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Department of  
Building and Housing  
*Te Tari Kaupapa Whare*

Dear Customer

Please find enclosed Amendment 4, effective 10 October 2011, to the Compliance Document for Clause G14 Industrial Liquid Waste of the New Zealand Building Code.

<b>Section</b>	<b>Old G14</b>	<b>October 2011 Amendments to G14</b>
Title pages	Remove title page and document history	Replace with new title page and document history
References	Remove pages 7–10	Replace with new pages 7–10
Definitions	Remove page 11/12	Replace with new page 11/12
G14/VM1	Remove page 19/20	Replace with new page 19/20

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## Compliance Document for New Zealand Building Code Clause G14 Industrial Liquid Waste – Second edition

Prepared by the Department of Building and Housing

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.

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### New Zealand Government

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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 and A2 of the Building Code and in the Definitions at the start of this Compliance Document.

<b>G14: Document History</b>			
	<b>Date</b>	<b>Alterations</b>	
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	10 October 2011	p. 2, Document History, Status p. 11, Definitions	pp. 7–9, References p. 19, G14/VM1 Table 3

**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 10 October 2011 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](http://www.dbh.govt.nz)

# References

For the purposes of New Zealand Building Code (NZBC) compliance, the Standards and documents referenced in this Compliance Document (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 this Compliance Document must be used.

Amend 4  
Oct 2011**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*

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*

Amend 3  
Sep 2010

NZS 3106: 2009 Design of concrete structures for the storage of liquids.

NZS 4219: 1983 Specification for seismic resistance of engineering systems in buildings.  
*Amend: 1, 2*

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

NZS 7601: 1978 Specification for polyethylene pipe (Type 3) for cold water services

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 4  
Oct 2011

AS/NZS 1477: 2006 PVC pipes and fittings for pressure applications  
*Amend: 1*

Amend 4  
Oct 2011

AS/NZS 1546: On-site domestic wastewater treatment units  
Part 1: 2008 Septic tanks

Amend 3  
Sep 2010  
Amend 4  
Oct 2011

AS/NZS 2032: 2006 Installation of PVC pipe systems

AS/NZS 2033: 2008 Installation of polyethylene pipe systems  
*Amend: 1, 2*

Amend 4  
Oct 2011

AS/NZS 2642: Polybutylene pipe systems  
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**

VM1 Table 3

VM1 Table 3

VM1 3.2.2, Table 4

VM1 3.2.1

VM1 Table 3

VM1 Table 3

VM1 Table 3

VM1 Table 3

VM1 Table 4

VM1 Table 3

VM1 Table 3

VM1 Table 3

		Where quoted
	AS/NZS 3518: 2004 Acrylonitrile butadiene styrene (ABS) compounds, pipes and fittings for pressure applications <i>Amend: 1</i>	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 <i>Amend: 1</i>	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
	<b>British Standards Institution</b>	
Amend 3 Sep 2010	BS 143, and BS 1256: 2000 Specification for malleable cast iron and cast copper alloy threaded pipe fittings. <i>Amend: 1, 2, 3, 4</i>	VM1 Table 3
	BS EN 1595: 1997 Pressure equipment made from borosilicate glass 3.3 – general rules for design, manufacture and testing	VM1 Table 3
Amend 3 Sep 2010		
Amend 4 Oct 2011		
Amend 3 Sep 2010	BS 2971: 1991 Specification for Class II arc welding of carbon steel pipework for carrying fluids	VM1 Table 3
	BS 4991: 1974 (1982) Specification for propylene copolymer pressure pipe	VM1 Table 3
Amend 3 Sep 2010	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

		<b>Where quoted</b>
	BS 6464: 1984 Specification for reinforced plastics pipes, fittings and joints for process plants	VM1 Table 3
	BS 7159: 1989 Code of practice for design and construction of glass-reinforced plastics (GRP) piping systems for individual plants or sites	VM1 Table 3
	BS 7777: 1993 Flat bottomed, vertical, cylindrical storage tanks for low temperature service	VM1 Table 4
	Part 1: Guide to the general provisions applying for design, construction and installation	
	Part 2: Specification for design and construction of single, double and full containment metal tanks for the storage of liquified gas at temperatures down to -165°C	
	Part 3: Recommendations for the design and construction of prestressed and reinforced concrete tanks and tank foundations and for the design and installation of tank insulation, tank lines and tank coating	
	BS EN 10241: 2000 Steel threaded pipe fittings	VM1 Table 3
Amend 4 Oct 2011	BS EN 12285: Workshop fabricated steel tanks	
	Part 1: 2003 Horizontal cylindrical single skin and double skin tanks for the underground storage of flammable and non-flammable water polluting liquids	VM1 Table 4
	Part 2: 2005 Horizontal cylindrical single skin and double skin tanks for the aboveground storage of flammable and non-flammable water polluting liquids	VM1 Table 4
Amend 3 Sep 2010		
	BS EN 12585: 1999 Glass plant, pipeline and fittings – Pipeline and fittings DN 15 to 1000 – compatibility and interchangeability	VM1 Table 3
Amend 3 Sep 2010 Amend 4 Oct 2011	BS EN 13121-3: 2008 GRP tanks and vessels for use above ground. Design and workmanship <i>Amend: 1 (2010)</i>	VM1 Table 4
<b>Standards Association of Australia</b>		
	AS 1741: 1991 Vitrified clay pipes and fittings with flexible joints – sewer quality	VM1 Table 3
Amend 3 Sep 2010		
Amend 4 Oct 2011	AS 3690: 2009 Installation of ABS pipe systems	VM1 Table 3
<b>New Zealand Regulations</b>		
	Hazardous Substances (Disposal) Regulations 2001	VM1 1.2.1
	The Resource Management Act 1991	VM1 1.2.1, 3.3.1

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# Definitions

This is an abbreviated list of definitions for words or terms particularly relevant to this Compliance 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*.

**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
- (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*.

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**Table 3: Standards relevant to piping systems**  
Paragraph 2.3.1

Material	System	Standards	Special conditions	
Amend 3 Sep 2010	Steel	Piping	NZS 4442 NZS/BS 1387	Welded pipe 100 to 1000 mm nominal diameter Tube suitable for screwing to BS 21
	Fittings		BS 143 and BS 1256	Screwed pipe fittings, malleable cast iron
			BS EN 10241 AS/NZS 4331	Screwed pipe fittings, wrought steel Flanges
Amend 3 Sep 2010	Jointing		NZS/BS 21	Screwed/socketed
			BS 2971	Welded
Amend 3 Sep 2010	Concrete	Piping	AS/NZS 4058	Precast concrete
Amend 4 Oct 2011 Amend 3 Sep 2010	Plastic (see Note 1)	ABS	AS/NZS 3518 AS 3690	Pipes and fittings Installation
		Polybutylene piping	AS/NZS 2642	Pipes and fittings
		Polyethylene piping	NZS 7601	Maximum working pressure up to 0.9 MPa
			AS/NZS 4130	Pipe for pressure applications
			AS/NZS 4129	Fittings for pressure applications
Amend 3 Sep 2010	Polypropylene Copolymer piping	AS/NZS 4401	Soil and waste systems	
		AS/NZS 2032	Installation and jointing techniques for above and below ground	
Amend 3 Sep 2010	PVC piping	BS 4991	For temperatures up to 100°C	
		AS/NZS 1260	Drain waste and venting	
		AS/NZS 1477	Pipes and fittings for pressure applications	
Amend 3 Sep 2010	Reinforced piping	AS/NZS 4765	Pipes for pressure applications	
		AS/NZS 2032	Installation of PVC-U pipe above and below ground	
Amend 4 Oct 2011	Ceramic	BS 6464	For glass reinforced piping system and fittings	
		BS 7159		
Amend 4 Oct 2011	Glass	AS 1741	Pipe and fittings for waste	
		BS EN 1595	Borosilicate glass 3.3 pipe and fittings – design, manufacture, testing	
Amend 4 Oct 2011	Glass	BS EN 12585	Glass pipeline and fittings nominal sizes	

**NOTE:**

1. The pressure resistance of plastic piping and fittings is significantly reduced at elevated temperatures. Manufacturers' data should be consulted for working temperatures above 20°C.

**2.3.2 Joints, fittings and valves** – The number of joints, fittings and valves in the *piping system* shall be kept to a practical minimum.

**COMMENT:**

This reduces the likelihood of blockage and leakage.

**2.3.3 Bends** shall have a centreline radius of no less than 1.5 times the nominal pipe diameter.

**2.3.4 Pipe wall thickness** shall be designed to avoid failure, paying due regard to:

- a) Operating temperature and pressure,
- b) Corrosion and erosion allowances, and
- c) Manufacturing tolerances.

**2.3.5 Thermal movement** – Piping layouts shall allow for expansion and contraction due to temperature change, without placing excessive stresses on piping materials, or excessive forces and moments on equipment anchors. Methods of accommodating thermal movement in piping may include:

- a) Positioning of connected equipment to take advantage of the inherent flexibility of pipework,
- b) Expansion loops or offset legs,
- c) Expansion bellows units,
- d) Expansion joints, and
- e) Accommodation of stresses by control of expansion direction via supports, anchors and guides.

**2.3.6 Piping systems** for *hazardous* liquid waste shall have:

- a) Flanged or butt-welded joints,
- b) Fail-safe control valves, normally closed,
- c) Protection against temperature both from the fluid conveyed or the occurrence of *fire*,
- d) Metal reinforced, spiral-wound and ring-jointed gaskets of a material suitable for the temperature and the waste being handled, and
- e) Protection against over-pressure.

**COMMENT:**

Threaded joints weaken the pipe, are particularly prone to leakage, and perform poorly in corrosive service. When leakage around the valve stem cannot be tolerated, valves with double packing boxes or with a bellows seal should be used.

**2.4 Pumps**

**2.4.1** Pumps shall be designed with regard to:

- a) The required capacity and flow rate,
- b) Maximum internal or external coincident pressure,
- c) Minimum or maximum temperatures expected in service,
- d) The suspended solids likely to be present in the liquid waste,
- e) Protection against leakage, by the selection of an appropriate chemically-resistant seal packing material,
- f) Minimising the length of suction lines, and providing the required net positive suction head,
- g) Ensuring any spillage is conducted away from the pump and motor,
- h) Providing a means of isolation for maintenance purposes, and
- i) Providing an appropriate alarm system to monitor pump operation failure and liquid waste overflow.

**2.4.2** Where suspended solids are likely to cause blockages, centrifugal pumps having a suction inlet diameter of no less than 100 mm shall be used.

**2.4.3** Typical pump installation layouts are shown in Figure 2.

**2.4.4** When *hazardous* liquid waste is to be conveyed, pumps shall:

- a) Be sealless or glandless pumps, and
- b) Include a remotely or automatically actuated shut-off valve in the pump inlet line.