

6	IEQ	6.7 ACOUSTICS AND NOISE
		IEQ 20 BACKGROUND NOISE
	EXCLUSIONS	Buildings/premises in which speech intelligibility is not important.
	OBJECTIVE	Control as far as practicable the background noise in premises at levels appropriate to the intended use of the premises.
	CREDITS ATTAINABLE	1
	PREREQUISITES	None.
	CREDIT REQUIREMENT	<p>1 credit for demonstrating background noise levels are within the prescribed criteria.</p> <p>Based on the nature of the building, relaxation should be allowed in considering the acceptance of this credit. The applicant should provide full submission of the design and calculation to justify the relaxation.</p>
	ASSESSMENT	<p>BEAM regards background noise in premises/rooms as a matter having an important bearing on quality and productivity. Given that different criteria may be used the Client shall define the criteria appropriate to the type and use of the premises/rooms in the building. However, for the purposes of assessment account should be taken of the criteria given below. Where alternative criteria are used, the Client shall provide evidence as to the suitability of the alternative, e.g. by making reference to authoritative guidance. Likewise, where criteria appropriate to the type and use of premises/spaces are not stated herein, the Client shall provide evidence as to the suitability of the criteria adopted.</p> <p>Compliance shall be demonstrated by detailed calculations or measurements, or both, depending on the Client's preference. Sufficient numbers of calculations and/or measurements shall be made to ensure that the requirements are met in all specified premises, but in particular for premises near street level and major outdoor sources. Some relaxation of the noise criterion for residential units may be considered. The intruding noise sources shall include external noise sources such as traffic noise, railway noise, etc.</p> <p>Site measurements on the completed building should be on at least one sample of each type of premises/room, taking account the worst case conditions of exposure to noise sources external to the space, and undertaken during periods appropriate to the usage pattern for the space. Measuring equipment shall conform to the accuracy requirements given in IEC 60804 [1] to type 2 or better, or equal equivalent standard.</p> <p>For centrally air-conditioned buildings, the assessment shall take into account noise from building services equipment while for de-centralised air-conditioned buildings, the assessment shall only consider the external noise sources.</p> <p>The Client shall submit details in form of a report prepared by a suitably qualified person providing a schedule of the premises and spaces in the building, relevant design details as they impact on noise isolation, the rooms/premises subject to field tests or for which detailed calculations have been made, the background noise criteria used, underlying assumptions, and the results of tests or calculations demonstrating compliance with the criteria (expressed in parameters that are consistent with the test and/or calculation methods).</p> <p>Where it can be demonstrated that background noise isolation, as</p>

1 International Electrotechnical Commission. IEC 60804: 2000. Integrating-averaging sound level meters.

measured or calculated for the most susceptible spaces/rooms/premises, meets appropriate performance criteria the credit shall be awarded.

ASSESSMENT CRITERIA

a) Offices

- Modular (private) offices and small conference rooms: 40 dB $L_{Aeq,T=8}$ hr or 45 dB $L_{Aeq,T=5}$ mins.
- Large landscaped offices: 45 dB $L_{Aeq,T=8}$ hr or 50 dB $L_{Aeq,T=5}$ mins.

b) Classrooms

Background noise shall be below 45 dB L_{Amax} in schools in urban areas, otherwise at or below 40 dB L_{Amax} , effective between the hours of 08:00 to 16:00.

c) Residential premises and hotel rooms

- In bedrooms under window closed conditions at or below 30 dB $L_{Aeq,T=8}$ hr, or 35 dB $L_{Aeq,T=5}$ mins, and < 45 dB between 23:00 to 07:00.
- In habitable rooms (other than kitchens) under closed window conditions < 55 dB $L_{Aeq,T=16}$ hrs between 07:00 to 23:00.

d) Indoor games halls & indoor swimming pools etc

Background noise level shall be less than 50 dB $L_{Aeq,T=5}$ mins.

Tables 5 and 6 of BS 8233 [2] give criterion for various activities in buildings.

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BACKGROUND

Background noise includes that from external sources as well as from the building services equipment. Table 4.1 in Chapter 9 of the Hong Kong Standards and Planning Guidelines provides a summary of maximum permissible noise levels at the external facade applicable to building uses which rely on operable windows for ventilation. Guidance on separation distances between road traffic and rail traffic and residential buildings is given in the Guidelines.

Calculations can be made in terms of $L_{Aeq,T}$ according to BS 8233, where $T = 16$ h (daytime) and 8 h (night time), appropriate to the criteria chosen. Calculations using the statistical energy analysis [3] are also acceptable. In centrally air-conditioned premises while NC, NR, PNC, NCB and RC are acceptable criteria for noise from air-conditioning equipment, the presence of outside noise sources renders $L_{Aeq,T}$ a better performance indicator for the aural environment [4]

Noise levels at the facade of a building can be established by measurement or prediction by simulation methods approved by the Environmental Protection Department. Predictions should take into consideration future as well as existing land uses. Estimation of road traffic noise can be made using the UK Department of Transport's prediction method [5]. For railway noise, calculations shall be made in terms of $L_{Aeq,T}$ using the UK Department of Transport's prediction method [6]. For noise from industry which is more or less of steady level, $L_{Aeq,T}$ is estimated according to British Standard BS 4142 [7]. T in the case can be 1 hr or 30 minutes.

- 2 British Standard Institution. BS 8233 Code of Practice for sound insulation and noise reduction for buildings.
- 3 European Committee for Standardization. CEN EN 12354 Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements. Bruxelles.
- 4 Chan D W T, Tang S K, Burnett J. Noise Criteria for Hong Kong Building Environmental Assessment Method for New Offices and Existing Offices (HK-BEAM). HKIE Transactions. HKIE Transactions, Vol. 5, No. 2, 1998, pp. 1-5.
- 5 UK Department of Transport. The Calculation of Road Traffic Noise. HM Stationary Office.
- 6 UK Department of Transport. The Calculation of Railway Noise. HM Stationary Office.
- 7 British Standards Institution. Method for rating industrial noise affecting mixed residential and industrial areas. British Standard BS 4142:1990. London, BSI, 1990.

EU 9 Energy Efficient Appliances

EU 10 Testing and Commissioning

EU 12 Metering and Monitoring

Water Use

WU P1 Water Quality Survey

WU P2 Minimum Water Saving Performance

WU 1 Annual Water Use

WU 5 Water Efficient Appliances

Indoor Environmental Quality

IEQ P1 Minimum Ventilation Performance

IEQ 1 Security

IEQ 2 Plumbing and Drainage

IEQ 4 Waste Disposal Facilities

IEQ 5 Construction IAQ Management

IEQ 6 Outdoor Sources of Air Pollution

IEQ 7 Indoor Sources of Air Pollution

IEQ 9 Increased Ventilation

IEQ 10 Background Ventilation

IEQ 11 Localised Ventilation

IEQ 12 Ventilation in Common Areas

IEQ 14 Thermal Comfort in Naturally Ventilated Premises

IEQ 15 Natural Lighting

IEQ 16 Interior Lighting in Normally Occupied Areas

IEQ 17 Interior Lighting in Areas Not Normally Occupied

IEQ 18 Room Acoustics

IEQ 19 Noise Isolation

IEQ 20 Background Noise

#107. 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)?

Suitably qualified person (SQP) is a professional who possesses the following qualification:

- a corporate member of HKIOA; or
- a corporate / certified / full member of other International Acoustic Institution; or
- a member of HKIE (Building Services, Mechanical or Environmental discipline) with relevant experience in Acoustic / Vibration Design. SQP should be responsible for the endorsement of the calculation and/or on-site measurement report.

(Released on 29 November 2019)

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

The sampling points should be selected based on at least one sample of each type of premises/room, taking into account the worst-case conditions of exposure to the external noise sources, such as traffic noise, railway noise and chiller plant and the measurement should be taken during periods appropriate to the usage pattern for the space. If the measurement is not taken at the premises/room most exposed to the external noise sources, substantiations, such as approved traffic noise impact assessment and fixed plant noise assessment shall be provided to justify the chosen conditions are the worst-case scenario. The selected sampling points should be approved by an SQP.