This Compliance Document is prepared by the Department of Building and Housing. The Department of Building and Housing is a Government Department established under the State Sector Act 1988.

Enquiries about the content of this document should be directed to:

Department of Building and Housing
PO Box 10-729, Wellington.
Telephone 0800 242 243
Fax 04 494 0290
Email: info@dbh.govt.nz

Sales enquiries should be directed to:
Customer Services,
Victoria University Book Centre
PO Box 12-337, Wellington, New Zealand
Telephone 0800 370 370, (04) 463 5511
Fax (04) 463 5510
Email: dbh@vicbooks.co.nz
www.vicbooks.co.nz

© Department of Building and Housing 2006

This Compliance Document is protected by Crown copyright, unless indicated otherwise. The Department of Building and Housing administers the copyright in this document.
You may use and reproduce this document for your personal use or for the purposes of your business provided you reproduce the document accurately and not in an inappropriate or misleading context. You may not distribute this document to others or reproduce it for sale or profit.

The Department of Building and Housing owns or has licences to use all images and trademarks in this document. You must not use or reproduce images and trademarks featured in this document for any purpose (except as part of an accurate reproduction of this document) unless you first obtain the written permission of the Department of Building and Housing.
Status of Compliance Documents

Compliance Documents are prepared by the Department of Building and Housing in accordance with section 22 of the Building Act 2004. A Compliance Document is for use in establishing compliance with the New Zealand Building Code.

A person who complies with a Compliance Document will be treated as having complied with the provisions of the Building Code to which the Compliance Document relates. However, a Compliance Document is only one method of complying with the Building Code. There may be alternative ways to comply.

Users should make themselves familiar with the preface to the New Zealand Building Code Handbook, which describes the status of Compliance Documents and explains alternative methods of achieving compliance.

Defined words (italicised in the text) and classified uses are explained in Clauses A1 of the Building Code and in the Definitions at the start of this Compliance Document.

<table>
<thead>
<tr>
<th>G6: Document History</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date</strong></td>
</tr>
<tr>
<td>First published</td>
</tr>
<tr>
<td>Amendment 1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Amendment 2</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Note: Page numbers relate to the document at the time of Amendment and may not match page numbers in current document.

Document Status

The most recent version of this document, as detailed in the Document History, is approved by the Chief Executive of the Department of Building and Housing. It is effective from 1 December 1995 and supersedes all previous versions of this document.

People using this Compliance Document should check for amendments on a regular basis. The Department of Building and Housing may amend any part of any Compliance Document at any time. Up-to-date versions of Compliance Documents are available from www.dbh.govt.nz
New Zealand Building Code
Clause G6 Airborne and Impact Sound

This Clause is extracted from the New Zealand Building Code contained in the First Schedule of the Building Regulations 1992.

<table>
<thead>
<tr>
<th>Provisions</th>
<th>Limits on application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OBJECTIVE</strong></td>
<td></td>
</tr>
<tr>
<td>G6.1 The objective of this provision is to safeguard people from illness or loss of amenity as a result of undue noise being transmitted between abutting occupancies.</td>
<td></td>
</tr>
<tr>
<td><strong>FUNCTIONAL REQUIREMENT</strong></td>
<td></td>
</tr>
<tr>
<td>G6.2 Building elements which are common between occupancies, shall be constructed to prevent undue noise transmission from other occupancies or common spaces, to the habitable spaces of household units.</td>
<td></td>
</tr>
<tr>
<td><strong>PERFORMANCE</strong></td>
<td></td>
</tr>
<tr>
<td>G6.5.1 The Sound Transmission Class of walls, floors and ceilings, shall be no less than 55.</td>
<td></td>
</tr>
<tr>
<td>G6.5.2 The Impact Insulation Class of floors shall be no less than 55.</td>
<td></td>
</tr>
</tbody>
</table>
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>References</td>
<td>7</td>
</tr>
<tr>
<td>Definitions</td>
<td>9</td>
</tr>
<tr>
<td>Verification Method G6/VM1</td>
<td>11</td>
</tr>
<tr>
<td>1.0 Airborne Sound Insulation</td>
<td>11</td>
</tr>
<tr>
<td>Field Tests</td>
<td></td>
</tr>
<tr>
<td>2.0 Impact Sound Insulation</td>
<td>11</td>
</tr>
<tr>
<td>Field Tests</td>
<td></td>
</tr>
<tr>
<td>Acceptable Solution G6/AS1</td>
<td>13</td>
</tr>
<tr>
<td>1.0 Construction of Wall, Floor</td>
<td>13</td>
</tr>
<tr>
<td>and Ceiling Assemblies</td>
<td></td>
</tr>
<tr>
<td>Index</td>
<td>19</td>
</tr>
</tbody>
</table>
References

For the purposes of New Zealand Building Code compliance, referenced documents shall be deemed to include any amendments issued prior to the date of the Approved Document as displayed at the foot of the page on which the references are listed.

**American Society for Testing and Materials**

- ASTM E 336: 1990 Method for measurement of airborne sound insulation in buildings
- ASTM E 413: 1987 Classification for rating sound insulation
- ASTM E 492: 1990 Test method for laboratory measurement of impact sound transmission through floor-ceiling assemblies using the tapping machine
- ASTM E 989: 1989 Classification for determination of impact insulation class (IIC)

**International Standards Organisation**

- ISO 140/VII: 1978 Field measurements of impact sound insulation of floors

<table>
<thead>
<tr>
<th>Where quoted</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>VM1 1.0.1</td>
<td></td>
</tr>
<tr>
<td>VM1 1.0.1, Definitions</td>
<td>Definitions</td>
</tr>
<tr>
<td>VM1 2.0.1</td>
<td></td>
</tr>
<tr>
<td>VM1 2.0.1</td>
<td></td>
</tr>
</tbody>
</table>
Definitions

This is an abbreviated list of definitions for words or terms particularly relevant to this Approved Document. The definitions for any other italicised words may be found in the New Zealand Building Code Handbook.

**Adequate** Adequate to achieve the objectives of the building code.

**Amenity** An attribute of a building which contributes to the health, physical independence, and well being of the building’s users but which is not associated with disease or a specific illness.

**Building** has the meaning ascribed to it by the Building Act 1991.

**Building element** Any structural and non-structural component or assembly incorporated into or associated with a building. Included are fixtures, services, drains, permanent mechanical installations for access, glazing, partitions, ceilings and temporary supports.

**Fixture** An article intended to remain permanently attached to and form part of a building.

**Habitable space** A space used for activities normally associated with domestic living, but excludes any bathroom, laundry, water-closet, pantry, walk-in wardrobe, corridor, hallway, lobby, clothes-drying room, or other space of a specialised nature occupied neither frequently nor for extended periods.

**Household unit** means any building or group of buildings, or part of any building or group of buildings, used or intended to be used solely or principally for residential purposes and occupied or intended to be occupied exclusively as the home or residence of not more than one household; but does not include a hostel or boardinghouse or other specialised accommodation.

**Impact insulation class (IIC)** A single number rating derived from measured values of normalized impact sound pressure levels in accordance with Method of ASTM E 492, Annex A1, Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine. It provides an estimate of the impact sound insulating performance of a floor-ceiling assembly.

**Sound transmission class (STC)** A single number rating derived from measured values of transmission loss in accordance with classification ASTM E 413, Determination of Sound Transmission Class. It provides an estimate of the performance of a partition in certain common sound insulation situations.
Verification Method G6/VM1

1.0 Airborne Sound Insulation Field Tests

1.0.1 The performance for airborne sound insulation may be verified using the procedures detailed in ASTM E 336, and the field sound transmission class may be verified using the method described in ASTM E 413. Field test results shall be within 5dB of the performance requirement.

2.0 Impact Sound Insulation Field Tests

2.0.1 The performance for impact sound insulation may be verified using the procedures detailed in ISO 140: Part VII, and the field impact insulation class may be verified using the method described in ASTM E 989. Field test results shall be within 5dB of the performance requirement.
1.0 Construction of Wall, Floor and Ceiling Assemblies

1.0.1 Sound transmission through building elements, shall be minimised by using one or more of the following construction techniques:

a) Physical separation of building elements comprising each face of any wall, floor or ceiling assembly which is common to two or more occupied spaces.

b) Use of noise control building elements.

c) Avoidance of rigid service connections (e.g. in plumbing) where the reticulation passes through noise control building elements separating different occupancies.

d) Making the noise control installation airtight by sealing all joints between building elements, and around penetrations and service fittings.

COMMENT:

1. Common walls should not be used for mounting fixtures and appliances which are likely to be a source of noise, e.g. telephones, TV sets, stereos, cupboards with doors, service switches.

2. Where the location of services in common walls and ceilings is unavoidable, they may require additional airborne and impact sound insulation in order that the building element achieves the performance.

3. Airtightness of common partition elements is important, as an unsealed air space can in some circumstances amplify, rather than reduce sound.

1.0.2 Figure 1 is a schematic presentation showing the building elements which require noise control between a household unit and the habitable spaces of an adjoining household unit.

1.0.3 Building elements constructed as shown in Figures 2 to 5 are an acceptable solution.

COMMENT:

1. Where carpet on underlay is shown in the figures, it is a requirement of the Acceptable Solution.

2. The glass fibre insulation shown in the figures has a density no less than 10 kg/m³.
Figure 1: Location of Building Elements Requiring Noise Control

Paragraph 1.0.2
**Figure 2: Acceptable Wall Assemblies for Noise Control**

**Paragraph 1.0.3**

**DETAIL 1**
**STC 55**
- 200mm nominal width normal weight concrete masonry units complying with NZS 3102
- All unit cavities to be filled with concrete

**DETAIL 2**
**STC 56**
- Double row of 100 x 50mm studs at 600mm centres on separate plates 25mm apart
- Two layers of 9.5mm plasterboard
- 75mm glass fibre insulation minimum density 10kg/m²
- Air space

**DETAIL 3**
**STC 60**
- Double row of 100 x 50mm studs at 400mm centres on separate plates 25mm apart
- Two layers of 16mm plasterboard
- 75mm glass fibre insulation minimum density 10kg/m²
- Air space

**DETAIL 4**
**STC 55**
- Concrete wall
  - Minimum thickness 150mm
  - Minimum density 400kg/m² of face area
Figure 3: Acceptable Floor/Ceiling Assemblies for Noise Control

Paragraph 1.0.3

**DETAIL 5**  
**STC 55**  
**IIC 55**

- Carpet on underlay
- 20mm high density particle board
- Separate floor joist and ceiling joist construction (excluding end walls)
- 75mm glass fibre insulation minimum density 10kg/m³
- Two layers of 12.5mm plasterboard

Figure 4: Acceptable Internal/External Wall Junction for Noise Control Between Two Units

Paragraph 1.0.3

**PLAN DETAIL D**

- External cladding
- Internal lining
- Wall framing
- Unit 4
- Taped or sealed joint
- Extent of noise control wall assembly
- 75mm glass fibre insulation minimum density 10kg/m³
- Unit 3
- Taped or sealed joint
Figure 5: Acceptable Floor/Wall Junctions for Noise Control Between Four Units

Paragraph 1.0.3

SECTION DETAIL A

- Noise control Wall assembly
- Carpet on underlay
- 150mm concrete floor
- Minimum concrete density 400kg/m²
- of face area
- Air space

SECTION DETAIL B

- 150mm concrete floor
- Carpet on underlay
- 150mm concrete wall
- Minimum concrete density 400kg/m²
- of face area

SECTION DETAIL C

- Noise control Wall assembly
- Flexible sealant
- Carpet on underlay
- 20mm high density particle board
- Solid blocking
- Timber floor joists not continuous over wall and separate construction from ceiling joists
- Ceiling lining two layers 12.5mm plaster board
- Air space
Index G6/VM1 & AS1

All references to Verification Methods and Acceptable Solutions are preceded by VM or AS respectively.

<table>
<thead>
<tr>
<th>Building elements</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>floor/ceiling assemblies</td>
<td>AS1 1.0.3, Figure 3</td>
</tr>
<tr>
<td>floor/wall junctions</td>
<td>AS1 1.0.3, Figure 5</td>
</tr>
<tr>
<td>internal/external wall junctions</td>
<td>AS1 1.0.3, Figure 4</td>
</tr>
<tr>
<td>requiring noise control</td>
<td>AS1 1.0.2, Figure 1</td>
</tr>
<tr>
<td>wall assemblies</td>
<td>AS1 1.0.3, Figure 2</td>
</tr>
</tbody>
</table>

| Habitable spaces | AS1 1.0.2 |
| Household units | AS1 1.0.2 |

| Impact insulation class | VM1 2.0 |
| Occupied spaces | AS1 1.0.1 |
| Rigid service connections | AS1 1.0.1 c) |
| Sound insulation tests | VM1 1.0, 2.0 |
| Sound transmission class | VM1 1.0, 2.0 |