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## **The Future Homes Standard: 2019 Consultation on changes to Part L and Part F of Building Regulations for new dwellings**

The Association of Noise Consultants (ANC) is a trade association for acoustic, noise and vibration consultancy practices in the UK. Membership has grown to over 110 member companies, representing over 1000 individual consultants. Established in 1973, the ANC seeks to raise the standards of acoustic consultancy and improve recognition of the vital role which good acoustics, and the management and mitigation of noise and vibration play in achieving good design and effective planning in the built and natural environment.

### **1. Introduction**

Managing noise associated with ventilation systems is an essential component of providing adequate ventilation, as required under the F1(1) regulation. Recent evidence<sup>1</sup> indicates that people will not operate ventilation systems correctly if they feel that the systems are too noisy. As a result, mechanical systems are switched off or turned down. In addition, if they feel too much noise is coming into the homes from outside, they will close trickle ventilators that have been purposely installed. This view is further supported within the evidence provided<sup>2</sup> with the consultation information which highlights the conflict between noise and the use of the ventilation systems.

There are two distinct areas where acoustics influences the effectiveness of the ventilation design:

- noise from the mechanical elements of the ventilation systems; and
- noise ingress through ventilation openings, such as background ventilators or open windows.

### **2. Noise from mechanical ventilation and extract fans**

We welcome the proposal to introduce management of noise from ventilation systems as a building regulation requirement.<sup>3</sup> Having said that, the proposed paragraphs 1.5 and 1.6 in AD-F are not at all clear and are not well defined. Phrases such as '*designed and installed to minimise noise*' and '*fans operating in normal background mode are not unduly noisy*' have

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<sup>1</sup> Jack Harvie-Clark, Nick Conlan, Weigang Wei & Mark Siddall (2019) How loud is too loud? noise from domestic mechanical ventilation systems, International Journal of Ventilation, 18:4, 303-312, DOI: 10.1080/14733315.2019.1615217

<sup>2</sup> Ventilation and Indoor Air Quality in New Homes, Ministry of Housing Communities & Local Government, Page 3

<sup>3</sup> The Future Homes Standard 2019 Consultation on changes to Part L (conservation of fuel and power) and Part F (ventilation) of the Building Regulations for new dwellings, Ministry of Housing Communities & Local Government, Section 4.12

good intentions but are too vague. Consequently, they are likely to lead to uneven implementation leading to the desired outcome not being achieved.

The Independent Review of Building Regulations and Fire Safety – Review’s Final Report<sup>4</sup>, found one of the key issues underpinning the system failure was ‘using the ambiguity of regulations and guidance to game the system’

The government’s Implementation Plan<sup>5</sup> stated that ‘the government will carry out a review of Approved Document F in line with the spirit of the recommendations of the Review’s Final Report and will facilitate better understanding of what is required **to ensure buildings are safe through clear standards and guidance**, as well as improving the rigour of the product labelling, testing and marketing process to ensure people working on buildings use safe products’

In our view, the current text falls well short of achieving that aim.

Furthermore, the term ‘normal background ventilation mode’ is used in the proposed AD-F when referring to the noise requirement, but it is not defined as a particular ventilation rate. Consequently, it is not possible formally to judge whether or not the system is unduly noisy, because ‘normal background ventilation mode’ is not defined.

We do, however, welcome the suggestion that mandatory testing is something that government could consider in the future. The unspecific nature of the current requirements would, though, make any such testing almost impossible to achieve.

However, with clearer, more precise guidance, mandatory performance testing would be more straightforward to undertake and be more effective.

We believe that the guidance in AD-F should include:

- Performance standards for sound from ventilation systems;
- Demonstration of compliance on completion

Based on our experience, we propose the following performance standards, so that people would be unlikely to be adversely affected by noise from the ventilation systems:

While providing whole dwelling ventilation, sound from any type of mechanical ventilation system should not exceed:

- 26 dB  $L_{Aeq, nT}$  in bedrooms, and
- 30 dB  $L_{Aeq, nT}$  living rooms

This would apply to Mechanical Extract Ventilation (MEV) and Mechanical Ventilation with Heat Recovery (MVHR) systems

While providing extract ventilation, sound from any type of mechanical ventilation system should not exceed:

- 26 dB  $L_{Aeq, nT}$  in bedrooms, and
- 35 dB  $L_{Aeq, nT}$  in living rooms, and
- 45 dB  $L_{Aeq, nT}$  in kitchens, sanitary accommodation and bathrooms

This would apply to intermittent fans used with natural ventilation as well as MEV and MVHR.

<sup>4</sup> Building a safer future – final report, , May 2018, Dame Judith Hackitt

<sup>5</sup> Building a Safer Future – An Implementation Plan, December 2019, Ministry of Housing, Communities and Local Government

To conform to overall Government policy on noise management, these figures should not be regarded as absolute fixed thresholds, but instead be used as the desired design targets.

Commissioning measurements of sound should follow the requirements of BS EN ISO 16032 and should be undertaken at the same time as those for ventilation airflow. All data should be lodged online in a database linked to the Standard Assessment Procedure (SAP) and Energy Performance Certificate (EPC), along with the air tightness test result and other evidence of compliance.

### 3. Noise ingress through ventilation openings

Noise ingress is currently controlled through the planning process if the local authority considers it to be necessary to comply with policy requirements.

The proposed changes make little mention of this aspect. However, it is becoming increasingly recognised that it is not possible to separate the acoustic and ventilation requirements of a particular building. Set out below are some suggestions for providing more guidance on this aspect.

#### Noise ingress through background vents

The document should include some reference to the acoustic requirements for background ventilators, with wording such as:

‘The selection of background ventilators should consider the noise ingress via the ventilators, and they should be selected to achieve appropriate internal levels such as the desirable indoor ambient noise levels as described in BS8233<sup>6</sup>.’

#### Noise ingress through open windows

The proposed wording of paragraph 1.7 of AD-F relates only to noise and purge ventilation. For purge ventilation as defined in AD-F (4 ach) we would not consider noise to be an issue, given the short exposure time whilst the purge ventilation is occurring. However it should be considered if purge provision is being used to provide additional ventilation for moisture extract or for controlling overheating.

We understand that overheating will be covered in separate guidance and we will respond separately on the overheating issues at the appropriate time.

We understand that the whole house design rates are based on winter conditions and that higher rates may be required in warmer months. AD-F refers to the provision for purge ventilation (usually open windows) to be used to provide the additional ventilation<sup>7</sup>.

However, there seems to be some contradiction on the use of open windows for whole house ventilation as section 1.46 has an accompanying note which states:

*A window on a night latch is not adequate for background ventilation, due to:*

- ***the risk of draughts***
- ***security issues***
- ***the difficulty of measuring equivalent area***

All of these issues would still apply if the provision for purge ventilation is relied upon for increasing the whole house rates in the warmer spring and autumn months.

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<sup>6</sup> BS 8233 :2014 Guidance on sound insulation and noise reduction for buildings

<sup>7</sup> Proposed AD-F Paragraph B.18

It is very common for residential developments on noisy sites to have planning conditions applied which state:

*If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.*

A recent review of noise assessments for planning applications identified that 96 % of noise assessments submitted with planning applications were based on achieving the desirable internal levels set out in BS 8233 with windows closed <sup>8</sup>.

To address these issues, we would recommend a slight change to B.18 to add the wording shown in bold:

*The whole dwelling ventilation rate is based on winter weather conditions. During warmer spring and autumn periods, the moisture removal capacity of the outdoor air is less, and additional ventilation may be required. Purge ventilation (e.g. windows) **or the provision for moisture extract (e.g. fans)** may be used for this purpose.*

This would enable the designer to provide ventilation solutions which did not rely on openable windows for whole house or extract ventilation, but open windows could be used for purge ventilation.

#### **4. Air Source Heat Pumps**

One of the elements of the proposed Future Homes Standard is the expectation that all homes would have a heat pump. Whilst the advantages of heat pumps in terms of reducing carbon emissions are clear, what does not appear to have been considered is the potential noise impact from these devices.

Any mechanical system that includes a fan has the potential to generate noise. As these pumps are attached to the exterior of a dwelling, the noise from them has the potential to impact on those living nearby.

Currently, such pumps can be installed using permitted development rights. At the time this legislation was implemented, the potential noise impact issue was recognised. Consequently, the requirements of the Microgeneration Certification Scheme have to be followed by the installer to manage the potential noise impact from these devices on those living nearby. If the Future Homes Standard is to include heat pumps, it is essential that managing the noise from these units is included as an intrinsic part of this process to mitigate and minimise the potential adverse effects.

Thank you for the opportunity to comment on this Standard. The Association would be pleased to discuss any of the issues raised in this response or participate in any further consultation on these matters.

Nick Conlan  
On behalf of Association of Noise Consultants

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<sup>8</sup> Conlan N and Harvie-Clark J. Using planning conditions to improve indoor environmental quality (IEQ) of new residential developments. In: IOA Acoustics 2018, Cardiff, UK, 23–24 April 2018. Proc IOA 2018; 40(Pt 1): 77–86.