

Dear Customer

Please find enclosed Amendment 6, effective 1 January 2017, to the Acceptable Solutions and Verification Methods for Clause G13 Foul Water of the New Zealand Building Code. The previous amendment to G13 (Amendment 5) was in February 2014.

Section	Old G13	January 2017 Amendments to G13
Title pages	Remove title page and document history pages 1-2B	Replace with new title page and document history pages 1-2B
References	Remove page 7/8	Replace with new page 7/8
G13/AS1	Remove pages 31-34	Replace with new page 31-34
G13/AS2	Remove page 37/38	Replace with new page 37/38
G13/AS3	Remove page 51/52	Replace with new page 51/52



**MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT**
HĪKINA WHAKATUTUKI

Acceptable Solutions and Verification Methods

For New Zealand Building Code Clause
G13 Foul Water

G13
BUILDING CODE

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Defined words (italicised in the text) and classified uses are explained in Clauses A1 and A2 of the Building Code and in the Definitions at the start of this document.

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**Verification Methods and Acceptable Solutions
are available from www.building.govt.nz**

New Zealand Government

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Document Status

The most recent version of this document (Amendment 6), as detailed in the Document History, is approved by the Chief Executive of the Ministry of Business, Innovation and Employment. It is effective from 1 January 2017 and supersedes all previous versions of this document.

The previous version of this document (Amendment 5) will cease to have effect on 30 May 2017.

People using this document should check for amendments on a regular basis. The Ministry of Business, Innovation and Employment may amend any part of any Verification Method or Acceptable Solution at any time. Up-to-date versions of Verification Methods and Acceptable Solutions are available from www.building.govt.nz

G13: Document History			
	Date	Alterations	
First published	July 1992		
Amendment 1	September 1993	pp. vii–viii, References p. xi, Definitions	p.25, Figure 3 p. 31, Figure 7
Reprinted incorporating Amendment 1		October 1994	
Amendment 2	1 December 1995	p. viii, References	
Amendment 3	28 February 1998	p. ii, Document History p. viii, References	p. 1, 1.0.1 p. 21, 1.0.1
Second edition published 1 July 2001	Effective from 1 October 2001	Document revised – second edition issued	
Amendment 1	Published March 2007 Effective from 23 June 2007	p. 2, Document History, Status p. 6, Contents pp. 7–8, References	pp. 9–10, Definitions p. 52A, AS3 1.0, 1.0.1, 1.0.2 p. 55, Index
Erratum 1	Effective from 23 June 2007	pp. 5–6, Contents pp. 33–34, AS1 8.0, 8.1	pp. 50–51, AS2 7.0, 7.1
Amendment 2	Effective from 21 June 2007	p. 2, Document History, Status pp. 3, 4, 4A, Building Code Clause p. 6, Contents	p. 8, References p. 52A, VM4 p. 54, Index
Amendment 3	Published 30 June 2010 Effective from 30 September 2010	p. 2, Document History, Status pp. 7–8, References p. 11, G13/VM1 1.0.1 p. 13, G13/AS1 Table 1 p. 32, G13/AS1 6.1.1 p. 33, G13/AS1 6.2.2, 6.3.1, 6.3.2, 7.1.2, Table 7	p. 37, G13/AS2 Table 1 p. 42, G13/AS2 5.1.2 p. 50, G13/AS2 6.1.2 p. 51, G13/AS3 1.0.1 pp. 54–55, Index
Amendment 4	Effective from 10 October 2011 until 14 August 2014	p. 2, Document History, Status p. 8, References	p. 10, Definitions p. 37, G13/AS2 Table 1
Amendment 5	14 February 2014 until 30 May 2017	p. 2A, Document History, Status pp. 7–8, References p. 9, Definitions p. 35, G13/VM2 1.0.1	p. 44, G13/AS2 5.6.1 p. 51, G13/SA2 1.03 p. 52A, 1.1.2
Amendment 6	Effective 1 January 2017	p. 8, References p. 31 G13/AS1 5.8.2, 5.8.3 p. 33 G13/AS1 6.4.1	p. 37 G13/AS2 Table 1 p. 51 G13/AS3 2.0.1, 2.0.2
Note: Page numbers relate to the document at the time of Amendment and may not match page numbers in current document.			

References

For the purposes of New Zealand Building Code (NZBC) compliance, the Standards and documents referenced in these Verification Methods and Acceptable Solutions (primary reference documents) must be the editions, along with their specific amendments, listed below. Where these primary reference documents refer to other Standards or documents (secondary reference documents), which in turn may also refer to other Standards or documents, and so on (lower-order reference documents), then the version in effect at the date of publication of these Verification Methods and Acceptable Solutions must be used.

Amend 4
Oct 2011Amend 5
Feb 2014Amend 5
Feb 2014

Where quoted

Standards New Zealand

Amend 3
Sep 2010

NZS 3501: 1976 Specification for copper tubes for water, gas, and sanitation
Amends: 1, 2, 3

AS1 Table 1,
AS2 Table 1Amend 5
Feb 2014

NZS 3604: 2011 Timber framed buildings

AS2 5.6.1

Amend 5
Feb 2014

NZS 4229: 2013 Concrete masonry buildings not requiring specific engineering design

AS2 5.6.1

NZS 4442: 1988 Welded steel pipes and fittings for water, sewage and medium pressure gas

AS2 Table 1

Amend 3
Sep 2010

British Standards Institution

BS 437: 2008 Specification for cast iron drain pipes, fittings and their joints for socketed and socketless systems

AS2 Table 1

Amend 3
Sep 2010

BS EN 12056-2:2000 Gravity drainage systems inside buildings. Sanitary pipework, layout and calculation

VM1 1.0.1

Standards Australia

Amend 3
Sep 2010

AS 1579: 2001 Arc welded steel pipes and fittings for water and waste water

AS2 Table 1

AS 1589: 2001 Copper and copper alloy waste fittings

AS1 Table 1

Amend 3
Sep 2010

AS 1646: 2007 Elastomeric seals for waterworks purposes

AS2 Table 1

Amend 3
Sep 2010

AS 2887: 1993 Plastic waste fittings

AS1 Table 1

Amend 3
Sep 2010

AS 3571: 2009 Plastic piping systems – Glass reinforced thermoplastics (GRP) systems based on unsaturated polyester (UP) resin – pressure and non-pressure drainage and sewerage (ISO 10467: 2004 MOD)

AS2 Table 1

Amend 4
Oct 2011

		Where quoted
Amend 3 Sep 2010	AS 4139: 2003 Fibre reinforced concrete pipes and fittings	AS2 Table 1
	Australian/New Zealand Standards	
Amends 3 and 4	AS/NZS 1260: 2009 PVC-U pipes and fittings for drain, waste and vent applications	AS1 Table 1, AS2 Table 1
Amends 5 & 6	<i>Amends: 1, 2</i>	
Amends 2 and 5	AS/NZS 1547: 2012 On-site domestic wastewater management	VM4 1.1.2
	AS/NZS 2032: 2006 Installation of PVC pipe systems	AS1 6.1.1, 6.2.2, 6.3.1, 7.1.2
	<i>Amend: 1</i>	AS2 5.1.2, 6.1.2, 7.0.1, Table 1
Amend 3 Sep 2010		AS3 1.0.1
Amend 4 Oct 2011	AS/NZS 2033: 2008 Installation of polyethylene pipe systems	AS1 Table 1
	<i>Amend: 1, 2</i>	
Amends 5 & 6	AS/NZS 2280: 2014 Ductile iron pipes and fittings	AS2 Table 1
	<i>Amend: 1</i>	
Amend 4 Oct 2011	AS/NZS 2566.2: 2002 Buried flexible pipelines – installation	AS2 Table 1
Amend 6 Jan 2017	<i>Amend: 1</i>	
Amend 1 Jun 2007	AS/NZS 3500:- Plumbing and drainage	AS1 7.1.3, 8.0.1, 8.0.2, 8.1,
Amends 5 & 6	Part 2: 2015 Sanitary plumbing and drainage	VM2 1.0.1 Comment, AS2 6.1.3, 7.0.2, 7.1 AS3 1.0.2
		AS2 Table 1
Amend 6 Jan 2017	AS/NZS 3518:2013 Acrylonitrile butadiene styrene (ABS) compounds, pipes and fittings for pressure applications	AS2 Table 1
		Amend 1 Jun 2007
	AS/NZS 4058: 2007 Pre cast concrete pipes (pressure and non pressure)	AS2 Table 1
	AS/NZS 4130: 2009 Polyethylene (PE) pipe for pressure applications	AS2 Table 1
	<i>Amend: 1</i>	
Amend 3 Sep 2010	AS/NZS 4401: High density polyethylene (PE-HD) pipes and fittings for soil and waste discharge (low and high temperature) systems inside buildings	AS1 Table 1
	2006	
Amend 3 Sep 2010	AS/NZS 4936: 2002 Air Admittance valves for use in sanitary plumbing and drainage systems.	AS1 5.8.2, Table 1
		Amend 6 Oct 2016
Amend 4 Oct 2011	AS/NZS 5065: 2005 Polyethylene and polypropylene pipe and fittings for drainage and sewerage applications	AS2 Table 1
	<i>Amend: 1</i>	
	European Standards	
	EN 12380: 1999 Air admittance valves for drainage systems – Requirements and test methods	AS1 5.8.2, Table 1
	American Society of Sanitary Engineers	
	ASSE 1050: 1991 Performance requirements for air admittance valves for plumbing DWV systems stack type devices	AS1 5.8.2, Table 1
	ASSE 1051: 1992 Performance requirements for air admittance valves for plumbing drainage systems	AS1 5.8.2, Table 1

5.6 Discharge stack and relief vents

5.6.1 The *discharge stack vent*, if also acting as a *drain vent pipe* shall have a *diameter* of not less than 80 mm. Where not acting as a *drain vent* the *discharge stack vent pipe* shall have a *diameter* of not less than that required in Table 6.

5.6.2 Every *discharge stack* serving *sanitary fixtures* or *sanitary appliances* from 3 floors within a *building* shall include a *relief vent pipe* as shown in Figure 7.

5.6.3 *Relief vent pipes* shall:

- a) Connect to the bottom of the *discharge stack* at no less than 300 mm below the lowest *discharge pipe* served, and at an angle of 45°, as shown in Figure 7,
- b) Be extended upwards at a gradient of no less than 1:80 to connect to the *discharge stack vent*, as shown in Figure 7, or extend separately to the atmosphere as an open vent, and
- c) Have a *diameter* of no less than that given in Table 6.

5.7 Termination of open vent pipes

5.7.1 Open *vent pipes* shall terminate outside the *building* in accordance with Paragraphs 5.7.2 and 5.7.3 or 5.7.4.

5.7.2 *Vent pipes* shall terminate outside the *building* and:

- a) Be at a height of not less than 50 mm above the overflow level of the highest *sanitary fixture* they serve, and

COMMENT:

The height of 50 mm above the overflow level is to ensure that the *vent pipe* does not convey *foul water* in the event of the *discharge pipe* becoming blocked.

- b) Incorporate a means to prevent the entry of birds and vermin and shall have an open area not less than 80% of the cross-sectional area of the *vent pipe* they serve.

5.7.3 Open *vent pipes* serving *discharge pipes* directly connected to the *foul water drainage system* shall terminate no closer to *building elements* than (see Figure 12):

- a) Ground level – 3.0 m above,
- b) Windows and other openings – 600 mm above, and 3.0 m below and horizontally,
- c) Roofs – 150 mm above,
- d) Decking having pedestrian access – 3.0 m above, below and horizontally,
- e) Eaves or parapets – 600 mm above, below and horizontally, and
- f) Air intakes – 5.0 m in any direction.

COMMENT:

These requirements reduce the likelihood of foul air from the *foul water drainage system* entering the *building*.

5.7.4 *Fixture vent pipes* serving *waste pipes* discharging to a *gully trap* shall:

- a) Terminate outside the *building* and be not less than 900 mm from any opening to the *building*, and
- b) Be vented to the atmosphere independently of any *vent pipe* system connected directly to the *foul water drainage system*.

COMMENT:

1. The location of the outlet of the *vent pipe* serving a *waste pipe* is less restrictive than the requirements for *vent pipes* serving *discharge pipes* connected directly to the *drain*. This is permitted because a *waste pipe* is not connected directly to the *foul water drainage system*, and hence a source of foul air.
2. An independent vent pipe system for *waste pipes* is needed to avoid the risk of *sewer gases* escaping through a *waste pipe* to a *gully trap*.

5.8 Air admittance valves

5.8.1 General

Air admittance valves may be used as venting where specified in accordance with Table 5.

5.8.2 *Air admittance valves* shall be manufactured to ASSE 1050, ASSE 1051, EN 12380 or AS/NZS 4936.

5.8.3 Size of air admittance valves

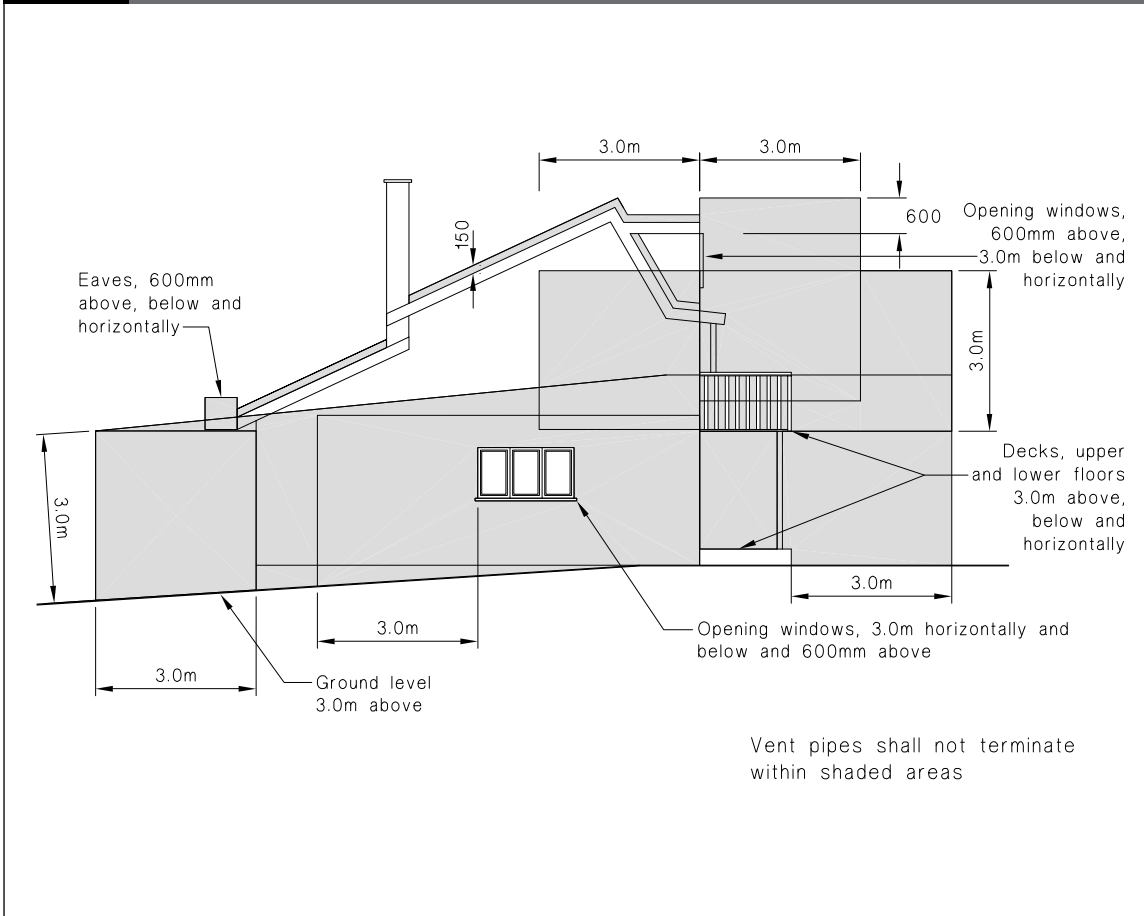
The *air admittance valve* shall have a *diameter* no less than that given in Table 6, and be no smaller in *diameter* than the *vent pipe* that it serves.

Air admittance valves that form an integral part of a *fixture trap* shall only be used as a *trap vent*.

Amend 6
Jan 2017

Amend 6
Jan 2017

Figure 12: Restricted location for the termination of vent pipes
Paragraph 5.7.3



5.8.4 Location

Air admittance valves shall be installed in an upright (vertical) position at least 100 mm above the weir of the *fixture* trap and in a location (see Figure 10 (c)):

- a) Accessible for maintenance and inspection,
- b) Where the valve is unlikely to become frozen,
- c) Protected from likely damage, and
- d) Where *adequate* air can enter the valve.

Ventilated openings shall be provided for *air admittance valves* installed within a wall space. The free area of the openings shall be not less than 1.5 times that of the *vent pipe*.

COMMENT:

A significant amount of ventilating pipework and roof penetrations may be avoided with the use of *air admittance valves*. However the pipework sizing, whether for individual *fixture* vents or branch vents, should follow the requirements of this Acceptable Solution. *Air admittance valves* are intended for anti-siphon situations and may not protect the **water seals** of traps in positive pressure situations.

6.0 Installation

6.1 Jointing methods

6.1.1 Jointing methods for PVC-U pipe shall comply with AS/NZS 2032.

Amend 3
Sep 2010

6.2 Pipe supports

6.2.1 Pipes shall be supported at centres not exceeding those in Table 7.

Amend 3
Sep 2010

6.2.2 For PVC-U pipes carrying discharges of greater than 60°C, support for the pipe shall be in accordance with Paragraph 6.3.2 of AS/NZS 2032.

Amend 3
Sep 2010

COMMENT:

Supports are required to ensure that the pipe gradient does not fall below minimum values given in Paragraph 4.2.1.

6.3 Thermal movement

6.3.1 The *plumbing system* shall accommodate without failure the expected longitudinal movement in pipes resulting from temperature changes. All copper and PVC-U pipes shall incorporate expansion joints. The provisions described in Section 6.4 of AS/NZS 2032 shall be used for PVC-U pipes.

Amend 3
Sep 2010

Amend 3
Sep 2010

6.3.2 At supports, and at wall and floor penetrations not incorporating expansion joints, movement shall be accommodated using pipe sleeves or a durable and flexible lagging material.

COMMENT:

1. Thermal expansion will cause a 10 m length of PVC-U to extend 0.8 mm for each 1°C rise of pipe temperature.
2. Provision for thermal movement by correctly locating expansion joints, with fixed and sliding supports, prevents damage to pipes and *fixtures*.

Amend 3
Sep 2010

6.4 Fire separation

6.4.1 Fire stopping shall be fitted to pipes passing through fire separations in accordance with C/AS2-6 Paragraph 4.4.

Amend 6
Jan 2017

7.0 Watertightness

7.1 Test methods

7.1.1 All above ground sanitary plumbing pipework shall be tested by water test or air test to verify that the system is watertight.

7.1.2 Water test: The method described in AS/NZS 2032 may be used for ensuring watertightness of above ground sanitary plumbing pipework.

Amend 3
Sep 2010

7.1.3 Air tests may be carried out in accordance with either clause 12.3.2 of AS/NZS 3500.2.2 or Paragraph 8.3 of E1/VM1.

Erratum 1
Jun 2007

Table 7: Distances Between Supports
Paragraph 6.2.1

Material	Pipe diameter (mm)	Maximum distance between supports (m)	
		Vertical pipe	Graded pipe
Copper pipes	32 to 50	3.0	2.5
	greater than 50	3.5	3.0
PVC-U pipes	32 to 50	1.0	0.5
	65 to 100	1.2	1.0
	greater than 100	1.8	1.2

Amend 3
Sep 2010

Acceptable Solution G13/AS2 Drainage

1.0 Scope

1.0.1 This Acceptable Solution is for below ground non-pressure (gravity flow) *foul water drains* having a *diameter* of no greater than 150 mm.

1.0.2 It does not apply to *foul water drainage systems* where it is necessary to dispose of industrial liquid wastes, chemical or toxic wastes and other wastes which cannot be discharged to a *sewer* without pre-treatment. See G14/MM1.

2.0 Materials

2.0.1 Materials for drainage pipes and joints shall comply with the appropriate standards shown in Table 1.

2.1 Fill materials

2.1.1 Fill materials, as shown in Figure 7, shall be:

- a) Bedding material of clean granular non-cohesive material with a maximum particle size of 20 mm,

- b) Selected fill of fine-grained soil or granular material that is free from topsoil and rubbish and has a maximum particle size of 20 mm, or
- c) Ordinary fill of excavated material.

3.0 Design

3.1 Bends

3.1.1 To reduce the risk of blockages, the *foul water drainage system* shall:

- a) Have a simple layout that incorporates the least number of changes of direction,
- b) Use bends having a radius of the practical maximum, and
- c) Be laid only in straight lines between bends or junctions (both horizontally and vertically).

3.2 Junctions

3.2.1 Any connection to a *drain*, excluding *vent pipe* connections, shall be made by means of sweep or oblique junctions. The angle that the branch makes at the point of entry with the main *drain*, shall be no greater than 60° (see Figure 1).

Table 1: Materials for drainage pipes
Paragraphs 2.0.1 and 5.3.1

	Material	Manufacturing Standard	Installation Standard
Amend 3 Sep 2010	Cast iron	BS 437	
	Concrete	AS/NZS 4058	
	Steel	NZS 4442 or AS 1579	
Amend 3 Sep 2010	PVC-U	AS/NZS 1260	AS/NZS 2032
Amend 4 Oct 2011	Polyethylene	AS/NZS 4130, AS/NZS 5065	AS/NZS 2033
	Polypropylene	AS/NZS 5065	AS/NZS 2566
Amend 3 Sep 2010	Ductile iron	AS/NZS 2280	
	ABS	AS/NZS 3518	
	Copper	NZS 3501	
Amend 3 Sep 2010	GRP	AS 3571	
	FRC	AS 4139	
	Elastomeric rings	AS 1646	

Amend 6
Jan 2017

Amend 6
Jan 2017

Figure 1: Connection of drains
Paragraph 3.2.1

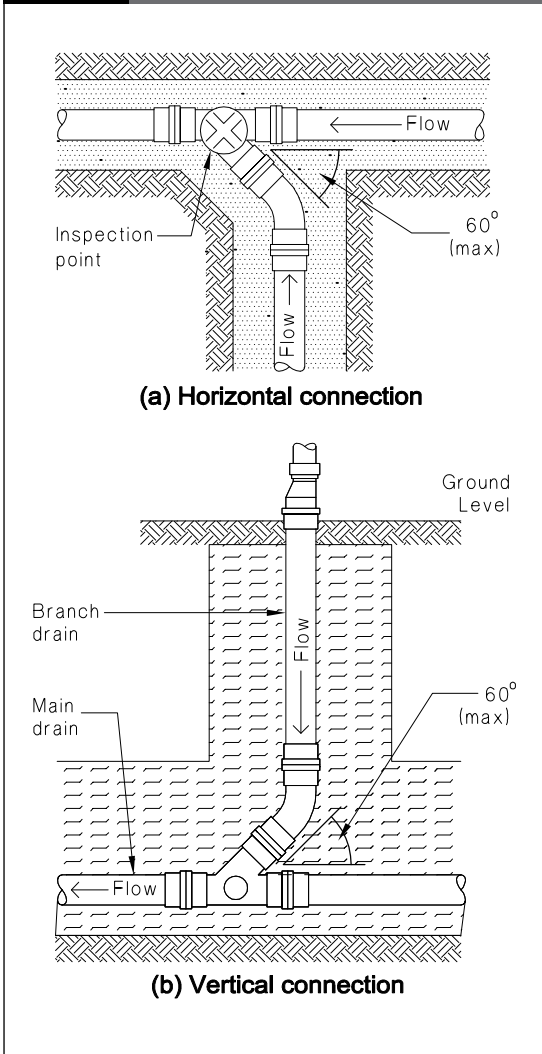
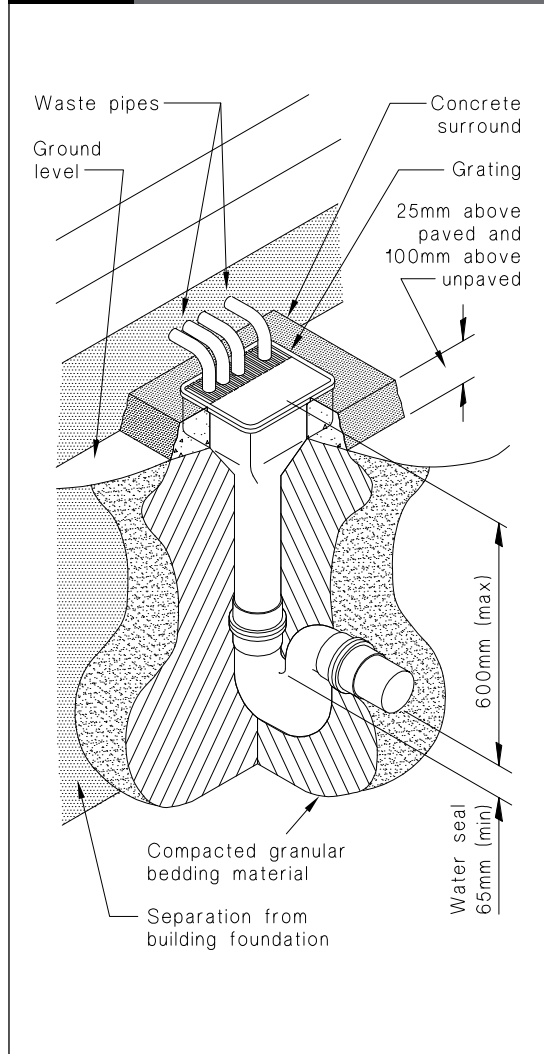


Figure 2: Details of gully traps
Paragraph 3.3.1



3.3 Gully traps

3.3.1 All *gully traps* shall be constructed to prevent the ingress of *surface water* and foreign bodies likely to cause a blockage, shall be located within the legal boundary of the land on which the *building* is erected, and shall have (see Figures 2 and 3):

- a) The overflow level of the gully dish no less than:
 - i) 25 mm above paved surfaces, or
 - ii) 100 mm above unpaved surfaces,

COMMENT:

It is imperative that the *waste pipe* connections to the *gully trap* remain watertight to prevent the ingress of ground/surface water.

- b) A grating that will allow surcharge,
- c) A minimum outlet pipe *diameter* of 100 mm,
- d) A *water seal* depth of at least 65 mm,
- e) At least one *discharge pipe* discharging to the *gully trap* to avoid *water seal* evaporation,
- f) *Waste pipes* that discharge to the *gully trap* arranged to permit easy cleaning of the *gully trap*,
- g) *Waste pipe* outlets located at least 20 mm above *water seal* level, and at least 20 mm below the grating,

Acceptable Solution G13/AS3 Plumbing and drainage

1.0 Installation of PVC-U pipe

1.0.1 AS/NZS 2032 is an Acceptable Solution for the installation of PVC-U pipe and fittings, but may exceed the performance criteria of NZBC G13.

Amends
1 & 6

2.0 AS/NZS 3500.2

2.0.1 AS/NZS 3500.2, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13, as modified by Paragraph 2.0.2, is an Acceptable Solution for plumbing and drainage.

2.0.2 Modifications to AS/NZS 3500.2

Clause 2.2 Delete and replace with "Materials and products shall comply with NZBC B2 and G13/AS1 Paragraph 2.0 Materials".

Section 3.19 Delete section.

Section 4.4 Replace "inspection shafts" with "access point" in this section.

Clause 4.6.6 This applies only to *Housing*.

Clause 5.6 Delete and replace with "Drains in other than stable ground shall be subject to specific design."

Amend 3
Sep 2010

Amend 6
Jan 2017

Amend 6
Jan 2017

Amend 6
Jan 2017

Amend 5
Feb 2014

