

<b>6</b>	<b>IEQ</b>	<b>6.3 INDOOR AIR QUALITY</b>	
		<b>IEQ 6 OUTDOOR SOURCES OF AIR POLLUTION</b>	
	<b>EXCLUSIONS</b>	Buildings that are designed for natural ventilation or using de-centralised air conditioning system.	
	<b>OBJECTIVE</b>	Demonstrate that airborne contaminants from external sources will not give rise to unacceptable levels of indoor air pollution in normally occupied spaces.	
	<b>CREDITS ATTAINABLE</b>	2	
	<b>PREREQUISITES</b>	None.	
	<b>CREDIT REQUIREMENT</b>	<p>a) Carbon monoxide (CO), Nitrogen dioxide (NO<sub>2</sub>) and Ozone (O<sub>3</sub>)</p> <p>1 credit for demonstrating compliance with the appropriate criteria for CO, NO<sub>2</sub> and O<sub>3</sub>.</p> <p>b) Respirable suspended particulate (RSP, PM<sub>10</sub>)</p> <p>1 credit for demonstrating compliance with the appropriate criteria for RSP.</p>	
	<b>ASSESSMENT</b>	<p>The Client shall provide a report prepared by a suitably qualified person detailing the criteria adopted for indoor air quality for each type of normally occupied areas within the building development.</p> <p>Where the Client does not offer criteria, BEAM aligns with the HKSAR IAQ Certification Scheme [1]. The criteria for air-conditioned buildings shall be those defined under Good Class in Table 1 of the scheme. For other occupied areas and habitable rooms, the criteria can be that defined in the Scheme, in ASHRAE 62.1-2007 [2] or equivalent standard.</p> <p>Compliance shall be demonstrated by measurement. The report shall identify the measurement protocol. i.e., the measuring equipment used, duration of measurements, number and details of the sampling points, the measurement results, and overall conclusions from the measurements survey. Measurements shall be made at all fresh air intake locations.</p> <p>For RSP, the instrument type used shall be of gravimetric type, such as cyclone elutriator or impactor. An instrument based on the optical scattering method is acceptable with a referenced calibration curve with respect to a gravimetric instrument. In a zone where it can be demonstrated that CO, NO<sub>2</sub>, O<sub>3</sub> and RSP are solely from outside, measurements can be taken at the outdoor air intake locations where CO, NO<sub>2</sub>, O<sub>3</sub> and RSP are likely to infiltrate.</p> <p>The objective of sampling is to ensure that the building will not suffer unduly from outside sources of pollution. The sampling protocol (number and locations of samples) shall follow as a minimum that given in Appendix 8.7. Any other protocol demonstrated to be of equal rigour appropriate to the nature of the premises surveyed would be acceptable.</p> <p>In the case of occupied/habitable rooms in air-conditioned/naturally ventilated buildings the measurement of indoor air pollutants shall take place whilst operating in the naturally ventilated mode. Given that air and pollutant exchange with the outside depends on prevailing climatic conditions, particularly wind speed and direction, it is expected that due</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p>

- Indoor Air Quality Management Group. A Guide on Indoor Air Quality Certification Scheme for Offices and Public Places. <http://www.iaq.gov.hk/cert/doc/CertGuide-eng.pdf>
- American Society of Heating Refrigeration and Air Conditioning Engineers. ASHRAE Standard 62.1. Ventilation for Acceptable Indoor Air Quality, Atlanta 2007.

account is taken and that measurements will be taken under typical or average climatic conditions.

Where it can be demonstrated that the identified pollutants are unlikely to exceed the limits prescribed, and as determined from an appropriate sample of measurements, relevant credit(s) shall be awarded.

## BACKGROUND

This section deals with pollutants found in indoor air which are mainly attributable to outdoor sources. In the case of occupied/habitable rooms in air-conditioned/naturally ventilated buildings the concern is indoor air pollutant from outdoor sources whilst operating in the naturally ventilated mode. Undertaking appropriate measurements in air-conditioned buildings will demonstrate that the design and construction of the building and services serve to reduce indoor air pollution from outdoor sources.

CO is a toxic gas which interferes with the oxygen transport capacity of the blood, and at levels to which people can be exposed in buildings, leads to symptoms such as headaches, nausea, chest constriction, etc, as well as affecting concentration. Exposure to oxides of nitrogen ( $\text{NO}_x$ ,  $\text{NO}_2$ ) can result in irritations to the eyes and respiratory system. Sources in occupied areas include infiltration from vehicle exhausts and enclosed car parks, and incomplete combustion within premises.  $\text{O}_3$  irritates the eyes and respiratory system. Sources of ozone in occupied areas include infiltration from outside occupied areas, and from equipment which utilises ultra-violet light or causes ionisation of air.

Respirable Suspended Particles ( $\text{PM}_{10}$ ) are suspended airborne particles with a nominal aerodynamic diameter of 10  $\mu\text{m}$  or less. The health impacts from inhalation of particles depend on size, shape and chemical reactivity. Outdoor sources are numerous, but vehicular exhaust and construction activity contribute significantly. Particulates from outside sources are carried into air-conditioned buildings through outside air intakes and through uncontrolled infiltration. Indoor sources include air ducts, equipment and user activities. Levels of RSP may be used as an indicator of the effectiveness of the air filtration system, sampling should be carried out at one representative zone in each type of premises.

Survey data for Hong Kong buildings show that if design and construction is adequate it should be possible to meet the Excellent Class of the Guidance Note for CO,  $\text{NO}_2$ ,  $\text{O}_3$  and RSP in new air-conditioned buildings.

**Q21. EU 10e, For BEAM Plus New Buildings Version 1.1 & 1.2, What should be submitted to demonstrate credit compliance in the Provisional Assessment (PA) stage?**

**Q22. EU 12, For BEAM Plus New Buildings Version 1.1 & 1.2, What are the requirements for metering and monitoring for clubhouse and carpark?**

### Water Use

**Q1. WU P1 & WU 1, Do I need to consider the water pressure indicated in the baseline figures for different water appliances when predicting the water consumption?**

**Q2. WU P1, Is water sample necessary to be taken from the supply point of WSD for water quality analysis under WU P1?**

**Q3. WU P1, WU P2/WU 1, For BEAM Plus New Buildings / Existing Buildings Version 1.1 and 1.2, is a conceptual plumbing sketch satisfactory for PA stage?**

**Q4. WU 5, For BEAM Plus New Buildings Version 1.2, how is WU 5 applied to different building types?**

**Q5. WU 5, For BEAM Plus New Buildings Version 1.1, how is WU 5 applied to different building types?**

**Q6. WU 5, For BEAM Plus New Buildings Version 1.1 & 1.2, how is WU 5 applied to different building types?**

**Q7. WU 5, For BEAM Plus New Buildings Version 1.1 & 1.2, what type of appliances shall be included into the assessment of this credit?**

**Q8. WU 5, For BEAM Plus New Buildings Version 1.1 & 1.2, what type of washing machine would meet the credit requirement and what type of substantiations shall be provided to justify for the performances of the washing machine?**

### Indoor Environmental Quality

**Q1. IEQ P1, How to achieve the outdoor air quality standard in local context of Hong Kong?**

**Q2. IEQ P1, IEQ 6 and IEQ 7, For BEAM Plus New Buildings Version 1.2, please clarify the assessment criteria under the new Indoor Air Quality (IAQ) objectives (IAQ Objective 2019) under the Indoor Air Quality Certification Scheme for Offices and Public Places**

The assessment criteria shall follow the Good Class of the IAQ Objectives and they are extracted below for reference. Please be reminded for nitrogen dioxide (NO<sub>2</sub>) and formaldehyde (HCHO), limit for BOTH averaging time shall be complied.

#### IEQ P1 and IEQ 6

	Parameter	Averaging Time	IAQ Objectives
1.	Carbon monoxide (CO)	8-hour averaging time	7000µg/m <sup>3</sup> or 6.1ppmv
2a.	Nitrogen dioxide (NO <sub>2</sub> )	8-hour averaging time	150µg/m <sup>3</sup> or 80ppbv
2b.		1-hour averaging time	200µg/m <sup>3</sup> or 106ppbv
3.	Ozone (O <sub>3</sub> )	8-hour averaging time	120µg/m <sup>3</sup> or 61ppbv
4.	Respirable Suspended Particulates (RSP)	8-hour averaging time	100µg/m <sup>3</sup>

#### IEQ 7

	Parameter	Averaging Time	IAQ Objectives
1.	Volatile organic compounds (VOCs)	8-hour averaging time	600µg/m <sup>3</sup> or 261ppbv
2a.	Formaldehyde (HCHO)	8-hour averaging time	100µg/m <sup>3</sup> or 81ppbv
2b.		30-minute averaging time	100µg/m <sup>3</sup> or 81ppbv
3.	Radon (Rn)	8-hour averaging time	167Bq/m <sup>3</sup>

**Q3. If a clubhouse is provided with VRV or split type units but with fresh air provided by PAU or fresh air fans, are IEQ P1 and IEQ 9 (NB) / IEQ 10 (EB) applicable?**

**Q4. IEQ P1, IEQ 9 and IEQ 12a, For BEAM Plus New Buildings Version 1.1 and 1.2, should T&C records showing the measured flow rate of the Fresh Air Equipment such**

Q21. EU 10e, For BEAM Plus New Buildings Version 1.1 & 1.2, What should be submitted to demonstrate credit compliance in the Provisional Assessment (PA) stage?

Q22. EU 12, For BEAM Plus New Buildings Version 1.1 & 1.2, What are the requirements for metering and monitoring for clubhouse and carpark?

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Q6. WU 5, For BEAM Plus New Buildings Version 1.1 & 1.2, how is WU 5 applied to different building types?

Q7. WU 5, For BEAM Plus New Buildings Version 1.1 & 1.2, what type of appliances shall be included into the assessment of this credit?

Q8. WU 5, For BEAM Plus New Buildings Version 1.1 & 1.2, what type of washing machine would meet the credit requirement and what type of substantiations shall be provided to justify for the performances of the washing machine?

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Q4. IEQ P1, IEQ 9 and IEQ 12a, For BEAM Plus New Buildings Version 1.1 and 1.2, should T&C records showing the measured flow rate of the Fresh Air Equipment such as Fresh Air Fan (FAF) or Primary Air Handling Unit (PAU) be submitted in the Final Assessment (FA) stage?

Q5. IEQ 2, For BEAM Plus New Buildings Version 1.1 and 1.2, sub-item 7 “maintenance of water seals”, are water seal traps required for all floor drains?

Q6. Should the noise level of the ventilation system or de-odourising system be considered under IEQ 4 (NB and EB)?

Q7. IEQ 5, For BEAM Plus New Buildings Version 1.1 and 1.2, how frequent should the records/evidence be submitted to demonstrate the implementation of IAQ management practice during construction?

Q8. IEQ 6 & 7, For BEAM Plus New Buildings Version 1.1 and 1.2, is HOKLAS accredited laboratory considered as acceptable to conduct the measurement of airborne contaminants?

No. The measurement must be conducted by IAQ Certificate Issuing Body (CIB) accredited under Hong Kong Accreditation Service (HKAS).

(Released on 29 November 2019)

Q9. IEQ 6, For BEAM Plus New Buildings Version 1.1 and 1.2, is it necessary to demonstrate that the measurement is taken at naturally ventilated mode?

Q21. EU 10e, For BEAM Plus New Buildings Version 1.1 & 1.2, What should be submitted to demonstrate credit compliance in the Provisional Assessment (PA) stage?

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Q9. IEQ 6, For BEAM Plus New Buildings Version 1.1 and 1.2, is it necessary to demonstrate that the measurement is taken at naturally ventilated mode?

No. The measurement should be conducted in accordance with the methodology as stated in IAQ Certification Scheme. It is not necessary to measure under naturally ventilated mode.

(Released on 29 November 2019)



Circular Letter No.: 2019.161

Issue Date: 11 September 2019

Application: BEAM Plus NB Version 1.1 & 1.2

Effective Date: 11 September 2019

**IEQ P1, 6 & 7 – Application of New IAQ Objectives for Minimum Ventilation Performance and Outdoor / Indoor Sources of Air Pollutants**

1. The Environmental Protection Department (EPD) has launched the new Indoor Air Quality (IAQ) objectives (“IAQ Objective 2019”) under the Indoor Air Quality Certification Scheme for Offices and Public Places on 1 July 2019. The IAQ objective 2019 takes into account of local circumstances and the latest World Health Organization’s IAQ guideline<sup>1</sup>.
2. To better align the credit assessment criteria for IEQ P1, IEQ 6 & 7 under BEAM Plus New Buildings (NB) against the IAQ Objective 2019, this Technical Circular Letter hereby announces the transitional arrangement as follow:
  - i. All projects registered after the effective date of this Technical Circular must adopt the criteria under IAQ Objective 2019; and
  - ii. For all project registered on or before the effective date, the project proponents can opt to adopt the criteria under previous IAQ objectives (“IAQ Objective 2003”)<sup>2</sup> or IAQ Objective 2019<sup>3</sup> for the assessment. However, the Applicant must apply either one of the IAQ objectives throughout the project assessment (i.e. If the project proponent decides to use the IAQ Objective 2019, then all parameters under IEQ 6 & 7 must follow the IAQ Objective 2019 throughout); and;
  - iii. For all projects commence Final Assessment on or after 1 July 2024, including those fall under paragraph (2)(ii) above, the project proponent must adopt the criteria under IAQ Objective 2019.
3. For projects that were registered on or before the effective date but are unable to commence Final Assessment before 1 July 2024, the project shall adopt the criteria under IAQ Objective 2019 under normal circumstance. For special case project, the Applicant is encouraged to file a Credit Interpretation Request for clarification and the Technical Review Committee will consider on a case-by-case basis.

<sup>1</sup> Government announcement on new IAQ objectives under the Indoor Air Quality Certification Scheme for Offices and Public Places, <https://www.iaq.gov.hk/en/iaq-certification-scheme/newiaqo.aspx>

<sup>2</sup> A Guide on Indoor Air Quality Certification Scheme for Offices and Public Places (2003), <https://www.iaq.gov.hk/media/8694/certguide-eng.pdf>

<sup>3</sup> A Guide on Indoor Air Quality Certification Scheme for Offices and Public Places (2019), [https://www.iaq.gov.hk/media/65346/new-iaq-guide\\_eng.pdf](https://www.iaq.gov.hk/media/65346/new-iaq-guide_eng.pdf)

4. Approved PA Projects: For projects that have already completed PA and have certain measurement report approved, the Applicant may opt to adopt the same assessment criteria for FA or voluntarily comply with this Technical Circular. For the avoidance of doubt, the Applicant shall provide PA evidences (e.g. extract of the PA report, documents submitted for assessment in PA, etc) in subsequent assessments to support the intention of using the same assessment methodology as in PA.



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Mr KM So  
Chairperson of Standards Sub-committee

Circular Letter No.: 2020.168

Issue Date: 5 June 2020

Application: BEAM Plus NB Version 1.1 and 1.2

Effective Date: 5 June 2020

### **Updated Exclusion Clauses for IEQ Credits**

1. **Technical Circular Letter No. 2016.134 dated 09 August 2016 will be withdrawn on the effective date.**
2. This Circular Letter clarifies the exclusion clause for the following credits:

Credits	New Exclusions
IEQ P1 IEQ 9	Residential premises, or Premises without any fresh air provision <sup>1</sup> .
IEQ 3	Residential premises, or Premises without any provision of air-conditioning equipment.
IEQ 5	Residential premises, or Premises without any fresh air provision <sup>1</sup> and HVAC system.
IEQ 6	Residential premises, or Premises without any fresh air provision <sup>1</sup> .
IEQ 7a IEQ 7b	Residential premises without any interior decoration, or Premises without any fresh air provision <sup>1</sup> and interior decoration.
IEQ 10	Premises with fresh air provision <sup>1</sup> .
IEQ 11b	Residential premises, or Premises without any future tenant (for example, single owner occupier premises).
IEQ 12	Premises without any enclosed common area in the main circulation route.
IEQ 13a	Normally occupied premises <sup>2</sup> without any air-conditioning equipment installed and provided by the project proponent, or without any fresh air provision <sup>1</sup> .
IEQ 13b	Normally occupied premises <sup>2</sup> without any installation of air diffuser in the air-conditioning system.
IEQ 14a	Normally occupied premises <sup>2</sup> with fresh air provision <sup>1</sup> .
IEQ 14b	Normally occupied premises <sup>2</sup> with fresh air provision <sup>1</sup> , or without any air-conditioning equipment installed and provided by the project proponent.

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Ir SK Ho  
Chairperson of Standards Sub-committee

<sup>1</sup> Fresh air provision means any fresh air equipment such as PAU, AHU, FAU, FAP, FAF, etc.; and/or premises with fresh air louvers, etc.

<sup>2</sup> Normally occupied premises are enclosed spaces / areas where people normally stay there for more than 1 hour per person per day on average.