

# A guide to the latest revision of the Building Regulations Approved Document E- Resistance to the passage of sound

Effective from 1st July 2003

## Background

The basis for the current Building Regulation standards date back to the early 1950's when 225mm thick solid brick walls and concrete floors were the norm and provided reasonable resistance to the passage of sound.

Since then building practices have changed dramatically. For some time now, the deemed-to-satisfy list of constructions that accompanied the guidance notes in Approved Document E has not always achieve satisfactory standards of sound insulation in practice.

In addition, there has been a considerable changes in lifestyle resulting in increased noise propagation. The common ownership of home entertainment systems is but one graphic example of this change.

More home working, the trend towards working unsociable hours and rising expectations has meant people are less tolerant of noise disturbance. As a direct result, the number of noise related complaints has more than trebled during the last decade.

## Effective Dates

The latest revisions to Part E of the Building Regulations came into effect on 1st July 2003 and has been designed to address the issues highlighted above.

Pre-completion testing for compliance with the regulations will be obligatory for all building conversions from 1st July 2003.

Pre-completion testing for compliance with the regulations will be obligatory for all new buildings from 1st January 2004, unless special exemption is granted for Robust Standard Details (RSDs).

## Summary of the Main Changes

- A new rating method:  $DnT_{w} + C_{tr}$  will come into effect on 1st July 2003. The primary purpose of the  $C_{tr}$  factor is to improve the sound insulating performance requirements of the structure at low frequencies.
- Builders can build whatever they like but they **MUST PROVE** to the satisfaction of the Building Control Officer that the construction meets the requirements of the Building Regulations. This effectively means a proportion of all new and conversion work will be subject to **MANDATORY** testing.
- The emphasis throughout the new guidance is on the control of **FLANKING** noise, i.e. the noise that reaches the receiving room from the source room but not directly through the specific floor or wall.
- The new guidance includes much advice on what to 'DO' and what 'NOT TO DO'. There is considerable emphasis on the avoidance of bridging between building elements. Where constructions derive a part of their performance from **ISOLATION**, this must be maintained.

## Acoustic Performance Requirements

Party Walls, Floors & Stairs	Airborne Noise		Impact Noise	
	Pre July 2003 DnTw dB	Post July 2003 DnTw + Ctr dB	Pre July 2003 LnTw dB	Post July 2003 LnTw dB
New Build	52	45	61	62
Conversion	48	43	65	64

\* Applied to floor constructions only

## Buildings Affected

Walls and floors in every residential conversion, new build and extension project will be affected by the changes. This includes hotels, student accommodation and all other specialist dwellings. The only exceptions being refurbishment projects in residential buildings of historic significance, where there will be a 'test and declare' option if the new standards cannot be achieved.

## Changes in the Detail of the Revised Regulations

It is not practical here to detail all the constructions. This section simply highlights some of the more obvious changes, which affect common building constructions used in high-density build,

- \* Each wall and floor type is described and then the associated flanking details are provided for each case.
- \* In order to 'comply' with the 'approved constructions', you MUST also comply with ALL OF THE DETAILING.
- \* Some construction methods are now incompatible, e.g. cavity party walls and continuous solid floors.
- \* Beam and block floors are no longer 'approved' for use as party floors. The advice is to 'seek guidance from `the manufacturer`'.
- \* For new build, all block work party walls are to be wet plastered. Dry lining finishes are to be referred to 'the manufacturer'.
- \* For vertically adjacent flats, the weight of the inner leaf of the external wall is to exceed 120kg/m<sup>2</sup>. In practical terms this would appear to exclude lightweight concrete blocks (Some exceptions are given)
- \* For floating floors, there is a maximum dynamic stiffness of 15 MN/m<sup>3</sup> and minimum resilient layer thickness of 5mm

## Requirements for Testing

In summary, testing should be carried out on site as part of the construction process, and Approved Document E refers to this as 'pre-completion testing'.

The person carrying out the building work is responsible for ensuring that appropriate sound insulation testing is undertaken and they are also responsible for the cost of the testing.

Building Control Bodies are responsible for selecting both the properties to be tested, and the number to be tested.

The performance standards to be achieved have a built-in allowance for measurement uncertainty, so if any test shows one of the values has not been met, the structure will fail.

## What Should be Tested and When

Tests are to be carried out between rooms or spaces that share a common area of separating wall or separating floor.

Tests are to be carried out once the dwelling-houses, flats or rooms on either side of a separating element are essentially complete. Impact sound insulation tests should be carried out before carpets, foam backed vinyl etc are laid on floors. There are some exceptions on floor coverings, which are detailed in the Regulations.

There is no need to test between living spaces, corridors, stairwells or hallways.

## Type of Constructions to be Tested

Test results only apply to the particular constructions tested and will be considered indicative of the performance of others of the same type in the same development. It is therefore essential that developments be split into a number of notional groups.

Dwelling-houses (including bungalows), flats and rooms for residential purposes are considered as three separate groups. If significant differences in construction types occur within any of these groups, then sub-grouping by type of separating floor and separating wall should be established

Further sub-grouping may be required if there are differences between flanking details at wall and floor junctions, different cavities or if the construction is considered to have 'unfavorable features' such as large potential flanking areas, for example unbroken walls in a flat.

Building control bodies can exercise their judgment to determine sub-groups.

## Minimum Number of Tests Required

Building Control Bodies should consult with developers on likely completion times on site, and ask for one set of tests to be carried out between the first dwelling-houses, flats or rooms for residential purposes scheduled for completion and/or sale in each group or sub-group. This applies regardless of the intended size of the group or sub-group. Therefore if a site comprises only one pair of dwelling-houses, flats or rooms for residential purposes, they should be tested.

As further properties on the same development become ready for testing, building control bodies should indicate at what point(s) they wish any further set(s) of tests to be conducted. Assuming no tests are failed, building control bodies should stipulate at least one set of tests for every ten dwelling-houses, flats or rooms for residential purposes in a group or sub-group.

Testing should be conducted more frequently at the beginning of a series of completions than towards the end, to allow any potential problems to be addressed at an early stage. However, on large developments testing should be carried out over a substantial part of the construction period.

## Action Following a Failed Set of Tests

In the event of a failed set of tests, appropriate remedial treatment should be applied to the rooms that failed the test. A failed set of tests raises questions over the sound insulation between other rooms sharing the same separating element in the dwelling-houses, flats or rooms for residential purposes in which the tests were conducted. The developer should demonstrate to the building control body's satisfaction that these rooms meet the performance standards. Normally this would be done by (a) additional testing, and/or (b) applying the appropriate remedial treatment to the other rooms and/or (c) demonstrating that the cause of failure does not occur in other rooms.

A failed set of tests raises questions over properties between which tests have not been carried out. The developer should demonstrate to the building control body's satisfaction that such properties meet the performance standards. Once a dwelling-house, flat or room for residential purposes is occupied, any action affecting it should be a matter for local negotiation.

After a failed set of tests, the rate of testing should be increased until the building control body is satisfied that the problem has been solved.

## Programme of Testing

Where pairs of rooms on either side of the separating element are different e.g. a bedroom and a study or a living room and a bedroom, at least one of the rooms in one of the pairs should be a bedroom and at least one of the rooms in the other pair should be a living room.

Where the layout has only one pair of rooms on opposite sides of the entire area of separating wall or floor between two dwelling-houses, flats or rooms for residential purposes then the number of airborne and impact sound insulation tests may be reduced accordingly.

## Types of Rooms to be Tested

The table below shows the minimum number of tests required (Building Control will advise on the actual numbers for each development). Full details of what tests are to be carried out and in which rooms can be found in the guidance.

Construction Type	Minimum number of tests	
	Airborne Noise	Impact Noise
Dwelling House & Bungalows	2	0
Flats with separating floor but without separating walls	2	2
Flats with separating floor and separating walls	4	2
Properties sold before fitting out	2-4	0-2
Historic Buildings	As agreed by Building Control	As agreed by Building Control

There is work ongoing to establish a new set of Robust Standard Details (RSDs). It is not clear at present whether constructions to RSDs will also require testing. The aim is to achieve a performance of +5dB in excess of the new requirements. In so doing, it may be possible that testing for new build will then be waived. Testing for conversions will remain mandatory. Under the current wording of the new part E, no waiver is permitted.

## Potential Additions to the Regulations

The Performance figures quoted for acoustic products are based on test results and can only be expected if the building design construction has followed good practice to ensure all potential flanking paths have been eliminated

In order for wall and floor construction to be fully effective, extreme care should be taken to correctly detail the junctions between the separating wall or floor and associated elements such as external walls and any penetrations. If junctions are incorrectly detailed, the acoustic performance will be limited and Building Regulation requirements may not be achieved in practise.