

A Developers Guide to: **Approved Document E Sound Testing**

Soundguard Acoustics Ltd

Rob Shaddick, MSc, MIOA

This guide has been produced by Soundguard Acoustics Ltd. Some of the information is specific to our testing method and variation may occur if using alternative testing companies or equipment. This document applies to England & Wales only



ANC
THE ASSOCIATION OF
NOISE CONSULTANTS

Soundguard Acoustics Ltd

2

Soundguard Acoustics Ltd is approved under the Association of Noise Consultants (ANC) registration scheme for carrying out sound insulation testing (Registration number: 194-01).

The ANC scheme is supported by Approved Document E and ensures that sound insulation tests are carried out by suitably qualified and experienced staff, in accordance with the appropriate standards. The scheme ensures that tests are properly traceable, audited and that you receive a fully documented report and certificate which will be easily recognised for approval by your local Building Control department.

If you require further advice with your project or end of build sound insulation testing then please contact us.

Our other services:

- Building Acoustic Design
- Pre Completion Sound Testing Services
- Conversions and Sound Proofing Advice
- Environmental Noise Assessment, Monitoring & Planning
- Workplace Noise Risk Assessment & Noise Control
- Festival & Event Noise Management
- Expert Witness



Sound Test?



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Contents

What is sound insulation testing?	4
What is the benefit of a sound test?	5
Is my building ready for sound testing?	6
How many tests do I need?	7
Where do I find an approved sound tester?	8
How is the sound test undertaken?	9
How is sound insulation performance determined?	10
Will sound testing disrupt work on site?	11
How will I know if I have passed?	12
How do I ensure good sound insulation performance?	13
What are the common points of sound insulation failure?	14
Frequently Asked Questions	15
Resources	16

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What is sound insulation testing?

Sound insulation testing is the assessment of the sound insulation performance of party walls and party floors between different dwellings. Testing is required once the property is nearing final completion and determines if the minimum Building Regulation standard for sound insulation has been met.

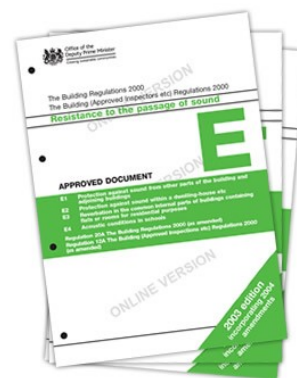
Developers are responsible for arranging testing to demonstrate compliance to Building Control that the Approved Doc E sound insulation regulations have been met. The procedure is more commonly referred to as pre-completion testing (PCT) or Approved Document E (ADE) sound testing.

What is Approved Doc E?

Approved Document E – ‘Resistance to the passage of sound’ came into force on July 1st 2003 and provides minimum sound insulation Building Regulation requirement for newly built and converted residential dwellings as well as the Code for Sustainable Homes. Properties include houses, flats, student residences, care homes, hotels and schools.

Approved Document E of the Building Regulations is a government-issued document providing guidance for architects, developers, building control bodies, building services engineers, and others involved in the design and conversion of buildings for residential purpose. The document explains the testing requirement and provides advice and details about building procedures and materials that affect test results.

A PDF of the Approved Doc E can be downloaded [HERE](#)



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What is the benefit of a sound test?

5

In buildings sound can be defined as 'airborne sound' (i.e. sound generated and transferred directly in the air by talking or home entertainment systems) or 'impact sound' (i.e. sound generated by the impact of an object striking the floor and transmitted through it, such as footfall noise).

The objective of Approved Document E is to raise sound resistance standards for both airborne and impact noise between dwellings to provide reasonable living conditions and improve the standards of acoustic insulation in attached properties

Sound insulation testing may also be required in non-residential buildings such as schools, hospitals and workplaces to ensure that noise sensitive areas such as classrooms, wards and meeting rooms are suitably insulated from noisier areas

Do I need a sound test?

All new and converted dwelling houses and flats for residential purpose require sound testing to Approved Document E standard. This also includes a room or suite of rooms which is not a dwelling house or a flat but which is used by one or more persons to live and sleep. For example, rooms in hostels, hotels, boarding houses, halls of residence, and residential homes.

Detached properties do not require sound testing and new constructions that have been built and appropriately registered with the Robust Details scheme do not need to be sound tested. Historic building conversions may not need to be sound tested but often a 'test and declare' certificate for sound insulation performance is requested by the Building Control Officer (BCO).

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Is my building ready for sound testing?

Sound insulation tests are undertaken when the development is “pre-completed”. This means that the test rooms should be at a stage where just final finishing, such as painting and carpets are required.

Soundguard Acoustics has provided a site checklist below to assist you with this. By ensuring that you meet the requirements of the checklist then the build can be deemed to be at a stage ready for sound insulation testing. Where items are not in place this will negatively affect the sound insulation performance of the build.

- ✓ Windows should be fully installed, glazed & closable
- ✓ Trickle vents and other ventilation systems should be fitted
- ✓ Internal & external doors must be hung, glazed & closable
- ✓ All wall, floors & ceiling constructions must be completed
- ✓ Skirting boards should all be fitted & cornice where fitted
- ✓ Electrical sockets, TV Aerial sockets & light switches should be fitted
- ✓ Rooms must be clear of building materials, tools & unfurnished
- ✓ No cosmetic floor coverings should be fitted (i.e. laminate, carpet, vinyl, ceramics)
- ✓ No trades should be working in the dwellings during the tests
- ✓ Access to rooms either side of the separating structure is essential
- ✓ Non-tester access to the rooms is prohibited during testing
- ✓ No noisy operations (drilling, cutting or groundwork) to occur nearby during testing
- ✓ Provision of 240v 50Hz mains power is required within the dwellings

How many tests do I need?

7

One set of tests needs to be undertaken for every ten flats or houses, provided the construction system is the same. A set means that the test should include two locations where the party element (wall or floor) is tested.

This is equivalent to two individual tests when assessing the performance of a wall (airborne performance only) and four individual tests when assessing a floor (two airborne and two impact tests). All tests must be undertaken between habitable spaces (e.g. bedrooms, living rooms) and not to or from common spaces such as stairwells and corridors.

Approved Document E 2003 states that a minimum of 10% of all party walls and floors is sound tested for every construction group or sub-group. This means that where variations in the construction may occur then further testing may be required.

Houses: a set of tests would usually comprise of two airborne sound insulation tests of a pair of separating walls

Flats: a set of tests would usually comprise of two airborne sound insulation tests on separating walls; two airborne sound insulation tests of separating floors and two impact sound transmission tests of separating floors

Rooms for Residential Purposes: (student residences, hotel rooms & care homes) a set of tests would usually comprise of one airborne sound insulation test of a separating wall; one airborne sound insulation test of a separating floor and one impact sound transmission test of a separating floor

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Where do I find an approved sound tester?

8

Soundguard Acoustics provided a thorough & professional service & achieved a successful outcome for my building refurbishment project. I would definitely recommend them to anyone seeking expertise in this area.

D. Widden,
Taunton, Somerset

Approved Document E states that the sound insulation testing body should be either a member of the **Association of Noise Consultants (ANC)** and have joined their PCT registration scheme or be registered testers with the **United Kingdom Accreditation Service (UKAS)**.

Choosing an accredited company under these schemes gives you the peace of mind that your reports will be accepted by all local authorities, building control and national guarantee companies.

By using an ANC member registered under the PCT registration scheme, such as Soundguard Acoustics Ltd, then you will receive a full report including instruction for your Building Control Officer for accessing the secure online testing certificates for your build. Soundguard Acoustics will also liaise with and release the report directly to your BCO if required.

You can find your local ANC PCT registration scheme member [HERE](#)

What if I use an unregistered company?

Don't! The quality and validity of the testing and results may be questionable and may not be accepted by the necessary approval bodies. It is likely that your BCO will ask for further or repeated testing by an accredited test company to validate the results. This will result in delay for your project and further payment to the accredited test company.

We found Soundguard Acoustics competent, prompt & professional to work with. We will certainly be working with them again on future projects & would definitely recommend them to fellow professionals.

L. Bullivant, BULLCO Ltd, Devon

Soundguard Acoustics offered clear professional advice on our new product development work with Robust Detail Ltd. They responded quickly and we are very happy with the service received. We would definitely recommend them

M. Panes, Superglass

How is the sound test undertaken?

Airborne sound insulation test (walls & floors): A controlled noise is generated by an amplifier and loudspeaker across a broad range of frequencies. The generated noise is very loud and can be in excess of 100dB. Initial measurements are taken using a Sound Level Meter within the 'source room' followed by further measurements in the 'receiver room' on the other side of the wall or floor under investigation. The source room speaker position is then changed and the measurements repeated either side of the partition under test.

Background noise measurements are made using a sound level meter in the receiving room and are used to apply appropriate corrections for external sound such as traffic noise. Similarly the reverberation time (the time taken for sound to decay by 60dB) is measured within the receiving room using the sound source and a sound level meter to determine the corrections that must be applied to account for the characteristics and absorptiveness of the room.

The difference in the two airborne noise levels (for walls and floors), corrected for background and reverberation characteristics determines the airborne sound insulation performance of the wall, or floor. A greater airborne noise difference between the source room and the receiver room determines a higher airborne sound insulation performance.

Impact sound transmission test (floors only): This test is different, a calibrated 'tapping machine' which comprises of five 'hammers' driven up and down by a cam and electric motor is used to "tap" the floor surface by applying a known force on the floor structure. The machine is placed in several pre-determined positions. The resulting noise is measured in the dwelling below, using a sound level meter.

Background noise measurements are made using a sound level meter in the receiving room and are used to apply appropriate corrections for external sound such as traffic noise. Similarly the reverberation time (the time taken for sound to decay by 60dB) is measured within the receiving room using the sound source and a sound level meter to determine the corrections that must be applied to account for the characteristics and absorptiveness of the room.

The measured noise levels in the receiving room (for impact floors tests), corrected for background and reverberation characteristics determines the impact sound insulation performance of the floor. For the impact noise the lower the measured level, the better the performance as less sound is being transmitted into the dwelling below.

How is sound insulation performance determined?

A sound insulation test of a separating partition will be considered as a pass if the airborne sound insulation is equal to or greater than the $D_{nT,w} + C_{tr}$ value shown for the appropriate dwelling in the table below and if the impact sound insulation is equal to or less than the $L'_{nT,w}$ value shown in the table below.

	Test Element	Airborne Sound Insulation $D_{nT,w} + C_{tr}$ dB (Minimum Values)	Impact Sound Insulation $L'_{nT,w}$ dB (Maximum Values)
New Build	Walls	45	-
	Floor	45	62
Conversion	Wall	43	-
	Floor	43	64
New Residential	Walls	43	-
	Floor	45	62
Converted Residential	Walls	43	-
	Floor	43	64

$D_{nT,w}$ is an in-situ measured performance parameter which demonstrates the level of resistance to sound transmission between two adjacent spaces. The measurement will include both direct sound transmission and flanking sound transmission of the construction. Flanking transmission is the effect of sound travelling through the building and may be particularly evident where beams and joists bridge a common partition or along poorly isolated lightweight wall constructions. The $D_{nT,w}$ of a separating wall or floor will typically be of the order 5 to 7 dB lower than the manufacturers specified R_w (single figure quantity of sound insulation) for the single element, due principally to the contribution from flanking sound transmission around the element when it is built on site.

C_{tr} is the spectrum adaption term. It is a correction attributed to the sound insulation quantity to account for urban traffic noise.

$L'_{nT,w}$ is an in-situ measured performance parameter which demonstrates the level of resistance to impact sound transmission between floors. The impact measurement includes both direct sound transmission and flanking sound transmission.

Will sound testing disrupt work on site?

During the test, high levels of noise are generated but in order to make accurate test measurements, relatively quiet conditions are needed. Anyone working in the testing area will have to leave temporarily and any noisy works in the vicinity of the test areas including external site activity will need to be halted.

We need access to all the rooms being tested. We will identify suitable couplings of test rooms and will try to schedule testing with you at a time when noise can be controlled to achieve the best possible testing results.

How long will testing take?

The time taken for testing varies with site conditions, but generally a set of tests on houses takes about one to two hours and a set of tests on flats between two to three hours. During the test Soundguard Acoustics will require free uninterrupted access to the rooms in all test areas.

Can I observe the sound test?

Soundguard Acoustics will happily give you a brief overview of the test and demonstrate what we do, however, during the formal tests there are stringent rules restricting the number of personnel within the test areas so you will need to leave the engineer to it.

Soundguard Acoustics provided a friendly service carried out in a prompt & professional manner

*K. Thomas,
Weston Super Mare*

Should I inform my neighbours of the testing?

Noise levels are very high and if the building is attached in any way to occupied properties then it would be advisable to inform the residents as they are likely to hear the test. In some builds access to their property may be required. We recommend you check this with your BCO and request access to the neighbouring properties accordingly

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How will I know if I have passed?

Where possible, Soundguard Acoustics will provide preliminary test results before we leave the site. We will follow this up with a fully documented and signed report with the ANC online access to your test certificates which will be emailed to you within 5 - 7 working days of your test. This can then be submitted to your BCO, we can submit the report directly to Building Control if you prefer. Printed copies are available if required.

I want peace of mind that I'll pass the sound testing

Performance varies for many reasons. Assuming correct designs and material selection, the most common factor influencing performance is poor workmanship. Detailing is critical to maximising on site performance, especially in floor isolation and appropriate party wall construction.

Soundguard Acoustics recommend that you appoint our expert acoustic consultants at the start of your project to review the designs, and then also to carry out on site inspections during the build process to check specifically for any workmanship issues that could cause problems when it comes to sound testing. Soundguard Acoustics can provide routine review of basic plans to complex computer modelled partition designs to predict the completed performance.

If you would like Soundguard Acoustics to review your designs and proposals or to comment on their suitability, then please speak to us about our acoustic design advice service. This is a relatively inexpensive option that can avoid sound testing failures which result in expensive remedial treatment and delay in your project.

What do I do if the test fails?

In line with the regulations you are required to carry out remedial works to ensure the development meets the relevant performance requirements and re-test. If you don't know what to do by way of remedial works then Soundguard Acoustics can advise you. You may also be asked by Building Control to test further examples of the construction elsewhere on the development in order to restore confidence and/or highlight the extent of the problem.

Fees associated with the preliminary sound testing do not cover the work involved in providing remedial design advice, designing retro-fit treatment or repeat compliance sound testing.

How do I ensure good sound insulation performance?

Walls

- ✓ Lay bricks frog up
- ✓ Tape, fill & seal all joints or holes
- ✓ Fill & seal masonry joints with mortar
- ✓ Keep the cavity leaves separate below ground floor level
- ✓ Stagger electrical sockets on opposite sides of the separating wall
- ✓ Fix panels & supporting frames to the ceiling and floor only
- ✓ Ensure any fire stops in the cavity are either flexible or fixed to one frame only
- ✓ Ensure that an external cavity wall junctions are stopped with a flexible closer
- ✓ Control flanking transmission from walls and floors connected to the separating wall with appropriate detailing
- ✓ Ensure that independent panels and supporting frames are not in contact with the existing walls
- ✓ Ensure that where clear cavities are required that bridging does not occur.

Floors & Ceilings

- ✓ Allow for movement of materials
- ✓ Use the correct density of resilient layer for the anticipated load of the floor
- ✓ Fill all joints between parts of the floor to avoid poorly insulated air paths
- ✓ Seal the perimeter of an independent ceiling with tape or acoustic sealant
- ✓ Control flanking transmission from walls connected to the separating floor by appropriate detailing
- ✓ Lay resilient materials in rolls or sheets with lapped joints or with joints tightly butted and taped
- ✓ Take the resilient layer up the wall edges to isolate the floating layer from the wall
- ✓ Ensure that floating floors are left 'floating' and are not rigidly fixed
- ✓ Leave a small gap between the floating floor layers and wall edges & skirting and fill with a flexible sealant
- ✓ Fix or glue the soft floor covering to the floor in type 1 floors (concrete base with soft floor covering)
- ✓ Give attention wherever a pipe or duct penetrates the floor, to reduce flanking transmission and air paths

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What are the common points of sound insulation failure?

Several points of failure can occur within a project. Although, where conscientious and sensible construction has been followed and good workmanship has been maintained at all stages of the project then a failed sound test becomes less likely. Sound travels via the flanking structures as well as walls and floors. So attention to detail is critical. The sound insulation is only as good as its weakest link.

Common reasons for sound testing failure:

- ✘ Poor workmanship
- ✘ Site not ready for pre-completion sound testing
- ✘ Poorly fitted or absent doors and windows
- ✘ Bridges created across partitions and through isolating layers
- ✘ Builder's materials in cavity and independent frame walls creating bridging pathways
- ✘ Deep electrical sockets and chases on separating partitions
- ✘ Electrical sockets placed back to back
- ✘ Tightly compressed acoustic insulation material in voids
- ✘ Holes, voids and services that have not been appropriately sealed
- ✘ Cavity type walls that have been converted to a solid masonry wall
- ✘ Cavity walls built off a continuous solid concrete slab floor
- ✘ Free standing panels or frames that have been fixed to the masonry core
- ✘ Incorrect resilient materials for the job
- ✘ Incorrect type or over / under filling of acoustic insulation
- ✘ Ceilings fitted with multiple down lighters
- ✘ Floating floors and bases that have been fitted tightly to walls and skirting
- ✘ Resilient bar that has been bridged with screws or nails
- ✘ Resilient bar that has been fitted in multiple directions
- ✘ Floating raft floors that have been screwed down or poorly isolated
- ✘ Rigid or direct connection between the ceiling and the floor base
- ✘ Non-resilient floor finishes that are rigidly connected to the floor base
- ✘ Sound flanking through beams, joists and walls due to poor isolation
- ✘ Inappropriate party wall junctions
- ✘ Inner skin lightweight block flanking pathways
- ✘ Poorly insulated soil waste pipe noise & transmission

Frequently Asked Questions

How much does a sound test cost?

This depends upon the size of the project and the number of tests involved. Soundguard Acoustics Ltd will provide a free quotation within 24 hours of your enquiry. Our quoted price includes everything involved with the sound test and the report with no hidden extras.

We have always had a good service from Soundguard Acoustics. Friendly, reliable & reasonably priced

J. Pearce,

DevonBuild.co.uk

15

What are Robust Details?

From the 1st July 2004, and for new house and flat developments, Robust Details may be used to eliminate the need for end of build pre-completion testing. Robust Details are high performance constructions that are capable of providing consistently good sound insulation but do require that the design is registered with, and approved by, Robust Details Ltd (RDL) and that confirmation of the construction, through on-site visual inspection by RDL has been completed in accordance with the registered design.

The specific details in the RDL handbook must be followed explicitly and each plot formally 'registered' with RDL before building commences. Robust Details registration cannot be used in conversions and so pre-completion testing must be undertaken in these circumstances.

As the specific details in the Robust Details scheme may not allow for flexibility in the design of a development or may not prove cost effective, pre-completion testing may still prove a more suitable and effective route to demonstrate compliance.

BREEAM credits for Acoustics

Under Hea 05 and Pol 05 it is possible to get credits for acoustic performance. Pre-completion testing can be used to verify performance and achieve BREEAM credits. Soundguard Acoustics Ltd can support this type of work for you.

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Resources

Soundguard Acoustics Ltd

www.soundguard.co.uk

Sound Testing South west

www.soundtestsouthwest.co.uk

Institute of Acoustics (IoA)

www.ioa.org.uk

Association of Noise Consultants (ANC)

www.theanc.co.uk

United Kingdom Accreditation Service (UKAS)

www.ukas.org

Robust Details Ltd

www.robustdetails.com

Local Authority Building Control (LABC)

www.labc.uk.com

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