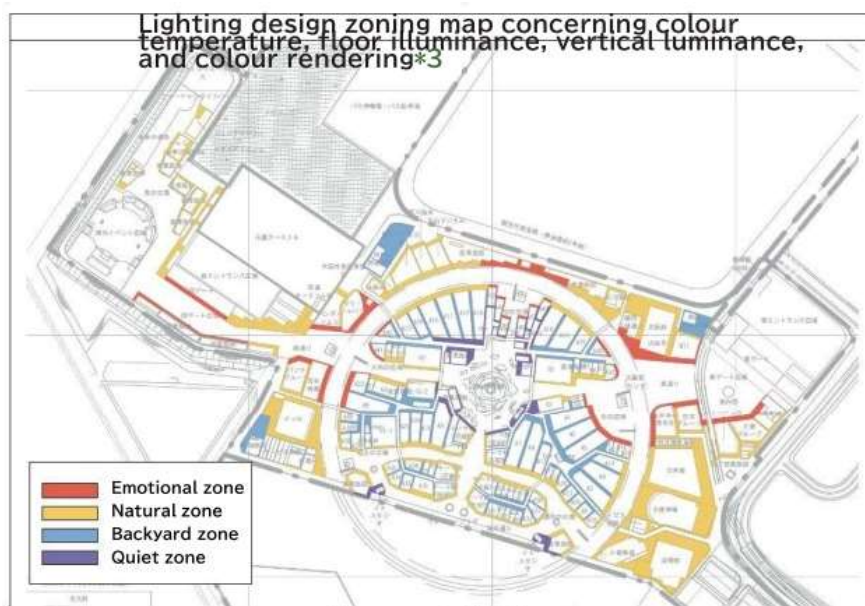
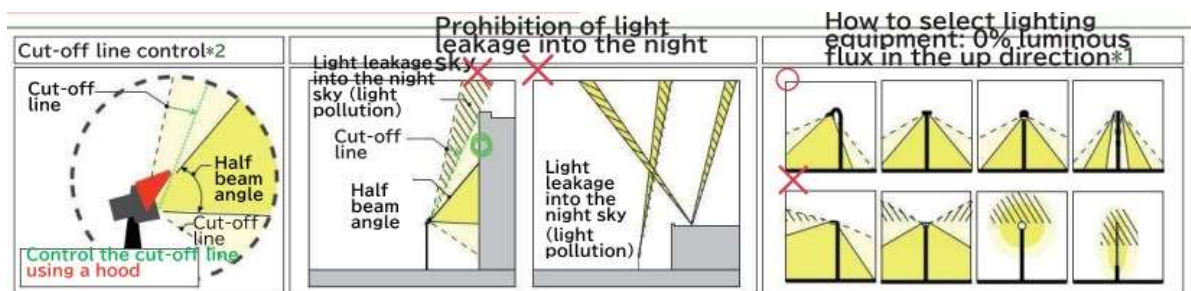
*1 Luminous flux: a measure of psychologically registered physical quantity (perceived power) of light that expresses the brightness of entire light emitted from a light source in a given direction.

*2 Cut-off line: the line along which the light emitted from lighting equipment is blocked

physically. This can be a cut-off line of the equipment itself or one created by installing a hood, louvre, board, etc.

*3 Glare: the ‘brightness’ that interferes with clear vision, causing discomfort and difficulty of seeing.

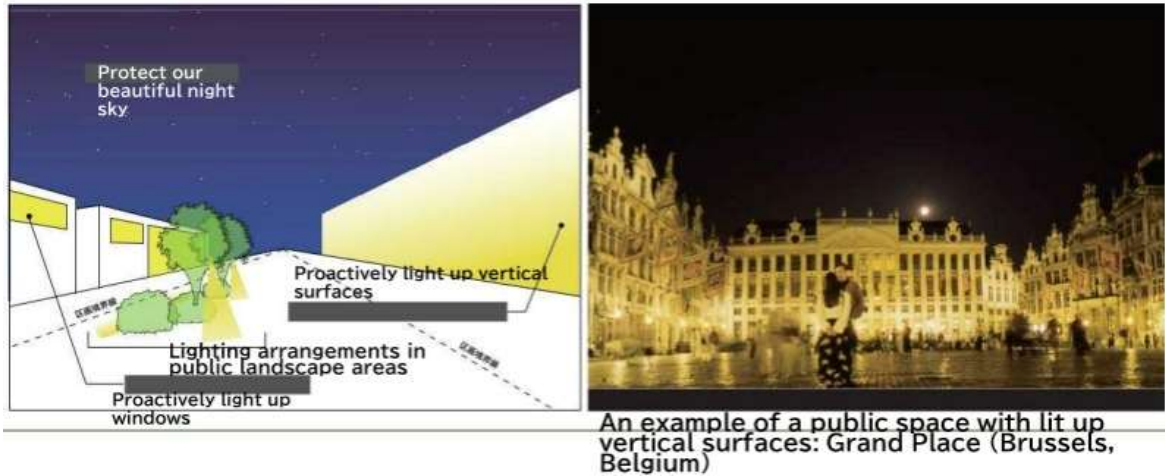
*4 Colour temperature: a parameter to describe the light appearance, where high colour temperatures designate white to blue-hued light appearance, and low colour temperatures refer to warm colours such as the light appearance of an incandescent light bulb.



Guide2

1. Brighten up the vertical surfaces and building walls facing the public zones (dramatically welcome visitors)
2. Control the lighting arrangements in expansive time slots (never fast-changing, extreme light effects)
3. Proactively introduce solar-powered lighting systems, especially ones with integrated lighting equipment (keeping sustainable future in mind)

4. Express radiant and dynamic life coherently with the buildings (enliven the Expo 2025 theme)



Recommended lighting parameters by zones				
Zone	Colour temperature	Average floor illuminance	Maximum average vertical luminance	Colour rendering
Emotional zone	3,000 K or lower	150 lx or lower	400 cd/m ² or below	Ra 80 or above (except self-contained solar lighting*)
Natural zone	3,000 K or lower	30 lx or lower	400 cd/m ² or below	Ra 80 or above (except self-contained solar lighting*)
Backyard zone	3,000 K or lower	20 lx or lower	50 cd/m ² or below	Ra 80 or above (except self-contained solar lighting*)
Quiet zone	2,800 K or lower	5 lx or lower	50 cd/m ² or below	Ra 80 or above (except self-contained solar lighting*)

*Self-contained solar lighting: lighting equipment with a solar generator and power storage device, requiring no external power source.