

BS 4142:2014 Methods for rating and assessing industrial and commercial sound.

Incorporating Amendment, No 1, 2019.

By Philip Dunbavin

BS 4142:2014 has just gone through the process of an amendment which is different to a revision, this difference caused some confusion during the consultation period. The BSI employs three main processes, revision, amendment, and corrigendum.

Revisions

Revisions are large-scale undertakings that require considerable resources and commitment. The text should be completely reviewed from a technical as well as an editorial point of view and should be brought into line with the most recent rules for structure, drafting and presentation. Revisions take a new publication date.

When a revision goes out for public comment, any and all comments or suggestions for improvement of the standard are welcomed. All comments and suggestions are carefully considered by the committee responsible, in this case EH/1/3. If a comment or suggestion is supported by referenced evidence then those are given significant weight and are more likely to be adopted than those that are based only on opinion.

Amendments

Amendments are used for the introduction of small-scale technical changes that do not affect a large proportion of the text of a standard. Amendments retain the original publication date, with an amendment date added. They are not re-typeset (unless required for technical reasons), and only new or changed text is edited. Additions, changes and deletions are marked with amendment tags.

The committee (EH/1/3 in this case) creates a list of errors that have been advised to them by users or identified by themselves. This will also include areas where interpretation of the standard could lead to an incorrect outcome and hence the text needs to be made more specific and clearer. In addition, corrections are proposed to any errors introduced in either drafting or production of the standard.

The list of corrections is sent out for public comment and comments are restricted to just the corrections proposed. An amendment cannot introduce new or other modifications irrespective of how well thought out or supported by evidence. That can only be done at a revision.

Corrigendum

A corrigendum makes alterations and/or additions to a standard that corrects one or more errors introduced in either drafting or production. This is in essence a very small amendment.

Consultation on the amendments to BS 4142:2014.

The list of the proposed amendments was made available on the BSI's Documents for Public Consultation (DPC) portal. The ANC, CIEH and the IOA were made aware of the presence of the proposed amendment so that they could comment on it and let their members know of its existence so that individuals could also submit comments.

Many of the IOA members mistakenly thought that they were being invited to make comments that went beyond the proposed amendments and that would have been appropriate if this was a revision. This appears to have caused some consternation and that is why I began this article with an explanation of how the BSI operates.

The amendments fall broadly into four areas:

- Typographical and typesetting errors
- Missing incorrect, or confusing words
- Clarifications
- Improvements to the examples

This article covers each of these in turn.

Typographical and typesetting errors.

There are a few typesetting errors in the unamended version and the following changes have been made:

- Replace m/s^{-1} with m/s .
- Replace dB/s^{-1} with dB/s .
- Replace $L_{Ae90(60 \text{ min})}$ with $L_{A90(60 \text{ min})}$.

Those errors occur in a number of places.

In Figure A.10, in the line background sound level $L_{Aeq(60 \text{ min})}$ is replaced with $L_{A90(60 \text{ min})}$.

Equation E.1 was incorrectly bracketed.

$$L_{pAF,n} = 10 \lg \left\{ \frac{[(\tau/\Delta t) - 1](10^{L_{pA,F,n-1}/10} + 10^{L_{Aeq,n}/10})}{(\tau/\Delta t)} \right\}$$

This has been replaced with:

$$L_{pAF,n} = 10 \lg \left\{ \frac{\left[(\tau/\Delta t - 1) 10^{L_{pAF,n-1}/10} + 10^{L_{Aeq,n}/10} \right]}{(\tau/\Delta t)} \right\}$$

Following on from equation E.1 the four-bullet points a), b), c), and d) had so many errors in them that the whole section has been redrafted.

In a similar fashion the equation in E.10 included dBs and dB when these were not required and these have been deleted.

Finally, a couple of typos in the Bibliography have been corrected.

Missing, incorrect, or confusing words.

There are quite a few of these and in each case the change is in bold.

In 1.2, b), 2 this has been corrected to read:

- 2) assessing sound from '**existing**', proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and

In 4 e) has been corrected to read:

- e) where a new development is to be assessed, understand what kind of sound a new industrial '**and/or commercial**' source would introduce, or what potential impact would be imposed from an existing source on a new sensitive receptor.

In tables A.6, A.7, and A.8 the text now reads:

...representative of the background sound when the source was '**not**' in operation

In B.2.4.5, the third bullet point the words '**in the context of**' have been replaced with '**with reference to**'. This was a different use of the word context that was perceived as confusing.

In clause 12, d) the reference to 'e.g., school, dwelling, office' has been deleted as BS 4142 does not apply to schools or offices.

A layout error has been corrected in clause 12, l) where the heading has been deleted and the first bullet point has become the heading to make the list read correctly.

Clarifications.

Indoor sound.

The first clarification is in the scope at 1.3 and this has two elements which relate to indoor sound levels.

Firstly, at h) this is expanded to add

'The methodology set out in Clauses 7, 8, and 9 of this standard is not intended to be used to assess the extent of the impact at indoor locations. Internal sound levels can be taken into account as outlined in Clause 11.'

Secondly the sentence following h) now reads:

'The standard is not intended to be applied to the assessment of indoor sound levels.'

The words **'derivation of indoor sound levels arising from sound levels outside, or the...'** have been removed to make the limit of the standards application clearer.

Other sound characteristics

These changes are to clarify the application of the 'other' character correction.

The heading in 9.2 of 'Other sound characteristic' and the following paragraph in the unamended version have been relocated later in this clause.

Note 2 now reads:

'NOTE 2 If characteristics likely to affect perception and response are present in the specific sound, within the same reference period, then the applicable corrections ought normally to be added arithmetically. However, if any single feature is dominant to the exclusion of the others then it might be appropriate to apply a reduced or even zero correction for the minor characteristics.'

At the very end of clause 9.2 the following has been added:

‘Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.’

The purpose of this is to clearly state that ‘other’ character correction should only be applied in the absence of all other characteristics and is **NOT** to be added to corrections for tonality, impulsivity and/or intermittency.

Adding character corrections.

In the note to 9.3.3 the words ‘in a linear fashion’ have been replaced by ‘arithmetically’. This corrects a poor choice of words. The last sentence of this note now reads:

‘Where both features are likely to affect perception and response, the corrections ought normally to be added arithmetically.’

Examples 6, 7, and 8.

Example 6

The example A6 has largely been rewritten with the following key changes:

In the commentary just one word has been changed with ‘**rating**’ being replaced by ‘**the character correction**’.

A.6.1

At the heading in A.6.1 the following words ‘**no significant acoustically distinguishing characteristics**’ have been replaced with ‘**slight tonality/ impulsivity outdoors, but no significant acoustically distinguishing characteristics indoors**’. This changes the whole nature of this example which was the intention.

In A6.1 at the start of the first paragraph this now reads:

An item of mechanical equipment has been installed at a commercial premise where other plant is also operating elsewhere on site. This ‘**item of mechanical**’ plant operates intermittently 24 hours a day, producing sound that is identifiable outside the nearest dwelling, particularly when the residual sound falls to lower levels when residents might be going to sleep. This correction also applies to A.6.2 and A.6.3 at the second line of the first paragraph.

At the end of this paragraph the last sentence has been deleted as part of the rewrite of this particular example.

The fourth paragraph has had the words **'and no vehicles were passing'** added in the description of how the L_{A90} was measured. This correction has also been applied to A.6.2 the last sentence of the fourth paragraph, and A.6.3 at the end of the fourth paragraph.

In table A.6 the words **'Acoustic feature correction'** have been replaced by **'Acoustic character correction'**. This has also been done in A.7 and A.8. With hindsight the committee realised that this change needs to be applied elsewhere in the standard but that will now have to wait until a full revision.

In Table A.6, in the eighth row, fourth column **'No significant distinctive features at noise receptor location (within bedroom)'** has been replaced with **'+2 dB correction for just perceptible tonality and +3 dB for slight impulsivity outdoors (despite no perceptible acoustically distinguishing characteristics at noise sensitive receptor location i.e. bedroom, indoors)'**. This reflects the overall change to this example.

Logically most of the numbers in table A.6 also had to change in order for the example to work.

In table A6 the commentary on the assessment has the following added to the end of it:

'Logarithmically subtracting residual level of 28 dBA from ambient of 36 dBA indicates that the source produces 35 dBA. BS8233 indicates that 35 dBA sound level from the plant, equating to an internal level of around 25dBA or lower, with no significant acoustically distinguishing characteristics is suitable for a bedroom.'

Example 7

This is mostly unchanged except for typographical and similar corrections.

Example 8

A.6.3

In a similar fashion changes have been made to example 8 to clearly differentiate them from examples 6 and 7.

In the fifth line of the first paragraph of A.6.3 the words **'At these more'** have been replaced so that it now reads:

‘Considering context at sensitive times the sound contains a tone that is just perceptible inside the dwelling and appears to be slightly impulsive when operation starts.’

In the final sentence of the first paragraph the words:

‘This means that a rating penalty of 2 dB for slight tonality, plus 3 dB for slight impulsivity, is applicable for this assessment.’

Have been replaced with:

‘These characteristics are more clearly perceptible outdoors. This means that a character correction of 4 dB for clearly perceptible tonality outdoors, plus 6 dB for clearly perceptible impulsivity outdoors, is applicable for this assessment.’

The purpose of these changes is to only refer to outside the dwelling and not inside a bedroom when applying character corrections.

In a similar vein the third line in the sixth paragraph has had the word ‘indoors’ replaced with ‘outdoors’ and the reference to ‘in the bedroom’ has also been removed. This now reads:

‘The change in sound level when the source starts and stops during the night is noticeable outdoors and, together with the slight tonality, can attract a listener’s attention.’

The last two sentences of the sixth paragraph have been modified in line with the previous changes which results in a 10dB character correction instead of a 5dB correction.

‘The change in sound level when the source starts and stops during the night **is clearly perceptible outdoors** and noticeable indoors. Similarly, a tonal component is clearly **perceptible outdoors and slightly noticeable in the bedroom**. It is appropriate to apply a character correction of 10 dB for the characteristics of the sound outdoors.’

Because this has also primarily been modified to reference the outdoors environment and again the character correction has changed from +5dB to +10dB. Consequently, the numbers in table A.8 have also changed.

The assessment has changed and is now:

‘The excess of 7 dB is greater than 5 dB which, depending upon the context, is likely to be an indication of an adverse impact. It is also possible that the absolute level of slightly over 40 dBA outside the dwelling when the source is operating could adversely affect residents when going to sleep.’

In the commentary on the assessment the last sentence has been replaced with:

‘However, consideration also needs to be given to the cumulative sound level within the bedroom and the slight character of the specific sound.

Logarithmically subtracting residual level of 33 dBA from ambient of 41 dBA indicates the source produces 40 dBA. BS 8233 indicates that 40 dBA sound level from the plant, equating to an internal level of around 30dBA or possibly lower, but with some acoustically distinguishing characteristics, may not be suitable for a bedroom.’

What about the next full revision?

The EH/1/3 committee have identified several areas where some research is necessary to inform any future revision and it is our intention not to embark on a full revision until that research is completed and it’s findings made available.

Author



Philip Dunbavin is the CEO and Chairman of PDA Ltd. He is a Fellow of the Institute of Acoustics and a Member of the Society of Environmental Engineers, and a past Chairman of the Association of Noise Consultants. He is the current chairman of the BSI committee EH/1/3 on environmental acoustics and also chairman of the BSI’s overarching EH/1 committee on Acoustics.