

Hea 2 Sound Insulation

Credits available: 4

Aim

To ensure the provision of sound insulation and reduce the likelihood of noise complaints.

Credit Requirements

Credits	
1	<ul style="list-style-type: none"> A commitment to carry out a programme of pre-completion testing based on the frequency listed in <i>Table 2, column A (Supplementary Guidance A: Frequency of Testing Required)</i> for every group or sub-group of houses or flats* <p>AND</p> <ul style="list-style-type: none"> A commitment to achieve the performance standards set out in the Building Regulations for England and Wales, Approved Document E (2003 Edition).
2	<ul style="list-style-type: none"> A commitment to carry out a programme of pre-completion testing based on the frequency listed in <i>Table 2, column B (Supplementary Guidance A: Frequency of Testing Required)</i> for every group or sub-group of houses or flats* <p>AND</p> <ul style="list-style-type: none"> A commitment to achieve the performance standards set out in the Building Regulations for England and Wales, Approved Document E (2003 Edition).
3	<ul style="list-style-type: none"> A commitment to carry out a programme of pre-completion testing based on the frequency listed in <i>Table 2, column B (Supplementary Guidance A: Frequency of Testing Required)</i> for every group or sub-group of houses or flats* <p>AND</p> <ul style="list-style-type: none"> A commitment to achieve airborne sound insulation values that are at least 3dB higher, and impact sound insulation values that are at least 3dB lower, than the performance standards set out in the Building Regulations for England and Wales, Approved Document E (2003 Edition).
4	<ul style="list-style-type: none"> A commitment to carry out a programme of pre-completion testing based on the frequency listed in <i>Table 2, column B (Supplementary Guidance A: Frequency of Testing Required)</i> for every group or sub-group of houses or flats* <p>AND</p> <ul style="list-style-type: none"> A commitment to achieve airborne sound insulation values that are at least 5dB higher, and impact sound insulation values that are at least 5dB lower, than the performance standards set out in the Building Regulations for England and Wales, Approved Document E (2003 Edition).

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For the definition of groups and sub-groups, see Section 1 in the Building Regulations England and Wales, approved Document E (2003 Edition).

Applicability

The same approach is taken for new build and refurbishment.

ALL dwellings, throughout the development, must meet the requirements of the relevant EcoHomes performance standards.

Main Information to be Provided by the Developer

1. Specifications must state details sufficient to meet the *Credit Requirements* and the *Guidance* below. This would include the details of the programme of pre-completion testing to be carried out on the development, including the number of groups and sub-groups.
 2. Evidence that the proposed building design has the potential to achieve the performance standards associated with the EcoHomes credit. This evidence could be field test data from previous developments or expert advice from an acoustic consultant.
 3. Confirmation that the acoustic consultancy is accredited by UKAS or a European equivalent for field sound insulation testing, OR that the testing is carried out in accordance with the relevant ISO requirements and the report and all measurement data are checked and verified by an organisation with UKAS accreditation for field sound insulation testing.
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Guidance

1. The EcoHomes performance standards are based on the requirements set out in Part E (2003) of the Building Regulations for England and Wales. However, EcoHomes does not currently accept details built to Robust Standards Details and requires additional tests, UKAS accreditation of testers and higher performance levels (for Credit 4 and 5) than those required by part E. For more details see the *Background* section.
2. Note that the same EcoHomes requirements are set throughout the UK i.e. even though the performance levels are based on the regulations in England and Wales, the same should apply for homes assessed in Northern Ireland and Scotland. For more details see the *Background* section.
3. The assessor needs to confirm that the acoustic consultancy carrying out/ set to carry out the testing is accredited by UKAS or a European equivalent for field sound insulation testing. If the testing has been carried out/ will be carried out according to the relevant ISO requirements this will also be accepted provided that the test reports and all measurement data have been/ will be checked and verified by an organisation with UKAS accreditation for field sound insulation testing.

4. The following table is a simplified form of the credit requirements for reference only.

Table 1: Credit Summary – Improvement on part E

Credits	Improvement on Regulations (dB)	
	Airborne sound $D_{nT,w} + C_{tr}$	Impact sound $L'_{nT,w}$
1	0	0
2	0	0
3	+3	-3
4	+5	-5

Notes to the Table:

- a. A commitment to carry out a programme of pre-completion testing based on the stated number of tests (Table 2) for houses or flats in a group or sub-group. For the definition of groups and sub-groups, see Section 1 in Approved Document E (2003 Edition) of the Building Regulations (England and Wales).
 - b. A commitment to achieve sound insulation values that are better, by the stated amount in Table 1, than the performance standards in Approved Document E (2003 Edition).
 - c. All criteria have to be met for the credit(s) to be awarded.
5. The commitments to pre-completion testing and to achieve the performance standards means that if any test is failed (according to either the performance standards in Approved Document E, for England and Wales, or the enhanced performance standards in EcoHomes, which are 3dB or 5dB higher) then remediation work shall be carried out on the construction and re-tests carried out to confirm that the performance standards have been met.
 6. Evidence that the proposed building design has the potential to achieve the performance standards could be field test data from previous developments, or expert advice from an acoustic consultant.
 7. Specifying structures to the typical types found in Sections 2, 3, 4 and 6 of the Approved Document E (2003 edition, Building regulations England and Wales) will NOT, in itself, be sufficient to achieve the credits. All other conditions of the Credit must be met.
 8. Building regulations England and Wales, approved Document E sections 1.13 to 1.16 describe the grouping procedures to be followed. For example, houses and flats are usually considered as two separate groups, and if there are significant differences in construction type then the groups will need to be broken down into sub-groups.
 9. Detached homes achieve all 4 credits by default as this section is only concerned with direct transfer of neighbour noise. It is rare however to have a development consisting entirely of detached homes.
 10. Testing should be between habitable rooms (i.e. bedroom to bedroom; living room to living room; living room to bedroom etc). If there are no habitable rooms with separating walls or floors no testing is needed, and the dwellings can be treated as detached homes. If habitable rooms only share separating walls or floors with spaces which cannot be tested, such as halls, stairways or small bathrooms, alternative evidence of performance should be provided.

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11. Where there are insufficient separating walls or floors in a development to carry out the number of tests specified in Table 2, all of the available separating walls or floors should be tested. Where all the available separating walls and floors have been tested this will be considered to be equivalent to column B of Table 2, and 2 or more credits will be awarded as appropriate.
12. No more than two airborne and two impact sound insulation tests should be undertaken between a pair of houses or flats i.e. a maximum of two airborne sound insulation tests should be carried out on any separating wall and a maximum of two airborne and two impact tests on any separating floor.

Flats

There is no specific guidance for flats/apartments. The standard approach should be followed.

Refurbishment

There is no specific guidance for refurbishment. The standard approach should be followed.

Special Cases

There are currently none for this issue.

Supplementary Guidance*A: Frequency of Testing Required*

The table below sets out the number of airborne and/or impact sound insulation tests to be conducted on each group or sub-group. A unit is either a flat or a house. Where units contain a single habitable room i.e. bedsits, the number of tests required is halved (see example 5).

For the definition of groups and sub-groups, see Section 1 in Approved Document E (2003) edition of the Building Regulations (England and Wales). Below examples will also give some guidance on how to define groups and subgroups.

Table 2: Frequency of testing required

Number of units of same group or sub-group on the site	Number of tests on separating walls and/or floors for one credit (Column A)	Number of tests on separating walls and/or floors for two or more credits (Column B)	Number of units of same group or sub-group on the site	Number of tests on separating walls and/or floors for one credit (Column A)	Number of tests on separating walls and/or floors for two or more credits (Column B)
1	0	0	31	16	20
2	2	2	32	16	22
3	2	2	33	16	22
4	2	2	34	18	22
5	2	4	35	18	24
6	4	4	36	18	24
7	4	4	37	18	24
8	4	6	38	20	26
9	4	6	39	20	26
10	6	6	40	20	26
11	6	8	41	20	28
12	6	8	42	22	28
13	6	8	43	22	28
14	8	10	44	22	30
15	8	10	45	22	30
16	8	10	46	24	30
17	8	12	47	24	30
18	10	12	48	24	30
19	10	12	49	24	30
20	10	14	50	26	30
21	10	14	51	26	30
22	12	14	52	26	30
23	12	16	53	26	30
24	12	16	54	28	30
25	12	16	55	28	30
26	14	18	56	28	30
27	14	18	57	28	30
28	14	18	58	30	30
29	14	20	59	30	30
30	16	20	60	30	30

B: Example of Testing Series and Compliance.

Example 1 - Two rows of identical terraced dwellings.

Each row consists of 6 houses, giving a total of 12 units. Reading from Table 2, this development needs 6 or 8 airborne tests performed on their separating walls, as set out in Table 3. As there are no separating floors, that is all the testing required.

Table 3: Credit requirements for Example 1.

Credits	Number of wall tests needed	Minimum airborne sound insulation levels to be achieved $D_{nT,w} + C_{tr}$ (dB)
1	6	45
2	8	45
3	8	48
4	8	50

Example 2 - Three blocks of flats, with four floors in each block. There are two identical flats per floor and a stairway divides the flats.

There are 24 flats in total. Walls only need airborne tests performed, floors need both airborne and impact tests. As testing is only required between habitable rooms. In this case there are no separating walls so only the floors need testing as set out in Table 4 below.

Table 4: Credit requirements for Example 2

Credits	Number of floor tests needed	Minimum airborne sound insulation levels to be achieved $D_{nT,w} + C_{tr}$ (dB)	Number of floor tests needed	Maximum impact sound insulation levels to be achieved $L'_{nT,w}$ (dB)
1	12	45	12	62
2	16	45	16	62
3	16	48	16	59
4	16	50	16	57

Example 3 - Three blocks of flats with four floors in each block. There are two adjoining identical flats per floor.

There are 24 flats in total. This is the same number of dwellings as in example 2, but in this case there are both separating walls and floors. The number of tests will therefore increase as the walls also need to be tested, see Table 5 below.

Table 5: Credit requirements for Example 3.

Credits	Number of wall tests needed	Minimum airborne sound insulation levels to be achieved $D_{nT,w} + C_{tr}$ (dB)	Number of floor tests needed	Minimum airborne sound insulation levels to be achieved $D_{nT,w} + C_{tr}$ (dB)	Number of floor tests needed	Maximum impact sound insulation levels to be achieved $L'_{nT,w}$ (dB)
1	12	45	12	45	12	62
2	16	45	16	45	16	62
3	16	48	16	48	16	59
4	16	50	16	50	16	57

Example 4 - A warehouse is to be converted into 21 identical flats over three floors.

Each flat has two separating walls, except for the end ones. For the purposes of EcoHomes, these can be grouped with the other flats. This means that there are either 10 or 14 separating walls and 10 or 14 separating floors that need testing, as set out in Table 6 below. 5 or 7 pairs of flats would be used for the testing.

Table 6: Credit requirements for Example 4.

Credits	Number of wall tests needed	Minimum airborne sound insulation levels to be achieved $D_{nT,w} + C_{tr}$ (dB)	Number of floor tests needed	Minimum airborne sound insulation levels to be achieved $D_{nT,w} + C_{tr}$ (dB)	Number of floor tests needed	Maximum impact sound insulation levels to be achieved $L'_{nT,w}$ (dB)
1	10	43	10	43	10	64
2	14	43	14	43	14	64
3	14	46	14	46	14	61
4	14	48	14	48	14	59

Example 5 - 56 bedsits, with en-suite bathrooms, over two floors.

As the bedsits consist of only one habitable room, there cannot be two floor tests or two wall tests between a pair of dwellings. This means the usual number of required tests is halved, as set out in Table 7 below.

Table 7: Credit requirements for Example 5.

Credits	Number of wall tests needed	Minimum airborne sound insulation levels to be achieved $D_{nT,w} + C_{tr}$ (dB)	Number of floor tests needed	Minimum airborne sound insulation levels to be achieved $D_{nT,w} + C_{tr}$ (dB)	Number of floor tests needed	Maximum impact sound insulation levels to be achieved $L'_{nT,w}$ (dB)
1	28/2=14	43	28/2=14	45	28/2=14	62
2	30/2=15	43	30/2=15	45	30/2=15	62
3	30/2=15	46	30/2=15	48	30/2=15	59
4	30/2=15	48	30/2=15	50	30/2=15	57

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Example 6 – A development comprising of 66 flats, 20 detached houses and 86 semi-detached houses.

The block of flats (66 flats) is built over seven floors. The development also contains 20 detached houses and 86 semi-detached houses (of which 56 are of identical traditional brick and block construction and 30 are of identical timber frame construction). There are therefore four subgroups on this development (one group for the flats, one group for the detached houses, one group for the timber frame semis and one group for the brick and block semis).

- Sub group 1 - 66 flats

Table 8: Number of walls to be tested for the flats

Credits	Number of wall tests needed	Minimum airborne sound insulation levels to be achieved $D_{nT,w} + C_{tr}$ (dB)
1	30	45
2	30	45
3	30	48
4	30	50

Table 9: Number of floors to be tested for the flats.

Credits	Number of floor tests needed	Minimum airborne sound insulation levels to be achieved $D_{nT,w} + C_{tr}$ (dB)	Number of floor tests needed	Maximum impact sound insulation levels to be achieved $L'_{nT,w}$ (dB)
1	30	45	30	62
2	30	45	30	62
3	30	48	30	59
4	30	50	30	57

The maximum number of tests required for any group or subgroup is 30. Consequently 30 airborne sound insulation tests of the separating walls, plus 30 airborne sound insulation tests of the separating floors and 30 impact sound insulation tests of the separating floors are required. 15 or more pairs of flats would be used to get the 30 tests (it would be necessary to use more than 15 pairs if there were not two suitable separating walls between a pair of flats).

- Sub group 2 - 20 detached houses – no field tests required
- Sub group 3 - 56 semi detached houses (brick and block construction)

Table 10: Number of walls to be tested for the brick and block semis.

Credits	Number of wall tests needed	Minimum airborne sound insulation levels to be achieved $D_{nT,w} + C_{tr}$ (dB)
1	28	45
2	30	45
3	30	48
4	30	50

Consequently 28 or 30 airborne sound insulation tests of the separating walls are required. 14 or 15 pairs of houses would be used for testing.

- Subgroup 4 - 30 semi detached houses (timber frame construction)

Table 11: Number of walls to be tested for the timber frame semis.

credits	number of wall tests needed	Minimum airborne sound insulation levels to be achieved $D_{nT,w} + C_{tr}$ (dB)
1	16	45
2	20	45
3	20	48
4	20	50

Consequently 16 or 20 airborne sound insulation tests of the separating walls are required. 8 or 10 pairs of houses would be used for testing.

Further Information

England and Wales Building Regulations
www.odpm.gov.uk

Robust Details
<http://www.robustdetails.com/>

Background

One of the most common causes for disputes between neighbours is noise. Environmental Health Officers in England and Wales received nearly 6000 noise complaints per million people in 2003/2004 from domestic premises. This accounts for 75% of all noise complaints received.

There are two aims with this credit:

- (a) to ensure the provision of sound insulation through a commitment to pre-completion testing

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- (b) to encourage higher standards of sound insulation through a commitment to design and build constructions that exceed the minimum performance standards in the Building Regulations, England and Wales, Approved Document E (2003 Edition),.

Section 0: Performance, Approved Document E (2003 Edition) '*Resistance to the passage of sound*' contains performance standards in terms of airborne and impact sound insulation for walls, floors and stairs that have a separating function.

To ensure that the design intent for sound insulation is achieved on site, sound insulation testing is covered by Regulation 20A or 12A of the Building Regulations (England and Wales). The normal way of satisfying Regulation 20A or 12A is to implement a programme of sound insulation testing, called pre-completion testing, according to the guidance set out in Section 1: Pre-completion testing, Approved Document E (2003 Edition). This guidance describes the normal programme of testing, based on at least one set of tests for every 10 houses, flats or rooms for residential purposes in a group or sub-group.

EcoHomes aims to ensure that the performance standards for sound insulation in Approved Document E (2003 Edition) are achieved through a commitment to pre-completion testing using, or checked by, test bodies with UKAS accreditation. It also aims to reward developments that make a commitment to achieve higher levels of sound insulation than the minimum performance standards in Approved Document E (2003 Edition).

Whilst the sound insulation components of the Building regulations in Scotland and Northern Ireland differ from the English Part E (2003) this credit is not affected by those differences. The sound insulation levels set out in the English Regulations, Part E 2003, provides the highest standards throughout the UK and are therefore used as a basis for EcoHomes.

From 1st July 2004, Robust Details have been introduced as an alternative to pre-completion testing for demonstrating compliance with Part E. Robust details have been developed for separating wall and floor constructions. These have been tested in the field against the performance standards in Approved Document E. The constructions are described in a guidance produced by Robust Details Ltd (www.robustdetails.com). At present these are not accepted under EcoHomes as proof of compliance with Part E standards as data is not currently available to demonstrate their robustness. BRE is discussing this with Robust Details Ltd and are awaiting field test data from them.

Further guidance on how to define a group or sub-group may be found in a BRE publication due to be published in 2006 "Practical Guidance on what constructions should be tested on a development".

References

Office of the Deputy Prime Minister. *Building Regulations Approved Document E – Resistance to the passage of sound* (2003)

Scottish Building Standards Agency. *Building (Procedure) (Scotland) Regulations 2004, Section 5 Noise*

Northern Ireland, Department of Finance and Personnel, *Building Regulations (Northern Ireland) 2000 DFP Technical Booklet G and G1: Sound*