

THE IMPORTANCE OF GOOD SOUND INSULATION FOR NEW DEVELOPMENTS

Developers, designers and contractors face a host of statutory and non-statutory requirements when designing and constructing new buildings in order to satisfy clients and end-users. One issue which is often critical to the overall success of the new building is sound insulation. This article will look at the reasons why good sound insulation is so important and how it can be achieved

Sound insulation in residential buildings is a regulatory issue with defined requirements specified in Part E of the Building Regulations and planning permissions often specifying required internal noise levels. Failure to meet the requirements in the Building Regulations can result in the Building Control Authority refusing to sign off the building, not a good idea if your purchaser wants to move in tomorrow! Getting the sound insulation right is, therefore, vital to meet regulatory requirements for the residential accommodation. However, even where there are no regulatory requirements, there may be implied or contractual requirements in order to ensure acceptable noise levels for the use of the building. The local authority wants to be able to hear what the Councillors are saying in the Council Chamber rather than only hearing the noise of passing traffic. Failure to address these requirements from the start can lead to an unhappy client and costly and disruptive remedial works. Sound insulation requirements for new developments fall into two categories; dealing with sound transmission between rooms within the same building and dealing with noise transmission through the external building envelope.

Part E of the Building Regulations is concerned specifically with noise transmission between rooms in residential premises for both new build and conversions. Numerical requirements are specified for both airborne and impact sound insulation. Compliance with these requirements can be achieved by using the Robust Details route of registering to build approved constructions, or by using alternative constructions and testing a sample of the rooms to demonstrate that the numerical limits have been met. The Robust Details route provides an approved construction detail to follow, but good planning is still important to ensure that the correct materials are used and a high standard of construction is maintained. Robust Details Inspectors carry out unannounced inspections of a sample of buildings during the construction phase and also carry out sound insulation tests of a sample of completed buildings. Robust Details do not cover all new build situations e.g. apartments with curtain wall façades and do not (and are unlikely ever to) cover conversions. Therefore, there will always be a need for a significant percentage of developments to use the testing route to meet Part E requirements. In these circumstances it is vital to get the construction correct from the start.

The first requirement is to choose the correct construction system. Sound insulation data is provided by materials suppliers showing systems that will meet Part E requirements. It must be remembered that the vast majority of this data is measured in controlled laboratory conditions, and the same level of performance will not be achieved on site for a variety of reasons. Therefore, an informed decision must be made on a system suitable for achieving the Part E requirements when installed on site. This is where the services of an acoustic consultant can be useful at the design stage.

Hepworth Acoustics carries out hundreds of sound insulation tests across England and Wales each year and we, therefore, have a large database of test results carried out on as-built installations that we use to make our recommendations, rather than having to base our recommendations on lab test results. We are also aware of the practical problems that can arise on sites, such as the fixing of kitchen cupboards and fittings to party walls. Issues such as these will often influence our recommendations. Spending a small amount of money on specifying the right construction system from the outset can save much time and money later on. The next critical area is to ensure that the construction is built to a high standard. The best system in the world can fail to meet Part E requirements if it is not built properly. It can be very minor details that affect the acoustic performance, the wrong length screws or mortar bridging a cavity. Acoustic testing will not be carried out until the rooms are finished and the construction details will be covered up. Therefore it is often difficult to determine the cause of a failed sound insulation test without at least partial demolition of the offending building element. A better way of managing the risk is to ensure that the works are adequately inspected to ensure that the potential acoustic performance will be achieved by the construction. Hepworth Acoustics offers a service to developers of checking the plans for the construction prior to commencement and then inspecting the works as they are built. It often involves some education of the site manager on the initial inspection so that he is aware of the types of detailing that are important for acoustic purposes, but usually after the first couple of visits a high standard is maintained. Using the acoustic consultant to inspect the works is efficient as they are aware of all of the acoustically important features.

An example of this was a conversion development carried out near Manchester. The development was a conversion and extension of a former six-storey mill building into 48 apartments. Hepworth Acoustics was involved in checking the original drawings; carrying out periodic site inspections during the construction works and specifying corrective work where necessary; and undertaking a phased programme of sound insulation testing at practical completion stage. All party walls and floors met the Part E sound insulation requirements. One final point is that the sound insulation testing should be carried out by an acoustics consultant that is either a member of the Association of Noise Consultant's Registration Scheme or is UKAS accredited for this work. Failure to adhere to this is likely to result in the Building Control Officer rejecting your test results. Sound insulation between residential premises is important, but residents are often just as concerned with noise break in from external sources such as road traffic, factories and licensed premises. This issue is becoming more important with the desire of central government and local authorities to focus new residential development away from green field sites and back in

to existing urban areas. This generally requires development on sites that are exposed to external noise sources. Once again, it is important to consider sound insulation from the outset. Sometimes sound insulation requirements can be minimised by careful layout design, but often there is little that can be done in layout terms. Therefore, the requirement for sound insulation must be quantified so that appropriate measures can be designed. This requires a detailed noise survey to be carried out to quantify the existing noise environment. The noise survey must not only give the right level of information, but must also be carried out at the right time of day e.g. if the site is next to a night club, it will be necessary to measure when the night club is busy. The results of this type of survey can then be used to design noise attenuation measures for the building envelope to ensure that the internal noise criteria are met. This will usually involve specifying glazing systems, but can sometimes involve wall and roof constructions.

Sound insulation of buildings is also required for a variety of public and commercial buildings. Premises such as pubs and night clubs will usually require sound insulation to prevent noise break out, whereas schools and other public buildings will usually require sound insulation to reduce noise break in. School teaching areas have ambient noise criteria specified in Building Bulletin 93 in order to ensure that children are able to hear the teacher properly. An example of this was a school project that Hepworth Acoustics carried out in Stockport, close to Manchester Airport. The school was exposed to noise from aircraft landing at Manchester Airport as well as road traffic on a busy road nearby. Careful design was required to attenuate noise transmission through the walls, windows and roof of the school to ensure that the internal criteria were met.

The most demanding sound insulation issues experienced often arise in multi-use developments where some rooms are generating high noise levels and other rooms have requirements for very low break-in levels. This could be a leisure development with a night club adjacent to a cinema, or recording studios with different users in different rooms. In order for these types of development to be successful, sound insulation must be considered and priced into the budget from the outset. Hepworth Acoustics has been involved in a number of schemes where the cost of sound insulation works has been several hundred thousand pounds. In addition, the sound insulation measures will have implications on the usable area and floor heights because of the use of floating floors, acoustic ceilings and wall linings. These types of works are not normally feasible to retrofit, and therefore if omitted from the original scheme will limit the uses of the building. In conclusion, suitable provision of sound insulation works is fundamental to the success of a wide range of buildings in order to meet statutory requirements as well as user requirements. In order to avoid problems, sound insulation should be considered as a fundamental part of the building design, and appropriate advice should be taken at the earliest stage.

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