

<b>6</b>	<b>IEQ</b>	<b>6.6 LIGHTING QUALITY</b>	
		<b>IEQ 16 INTERIOR LIGHTING IN NORMALLY OCCUPIED AREAS</b>	
	<b>EXCLUSIONS</b>	Residential buildings, hotels and apartment buildings.	1
	<b>OBJECTIVE</b>	Ensure the adequacy and maintenance of visual comfort conditions achieved by the electric lighting provisions in occupied spaces.	
	<b>CREDITS ATTAINABLE</b>	1 + 1 BONUS	
	<b>PREREQUISITES</b>	None.	
	<b>CREDIT REQUIREMENT</b>	<p>1 credit where the prescribed lighting performance in each type of premises in respect of illuminance and lighting quality is achieved.</p> <p>It is required to fulfill the following:</p> <ul style="list-style-type: none"> <li>(i) prescribed lighting performance in respect of maintained illuminance and illuminance variation; and</li> <li>(ii) the limiting unified glare rating is achieved and light sources have an appropriate colour rendering index.</li> </ul> <p>1 BONUS credit for providing automatic control of artificial lighting such as daylight sensors at perimeter zones and/or occupancy sensors.</p>	
	<b>ASSESSMENT</b>	<p>The design criteria for interior lighting shall be at the discretion of the Client but shall embrace both 'quantity' and 'quality' of the lighting system performance including: maintained horizontal, and where appropriate vertical, illuminance, illuminance variation, limiting glare index, colour rendering, and modulation of light output appropriate to the type and use of the premises/indoor spaces.</p> <p>The criteria adopted shall be based on authoritative guidance, such as that provided in CIE [1,2], CIBSE [3] and/or IESNA [4] publications, or equivalent. As the focus is on lighting for comfort and productivity, lighting for performing arts, display decoration, ambience. etc., will normally be excluded from consideration.</p> <p>Compliance with the assessment criteria shall be demonstrated either by measurements using a standardised measurement protocol appropriate to the parameter being assessed, and/or by modelling (calculation), providing the calculation method or software used is based on a standardised method, and uses data/assumptions appropriate to the circumstances. Notwithstanding, demonstration of compliance with a) requires that the maintained illuminance take into account the influence on light output by adjacent air-conditioning or ventilation fixtures, and the lighting maintenance plan (the period for luminaire cleaning and group re-lamping) appropriate to the circumstances [5].</p> <p>The Client shall submit a report prepared by a suitably qualified person detailing the 'as installed' lighting systems or, for premises/spaces yet to be fitted-out, the technical details of the proposed lighting systems for each type of normally occupied space within the development. The report shall detail the design criteria and the results of measurements or other means of demonstrating compliance. For premises to be fitted out by tenants compliance shall be confirmed if the technical details and contractual arrangements with tenants in respect of lighting installations</p>	<p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p>

- 1 Commission Internationale de l'Eclairage (CIE). Lighting of Indoor Work Places. CIE Standard S 008/E.
- 2 Commission Internationale de l'Eclairage (CIE). Discomfort Glare in Interior Lighting. CIE 117-1995.
- 3 The Chartered Institution of Building Services Engineers. Code for interior lighting. London. CIBSE.
- 4 Illuminating Engineering Society of North America. Lighting Handbook, Reference & Applications. 9<sup>th</sup> edition., New York.
- 5 Commission Internationale de l'Eclairage (CIE). Maintenance of indoor electric lighting systems. CIE Technical Report - Publication No. 97. Vienna.

are deemed to meet the assessment criteria.

The Client shall submit a report prepared by a suitably qualified person detailing the automatic control of artificial lighting such as daylight sensors in perimeter zones and/or occupancy sensors.

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#### MEASURED PERFORMANCE

For lighting installations that are already installed, horizontal and vertical illuminance and luminance can be measured using a lux meter and a luminance meter. The colour quality of lamps can be assessed from the lamp specifications. Colour appearance (correlated colour temperature) can be checked from the lamp labels or by measurement using a colour meter. Flicker can be assessed by whether the specified ballasts are magnetic or electronic, and can be tested using a simple 'flicker meter'.

Air diffusers located near to fluorescent luminaires with open lamp compartments may result in cool air blowing over the lamps directly causing decrease light output and lamp efficacy. The design details should demonstrate that the cool air from diffusers will not adversely impact lamp performance.

#### COMPUTATION

The 'lumen method' can be used to calculate the maintained illuminance over the working plane according to the calculation procedure described in Section 4.5.3 of the CIBSE Code or in Appendix 3 of the CIBSE Lighting Guide [6]. The calculated maintained illuminance will then be checked for compliance with the recommendations given in Section 2.6.4 of the Code, or the recommendations given in Chapter 5 of the Guide.

The illuminance variation consists of 'uniformity' which is concerned with illuminance conditions on the task and immediate surroundings, and 'diversity' which expresses changes in illuminance across a larger space. The uniformity and diversity can be calculated according to that described in Section 4.5.4 of the Code. The calculated uniformity (minimum to average illuminance) over any task area and immediate surround should not be less than 0.8. The diversity of illuminance expressed as the ratio of the maximum illuminance to the minimum illuminance at any point in the 'core area' of the interior should not exceed 5:1. The core area is that area of the working plane having a boundary 0.5 m from the walls.

The glare index can be calculated according to either of the two methods described by CIE [2], or the CIBSE Technical Memoranda [7]. These methods are also summarised in Section 4.5.6 of the CIBSE Code [3]. The calculated glare index shall be checked for compliance with the recommendations given in Section 2.6.4 of the Code or Chapter 5 of the Lighting Guide.

For assessment using the IESNA Lighting Criteria, the calculation methods described in Chapter 9 of the IESNA Lighting Handbook can be used for the calculation of the following parameters:

- horizontal and vertical illuminance;
- glare: VCP or UGR; and
- luminance.

Alternatively, a validated computer program such as RADIANCE, LIGHTSCAPE etc can be used for the calculation. The calculated results will then be checked for compliance with the recommended criteria in the IESNA Lighting Design Guide.

6 The Chartered Institution of Building Services Engineers. Lighting Guide LG7: Lighting for offices. London, CIBSE, 1993.  
7 The Chartered Institution of Building Services Engineers. Technical Memoranda TM10. Calculation of glare indices. London, CIBSE, 1985.



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BEAM Plus NB Version 1.2

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### **Credits Not Applicable to Not Normally Occupied Buildings**

This circular letter announces that the following credits are not applicable to buildings that are not normally occupied (e.g. pump stations, sewerage treatment plants).

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- SA 2
- SA 3
- IEQ 10
- IEQ 15
- IEQ 16
- IEQ 21
- IEQ 23a

Signed :

A handwritten signature in blue ink, appearing to read "Ray", is written over a horizontal line.

Dr. Raymond Yau  
Chairperson of Technical Review Committee

**Q25. IEQ 16&17, For BEAM Plus New Buildings Version 1.1 and 1.2, how should the representative sampling points be selected and what is the percentage of compliance of the sampling points in order to achieve the credit?**

The sampling point should represent each type of premises with a typical lighting layout. To achieve the credit, 100% compliance of all the representative sampling points is required.

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(Released on 29 November 2019)

**Q26. IEQ 16&17, For BEAM Plus New Buildings Version 1.1 and 1.2, should decorative lighting be assessed?**

**Q27. IEQ 18, 19, 20 & 21, For BEAM Plus New Buildings Version 1.1 and 1.2, what is the definition of “suitably qualified person” (SQP)?**

**Q28. IEQ 18, For BEAM Plus New Buildings Version 1.1 and 1.2, how should the representative sampling points be selected?**

**Q29. IEQ 19, For BEAM Plus New Buildings Version 1.1 and 1.2, how should the representative sampling points be selected?**

**Q30. IEQ 19, For BEAM Plus New Buildings Version 1.1 and 1.2, in normal credit, is impact noise isolation (IIC) between floors required for Office, Hotel and Residential premises?**

**Q31. IEQ 20, For BEAM Plus New Buildings Version 1.1 and 1.2, how should the representative sampling points be selected?**

**Q32. IEQ 21, For BEAM Plus New Buildings Version 1.1 and 1.2, how should the representative sampling points be selected?**

**Q33. IEQ 22, For BEAM Plus New Buildings Version 1.1, please elaborate on the requirement of enhanced provisions under this credit.**

**Q34. Under BEAM Plus NB IEQ 23, how many times can the same amenity type be counted within the same development?**

**Q35. IEQ 23, For BEAM Plus New Buildings Version 1.1 and 1.2, is there a list of amenity features which comply with the requirements of IEQ 23?**

## Management

**Q1. MAN 1, For BEAM Plus Existing Buildings Version 2.0 Comprehensive Scheme & MAN 2, For BEAM Plus Existing Buildings Version 2.0 Selective Scheme, please elaborate on the documentations required to fulfill the internal audit criteria under this credit.**

**Q2. MAN 3, For BEAM Plus Existing Buildings Version 2.0 Comprehensive Scheme & MAN 4, For BEAM Plus Existing Buildings Version 2.0 Selective Scheme, what is the definition of BEAM Professional with EB credential.**

**Q3. MAN 9b, For BEAM Plus Existing Buildings Version 2.0 Comprehensive Scheme & MAN 11b, For BEAM Plus Existing Buildings Version 2.0 Selective Scheme, regarding bulk purchase of the management company:**

**Q26. IEQ 16&17, For BEAM Plus New Buildings Version 1.1 and 1.2, should decorative lighting be assessed?**

No. Decorative lighting as defined under Schedule 2 of Buildings Energy Efficiency Ordinance (BEEO) should be excluded from the assessment of IEQ 16 & 17. However, the Applicant should provide clear delineation such as layout drawings and lighting fitting schedule highlighting the portion where decorative lightings are installed in the development.

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