Compliance Document for New Zealand Building Code Clause G6 Airborne and Impact Sound

Prepared by the Department of Building and Housing

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

Department of Building and Housing
Te Tari Kaupapa Whare

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

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ISBN 0-477-01606-5

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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.

G6: Document History

	Date	Alterations	
First published	July 1992		
Amendment 1	19 August 1994	pp. i and ii, Document History p. 5, Figure 2 p. 6, Figure 3	
Amendment 2	1 December 1995	p. ii, Document History p. vi, References p. 3, 1.0.1, 1.0.2	p. 5, Figure 2 p. 7, Figure 5 p. 8, Index

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.

FIRST SCHEDULE—*continued*

Clause G6—AIRBORNE AND IMPACT SOUND

Provisions	Limits on application
OBJECTIVE **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.	
FUNCTIONAL REQUIREMENT **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*.	
PERFORMANCE **G6.3.1** The *Sound Transmission Class* of walls, floors and ceilings, shall be no less than 55. **G6.3.2** The *Impact Insulation Class* of floors shall be no less than 55.	

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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.

			Where quoted
	American Society for Testing and Materials		
Amend 2 Dec 1995	ASTM E 336: 1990	Method for measurement of airborne sound insulation in buildings	VM1 1.0.1
	ASTM E 413: 1987	Classification for rating sound insulation	VM1 1.0.1, Definitions
Amend 2 Dec 1995	ASTM E 492: 1990	Test method for laboratory measurement of impact sound transmission through floor-ceiling assemblies using the tapping machine	Definitions
Amend 2 Dec 1995	ASTM E 989: 1989	Classification for determination of impact insulation class (IIC)	VM1 2.0.1
	International Standards Organisation		
	ISO 140/VII: 1978	Field measurements of impact sound insulation of floors	VM1 2.0.1

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.

Acceptable Solution G6/AS1

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*.

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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*.

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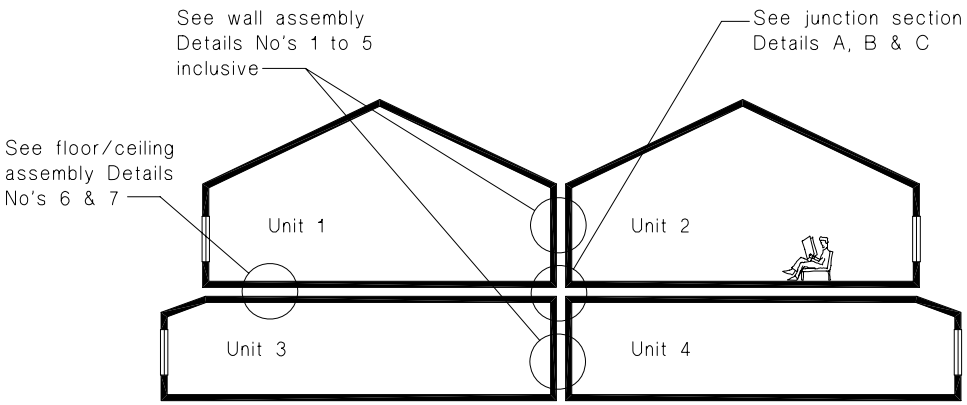
1.0.3 *Building elements* constructed as shown in Figures 2 to 5 are an acceptable solution.

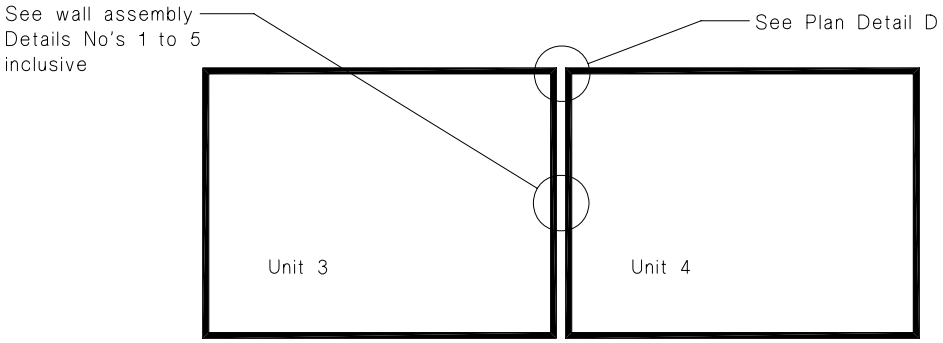
COMMENT:

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/m^3.

Figure 1: **Location of Building Elements Requiring Noise Control**
Paragraph 1.0.2



SCHEMATIC SECTION THROUGH FOUR UNITS



SCHEMATIC PLAN - TWO ADJACENT UNITS

Figure 2: **Acceptable Wall Assemblies for Noise Control**
Paragraph 1.0.3

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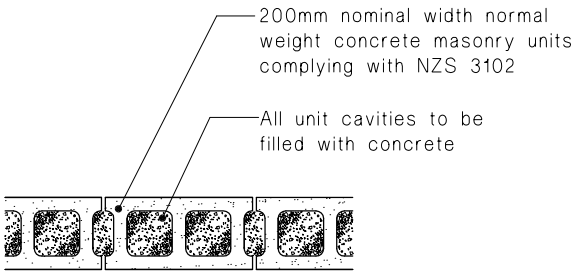
DETAIL 1
STC 55



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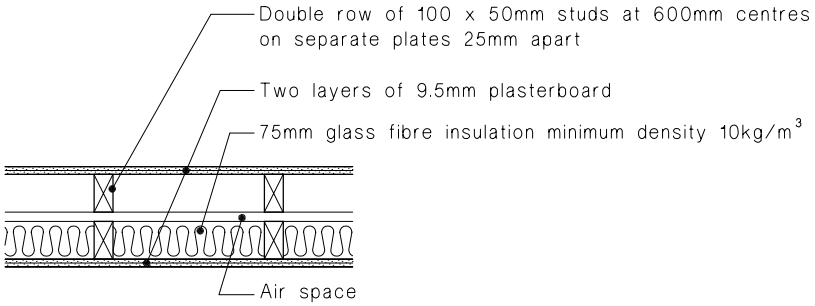
DETAIL 2
STC 56



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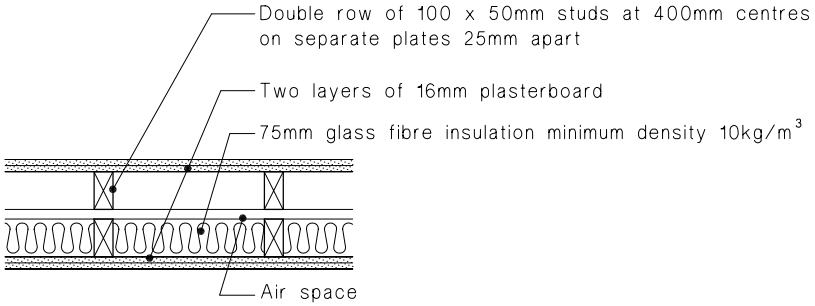
DETAIL 3
STC 60



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DETAIL 4
STC 55

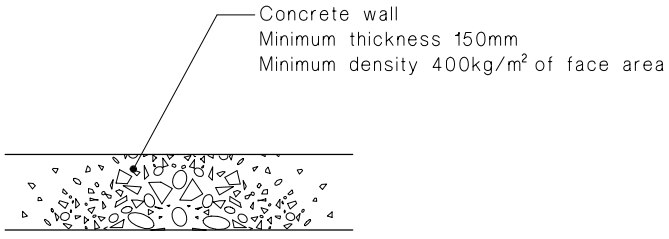

Figure 3: **Acceptable Floor/Ceiling Assemblies for Noise Control**
Paragraph 1.0.3

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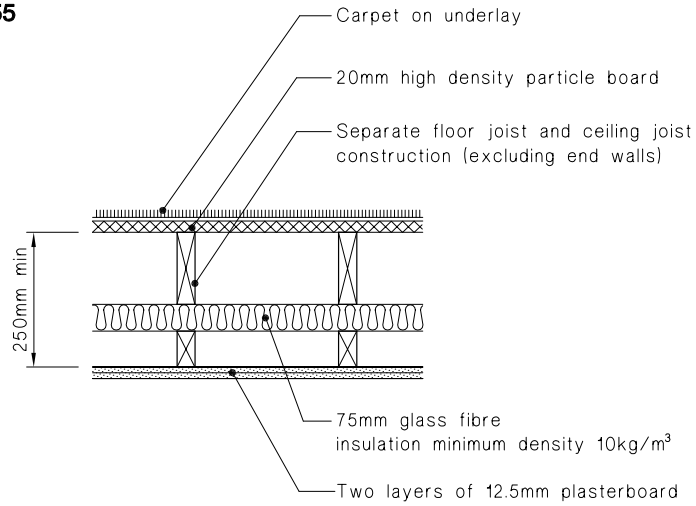
DETAIL 5 STC 55 IIC 55



Amend 1 Aug 1994

DETAIL 6 STC 55 IIC 55

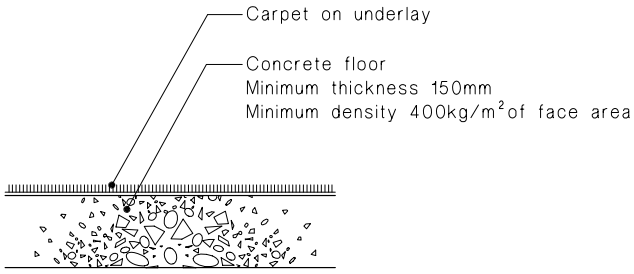


Figure 4: **Acceptable Internal/External Wall Junction for Noise Control Between Two Units**
Paragraph 1.0.3

PLAN DETAIL D

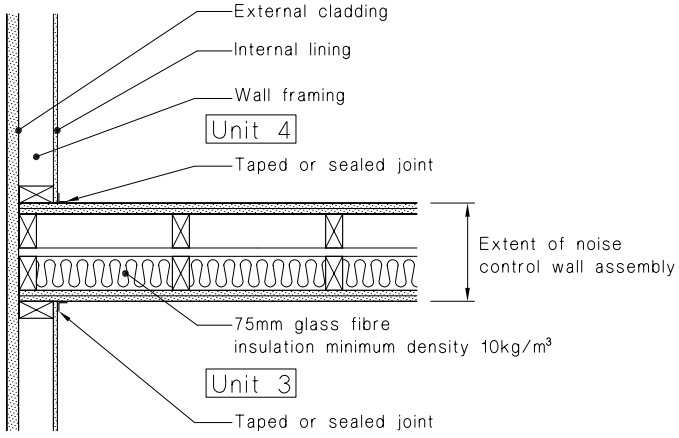


Figure 5: **Acceptable Floor/Wall Junctions for Noise Control Between Four Units**
Paragraph 1.0.3

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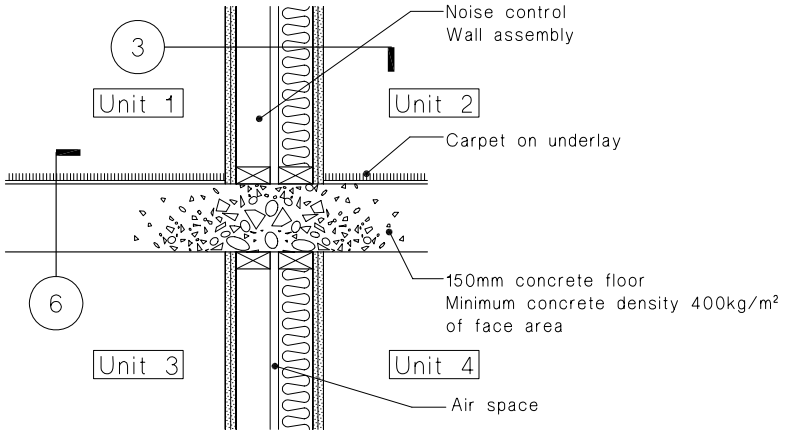
SECTION DETAIL A



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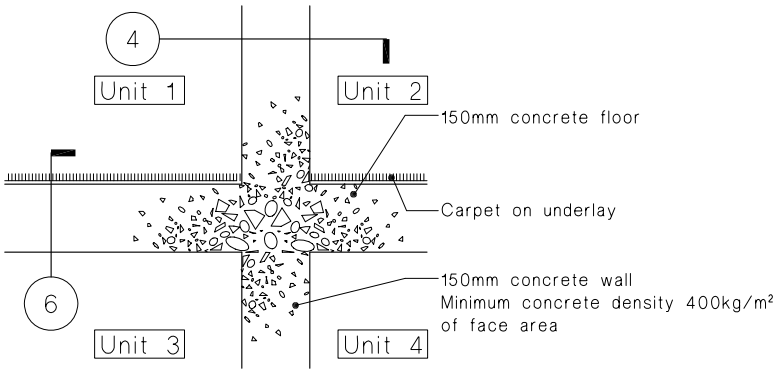
SECTION DETAIL B



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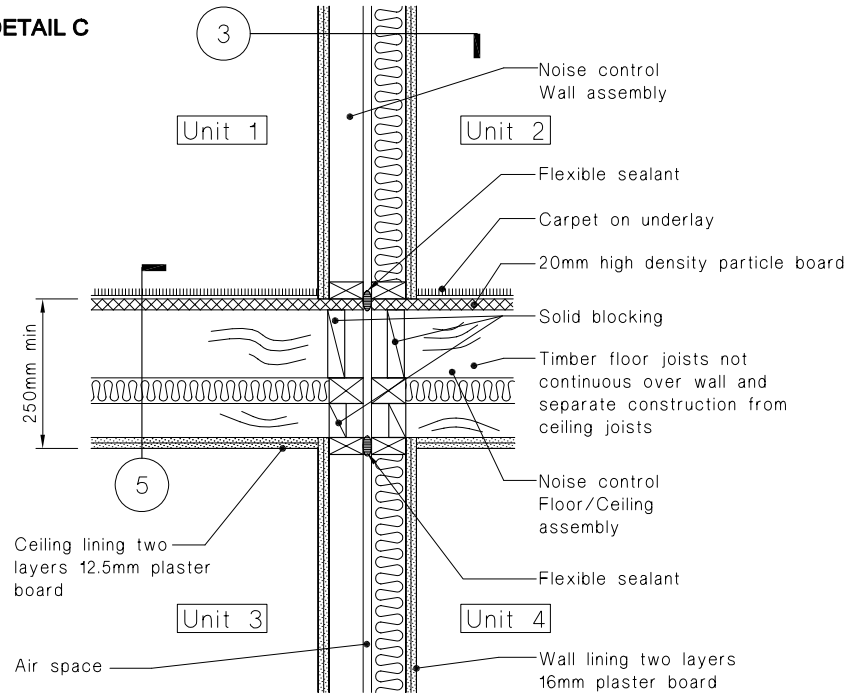
SECTION DETAIL C



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Index G6/VM1 & AS1

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

Building elements
floor/ceiling assemblies . . . . . **AS1** 1.0.3, Figure 3
floor/wall junctions . . . . . **AS1** 1.0.3, Figure 5
internal/external wall junctions . . . . . **AS1** 1.0.3, Figure 4
requiring noise control . . . . . **AS1** 1.0.2, Figure 1
wall assemblies . . . . . **AS1** 1.0.3, Figure 2

Habitable spaces **AS1** 1.0.2

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Household units **AS1** 1.0.2

Impact insulation class **VM1** 2.0

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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