MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Dear Customer

Please find enclosed Amendment 5, effective 14 February 2014, to the Acceptable Solution and Verification Method for Clause G14 Industrial Liquid Waste of the New Zealand Building Code. The previous amendment to G14 (Amendment 4) was in October 2011.

Section	**Old G14**	**February 2014 Amendments to G14**
Title pages	Remove title page and document history page 1/2	Replace with new title page and document history pages 1–2B
Contents	Remove page 5/6	Replace with new page 5/6
References	Remove pages 7/8	Replace with new pages 7/8
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G14/VM1	Remove pages 15–18	Replace with new pages 15–18
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MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Acceptable Solutions and Verification Methods

For New Zealand Building Code Clause G14 Industrial Liquid Waste

Second Edition

G14
BUILDING CODE

Status of Verification Methods and Acceptable Solutions

Verification Methods and Acceptable Solutions are prepared by the Ministry of Business, Innovation and Employment in accordance with section 22 of the Building Act 2004. Verification Methods and Acceptable Solutions are for use in establishing compliance with the New Zealand Building Code.

A person who complies with a Verification Method or Acceptable Solution will be treated as having complied with the provisions of the Building Code to which the Verification Method or Acceptable Solution relates. However, using a Verification Method or Acceptable Solution 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 Verification Methods and Acceptable Solutions and explains alternative methods of achieving compliance.

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.dbh.govt.nz

New Zealand Government

Document Status

The most recent version of this document (Amendment 5), as detailed in the Document History, is approved by the Chief Executive of the Ministry of Business, Innovation and Employment. It is effective from 14 February 2014 and supersedes all previous versions of this document.

The previous version of this document (Amendment 4) will cease to have effect on 14 August 2014.

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.dbh.govt.nz

G14: Document History

	Date	Alterations	
First published	July 1992		
Amendment 1	September 1993	pp. vi – viii, References	
Amendment 2	1 December 1995	pp. i and ii, Document History	p. iv, G14.3.2 (d)
Second edition	21 June 2007	Document revised – second edition issued	
Amendment 3	Published 30 June 2010 Effective from 30 September 2010	p. 2, Document History, Status pp. 7–9, References	p. 19, G14/VM1 Table 3 p. 22, G14/VM1 Table 4
Amendment 4	Effective from 10 October 2011 until 14 August 2014	p. 2, Document History, Status p. 11, Definitions	pp. 7–9, References p. 19, G14/VM1 Table 3
Amendment 5	14 February 2014	p. 2A, Document History, Status p. 5, Contents p. 7, References p. 11, Definitions	pp. 16–17, G14/VM1 1.3, 1.4, 1.6.2, Table 2 p. 25, G14/AS1 1.2.1, 1.2.2

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

Contents

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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.

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Amend 4 Oct 2011

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	Where quoted
Standards New Zealand	
NZS/BS 21: 1985 Specification for pipe threads for tubes and fittings where pressure-tight joints are made on the threads (metric dimensions) *Amend: 1*	VM1 Table 3
Amend 3 Sep 2010 NZS/BS 1387: 1985 Specification for screwed and socketed steel tubes and tubulars and for plain end steel tubes suitable for welding or for screwing to BS 21 pipe threads *Amend: 1*	VM1 Table 3
NZS 3106: 2009 Design of concrete structures for the storage of liquids.	VM1 3.2.2, Table 4
Amend 3 Sep 2010 NZS 4219: 2009 Seismic performance of engineering systems in buildings.	VM1 3.2.1
Amend 5 Feb 2014 NZS 4442: 1988 Welded steel pipes and fittings for water, sewage and medium pressure gas	VM1 Table 3
NZS 7601: 1978 Specification for polyethylene pipe (Type 3) for cold water services	VM1 Table 3
Amend 3 Sep 2010 **Standards Australia/Standards New Zealand**	
Amend 4 Oct 2011 AS/NZS 1260: 2009 PVC-U pipes and fittings for drain, waste and vent applications *Amend: 1*	VM1 Table 3
Amend 5 Feb 2014 AS/NZS 1477: 2006 PVC pipes and fittings for pressure applications *Amend: 1*	VM1 Table 3
Amend 4 Oct 2011 AS/NZS 1546: On-site domestic wastewater treatment units	
Amend 4 Oct 2011 Part 1: 2008 Septic tanks	VM1 Table 4
AS/NZS 2032: 2006 Installation of PVC pipe systems	VM1 Table 3
Amend 3 Sep 2010 AS/NZS 2033: 2008 Installation of polyethylene pipe systems *Amend: 1, 2*	VM1 Table 3
Amend 4 Oct 2011 AS/NZS 2642: Polybutylene pipe systems	VM1 Table 3
Amend 4 Oct 2011 Part 2: 2008 Polybutylene (PB) for hot and cold water applications	
Part 3: 2008 Mechanical jointing fittings for polybutylene pipes for hot and cold water applications *Amend: 1*	
Amend 4 Oct 2011	

		Where quoted
	AS/NZS 3518: 2004 Acrylonitrile butadiene styrene (ABS) compounds, pipes and fittings for pressure applications *Amend: 1*	VM1 Table 3
Amend 3 Sep 2010	AS/NZS 4058: 2007 Pre Cast concrete Pipes (pressure and non pressure)	VM1 Table 1
Amend 4 Oct 2011	AS/NZS 4129: 2008 Fittings for polyethylene (PE) pipes for pressure applications	VM1 Table 3
Amend 4 Oct 2011	AS/NZS 4130: 2009 Polyethylene (PE) pipes for pressure applications *Amend: 1*	VM1 Table 3
	AS/NZS 4331: 1995 Metallic flanges Part 1: Steel flanges Part 2: Cast iron flanges Part 3: Copper alloy and composite flanges	VM1 Table 3
Amend 3 Sep 2010	AS/NZS 4401: 2006 High density polyethylene (PE-HD) pipes and fittings for soil and waste discharge (low and high temperature) systems inside buildings	VM1 Table 3
Amend 3 Sep 2010	AS/NZS 4765: 2007 Modified polyvinyl chloride (PVC-M) pipes for pressure applications	VM1 Table 3
	British Standards Institution	
Amend 3 Sep 2010	BS 143, and BS 1256: 2000 Specification for malleable cast iron and cast copper alloy threaded pipe fittings. *Amend: 1, 2, 3, 4*	VM1 Table 3
Amend 3 Sep 2010 Amend 4 Oct 2011 Amend 3 Sep 2010	BS EN 1595: 1997 Pressure equipment made from borosilicate glass 3.3 – general rules for design, manufacture and testing	VM1 Table 3
	BS 2971: 1991 Specification for Class II arc welding of carbon steel pipework for carrying fluids	VM1 Table 3
Amend 3 Sep 2010	BS 4991: 1974 (1982) Specification for propylene copolymer pressure pipe	VM1 Table 3
	BS 6374:– Lining of equipment with polymeric materials for the process industries Part 1: 1985 Specification for lining with sheet thermoplastics Part 2: 1984 Specification for lining with non-sheet applied thermoplastics Part 3: 1984 Specification for lining with stoved thermosetting resins Part 4: 1984 Specification for lining with cold curing thermosetting resins Part 5: 1985 Specification for lining with rubbers	VM1 Table 4

Definitions

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

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Adequate *Adequate* to achieve the objectives of the *Building Code*.

Building has the meaning given to it by sections 8 and 9 of the *Building Act 2004*.

Grease trap A device designed to intercept grease in a *foul water* discharge.

Hazardous Creating an unreasonable risk to people of bodily injury or deterioration of health.

Interceptor trap A device which will separate and retain desired liquids and solids from a liquid stream and which will provide a water barrier to prevent foul air or gas from entering any downstream system.

Network utility operator means a person who—

(a) undertakes or proposes to undertake the distribution or transmission by pipeline of natural or manufactured gas, petroleum, biofuel or geothermal energy; or

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(b) operates or proposes to operate a network for the purpose of—

(i) telecommunication as defined in section 5 of the Telecommunications Act 2001; or

(ii) radiocommunications as defined in section 2(1) of the Radiocommunications Act 1989; or

(c) is an electricity operator or electricity distributor as defined in section 2 of the Electricity Act 1992 for the purpose of line function services as defined in that section; or

(d) undertakes or proposes to undertake the distribution of water for supply (including irrigation); or

(e) undertakes or proposes to undertake a drainage or sewerage system

Piping system An assembly of pipes, pipe-fittings, gaskets, bolting and pipe supports.

Sewer A *drain* that is under the control of, or maintained by, a *network utility operator*.

Table 1: Examples of industrial liquid waste and typical treatment and disposal methods (see Note)
Paragraph 1.2.2

Type of industrial waste	Industry source	Typical contaminants	Typical treatment and disposal methods
Waste containing organic compounds:			
1) Natural organic waste from food and drink manufacture	Meat processing Dairy processing Canning Poultry processing Brewing Vegetable processing Wine-making Sugar refining Food processing Fish processing	Soluble and suspended solids Carbohydrates Proteins Fat and grease Alkalis	Neutralisation Grease recovery Sedimentation flotation Biological Land application Discharge to sewer
2) Other organic waste from processing animal and vegetable matter	Pulp and paper Tannery and leather processing Wool scouring Textile and carpet manufacture Timber treatment Hospitals Mortuaries	Carbohydrates Proteins Acids, alkalis Tannins Inorganic salts Dyes, bleaches Latex Suspended solids Viruses Fat and grease	Neutralisation Screening Sedimentation flotation Chemical precipitation Cooling towers Disinfection Heat
Waste containing metals and cyanides	Mineral processing Steel mills Foundries Plating operations Metal fabrication Electrical manufacturing	Acids, alkalis Oil Heavy metals Chromium Cyanides Solvents Suspended solids	Neutralisation Sedimentation flotation Chemical precipitation Ion exchange Filtration Distillation and stream stripping Cooling towers Heat
Other chemical waste	Fertiliser works Paint manufacture Pharmaceutical Petrochemical Agrochemical production Plastics manufacture	Organic chemicals Solvents Acids, alkalis Suspended solids Inorganic salts Viruses	Neutralisation Screening Sedimentation flotation Chemical treatment Absorption and ion exchange Distillation and steam stripping Membrane separation Biological Incineration Secure landfill Disinfection

NOTE:

This table gives examples but does not purport to be an exhaustive list.

1.3 Related Acceptable Solutions and Verification Methods

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1.3.1 Table 2 identifies the Acceptable Solutions and Verification Methods that are referenced in G14/VM1.

1.4 Location of collection, storage and treatment facilities and disposal systems

1.4.1 Collection, storage and treatment facilities and disposal systems shall be located:

a) In areas that will not create health or safety hazards,

b) To ensure that spillage from storage tanks or ponds can be safely contained, and

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COMMENT:
Verification Method F3/VM1 Hazardous Substances and Processes gives guidance on the requirements for the capacity of compounds intended for the containment of spillage.

c) In areas with sufficient access for cleaning, clearing of blockages, and maintenance.

1.4.2 Storage tanks may be placed below ground provided:

a) Precautions are taken to avoid:

   i) health or safety hazards,

   ii) corrosion that threatens the integrity of the tank or associated plant, and

b) Tanks are designed to withstand the effects of associated loads.

1.5 Construction materials

1.5.1 All materials in contact with industrial liquid waste shall be resistant to corrosion, chemical attack, and any abrasion or physical abuse that can be reasonably expected.

1.5.2 Any corrosion allowance provided in the design of equipment handling liquid waste shall be *adequate* for the *intended life* of the facilities.

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Table 2: Building Code clauses, Acceptable Solutions and Verification Methods referenced in G14/VM1
Paragraph 1.3.1

Building Code clause	Subject	Paragraph in G14/VM1
NZBC B1 Structure and B1/VM1	Seismic restraint of tanks	3.2.1
NZBC D1 Access Routes	Vehicle access	1.8
NZBC F3 Hazardous Substances and Processes and F3/AS1	Collection and storage of hazardous liquid waste	1.1.2, Figure 1 and 1.4.1
NZBC G12 Water Supply and G12/AS1	Contamination of water supply	1.6.3
	Water hose for emergency use near storage tanks	3.3.2
NZBC G13 Foul Water and G13/AS1	Conveyance of treated wastewater	2.0.1 and Figure 1
	Drainage of water used in emergency near storage tanks	3.3.2

1.6 Avoiding contamination

1.6.1 Industrial liquid waste systems, storage and treatment tanks and *piping systems* shall be tested on completion to avoid contamination of any soil, ground water or waterways through run-off from washing-down, rain, accidental overflows or other causes.

1.6.2 The area containing waste storage facilities shall be impervious and contained so as to avoid contamination of any soil, ground water or waterways through run-off from washing-down, rain, accidental overflows or other causes.

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COMMENT:
Verification Method F3/VM1 Hazardous Substances and Processes gives guidance on the requirements for the capacity of compounds intended for the containment of spillage.

1.6.3 Industrial liquid waste facilities shall be installed to avoid contamination of any potable water supply, as required by NZBC G12 Water Supplies.

1.7 Separation of waste

1.7.1 Separate systems shall be provided to convey and store industrial liquid wastes that require different treatment and/or disposal methods, or where the wastes are incompatible.

COMMENT:
This situation is usual for premises that produce both industrial liquid waste and *foul water*. Incompatibility may be due to the physical **or** chemical nature of the wastes.

1.8 Vehicle access

1.8.1 Vehicle access areas for the collection of industrial liquid waste shall:

a) Comply with NZBC D1 Access Routes. Where possible, access layout shall provide sufficient space for vehicles to drive in and out of the facility without reversing or interference with other activities on the site,

b) Drain any spilled waste to a kerbed area sloped so that the waste does not collect under the vehicle, or drain in an uncontrolled manner to other areas of the plant, and

c) Any spilled waste shall:

   i) be contained on-site for subsequent removal,

   ii) not enter the surface water system, and

   iii) not enter the sewage system unless the spilled waste is acceptable as a discharge to the *sewer* by the *network utility operator*.

1.9 Security

1.9.1 Where unauthorised access to storage and treatment facilities may be *hazardous*, security shall be provided by:

a) Locating the facilities in a lockable enclosed space within a *building*, or

b) An external security fence with lockable gates if located in the open.

2.0 Conveyance of industrial liquid waste

2.0.1 Where the *network utility operator* accepts the discharge of industrial liquid waste to a *sewer*, the waste shall be conveyed in a plumbing and drainage disposal system complying with NZBC G13 Foul Water.

2.1 Layout

2.1.1 Screens, grit chambers, *grease traps* or similar appropriate equipment should be installed at the head of *piping systems* if suspended solids or material within the liquid waste might cause blockage of the *piping system*.

2.1.2 Wherever possible, *piping systems* shall convey industrial liquid waste using gravity flow.

2.1.3 Gravity flow pipelines should have sufficient gradient to provide flow velocities that prevent the settlement of entrained solids and grit.

2.1.4 Pipework containing *hazardous* liquid waste shall not be buried except where this is unavoidable.

2.1.5 Piping above access areas shall have a ground clearance of no less than 4.5 m. In vehicle access areas, signs shall be dis-played indicating the amount of clearance.

2.1.6 Valves shall be readily accessible. The distance between operating floor level and the centreline of any valve handwheels located above floor level shall be no more than 2.2 m, unless extension operating gear is provided. Valve stems shall not slope downwards in a way that allows solids to enter the gland.

2.1.7 Pipework flanges shall not be located over roads, walkways or cable trays, or places where leakage could cause damage or a hazard.

2.2 Drainage

2.2.1 Floor surfaces used to drain free flowing liquid should slope towards waste collection systems:

a) For non-*hazardous* waste – no less than 1 in 80 for a travel distance of no more than 12.0 m, or

b) For *hazardous* waste – no less than 1 in 40 for a travel distance of no more than 6.0 m.

COMMENT:
Drainage valleys should not coincide with access ways. Kerbs may be required to prevent hazardous liquid waste contaminating access areas or mixing with other fluids.

2.2.2 Industrial liquid waste shall be prevented from polluting or overflowing onto adjacent property.

2.2.3 *Interceptor traps* shall be installed at the exit points of areas containing flammable liquid waste that is immiscible in water, to prevent the spread of *fire*.

2.2.4 Liquid-sealed traps shall be provided at any branch connections to contain *hazardous* gases within parts of the conveyance system. Traps shall be vented to a safe location no less than 3.0 m above ground level.

2.2.5 *Grease traps* shall be provided where liquid waste is likely to convey grease.

COMMENT:
Grease solids shall not be allowed to accumulate to an extent that the *grease trap* is blocked. Refer to G13/AS2.

2.3 Piping

2.3.1 The *piping system* shall comply with the Standards applicable to the material used and waste being conveyed. Related Standards are listed in Table 3.

Acceptable Solution G14/AS1 Industrial Liquid Waste

1.1 Security

1.1.1 A fence erected to ensure security against unauthorised access to storage and treatment facilities shall comply with F5/AS1 Construction and Demolition Hazards.

1.2 Acceptable disposal systems

1.2.1 Discharge to the sewer without pre-treatment – Where the *network utility operator* accepts the discharge of industrial liquid waste to a *sewer* without pre-treatment, the disposal system shall comply with Acceptable Solution G13/AS2.

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1.2.2 Discharge to the sewer after pre-treatment – Where the *network utility operator* accepts the discharge of industrial liquid waste to a *sewer* with pre-treatment, that part of the discharge system used to convey the waste after treatment shall comply with Acceptable Solution G13/AS2.

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