Plumbers,
Gasfitters and
Drainlayers Board

2024
Continuing Professional Development





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Introduction

Tēnā koutou katoa,

Welcome to the Board's 2024 continuing professional development (CPD) course.

Completing the CPD course contributes to a safe and competent workforce, and we appreciate your commitment to furthering your knowledge and skillset. By prioritising ongoing learning and staying up to date with industry best practices, you have a crucial role in protecting the public from potential risks and hazards.

This year's course content was developed through a combination of feedback received in previous years from practitioners and industry and developed by subject matter experts.

Your feedback is essential to help shape future courses and ensure the content is as current and relevant as possible. We ask that you provide feedback through the survey you will be sent after the course.

Finally, we expect that the format and delivery of CPD will evolve in the coming years. We will seek your feedback on any proposals for how CPD is delivered in the future before any decisions are made.

Thank you for all that you do to ensure the highest standards of safety and quality in your work.



Ngā mihi
Aleyna Hall
Chief Executive

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01

Topic 01: Insights from Building Consent Authorities

This topic provides insights gained from Building Consent Authorities about the most common reasons building inspections fail and what can be done to improve outcomes.

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Introduction

Tradespeople in New Zealand are among some of the best in the world. This topic will help plumbers and drainlayers collaborate with Building Consent Authorities (BCAs) and do even better work on jobs which require building consent. This will help ensure fast and efficient inspections so BCAs approve them with no problem.

This is all about making work safe and compliant and helping you have a few less headaches when it comes to compliance.

Most Councils say that the vast majority of the plumbers and drainlayers they deal with do a great job. But they are let down by a few who work outside of their competency.



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How often do inspections fail?

In 2020 a report was released, looking into the viability of self-certification in the construction industry. The report found the number of failures and failure rate of plumbing and drainlaying inspections could not be accurately measured with the data they had available.[1]

This means we don't know how often plumbing and drainlaying inspections fail in New Zealand. But we do know inspection failures can result in more re-work, less profitable businesses, and busier inspectors (which can exacerbate the delays in inspections!).

Auckland City Council vs Kāpiti Coast District Council

The Auckland City Council and the Kāpiti Coast District Council supplied data to the Board on how often plumbing and drainage inspections fail.

For Auckland it showed:

- 10% of plumbing inspections fail.
- 19% of drainage inspections fail.

That said, it's much better than some of the other inspection types. For example, 40% of framing inspections in Auckland fail.

Let's compare this to the data from the Kāpiti Coast District Council. The below table shows data from plumbing and drainage inspections on the Kāpiti Coast from July 2022 to July 2023.

Inspection type	Number of inspections	Passed		Failed	
		number	%	number	%
Drainage	775	492	63	283	37
Pre-line plumbing	673	490	73	183	27
Pre-slab plumbing	378	261	69	117	31

Overall, our industry does a great job and takes a lot of pride in their work but there are areas for improvement.

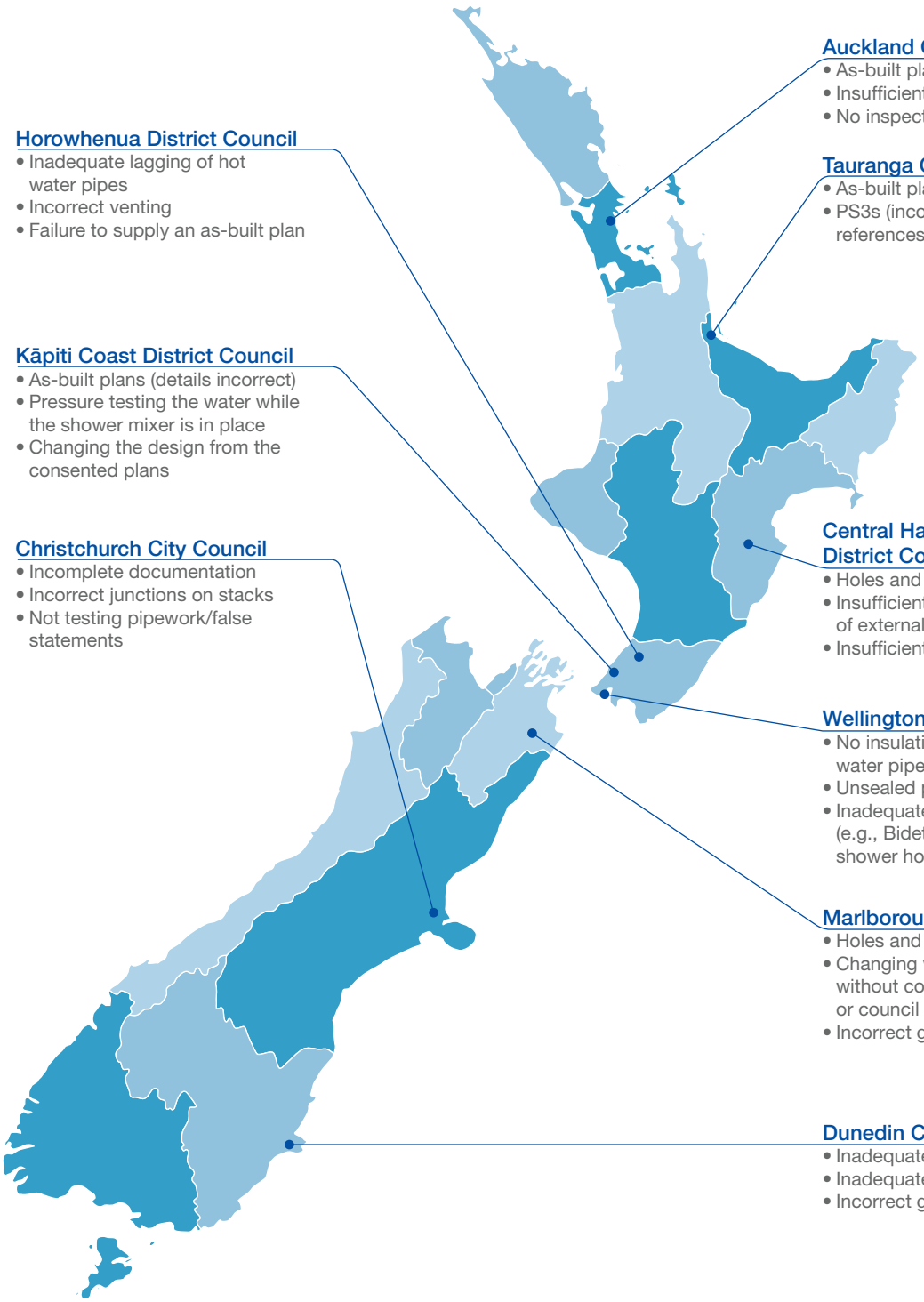
These are just two examples, and no doubt the failure rate of inspections will vary throughout New Zealand.

1. Sapere. (2020) *Self-certification in construction industry trades*. *https://www.mbie.govt.nz/dmsdocument/13712-sapere-report-self-certification-in-construction-industry-trades*. Pages 49-50.

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In what areas do BCAs see room for improvement?

The Board reached out to BCAs throughout New Zealand to get key insights from them to what areas we can improve. The below map shows responses from BCAs throughout New Zealand on why plumbing and/or drainage inspections fail, or what areas delay a building consent being issued.



Auckland City Council
- As-built plans (no dimensions)
- Insufficient fall on drains
- No inspection points on stacks

Horowhenua District Council
- Inadequate lagging of hot water pipes
- Incorrect venting
- Failure to supply an as-built plan

Tauranga City Council
- As-built plans (missing details)
- PS3s (incorrect building code references)

Kāpiti Coast District Council
- As-built plans (details incorrect)
- Pressure testing the water while the shower mixer is in place
- Changing the design from the consented plans

Christchurch City Council
- Incomplete documentation
- Incorrect junctions on stacks
- Not testing pipework/false statements

Central Hawkes Bay District Council
- Holes and notches into framing
- Insufficient frost and UV protection of external water pipes
- Insufficient cover of drains

Wellington City Council
- No insulation on the hot water pipes
- Unsealed pipework penetrations
- Inadequate backflow prevention (e.g., Bidet seats and slide shower hoses)

Marlborough District Council
- Holes and notches into framing
- Changing wastewater systems without consulting the designer or council
- Incorrect gully dish height

Dunedin City Council
- Inadequate pipework insulation
- Inadequate as-built plans
- Incorrect gully dish height

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So, what are the key insights for improvement?

The two most common areas where plumbers and drainlayers can improve are:

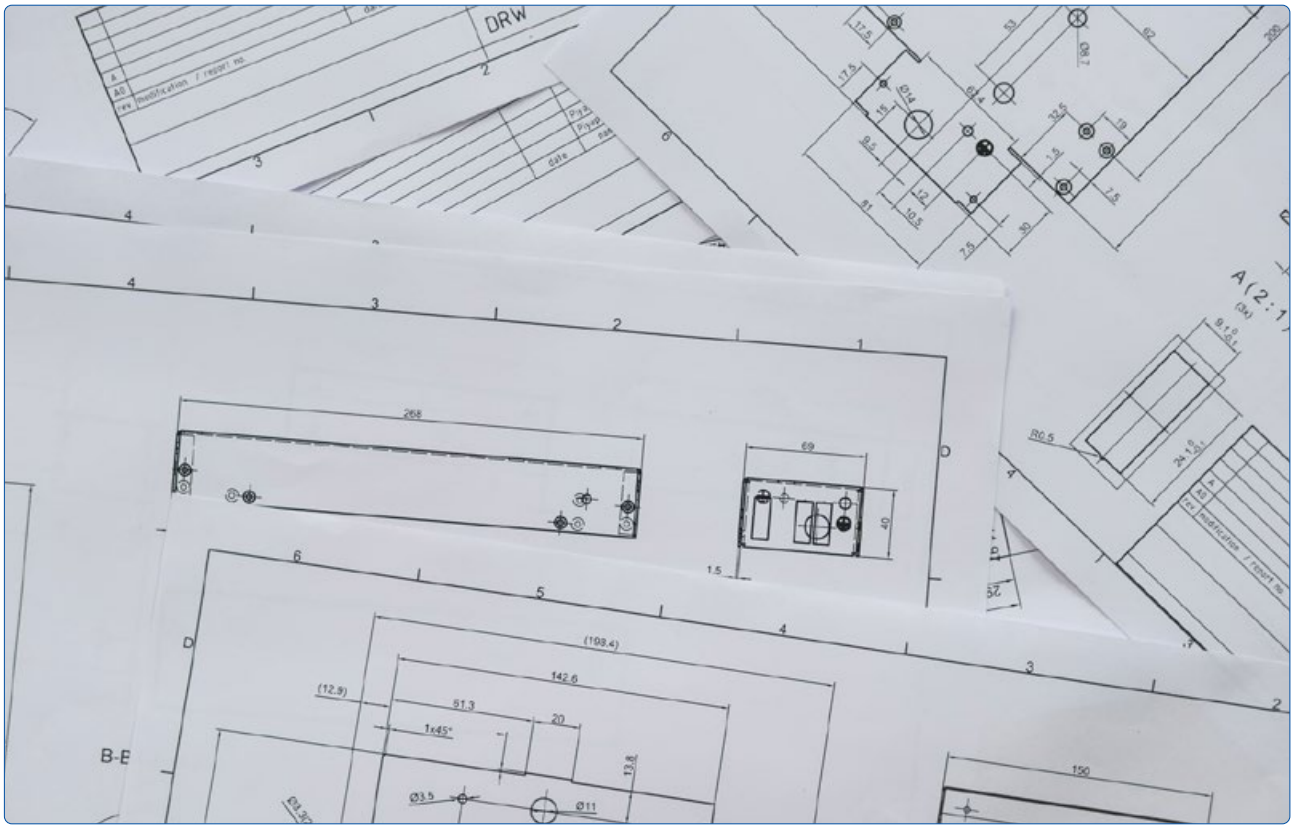
1. Paperwork
2. Insulation of pipework

Let's look at these insights a bit further…

Paperwork

It's probably no surprise to anyone that this is an area that needs improvement. Many of us love the practical side of the job but don't enjoy the paperwork. The feedback from BCAs shows that paperwork is the most common issue by far – especially with as-built plans. As-built plan problems included:

- missing information
- incorrect information
- complete absence – i.e. failure to supply a plan at all.



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Why are as-builts important?

When installing plumbing and drainage on site, there are often slight deviations to the approved consented design. These minor changes need to be recorded to ensure that what has been installed can be assessed for approval by the BCA as complying with the building code. These approved Minor Variations will be issued with the Code of Compliance Certificate once the building works are completed, confirming the works undertaken comply with the Building Code.

All minor variations to the consented design need to be approved by the BCA before the work is undertaken. When making small changes to the plumbing or drainage design, ask the BCA whether you can make a minor variation to the consented plans. The BCA needs to grant the approval for the minor variation in writing.

The most common way to record these minor changes to consent is via an as-built drawing. Although Minor Variations aren't required to be submitted in a prescribed form, the amended plan would need to be of sufficient detail to ensure that if the building work were completed to the design it would comply with the building code.

If there is a major deviation to your consent, such as changing the type of soakage system or type of sewer outfall, this may constitute a Formal Amendment to your consent. Discuss this with your BCA before deviating from the plumbing and drainage design shown on the consented plans.

To help with as-builts the Board has developed some resources to help. Specifically:

- Example of as-built plan for wastepipes
- Example of as-built plan for drainage
- Template for an A3 as-built plan
- Template for an A4 as-built plan
- As-built checklist

These resources can be found on the Board's website at *www.pgdb.co.nz*

On the next page are examples of as-built plans for wastepipes and drainage which have the level of detail acceptable to a BCA.

To help you not to miss anything the Board has also developed this checklist to use while filling out an as-built. This can also be used when you are training staff to ensure consistency in the level of information they provide.

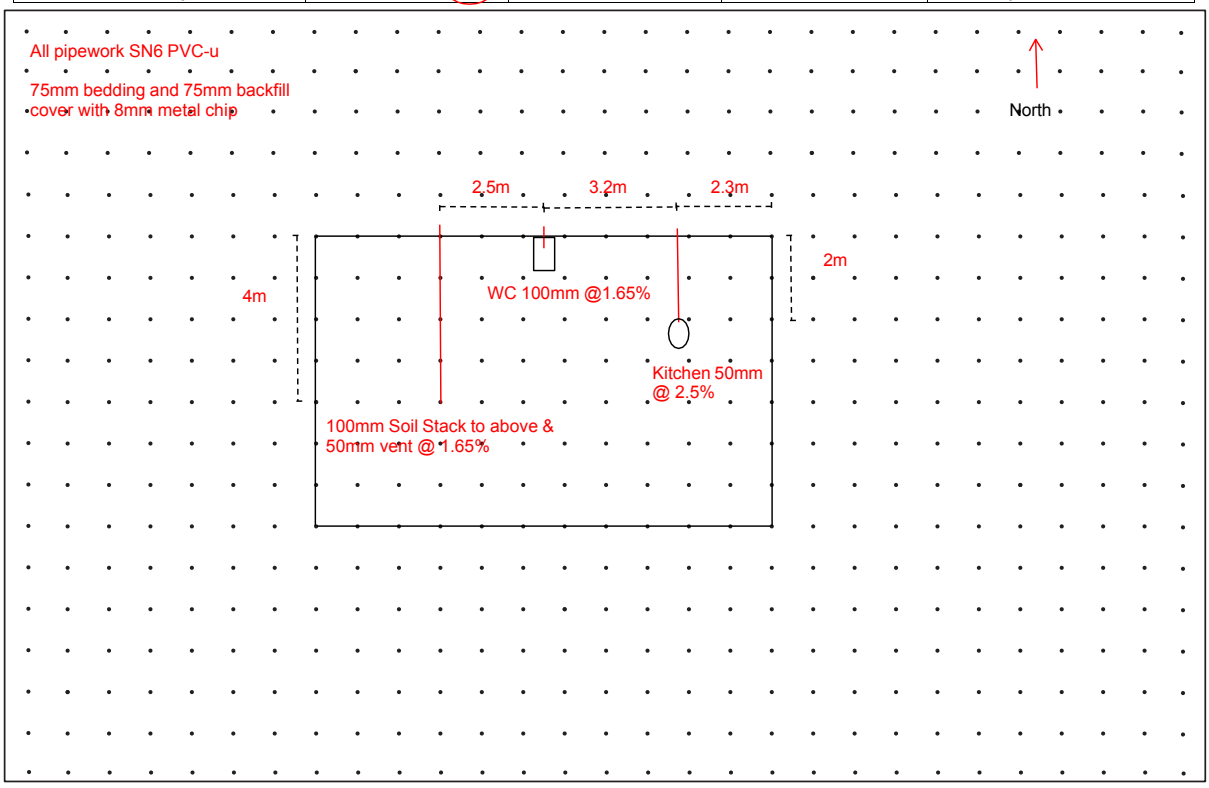
The key aspects an as-built plan should include are:

- Street address, Lot & Deposit number
- Building consent number
- Practitioner details
- License number
- Means of compliance with the building code (Acceptable Solution / Verification Method or Alternative Solution)
- North arrow and relevant boundaries
- Clear measurements taken from building or relevant boundaries.
- Scale
- Location of pipework, soakage pits, inspection/ testing openings etc.
- Size and type of soakage systems
- Size and location of vents
- Size, type, and gradient of pipework
- Bedding and backfill type
- Annotations on plans don't have to be typed but must be legible
- The date the work was completed
- Connections to network utility operator services

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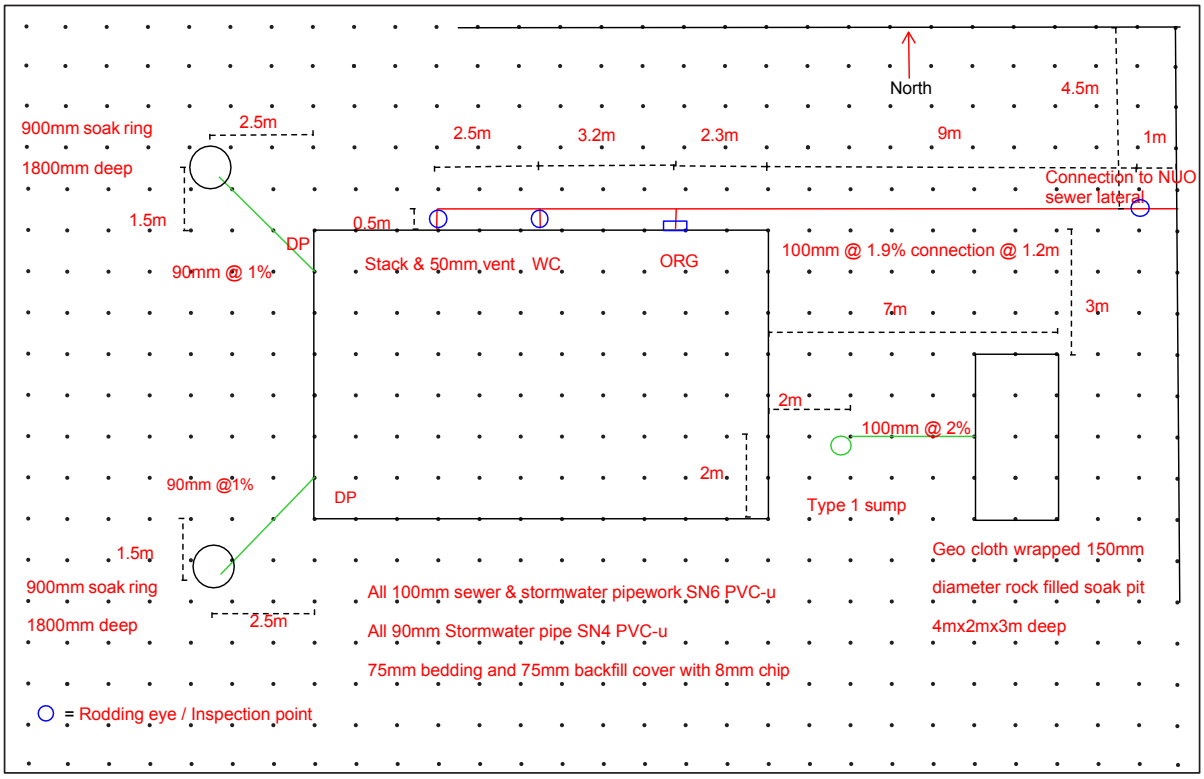
Example 1: Wastepipes

As built	Address: 123 1st Avenue, Bath City		License: 93369	Practitioner: John Doe
Consent: 897987	Lot: 2	DP: 789	Ph: 555 575556	Email: John@email.com
Circle means of compliance	G13: AS1 AS2 (AS3)	E1: ~~VM1 AS1 AS2~~	Scale: 1 : 100	Date completed: 25/12/2024



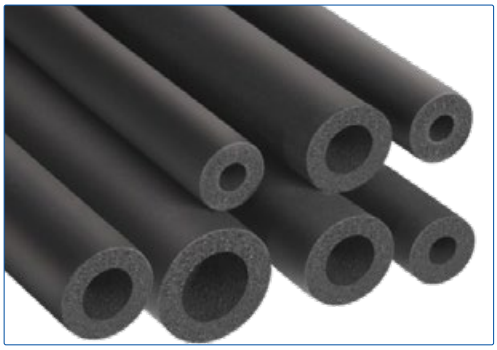
Example 2: Drainage

As built	Address: 123 1st Avenue, Bath City		License: 93369	Practitioner: John Doe
Consent: 897987	Lot: 2	DP: 789	Ph: 555 57556	Email: John@email.com
Circle means of compliance	G13: AS1 AS2 (AS3)	E1: (VM1) (AS1) AS2	Scale: 1:100	Date completed: 25/12/2024



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Insulation of water pipes



Insulation of water pipes has one main function, and that's to limit energy transfer (e.g., heat loss). But it's required for a number of different scenarios.

Protection from freezing

G12/AS1 paragraph 7.2.1 requires that where there is a likelihood of freezing, hot and cold water pipework shall be protected.

Remember, the November 2023 updates to G12/AS1 require that where the insulation is exposed to UV light it must also be UV resistant.



Insulating the hot distribution pipes

NZS 4305:1996 Energy Efficiency - Domestic Type Hot Water Systems (cited in H1/AS1 and H1/AS2) stipulates that the hot water outlet of a HWC must be thermally insulated. Paragraph 3.7.1 says:

Hot water distribution pipes shall be thermally insulated between the storage water heater and one or more of the following points (refer figure 3):

a) For horizontal pipe, to not less than 2m (refer figure 3(a));

b) To the end of the first continuous 2m of horizontal pipe, if the pipe has not followed a downward direction (refer figure 3 (b));

c) To the first pipe drop of at least 250mm, i.e. heat trap. The insulation shall extend at least 150mm past the top of the heat trap (refer figure 3(c)).

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Figure 3(a): NZS 4305:1996

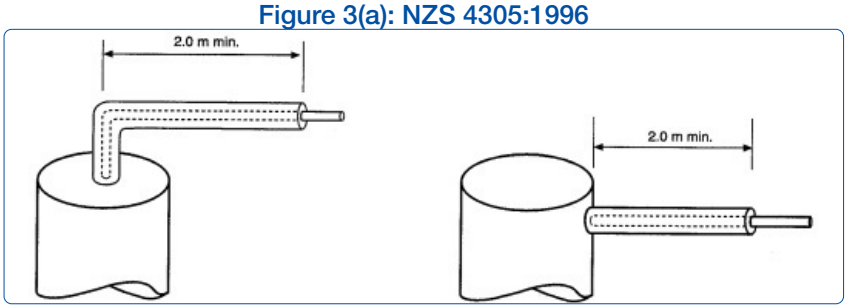


Figure 3(b): NZS 4305:1996

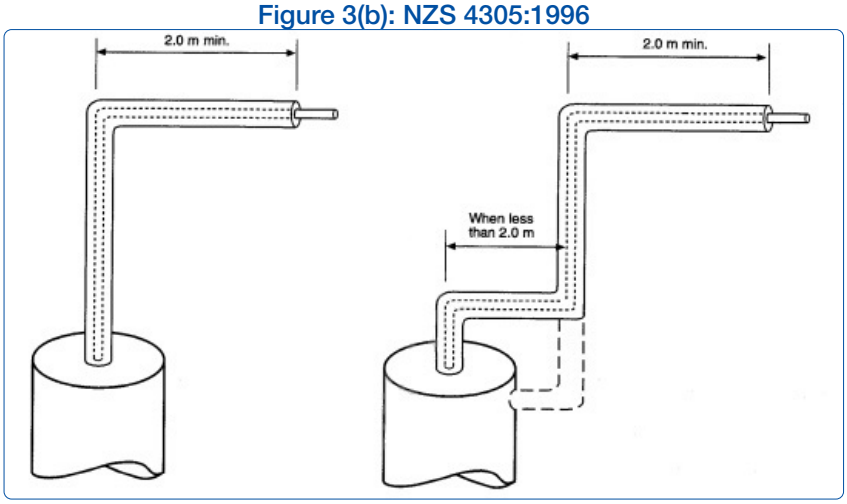
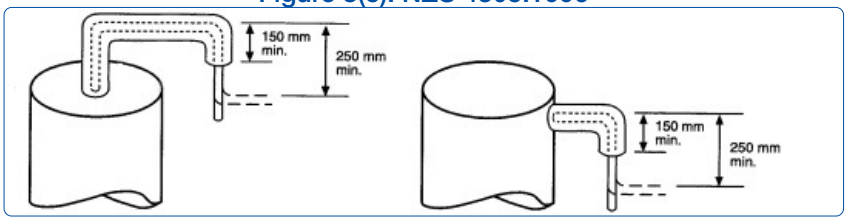


Figure 3(c): NZS 4305:1996



In addition, NZS 4305 clause 3.7.2 says the distribution pipe to the kitchen sink should be insulated.

Remember, when the standards say ‘should’, it is not mandatory to follow them – but it is good practice.

NOTE: ‘NZS 4305:1996 Energy Efficiency - Domestic Type Hot Water Systems’ is free to access online as one of the Ministry of Business Innovation and Employment’s 120+ sponsored building-related standards.

Protection from unintentional heating

It is also important to remember that the November 2023 update to G12/AS1 Paragraph 7.3.1 requires cold water pipework to be installed to avoid the likelihood of unintentional heating. This means cold water pipework in ceiling spaces may require insulation.

Summary

Plumbers and drainlayers in New Zealand do a great job, but continuous improvement remains a priority. The aim is not only to maintain high standards but to improve them further, ultimately ensuring smoother inspections and elevating the quality and safety of plumbing and drainlaying work.

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Test your knowledge on this topic

Answers on page 124

Q1. According to NZS 4305, what length of insulation must be installed on the hot water outlet pipe from a hot water cylinder which does not have a heat trap?

Q2. Fill in the gaps:

As-builts are important because they record minor _____ to help demonstrate _____.

Q3. The November 2023 update to G12/AS1 added a requirement that if insulation is exposed to UV light it must be what?

Notes

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02

Topic 02:
Updates to Codes and Standards:
Part 1 – AS/NZS 3500 Series

In November 2023, the updated version of AS/NZS 3500 was cited in New Zealand Building Code documents. This topic covers some of the key changes in the AS/NZS 3500 series of standards.

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Introduction

The ongoing development of the AS/NZS 3500 series of plumbing and drainage standards is a collaborative process overseen by Standards Australia and Standards New Zealand. It begins with identifying issues and the need for changes, followed by the formation of a technical committee with industry experts. This committee drafts, reviews, and refines proposed updates, incorporating feedback through extensive consultations and public reviews. The standards undergo multiple rounds of scrutiny to ensure consensus. Things that are considered when updating the standards include:

- Nature and the extent of the issue
- Options to resolve the issue
- Latest research
- Updates in technology
- Stakeholder feedback
- Financial impact of the updates
- Feasibility of the updates
- Impacts of proposed changes on:
  - Public health and safety
  - Social community
  - Environment
  - Economy



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Updates

In November 2023, New Zealand Building Code documents were updated to reference the 2021 edition of the AS/NZS 3500 series.

There are many changes in the 2021 AS/NZS 3500 plumbing and drainage standards. A summary of the changes can be found in the 'Preface' of AS/NZS 3500 parts 1 to 4. This topic will address some of the key changes affecting plumbers and drainlayers in New Zealand.

Below is a summary of the key changes this topic will cover:

a) All definitions have been moved to AS/NZS 3500.0:2021 Glossary of terms

b) Updated jointing methods for plastic water supply pipes – AS/NZS 3500.1 and 4

c) Updates to the requirements for water services in metal framed walls – AS/NZS 3500 parts 1 and 4

d) The separation distance between above ground heated water pipework and electrical wires is being reduced from 100mm to 25mm to align with the AS/NZS 3000 wiring rules – AS/NZS 3500.4

e) Updates to installation requirements for air admittance valves and pressure attenuators – AS/NZS 3500.2

f) Updates to the requirements for pipework identification marking – AS/NZS 3500 parts 1– 4

g) Removal of the requirement for a commercial dishwashing machine drainage to only connect to a disconnector gully with a 10m discharge pipe – AS/NZS 3500.2

h) Additional provisions for heated water circulatory systems and an additional new 'Appendix Q' for the sizing of branches from circulatory heated water systems – AS/NZS 3500.4

i) Revised rainfall data for a more accurate stormwater drainage design – AS/NZS 3500.3

j) Requirement for junctions serving DN 100 branch drains installed on grade to connect with a 15° incline – AS/NZS 3500.2

Definitions

Prior to this update, AS/NZS 3500.0 was last updated in 2003. So, this standard was due for an updated version.

The definitions which were part of AS/NZS 3500 parts 1 to 4, 2018, have been relocated to AS/NZS 3500.0:2021. This creates consistency between the series and puts all the definitions in one place.

New definitions have been added where new technology is introduced.

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Jointing methods

AS/NZS 3500 parts 1 and 4 have been updated to specify the jointing methods for different plastic pipes. Clause 5.6.9 references the relevant jointing standards for:

- Polyvinyl chloride (PVC) = AS/NZS 2032
- Polyethylene (PE) = AS/NZS 2033
- Acrylonitrile butadiene styrene (ABS) = AS/NZS 3690

Please note, AS/NZS 2032 is available in the standards library which is accessed through your trade login when you have an active licence!



Water services in metal wall framework

AS/NZS 3500.1:2021 clause 5.5.2.1 (c) and AS/NZS 3500.4:2021 clause 4.6.1.1 (c) include updates for installing water supply pipework through metal wall framework. The requirements are the same between the two standards. In particular these standards specify:

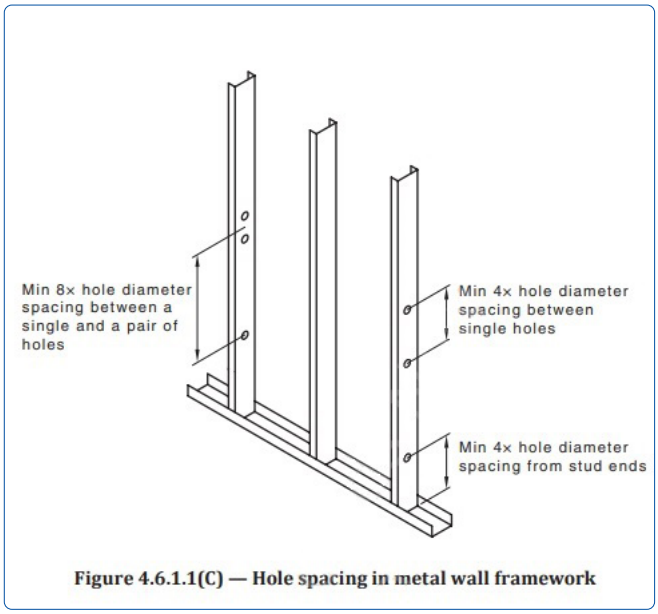


Figure 4.6.1.1(C) — Hole spacing in metal wall framework

Figure from AS/NZS 3500.4:2021

"Metal wall framework – Water services shall be installed in existing preformed holes where possible. Additional holes, where required, shall be no larger than the preformed holes installed by the manufacturer or 32mm when there are no pre-existing holes. The additional holes shall be placed –

i) With hole centres no further from the centreline of the member than +/–10% of the member depth;

ii) At a minimum spacing or end distance of 4 times the hole diameter (for single holes); and

iii) At a minimum spacing or end distance of 8 times the hole diameter (for pair-to-pair or single pair holes), see Figure 4.6.1.1(C)"

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Clearances from electrical services

Prior to the update, AS/NZS 3500 parts 1 and 4, 2018, required an above ground separation distance of 100mm from electrical wiring, gas pipes and other services. But the electrical standard AS/NZS 3000.1 only required electricians to have a separation distance of 25mm from water services. This created a problem when the electrician installed their wiring after the plumber had installed their water pipes.

To create consistency between the electrical and plumbing standards, clause 4.3.2.2 of AS/NZS 3500.4:2021 has been amended to clarify that the minimum separation distance between above ground water services to other services to be 25mm.

Venting requirements

Some of the installation requirements for Air Admittance Valves (AAV) and Pressure Attenuators were updated to align with current industry practices. The recent update to the standard aimed to bring it in line with common industry practices while ensuring safe and efficient ventilation performance.

AS/NZS 3500.2:2021 updates include:

- Changes to the provisions including updated limitation, location, and installation requirements.
- Changes to the use of Pressure Attenuators in AS/NZS 3500.2:2021 section 6.11, including updated limitation, location, and installation requirements. These include:
  - The exclusion of pressure attenuators on stacks subject to continuous flows which may impede their operation;
  - An updated note indicating the use of pressure attenuators is not limited by building height;
  - A new requirement for pressure attenuators to be installed as close as possible to the stack (< 2m away) with minimal changes in direction;
  - Updates to the required locations for pressure attenuators.

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Pipework marking

AS/NZS 3500:2021 parts 1– 4 have updates to include new requirements for pipework identification. These changes help ensure clear and consistent labelling requirements between the standards to minimise pipework misidentification and subsequent cross-connections.

The updated pipework identification provisions require accessible pipework to be permanently marked to be readily identifiable in the following building types:

"Accessible pipework shall be permanently marked so as to be readily identifiable as part of the water service within:"

"(b) In New Zealand –

iv) Multi-unit dwellings, including apartment buildings but excluding low rise multi-unit dwellings such as an attached dwelling or flat;

v) Communal residential buildings, excluding holiday cabins and backcountry huts;

vi) Communal non-residential buildings;

vii) Commercial buildings; and

viii) Industrial buildings."

Refer to NZBC Clause 'A1 Classified Uses' for information on building use categories.

It also reduces the distance of the required spacing to every 6m (previously it was every 8m).



There are additions to where the pipework markings shall be placed, these include:

- Adjacent to service appliances and bulkheads (as well as the existing requirements to be adjacent to branches, junctions and wall and floor penetrations);
- At every floor level within vertical ducts and riser cupboards.

Reference to NZS 5807 for information on identification marking in New Zealand has moved from a mandatory part of the text to an informative note. To make up for this there is significantly more detail added to the text to detail the requirements, making them easy to follow without having to reference another standard.

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Commercial dishwasher connections

The requirement that a commercial dishwashing machine drainage only connect to a disconnector gully with a 10m discharge pipe has been removed. This allows for more effective arrangement of commercial kitchens.

The excerpts below, from tables in the 2018 and 2021 versions of AS/NZS 3500 part 2, show the difference in requirements.

Appendix B AS/NZS 3500.2:2018

Fixture	Floor waste Gullies	Discon-nector gullies	Vented drain	Reduced velocity aerated stack system	Fully vented stack system	Single stack	Single stack modified
Commercial dishwasher	NP	10.0	NA	NA	NA	NA	NA

NA = Not allowed

Table B.1 AS/NZS 3500.2:2021

Fixture	Floor waste Gullies	Discon-nector gullies	Vented drain	Reduced velocity aerated stack system	Fully vented stack system	Single stack	Single stack modified
Commercial dishwasher							
DN 50mm trap and DN 65mm waste	NA	10.0	10.0	10.0	NA	NA	NA
DN 50mm trap and DN 50mm waste	NA	6.0	NA	2.5	2.5	2.5	2.5

NA = Not allowed

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Heater water circulatory systems

AS/NZS 3500.4:2021 will be updated to include new provisions for metered branches from circulatory heated water systems. These include new requirements for branch offtakes and heated water meters to be located in common property. These provisions also specify that heated water meters must be accessible and that branch offtakes must be as close as possible to the apartment or dwelling they serve.

Additional best practice information has been included in the notes, and includes recommending that the volume of water within dead leg branch pipes from circulatory heated water systems does not exceed 2 litres.

An informative 'Appendix Q' has also been added which provides guidance for sizing branches from circulatory heated water systems.

Rainfall intensity

As we have seen in New Zealand, our rainfall intensities have changed over the years. AS/NZS 3500.3:2021 has been revised with updated rainfall data for a more accurate stormwater drainage design. The changes include:

- A change in the terminology used by using Annual Exceedance Probability (AEP), rather than Average Recurrence Interval (ARI).
- The New Zealand rainfall maps have been replaced by Table E.1 showing 10% AEP (10 years ARI) and 2% AEP (50 years ARI) rainfall intensities for selected locations.
- The design rainfall intensities for balcony and terrace drainage systems in New Zealand have been included. Whereas previously it had the same intensities for both Australia and New Zealand.



Definitions of AEP and ARI from AS/NZS 3500.0:2021:

- Annual Exceedance Probability (AEP) = Probability that a given total (quantity) of rainfall, accumulated over a given duration will be exceeded in any one year.
- Average Recurrence Interval = Mean or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration.

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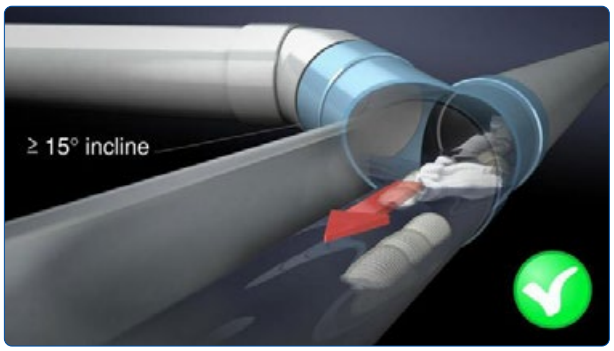
Drains on Grade

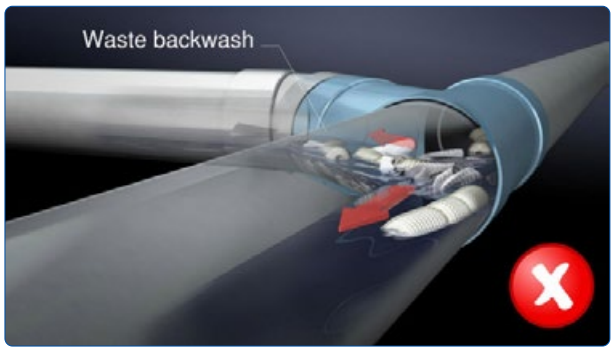
AS/NZS 3500.2:2021 has been updated to require equal junctions for drains on grade to enter with a 15° incline. This prevents partial backwash and helps to prevent blockage within the drainage system. Equivalent provisions were introduced into NZBC Acceptable Solutions G13/AS2 as part of the November 2023 building code document update.

This topic was covered in detail in last year's CPD so for more information see last year's handbook.









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Looking to the future

The AS/NZS 3500 plumbing and drainage standards are updated on a regular basis. From September to November 2023 Standards Australia consulted on further updates to the AS/NZS 3500 standards. As part of the review process some things come up which can't be addressed in the current review cycle, but the committee does look to whether it needs to be addressed in future reviews.

AS/NZS 3500:2024 proposed updates

The AS/NZS 3500 series is due to be updated again in 2024. Some of the areas affected by proposed updates are:

- Backflow prevention (AVB's): AS/NZS 3500.1 – Proposed minor amendments to existing backflow prevention provisions for Atmospheric Vacuum Breakers.
- Waterless urinals: AS/NZS 3500.2 – Proposed new provisions for waterless urinals which aim to prevent struvite build up and reduce blockages in the sanitary drainage system.
- Miscellaneous appliances: AS/NZS 3500 parts 1, 2 & 3 – Proposed new provisions for the installation of water using appliances and requirements for wastewater discharge from miscellaneous devices and appliances that these standards don't fully cover.
- Multi-building developments: AS/NZS 3500.2 – Proposed clarifications to existing provisions for multi-building development sites where there's more than one building connected to a sanitary drainage system within a single property.
- Rainwater tank installation: AS/NZS 3500.1 – Proposed new provisions for rainwater storage tanks and supply systems.
- Rainwater harvesting: AS/NZS 3500.3 – Proposed new provisions for rainwater harvesting systems, including charged stormwater systems.
- Overflow from eaves and gutters: AS/NZS 3500.3
- Polyethylene pipes: AS/NZS 3500.3
- Vacuum drainage: AS/NZS 3500.2
- Flexible hoses: AS/NZS 3500 parts 1 and 4 – Proposed new provisions specifying the use of certain categories of flexible hoses.

Water supply pipe sizing

Anecdotally we are seeing the pipe sizing methods in AS/NZS 3500.1 resulting in oversized water reticulation systems in some commercial buildings. This may be partly because the design methods were based on now out-of-date research when less water-efficient fixtures were used. It is a big project to update the pipe sizing methods and requires significant research. So, we won't see this included in 2024's updates. But it's likely in the coming years we will see changes to pipe sizing methods which are based on more up-to-date research.

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Test your knowledge on this topic

Answers on page 124

Q1. What is the minimum clearance between electrical wires and above ground water services?

Q2. When pipework identification is required, what is the minimum distance between spacings?

Q3. A dead leg on a circulatory hot water system should be limited to a maximum of what volume?

Notes

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03

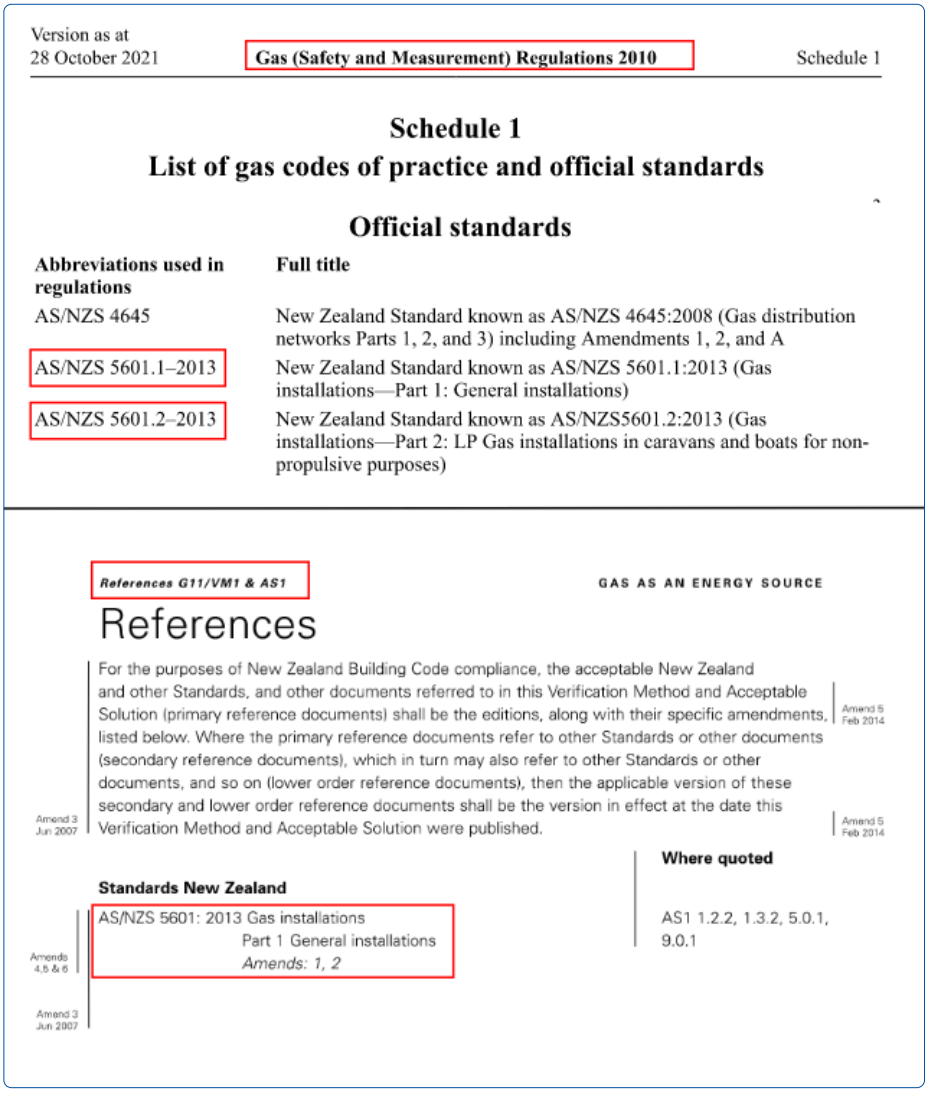
Topic 03:
Updates to Codes and Standards:
Part 2 – AS/NZS 5601

AS/NZS 5601 parts 1 and 2 were updated in 2022 and 2020, respectively. These updated standards are not yet referenced in legislation, but this topic will cover some key changes in preparation for when they are referenced.

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Introduction

In 2022 AS/NZS 5601 part 1 was updated, and in 2020 part 2 was updated. At the time of writing this CPD, neither has been referenced in the Gas (Safety & Measurement) Regulations 2010 (GSMR). This means the 2013 versions of AS/NZS 5601 parts 1 and 2 are still used for purposes of compliance. Because these documents are referenced in legislation (rather than in the acceptable solutions and verification methods like the AS/NZS 3500 series) it can be a lengthy process to update.



Version as at
28 October 2021

Gas (Safety and Measurement) Regulations 2010

Schedule 1

Schedule 1

List of gas codes of practice and official standards

Official standards

Abbreviations used in regulations	Full title
AS/NZS 4645	New Zealand Standard known as AS/NZS 4645:2008 (Gas distribution networks Parts 1, 2, and 3) including Amendments 1, 2, and A
AS/NZS 5601.1–2013	New Zealand Standard known as AS/NZS 5601.1:2013 (Gas installations—Part 1: General installations)
AS/NZS 5601.2–2013	New Zealand Standard known as AS/NZS5601.2:2013 (Gas installations—Part 2: LP Gas installations in caravans and boats for non-propulsive purposes)

References G11/VM1 & AS1

GAS AS AN ENERGY SOURCE

References

For the purposes of New Zealand Building Code compliance, the acceptable New Zealand and other Standards, and other documents referred to in this Verification Method and Acceptable Solution (primary reference documents) shall be the editions, along with their specific amendments, listed below. Where the primary reference documents refer to other Standards or other documents (secondary reference documents), which in turn may also refer to other Standards or other documents, and so on (lower order reference documents), then the applicable version of these secondary and lower order reference documents shall be the version in effect at the date this Verification Method and Acceptable Solution were published.

Amend 5 Feb 2014

Amend 3 Jun 2007

Amend 5 Feb 2014

Standards New Zealand	Where quoted
AS/NZS 5601: 2013 Gas installations Part 1 General installations *Amends: 1, 2*	AS1 1.2.2, 1.3.2, 5.0.1, 9.0.1

Amends 4,5 & 6

Amend 3 Jun 2007

GSMR and NZBC G11 Showing what Standard is currently in force

Both part 1 and 2 have a lot of updates to them. This topic will mostly cover some of the updates to part 1, except for a section on part 2 which helps provide clarification around working on tiny houses.

We don't yet know whether AS/NZS 5601 part 1 and 2 will be cited in their entirety. But this topic shows some of the key changes that may affect gasfitters in New Zealand.

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AS/NZS 5601 part 2 – Clarifications around tiny houses

The 'Scope' of part 2 has added an informative note to clarify when to use it for gasfitting work on tiny houses. The note says:

"Note 1: A mobile home includes what is often referred to as a "tiny house", which is a relocatable home as distinct from a permanent structure that is transported from one fixed location to the next…"

This helps give gasfitters clarity on which standard to use when carrying out gasfitting on tiny houses.



Being a 'tiny house' does not automatically exclude it from also being a building. And having wheels on the 'tiny house' does not automatically make it a vehicle. To determine whether the tiny house is also a building refer to the Building Act 2004. To determine whether the tiny house is a vehicle refer to the Land Transport 1998. There are several determinations on the building performance website which clarify when a structure is a vehicle or a building.

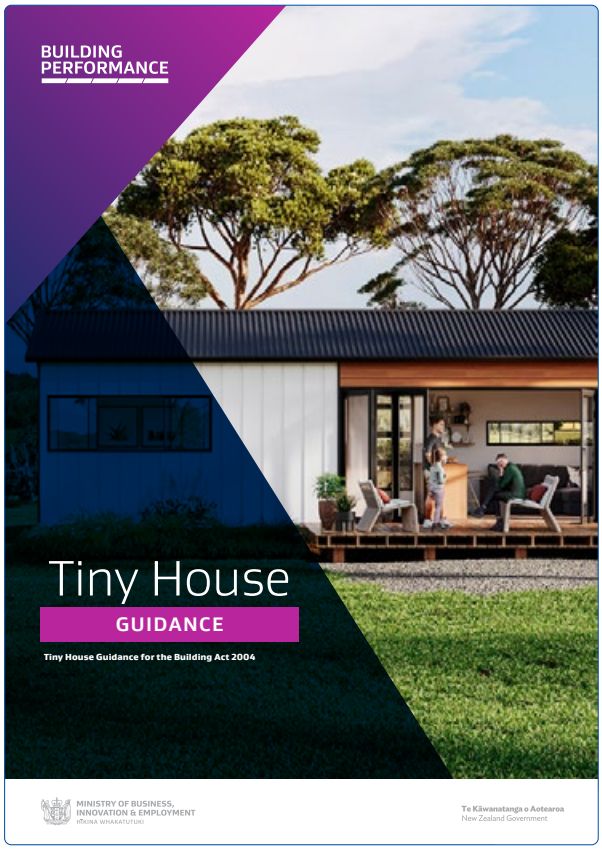
a) The Building Act – Section 8 of the Building Act 2004

b) Land Transport 1988 – Section 2 of the Land Transport Act

c) The Building Performance Website: *www.building.govt.nz*

MBIE have produced a guidance document to help manufacturers, tiny house owners, councils, building consent authorities and regional/territorial authorities navigate some of the requirements in respect to ensuring that tiny house buildings are safe, healthy, and durable for their intended use.

This MBIE guidance document can be found at: *https://www.building.govt.nz/assets/Uploads/getting-started/tiny-houses/tiny-houses-guidance-mbie.pdf*



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Summary of changes for AS/NZS 5601 part 1

The Preface of part 1 summarises of the major changes in AS/NZS 5601.1:2022 as:

a) A new definition of “Ignition source”

b) Section 2 separated into "Essential safety requirements” and “Performance based design requirements”

c) Brazing prohibited within 1m of non-metallic components

d) New drawings for consumer piping located in cavities

e) Prohibition of the installation of multilayer pipe above ground external to buildings

f) Provision of emergency isolation for multilayer pipe, including a new definition for a fire safety system

g) Increased clearance requirement between domestic cooking appliances and rangehoods

h) Restrictions on the use of semi-rigid connections on the installation of commercial catering equipment

i) New requirements for the protection of combustible surfaces adjacent to commercial catering equipment

j) New pipe sizing graphs and tables

k) Effect of altitude on gas supply on high rise building installations

l) Revised requirements for flue terminal locations under a covered area, recess or on a balcony

m) New requirement for the isolation of installations located in educational facilities

n) New requirements for the freestanding commercial catering equipment with under-equipment connection

o) New requirements for the connection of freestanding commercial catering equipment using a hose assembly

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Ignition source definition

The definition of ignition source has been updated. The key change replaces the words “flammable mixture” with “explosive atmosphere.”

2013 version	2022 version
“A source of energy sufficient to ignite a **flammable mixture** and includes, but is not limited to, naked flames, exposed incandescent material, electrical welding arcs, and any electrical or mechanical equipment not suitable for use in hazardous locations.”	“source of energy that can ignite an **explosive atmosphere**”

Section 2

The formatting of section 2 has been changed to make it clear which parts of it are ‘Essential safety requirements’ and which are requirements for a ‘Performance based design’. This will help prevent any confusion between them.

Brazing prohibited within 1m of non-metallic components

Table 4.2 adds to its limiting conditions that brazing is not permitted within 1m from a joint with non-metallic components. This will help protect those components from damage from the heat of brazing.

Gasfitters can still braze a component before connecting to an installation with non-metallic components.

In addition to this, details have been added to an image in figure 5.2.12 (a) which will require that when multilayer pipe is installed there should be 1 metre of metallic pipe:

- into the building
- prior to connecting to appliances



New drawings for consumer piping located in cavities

Section 5 of AS/NZS 5601.1:2022 provides several new drawings to help when installing consumer gas pipes in wall cavities. These include information on holes and notches in studs and plates. This section also has information on installing pipework through steel frames. Many of these images align with some of the images in AS/NZS 3500:2021 parts 1 and 4. This helps create consistency between the trades.

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Above-ground multilayer pipe installation

One change which will have a big effect on gasfitters is clause 5.3.16 which says, "Multilayer piping shall not be installed above ground external to a building."

Multilayer piping installed above ground external to a building is prone to damage from UV light or other external forces. Restricting the location where multilayer pipe is installed will help protect people and prevent damage.



Provision of emergency isolation for multilayer pipe

Where multilayer pipe is installed as part of consumer piping, a safety device that automatically closes off the gas supply in the event of a fire-related compromise to gas tightness is required. This safety device should be positioned in a readily accessible location, as near as possible to the point of supply and prior to any multilayer pipe.

Additional emergency isolation may also be installed on separate gas lines to isolate individual appliances.

One option is to install Under Pressure Shut Off (UPSO) device. Some gas meters will already have an UPSO installed. If the gas meter features an UPSO device, you should confirm its compliance by checking with the gas meter company. Also, ensure the meter volume is accurately sized for optimal functionality.

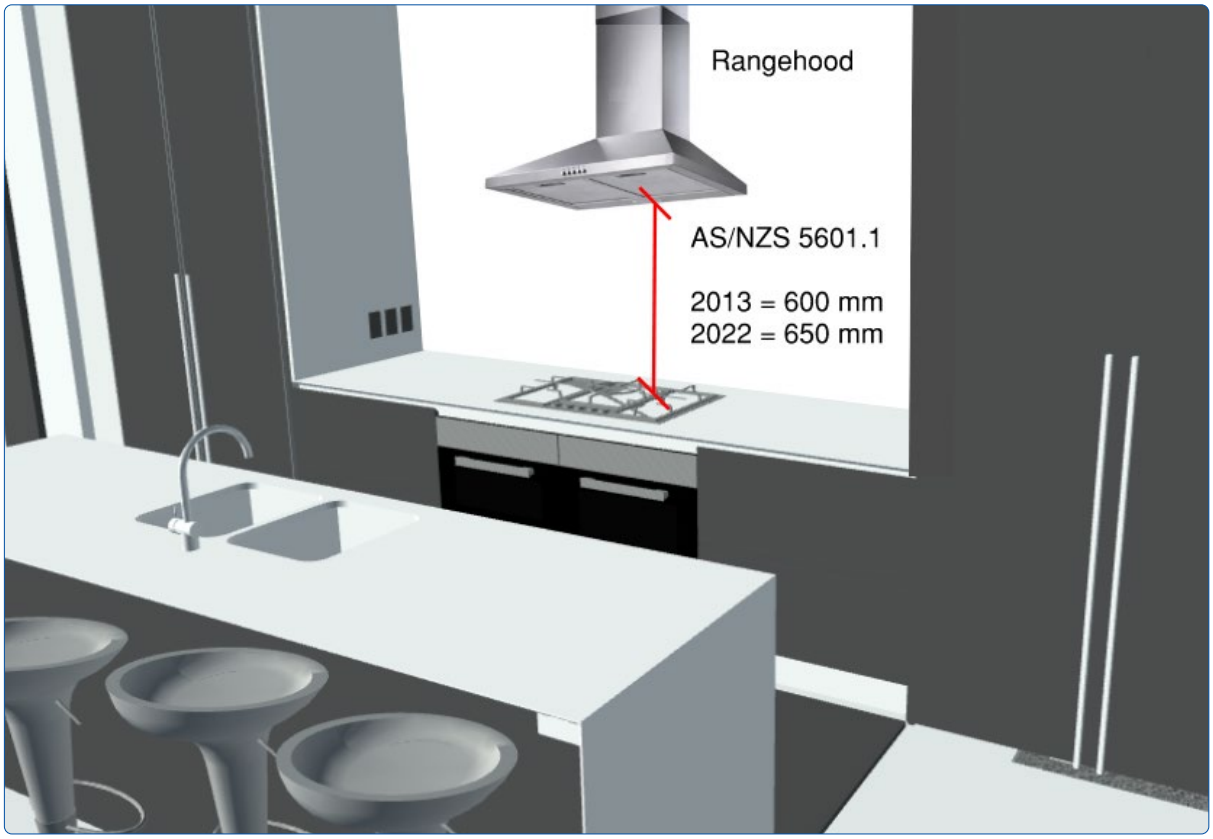
Another approach is to install an Excess Flow Valve (EFV). It's crucial to size EFVs appropriately to manage the total gas consumption of the installed appliances. Undersizing may lead to frequent tripping due to low flow, causing inconvenience and disruption.



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Domestic cooking appliance clearances

Section 6.10.1 provides the clearance from the highest part of the burner on a domestic cooking appliance to a rangehood. This is being increased to 650mm (formerly 600mm). However, clause 6.10.1.1 (a) (iii) makes an allowance for existing installations. Where a domestic cooking appliance is being replaced, the overhead clearance from the highest part of the burner to the rangehood shall be not less than 600mm. That said, gasfitters should also check the manufacturer's installation instructions of the cooker they are installing to ensure the installation also meets their clearance requirements.



Example of minimum rangehood distance requirement (domestic)

Semi rigid connectors on commercial catering equipment

Clause 6.10.2.8 outlines a restriction which says semi rigid connectors shall only be used on commercial catering equipment where:

a) The appliance is permanently fixed to the mounting surface, so movement is not possible once in the installed position and;

b) The semi rigid connector is protected from mechanical stress i.e. bumps and knocks etc.

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Protection of combustible surfaces adjacent to commercial catering equipment

A new table called 'Table C.2.2' is added to Appendix C. The table includes the minimum thickness for thermal protection of combustibles adjacent to commercial catering equipment.

Application	Minimum thickness mm	Maximum coefficient of heat transfer (U), W/m²K[a]
Thermal protection of combustibles adjacent to commercial catering *appliance(s)*	15	7.5
Thermal protection of combustibles adjacent to *appliances* other than commercial *catering appliance(s)*	6	20

[a] The maximum coefficient of heat transfer shall be tested in accordance with ASTM C518. Test samples for the method specified in ASTM C518 shall not be exposed to temperatures that will change the specimens in an irreversible manner. Test samples shall be conditioned at 22°C and 50% R.H. for a period of time until less than a 1% mass change is observed over a 24h period. For some materials, such as cellulose, considerably longer times may be required for both conditioning and testing.

NOTE 1 The heat transfer coefficient U (W/m²K), thermal resistance R (m²K/W), thermal conductivity k (W/mK) and thickness t (m) of materials are related by the following formulas: U = 1/R, R = t/k, U = k/t.

NOTE 2 "Heat transfer coefficient" is often also referred to as "'thermal conductance".

New pipe sizing graphs and tables

New tables have been added to 'Appendix F' to help size gas installations where the supply pressures are around 70kPa and 140kPa. This provides gasfitters an acceptable method for sizing higher pressure gas installations.

NOTE: this is only for the tables. The graphs still only chart to up to 10kPa.

Effect of altitude on gas supply

The informative 'Appendix K' has been updated to provide information to compensate for the effect of altitude on the gas supply. It says in New Zealand as a "general rule of thumb" that for every 100m of altitude the pressure will approximately:

- increase by 0.5kPa for natural gas
- decrease by 1.3kPa for LPG

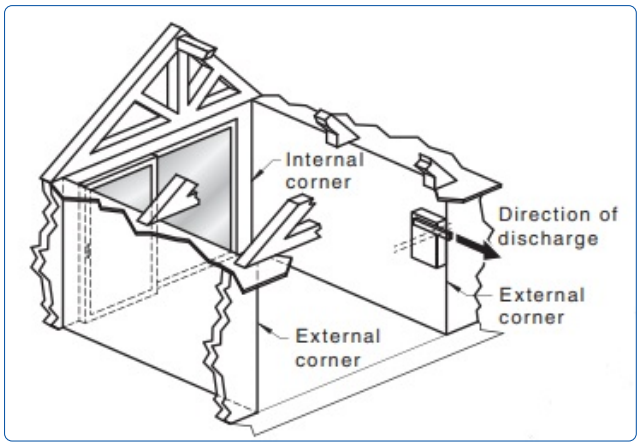
This can help gasfitters with designing systems for high rise buildings.

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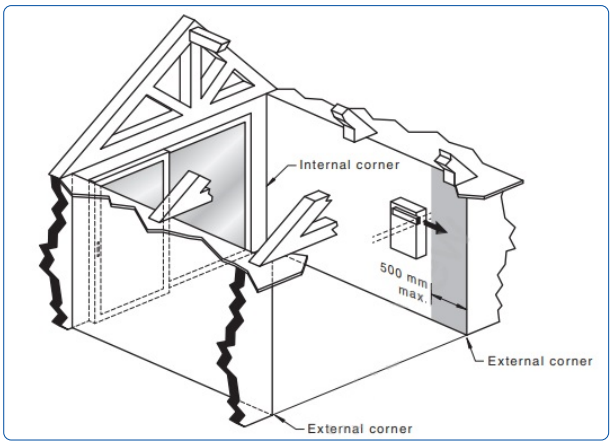
Flue terminal locations under a covered area

The key difference for flue terminal locations under a covered area is that the 2013 version of AS/NZS 5601.1 allows the flue terminal to be within 500mm of the opening so long as the flue is facing the discharge direction. Whereas the update in the 2022 version requires the flue to terminate outside the covered area.

AS/NZS 5601.1:2022



AS/NZS 5601.1:2013



Isolation of installations located in educational facilities

A new clause (5.2.9.1) provides information on isolation requirements for educational facilities with appliances without flame safeguard systems such as a school laboratory with Bunsen burners. A means of isolation must be fitted and include all the following:

a) A readily accessible quarter turn manual isolation valve at the inlet of the installation.

b) An electrically operated solenoid valve at the inlet of the installation. The solenoid valve shall be controlled by a timing device set to the duration for which the installation is expected to operate.

c) A readily accessible emergency stop button connected to the electrically operated valve with key-operated reset function to ensure no gas flows to the installation after restoration of power following a power failure.

d) Signage adjacent to the emergency stop button indicating its purpose.

e) Operating instructions for the emergency stop button.

f) The system shall require pressure proving of the downstream installation prior to restoration of the gas supply.

This additional information should help give clarity for gasfitters on installation requirements for educational facilities which will ensure the installations are safe.

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Freestanding commercial catering equipment – under-equipment connection

Clause 6.10.2.6 says "Freestanding commercial catering equipment having a connection point under the equipment shall not be connected to that point using a hose assembly."

This means for some installations it may be necessary to extend the appliance connection point to a higher level.

Freestanding commercial catering equipment – hose assembly

Clause 6.10.2.7 provides several new requirements when connecting commercial catering equipment with a hose assembly. This helps make the hose assembly connection requirements clear when they are being used on commercial catering equipment.

Going forward

It's important to remember that the updated versions of AS/NZS 5601 parts 1 and 2 need to be referenced in the GSMR before these changes come into force. Until then AS/NZS 5601.1:2013 is still the version used as a means of compliance.

If gasfitters are using the 2022 version of part 1 or the 2020 version of part 2, they will need to do a certified design when issuing their gas certificate (see GSMR regulation 43 to see what is required in a certified design).

When the updated version is referenced in the GSMR there will likely be a transition period to allow gasfitters time to become familiar with the changes.

Future updates

Future updates to AS/NZS 5601.1 will likely include information about hydrogen and biogas.

Summary

The AS/NZS 5601 part 1 and part 2 gas installation standards are updated on a regular basis. From December 2023 to March 2024 Standards Australia consulted on proposed amendments to the standards. Some areas of AS/NZS 5601.1 affected by the proposed updates are:

- Updates to the scope – Proposed amendment to allow section 2 to be applied to any gas or gaseous fuel in any combination to supply a gas appliance.
- Additional definitions added – Proposed definitions added for down-draught extraction system, overhead radiant heater, overhead radiant tube heater and patio heater.
- Updates to pipe work installation requirements – Proposed amendments are made in Table 4.2 for the installation of stainless steel pipe and multilayer pipe.
- Updates around the emergency isolation of multilayer pipe – Proposed amendment to alert occupants when the fire safety system operates, and several informative notes added.
- Addition of a prohibited location for consumer piping – Proposed to prohibit the installation of consumer piping in New Zealand in a detached dwelling that is not serviced by that consumer piping.

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- Additional requirements for gas appliance locations – Proposed that flueless heaters or open flue appliances shall not be installed in rooms with heat transfer systems.
- The addition of a normative appendix for the location of flue terminals for small gas engine-driven appliances – Proposed details include a figure and table to show the flue terminal clearance requirements.
- Multiple editorial amendments.

Other future updates to AS/NZS 5601.1 will likely include information about hydrogen and biogas.



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Test your knowledge on this topic

Answers on page 124

Q1. The update prohibits brazing within what distance from non-metallic components?

Q2. The new clearance between the highest part of a burner from a domestic cooking appliance to a rangehood is?

Q3. Fill in the gaps: The update prohibits multilayer gas pipe being installed _____-ground _____ to a building.

Notes

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04

Topic 04:
New Products and Technology

This topic explores changes in products and technology used in plumbing, gasfitting and drainlaying systems.

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Heat pump hot water cylinders

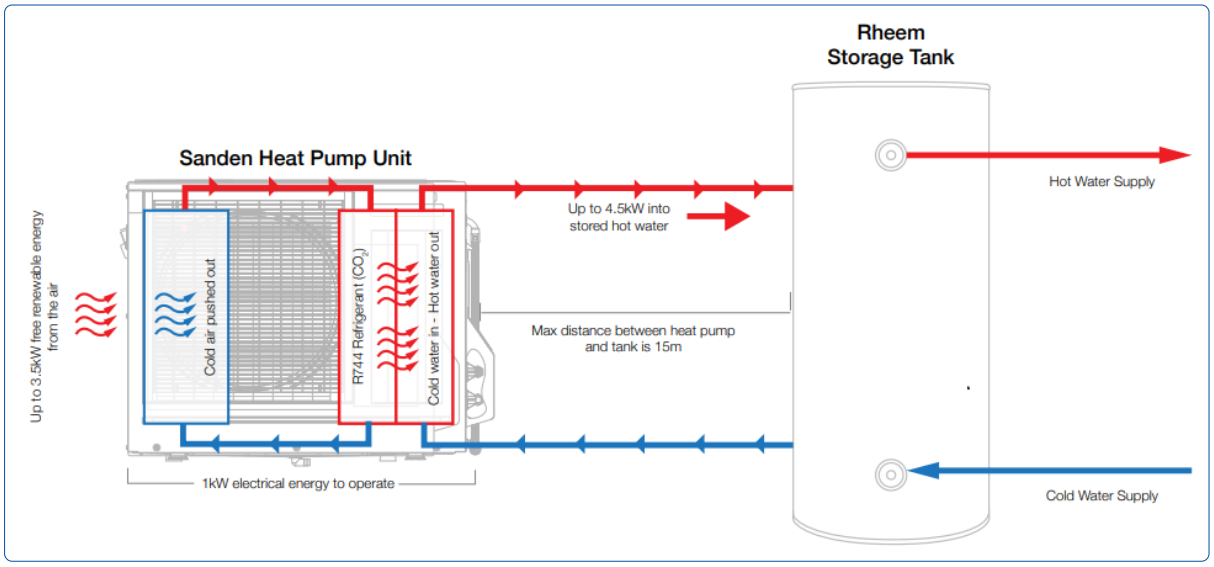
Overview

A heat pump hot water cylinder works a bit like a reverse refrigerator, pulling heat from the air around it to warm the water. It has a fan which draws in air, and this air passes over a refrigerant-filled coil. The heat in the air transfers to the refrigerant, making it turn into a gas. This gas gets compressed, which makes it even hotter. Then, the hot gas moves through another coil inside the tank, heating the water around it. As the gas cools down, it turns back into a liquid and the whole process starts over again. It's a super-efficient way to heat water, especially when there's warmth in the air to grab onto.

There are different types of heat pump hot water cylinder set ups. Some have the heat pump attached, sitting either on top of the cylinder or on the body of it. Others may have a separate heat pump unit which can be located away from the cylinder.



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Installation considerations

Some things to consider when installing a heat pump hot water cylinder are:

Orientation

Many models require good airflow for optimum performance. Always check with the manufacturer what is required for the model you are installing.

Noise

The heat pump's components (such as the fan and compressor) run while heating the water, which can make a constant sound. The noise level is generally low, but it can run at night. You should avoid installing it near bedrooms or neighbours' bedrooms. Some models have specialty features such as timer functions to limit operating hours if noise is a concern.

Weather

Like any heat pump, weather can have an impact. Suitable temperature ranges vary depending on the different models. The Rinnai Hydraheat is suitable for installation in climatic conditions ranging from -10°C to +42°C. The Rheem Ambiheat is suitable for installation in climatic conditions ranging from -5°C to +43°C. Many models have an electric booster element which will take over when the climatic conditions are outside the range.

If they are installed in a snow zone, they will need to be installed in a covered area to prevent snow covering the unit.

Benefits

Energy efficiency

Heat pump cylinders are highly energy efficient, utilizing heat from the air to heat water, consuming less electricity compared to traditional electric water heaters.

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Lower operating costs
Owing to their energy efficiency, heat pump cylinders can result in lower monthly energy bills, especially in regions with moderate climates.

Reduced carbon emissions
Heat pump cylinders have lower greenhouse gas emissions compared to conventional electric water heaters, contributing to a smaller environmental footprint.

Disadvantages

Higher initial cost
Heat pump hot water cylinders have higher upfront costs compared to traditional electric water heaters, which can deter initial investment for some consumers.

Space requirements
Heat pump cylinders often require more installation space due to the need for adequate air circulation around the unit.

Noise levels
The heat pump units can produce noise from the fan and compressor, which might be a concern if installed near bedrooms.

Refrigerants
Many traditional heat pump refrigerants are found to have a significant environmental impact. The impacts include ozone depletion and contribution to global warming. Many of these are being replaced with more environmentally friendly refrigerants such as propane-based refrigerants. However, these carry a risk owing to their flammability.

To avoid potentially harmful leaks plumbers should avoid working on the heat pump component of the system unless they are also trained refrigerant technicians and approved by the manufacturer.



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Electric continuous flow water heaters

Overview



Electric continuous flow water heaters are not a new product for many plumbers. But traditionally they have been only suitable for point of use or a small number of fixtures.

The Rheem Eclipse electric continuous flow water heater is designed for use in residential apartments and commercial buildings where 3-phase power is available. It comes in 18kW and 27kW models depending on the needs of the building. Rheem also has models which are suitable for 50°C and 60°C water temperatures.

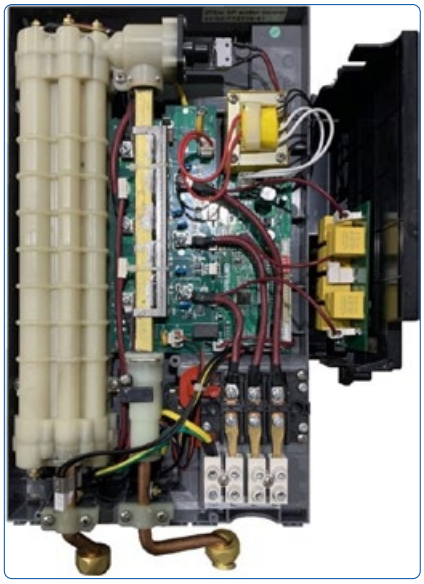
Installation considerations

Like any water heater, consideration should be given to the quality of water entering the unit and the supply pressure. Consideration should also be given to whether there is suitable power supply for it and whether the power supply can be run to the location of the unit.

Benefits

Power savings

Like other continuous flow water heaters, it only heats the water being used. So power consumption can be reduced (depending on usage).



Saves space

Compared to a hot water cylinder the continuous flow water heater takes up much less space.

Flexibility in placement

Unlike gas continuous flow water heaters, the electric model doesn't rely on air for combustion or fluing. This offers more flexibility in location of the unit.

Disadvantages

Power increases

Like other continuous flow water heaters, there are no storage limits to how much hot water can be used. Over use can result in higher power consumption.

Limited residential use

Because this model requires 3-phase power its residential use is mostly suitable for apartment buildings.

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Excess flow valves

Overview

AS/NZS 5601.1:2022 clause 5.2.11 introduces the provision for emergency isolation where multilayer pipe is used as part of the consumer piping. One way of providing emergency isolation which meets the requirements of clause 5.2.11 is to use an Excess Flow Valve (EFV). EFVs are not new technology, but they are something we will likely see more of when AS/NZS 5601.1:2022 is referenced.



EFVs play a crucial role in gas systems as safety devices designed to automatically halt gas flow during sudden surges such as a break in the line. They help prevent hazards such as fires or explosions in cases of gas line damage. These valves are installed to swiftly restrict gas flow in emergencies, ensuring the safety and integrity of gas systems.

Installation considerations

Correct installation is vital for EFVs to function. When installing an excess flow valve, always consult with the manufacturer's installation instructions to ensure it is installed correctly. Failure to do this could result in nuisance tripping (e.g. when a high gas consumption appliance is used it is set off and isolates the gas), or failure to isolate the gas in an emergency such as a broken gas pipe.

Location

EFVs should be installed as close as possible to the gas supply point and be readily accessible. Additional excess flow valves may also be installed on individual gas lines.

Valve size

EFVs should be appropriately sized to accommodate the total gas consumption of the installed appliances. If undersized, they might trip out due to low flow, resulting in frequent nuisance tripping.

Gas meter

Ensure the gas meter is sized larger than the EFV; an undersized gas meter may hinder the EFV's functionality. Contact the gas supplier if the gas meter is undersized.

Gas pipe installation

Take into account pressure drops through EFVs and multilayer piping. Refer to the installation instructions provided by the EFV manufacturer and the pipe sizing guidelines from the multilayer pipe manufacturer for accurate sizing considerations.

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Benefits

In addition to their main safety function there are several benefits to using an EFV as opposed to other methods such as an Under-Pressure Shut Off (UPSO).

Cost effective

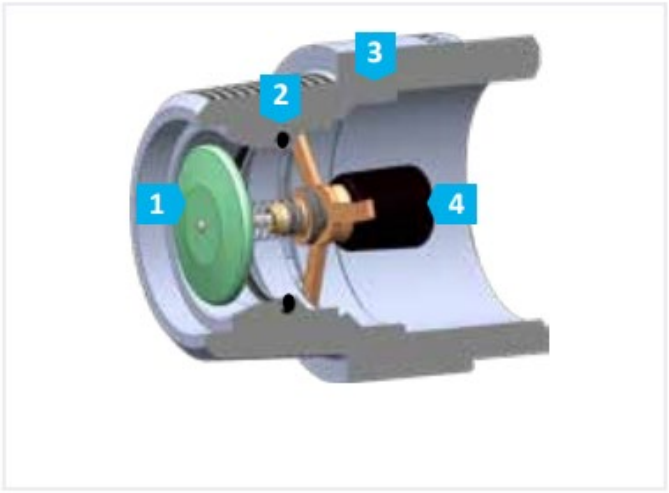
Installing an EFV can be more affordable than other compliant emergency isolation options.

Space saving

The EFV can be installed inline without taking up much space.

Disadvantage

The main disadvantage with an excess flow valve is the number of factors to consider when sizing them. This means there is a risk that they will be incorrectly sized and not function.



SENTRY GS Cutaway (DN25)

1. Closing Disc with By-pass Orifice
2. O-Ring
3. Housing
4. Damping System

Rainwater retention and detention systems

Overview

Rainwater retention and detention are key strategies in sustainable water management. *Retention* involves capturing rainwater and storing it for later use (AKA rainwater harvesting). This stored water can be utilized for various purposes, such as irrigation, flushing toilets, and washing machines. This helps reduce reliance on conventional water sources and promotes water conservation.

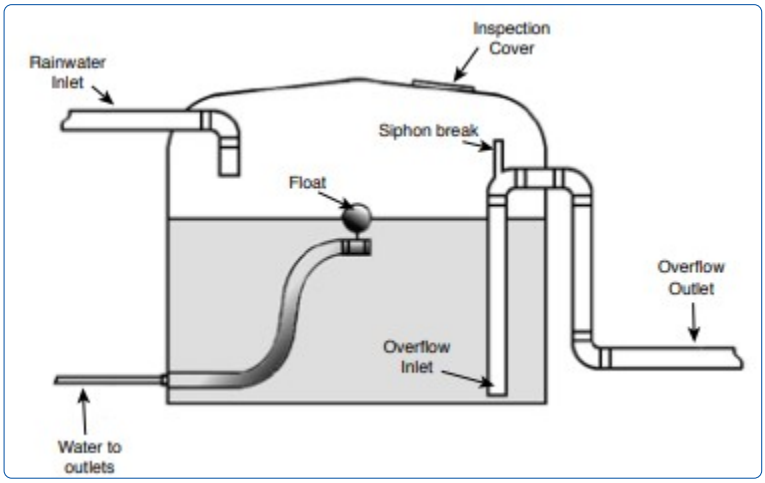


Figure 1: Retention

On the other hand, rainwater *detention* focuses on temporarily holding rainwater and gradually releasing it into the stormwater system or natural water bodies. This approach helps prevent rapid runoff, minimizing the risk of flooding and erosion in urban areas. Detention systems can include ponds, basins, or permeable pavements that temporarily hold rainwater before slowly releasing it into the environment.

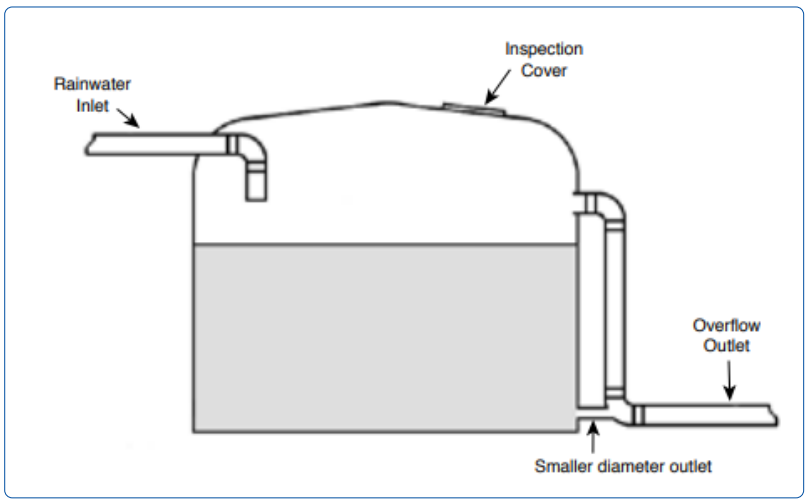


Figure 2: Detention

Both rainwater retention and detention contribute to sustainable water practices, offering benefits such as reducing strain on municipal water supplies, alleviating stormwater management challenges, and promoting the efficient use of a valuable resource. These strategies align with eco-friendly and water-sensitive design principles, fostering resilience in the face of changing climate patterns and urban development.

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Retention and detention systems are not new, but processes are changing to better align with construction trends and council requirements. We are increasingly seeing retention and detention being required in urban areas where there is limited space to install large water tanks. It can often be costly to install buried tanks in the smaller properties because of the excavation that may be required and how this can affect the foundation of a building. This has led to some innovation in the type of water tanks available.

Types of systems

There are different types of systems which are suitable for the various needs of a property. The two I will highlight are slim tanks and modular under-slab tanks.

Slim tanks

Slim tanks are smaller and more versatile in size compared to many traditional above-ground tanks. Generally they don't take up much space, as they can be run along walls or fence lines so the outdoor area can be used more effectively without the intrusion of big, unsightly tanks. They're designed to look good and fit well with your house, whether it's an existing house or a new building. The tanks can be modular, which means they are suitable for various volumes of water.

One key safety consideration when installing a slim tank is how to constrain it to prevent it from tipping. Unlike the traditional round tanks, slim tanks can tip over in high winds or during a seismic event. A slim tank holding 1000 litres of water weighs about one tonne. To prevent slim tanks tipping, it is always important to install them in line with the manufacturer's installation instructions.

The other thing to consider is having an appropriate base. The weight of a slim tank and its stored water will be borne by a small area. Bases should be installed in line with the manufacturer's installation instructions.

Some slim tanks can be cladded over to help improve aesthetics.



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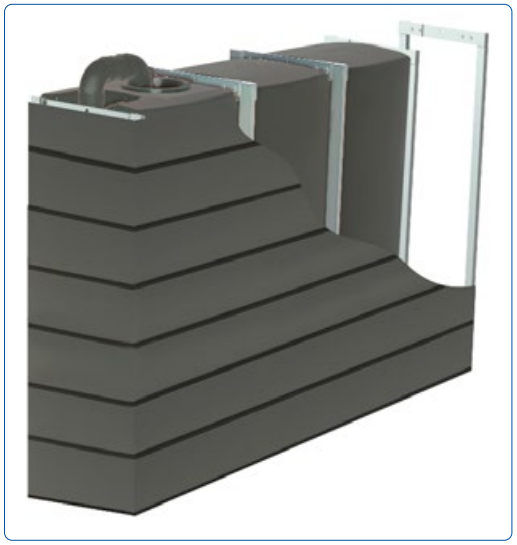
Modular tanks

Essentially all water tanks can be modular if they are set up right. But some tanks are specifically designed to be modular. These are often installed within the concrete slab of a building, taking the space of void fillers. Some modular tanks are the same dimensions as commonly used void fillers, thus requiring little to change in the slab design to make allowance for them. Some modular tanks require joints within the slab, while for others the joints are external to the slab.



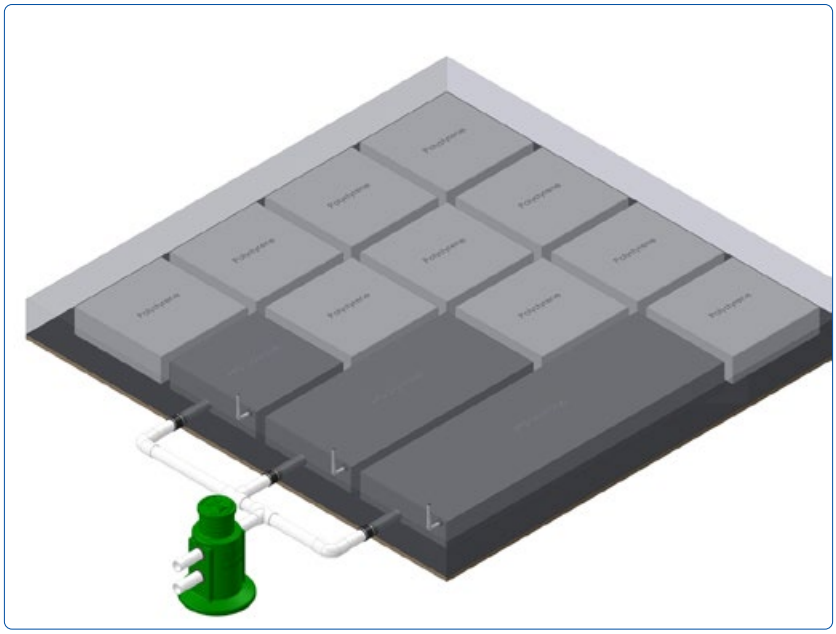
The main use of modular tanks is within a building's concrete slab. But many can also be installed beneath a concrete driveway and under decks. A benefit of installing modular tanks in the slab is that they can raise the invert level of the stormwater drain. This is particularly helpful when there is limited gradient to the outfall.

Being modular, the tanks have the capacity to store various volumes of water for the different needs of the building.



When installing in a slab some things to consider are:

- *Their proximity to other services* – We all know the tanks will need to be out of the way of things like wastepipes. But will there be a sufficient clearance from services like underfloor heating?
- *Their effect on the structure of the slab* – The location of the tanks may affect the structure of the slab by obstructing such things as structural steel. You may need to get approval from an engineer for any modifications the tanks make to the slab.



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Test your knowledge on this topic

Answers on page 124

Q1. When deciding where to locate the heat pump hot water cylinder, what room should you avoid placing it nearby?

Q2. What type of buildings is the Rheem electric continuous flow water heater suitable for?

Q3. What does an excess flow valve do?

Notes

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05

Topic 05:
Changes to Drinking Water Legislation in New Zealand

Changes to drinking water legislation affect most of your customers. There have been significant changes in how safe drinking water is supplied and what equipment is permitted. These changes represent a substantial opportunity for work.

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The changes

In November 2021, there were two very important changes to how we manage and legislate drinking water in New Zealand.

We got:

- A New Drinking Water Regulator – Taumata Arowai
  - *https://www.taumataarowai.govt.nz/*
- New Drinking Water Legislation – The Water Services Act 2021
  - *https://www.legislation.govt.nz/act/public/2021/0036/latest/LMS374564.html*

What does this mean for plumbers

These changes significantly alter how safe drinking water is supplied, and what equipment may be used.

> Validated UV units are now required for all applications except domestic self-supplies (single home with its own water source)
>
> The standard UV units you may be used to using can now only be used on domestic self-supplies

As the certified experts in your trade, people rely on you to know what the right thing to do with their water is. Plumbers are usually the first port of call when people have questions about their water, and so it is important to understand what is required to keep people safe.

What are Validated UV units?

Validated UV units are certified by a 3rd party so there is proof that they do what they say they do. They are used at a higher UV dose than standard domestic UVs and all of them have sensors to make sure that enough UV light is getting through the water, so that they can deactivate the bugs to disinfect the water properly. This proves that the UV is working, and the water is safe 24/7.

Standard UV units have no way of indicating that they are successfully treating the water, and often people will think they are safe when their quartz sleeve is too dirty to let the light through, the water is too dirty to treat, or they have just reset the lamp counter instead of changing the lamp.

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UV units can be validated to:

- Ultraviolet Disinfection Guidance Manual (USEPA 2006b).
- DVGW Technical Standard W294 (DVGW 2006).
- öNORM M 5873-1: 2020 01 01.11
- NSF/ANSI 55 Class A (NSF, ANSI n.d).

NSF 55 Class A is the most common validation used on smaller water supplies.

	NSF 55 Class A UV	Standard UV
UV Dose	40mJ/cm^2	30mJ/cm^2
In-Built Flow Restrictor	Yes	No
UV Sensor	Yes	No or Optional
3rd Party Certified	Yes	No

Maintenance and water testing

All water treatment equipment must be maintained regularly to be effective, so to keep your customers safe and compliant it is important to discuss the maintenance requirements of any equipment that you install and come to an agreement about who will do the maintenance. It may be a service you wish to offer. If so, ensure that you are familiar with both the maintenance requirements set out by the manufacturer, and either the Acceptable Solutions or the Drinking Water Quality Assurance Rules.

All water suppliers are now required to test their water quality regularly. Sampling may also be a service you wish to offer. If so, please ensure that you are trained in proper sampling techniques, and ensure that what you are testing and the frequency of testing meet the compliance requirements.

Taumata Arowai

Taumata Arowai have taken over from the Ministry of Health in regulating the quality of drinking water for the whole of New Zealand.

Their role is to ensure that all communities have access to safe, reliable drinking water, every day.

They also maintain the register of drinking water suppliers and follow up on compliance requirements.

Wai Ora. Tangata Ora. – Healthy Water. Healthy People.

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The Water Services Act 2021

The Water Services Act defines who a drinking water supplier is and what their responsibilities are.

This replaces the Drinking Water Standards 2005 (revised 2018).

The aim of the Water Services Act is to provide a regulatory framework that is consistent with international best practice to ensure that drinking water suppliers provide safe drinking water to their consumers.

How do I know who is a Drinking Water Supplier?

Drinking Water Supplier

If you own or operate a water supply (that you know, or reasonably ought to know) is being used as drinking water by people outside of your own home, you are a Drinking Water Supplier and will have responsibilities under the Water Services Act 2021.

- See Section 8 of Water Services Act 2021
- Registration required by 15th Nov 2025

Domestic Self-Supply

A Domestic Self-Supply is NOT a water supplier, so does not need to register.

A Domestic Self-Supply is a SINGLE HOUSE or DWELLING with its OWN water supply

- See section 10 of Water Services Act 2021
- Domestic Self-Supplies have responsibilities under the Building Act 2004 and the Health Act 1956

Examples

A single property with tenants on a lease supplied by a rainwater tank is a domestic self-supply.

A single holiday house that is supplied by a rainwater tank and is rented to tourists on a short-term basis is a domestic self-supply.

A multi-dwelling building (for example, multiple separate apartments contained in a single building) that has its own bore water supply is a Water Supplier.

A marae wharekai (dining hall) or community hall that has its own river water supply is a Water Supplier.

A café building supplied by a rainwater tank is a Water Supplier.

Examples from Water Services Act 2021, Section 10

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What does a Drinking Water Supplier have to do?

All Water Suppliers, regardless of their size, need to meet the New Zealand Drinking Water Standards and take all practicable steps to comply with Aesthetic Values.

All water suppliers need to meet the Duty of Care to supply safe drinking water (since Nov 2021).

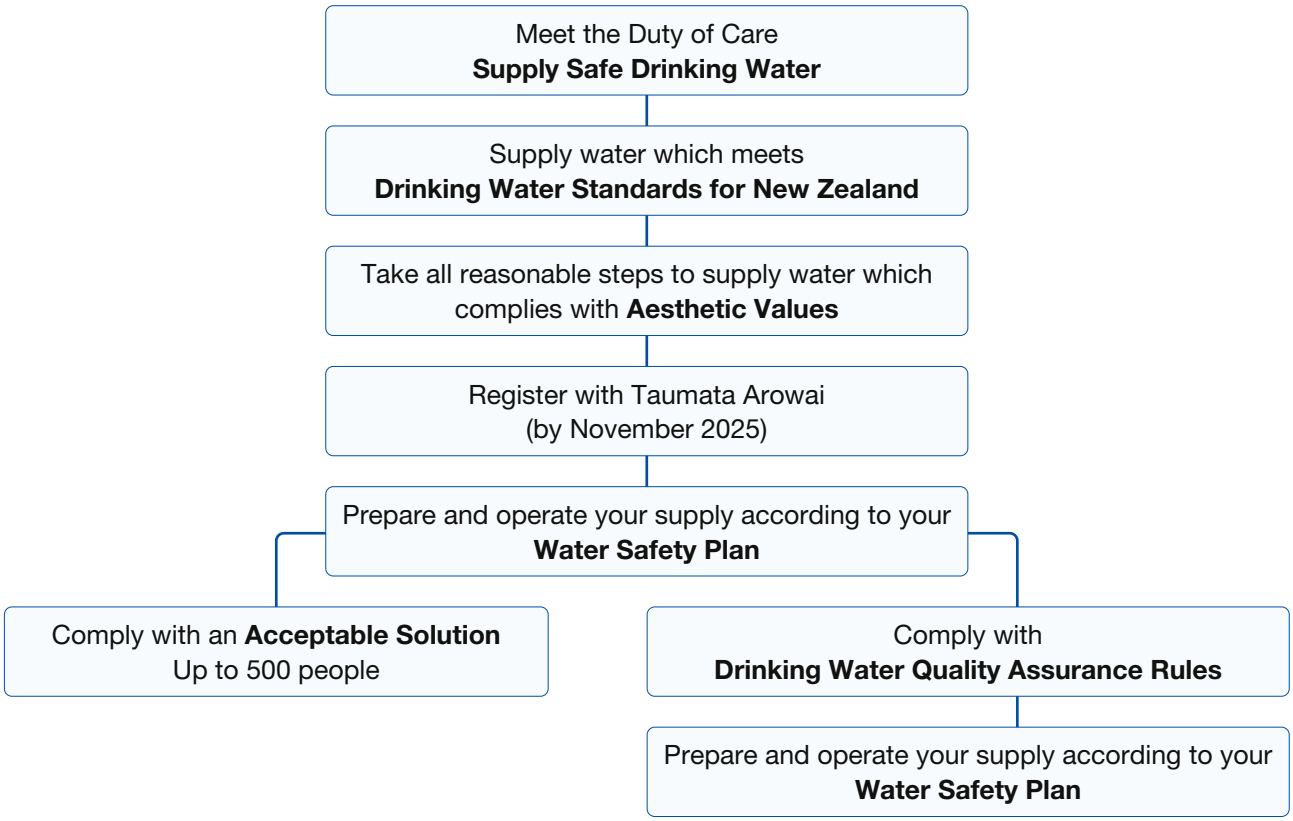
All water suppliers need to register their supply with Taumata Arowai. Unregistered water suppliers have until **15th November 2025 to register their supply and until 15th November 2028 to comply**.

Very Small, Small and Medium Water Suppliers need to either adopt an Acceptable Solution, or alternatively have both a Water Safety Plan and comply with the Drinking Water Quality Assurance Rules.

Large water suppliers must have a Water Safety Plan and comply with the Drinking Water Quality Assurance Rules.

Acceptable Solutions are a practical and cost-effective way for Very Small, Small and Medium Drinking Water Suppliers to meet their compliance obligations under the Water Services Act. However, they only apply to particular supply types and situations.

How to comply



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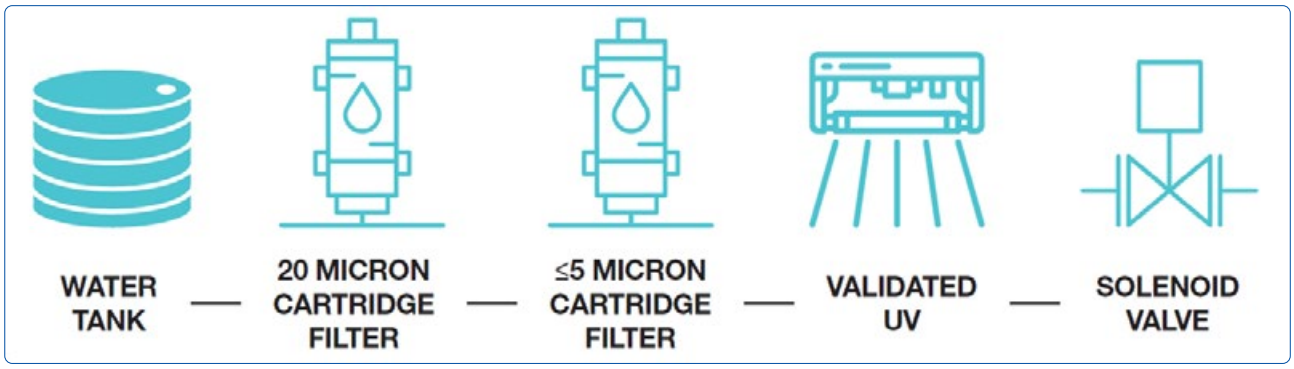
Pathways to Compliance



Important Info about Taumata Arowai Acceptable Solutions

- Taumata Arowai Acceptable Solutions for drinking water suppliers are based on an end point treatment system
- You can use one end point treatment system with validated UV for either:
  - One building with up to 500 people
  - Up to 3 buildings with up to 100 people total across all the buildings, if they are on a single site
- You can use multiple end point treatment systems on a water supply (e.g. if you have 9 buildings on a site, you can use 3x end point treatment systems)

The Acceptable Solutions look like this:



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Installed Examples of Acceptable Solutions:

Photos provided by White International

Example 1: Accommodation venue using the Drinking Water Acceptable Solution for Spring and Bore Water Supplies



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Example 2: A Business using Drinking Water Acceptable Solution for Spring and Bore Water Supplies with additional pre-treatment to make water suitable for UV treatment



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Example 3: A School using Drinking Water Acceptable Solution for Roof Water Supplies



Option B - Drinking Water Quality Assurance Rules

In particular, the Water Quality Assurance Rules lay things out clearly and structures the rules around source water, treatment systems and distribution systems.

SCAN BELOW

If you choose to comply using the drinking water quality assurance rules, then you will need to

1. Identify what type of Water Supplier you are
2. Prepare a Water Safety Plan
3. Comply with the rules which apply to you

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The Drinking Water Quality Assurance rules are for whole supply treatment. The requirements are broken into modules.

There are modules for:

- General rules
- Source water rules
- Treatment rules
- Distribution rules

There are 3 different levels for different sizes of water supply. This means that smaller water supplies have simpler rules than bigger supplies. This is because risk increases as supply size increases.

To use the Drinking Water Quality Assurance rules, consult table 2 in the Drinking Water Quality Assurance Rules and select the supply size and type which applies to your situation, follow the rule modules which apply, and prepare a water safety plan.

Table 2. Categories of drinking water supply and Rules that apply to them

Categories of drinking water supplies	Rule modules that compliance is demonstrated against
1. Very small communities	
Up to 25 people, or up to 50 people for up to 60 days in any 12 month period	VSC
If supplying drinking water to a planned event which increases the total population to more than 50 people.	G + TDWS (for the duration of the planned event)
2. Networked supplies	
Small (26–100 people)	G + S1 + T1 + D1
Medium (101–500 people)	G + S2 + T2 + D2
Large (>500 people)	G + S3 + T3 + D3
3. Self-supplied buildings	
Small (26–100 people)	G + S1 + T1
Medium (101–500 people)	G + S2 + T2[4]
Large (>500 people)	G + S3 + T3[5]
4. Water carrier services	
Any population size	G + WC
5. Water carrier supplies	
Any population size	G + S1 + T1
6. Community drinking water stations	
Any population size	G + S1 + T1

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Installed Examples Using the Drinking Water Quality Assurance Rules

Photos provided by White International

Example 1: A small community using a spring water source with chemical treatment and validated UV



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Example 2: A medium network supply, with filters, validated UV & chlorination



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What is a Water Safety Plan?

A Water Safety Plan is a risk management plan for the water supply. In many ways it is similar to a health and safety manual, but for the water supply.

As a plumber it is important to understand what goes into a water safety plan as this may affect:

- How/when you work on a water supply
- How you record your work on a water supply (you may be asked to record each visit and what was done on that visit)
- What equipment you can offer a water supply
- Whether you are asked to sanitise pipework after working on a water supply more often

It is also a source of information about the water supply that may help make your job easier and safer.

Water Suppliers who have a water safety plan should also have an operations manual, which will also help you understand the equipment on site and the maintenance required.

Water suppliers need to be more conscious than ever before about how they manage their water supplies and how they are proving that the water supplies are safe.

Useful links:

Water services Act 2021

Drinking water quality assurance rules

NZ drinking water regulator Taumata Arowai

Taumata Arowai 'Acceptable Solutions' for small water suppliers

NZ drinking water standards

Water safety plan resources

NZ drinking water aesthetic values

Am I a water supplier?

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Test your knowledge on this topic

Answers on page 124

Q1. Who are Taumata Arowai?

Q2. Where do I need to use validated UV units?

Q3. Who is a Water Supplier?

Notes

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06

Topic 06:
Gully Traps and Sewer Overflows

Drainlayers are often caught between the building design and landscaping when it comes to overflow relief gully (ORG) compliance. This topic covers some of the data around ORG performance as well as solutions for compliance.

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Sewer relief,not stormwater drains!

An overflow relief gully (ORG), or gully trap, must do one thing but must not do another!

- An overflow relief gully (ORG) must provide a relief point such that if the downstream foul sewer becomes blocked or surcharges, the overflow must occur outside at the ORG, not inside the building; and
- The ORG / gully trap must be constructed to prevent the ingress of surface water into the foul sewer.

Foul sewers are designed to convey wastewater – not stormwater. If stormwater enters a foul sewer, i.e. via an overflow relief gully acting as a surface water drain, the sewer can become overloaded and sewage spills can occur.

These overflows can occur in people's gardens, into streams or onto our beaches. None of which are pleasant! No-one wants to be swimming in sewage!



Ensuring that that the ORG / gully trap is constructed correctly plays an important part in protecting our environment.

The Ministry of Business, Innovation and Employment (MBIE) publish *Verification Methods and Acceptable Solutions* and Standards New Zealand publish *Standards*, both of which provide examples of how to comply with the Building Code. Note, only standards which are cited in a Verification Method or Acceptable Solution have been deemed to comply with the Building Code.

There may be alternative ways to comply, but these need to be approved by the local Building Consent Authority (BCA).

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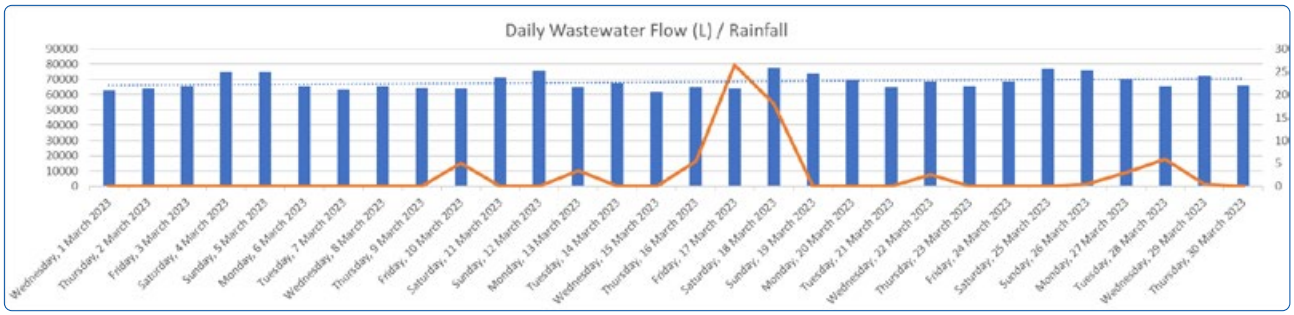
The problem

The following charts are daily wastewater flows from a new pressure sewer catchment of approximately 180 houses, being monitored via a 50mm magflow meter where it discharges into a gravity network. As a pressure sewer system, it is assumed that there is no infiltration into pipes as they are under pressure, and it is noted that there is no rain response to the 26.5mm rain event in March (no roofs connected). However, on 9 May, with a 74mm rain event and waterlogged ground (owing to the rain events on 1 May and 4 May), twice the average volume of "wastewater" was discharged into the gravity network.

Whilst the pressure sewer network operated fully, the downstream gravity infrastructure could not cope and sewage overflows occurred into people's gardens and ultimately into the Manukau Harbour.

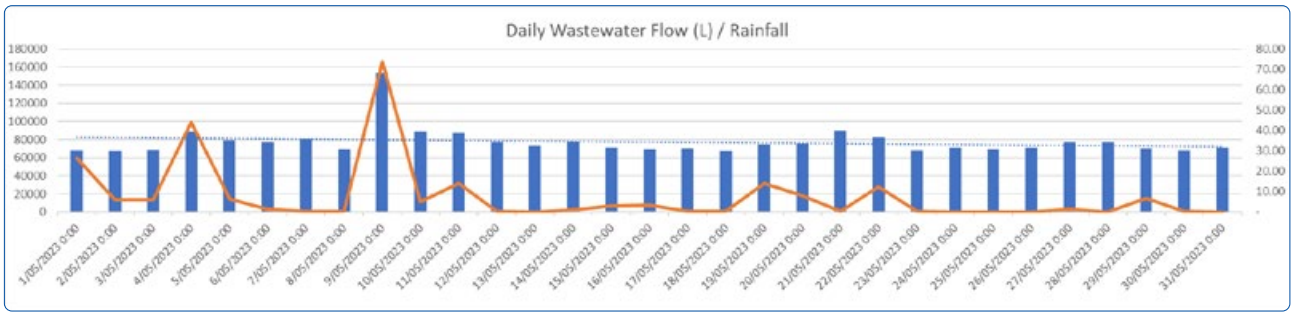
On inspection, numerous overflow relief gullies / gully traps were found to be flush with the ground, and acting as stormwater drains. One property owner said that it was good, as it prevented his garden from flooding, not understanding that whilst it prevented stormwater ponding in his garden, it resulted in sewage overflows into people's gardens downstream of his house and ultimately into the sea.

March



No response to 25mm event (i.e., no roofs connected).

May



Twice the daily flow recorded due to gully traps draining overland flow.

Blue = Daily Wastewater volume (L) Left hand axis; Orange Line = Daily Rainfall (mm) Right hand axis.

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Acceptable Solutions and Verification Methods For New Zealand Building Code Clause G13 Foul Water

Ministry of Business, Innovation and Employment, 2 November 2023

Acceptable Solution G13/AS2 Drainage

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) 75 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.

[For additional requirements b) to j) see Acceptable Solutions and Verification Methods For New Zealand Building Code Clause G13 Foul Water – free to download – with link below].

3.3.2 In order to provide overflow relief for the drainage system, every building used for housing shall be provided with at least one gully trap which shall:

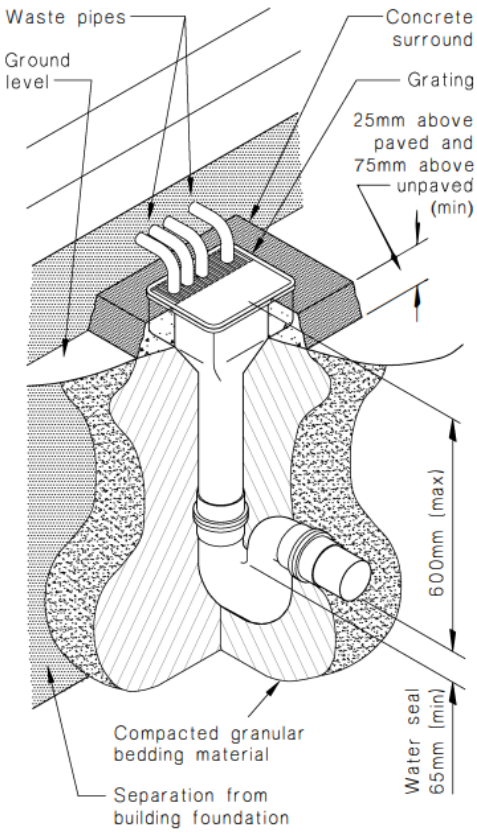
a) Be positioned so that the top of the gully dish is no less than 150 mm below the overflow level of the lowest sanitary fixture served by the drainage system,

b) Have a grating that will allow surcharge,

c) Be located in a visible position, and

d) Be installed so that surcharge cannot enter into or under buildings.

Figure 2: Details of gully traps
Paragraph 3.3.1

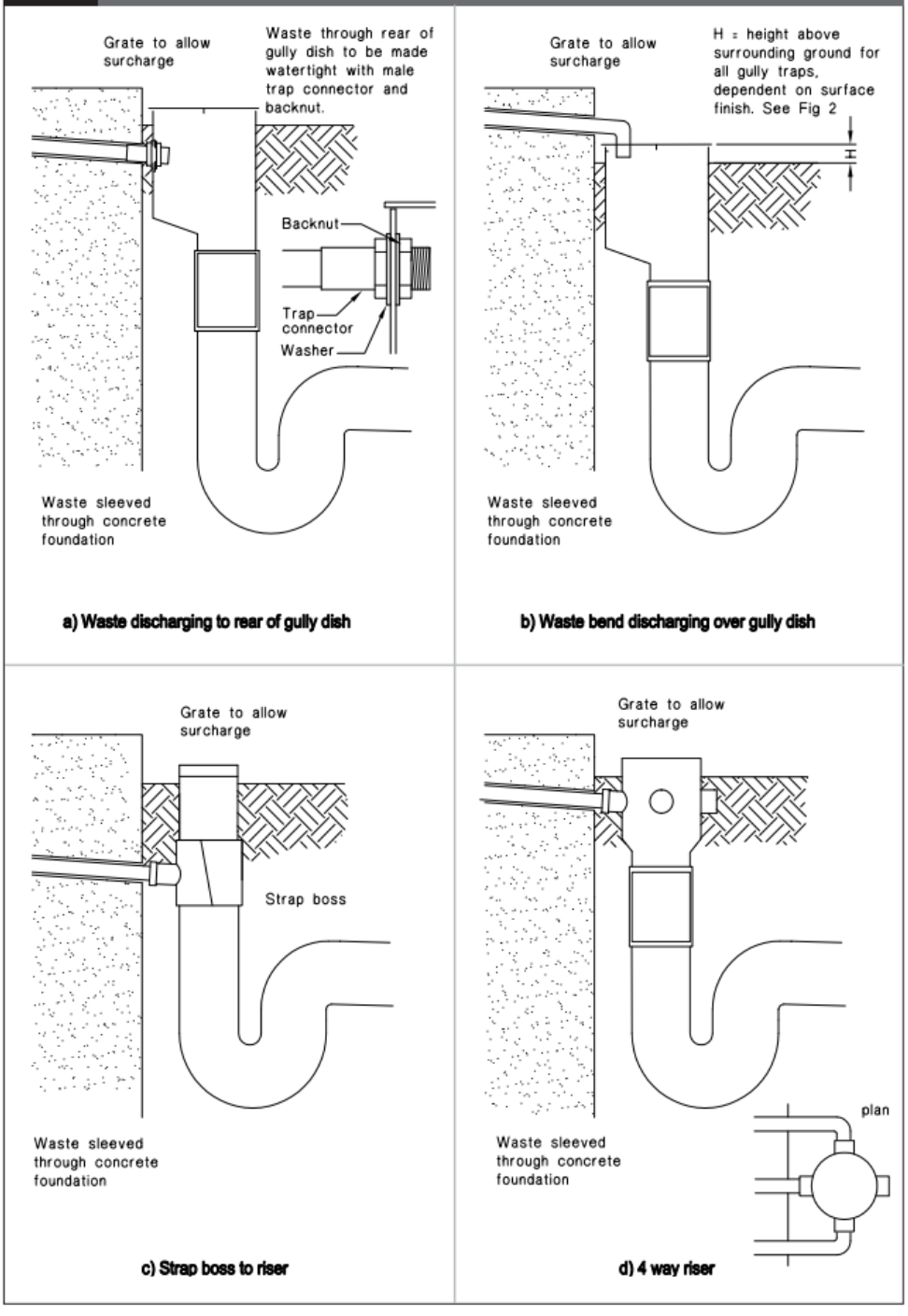


This document is available to download free of charge: *www.building.govt.nz*

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It is also important to connect wastepipes in a manner to prevent water getting into the gully trap or ORG. In practice, it is noted that the acceptable solution in Figure 3 a) is rarely followed, but we still need to install wastepipes to prevent water ingress.

Figure 3: **Methods of connecting to gully traps**
Paragraph 3.3.1



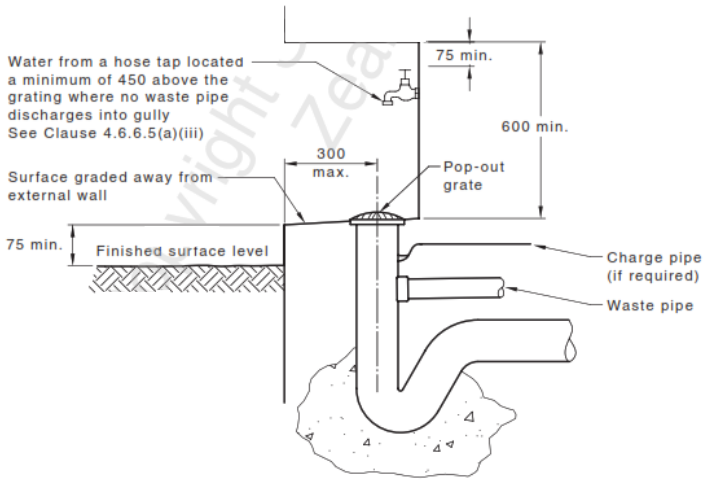
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AS/NZS 3500.2:2021 Plumbing and Drainage

4.6.6. Overflow Relief Gullies

4.6.6.1 General

At least one overflow relief gully shall be installed in the drain, except as provided in Clause 4.6.6.2. Disconnector gullies conforming with the requirements of clauses 4.6.6.3 to 4.6.6.7 may be used as overflow relief gullies.



(b) Typical details of overflow relief gully positioned in recess

Figure 4.6.6.5 — Positioning of overflow relief gully

4.6.6.6 Height of overflow point below lowest fixture

A minimum height of 150mm shall be maintained between the top of the overflow gully riser and the lowest fixture connected to the drain.

4.6.6.7 Height above surrounding ground

The minimum height between the top of the overflow gully riser or the invert of the overflow pipe and the finished surface level shall be 75mm, except where the gully riser is located in a path or a paved area, where it shall be finished at a level so as to prevent the ponding and ingress of water.

See AS/NZS 3500.2:2021 Plumbing and Drainage, Part 2: Sanitary plumbing and drainage for full details. This document is accessible at no charge in the standards library which you can access through your trade login when you have an active licence: *www.pgdb.co.nz*

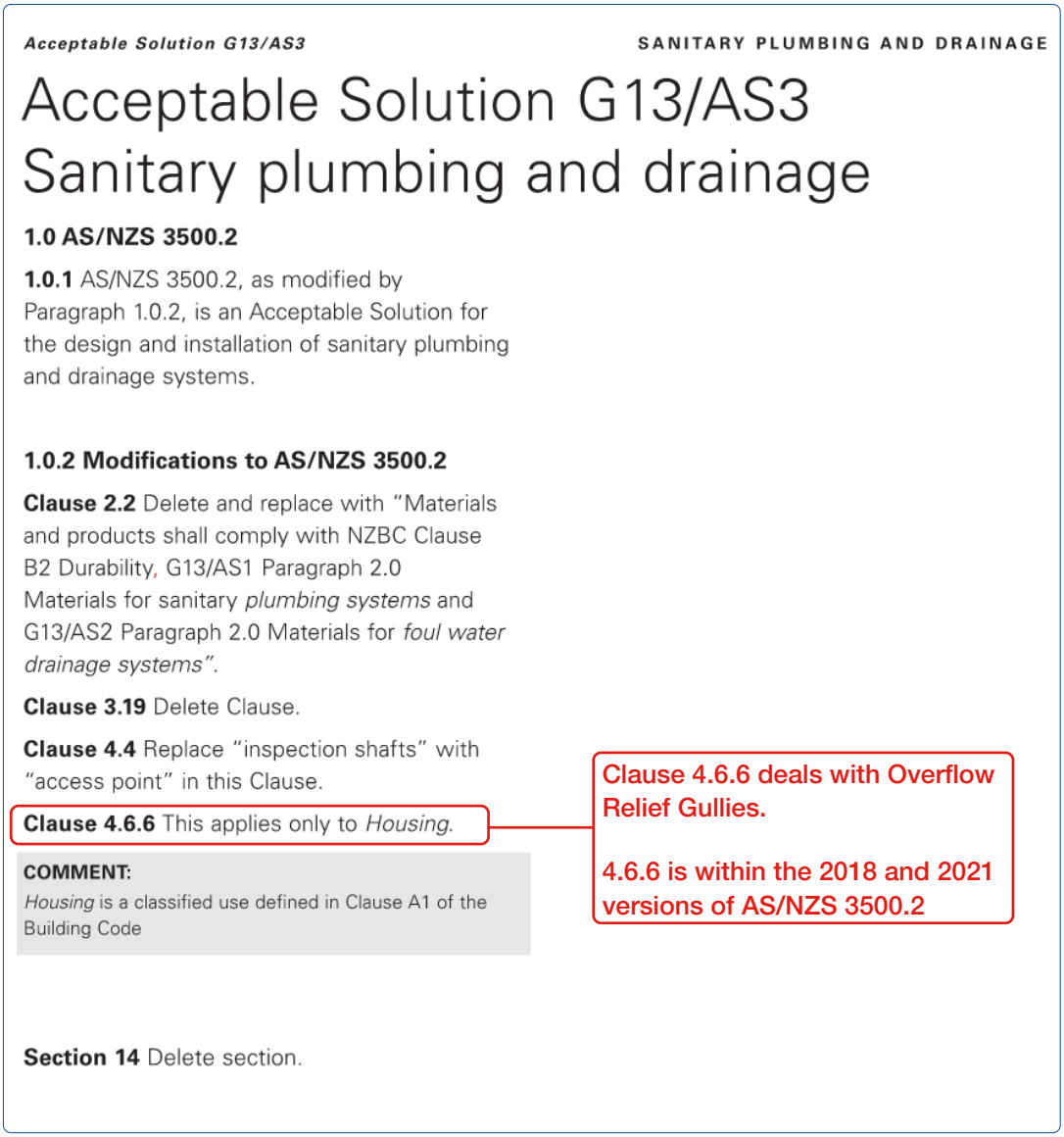
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G13/AS3 modification to AS/NZS 3500.2

You may recall from last year's CPD in respect to Junctions on Grade and the reference to "modifications" to the acceptable solutions. Well, this also applies to ORGs!

If we refer to G13/AS3, you will note that Clause 4.6.6 is deleted. Thus the requirement for an ORG only applies to housing when using G13/AS3 as an Acceptable Solution.

G13/AS3 is in fact using AS/NZS 3500.2 as an Acceptable Solution with New Zealand-specific modifications, which must be adhered to if you want to use G13/AS3 as an Acceptable Solution.



Acceptable Solution G13/AS3 SANITARY PLUMBING AND DRAINAGE

Acceptable Solution G13/AS3 Sanitary plumbing and drainage

1.0 AS/NZS 3500.2

1.0.1 AS/NZS 3500.2, as modified by Paragraph 1.0.2, is an Acceptable Solution for the design and installation of sanitary plumbing and drainage systems.

1.0.2 Modifications to AS/NZS 3500.2

Clause 2.2 Delete and replace with "Materials and products shall comply with NZBC Clause B2 Durability, G13/AS1 Paragraph 2.0 Materials for sanitary *plumbing systems* and G13/AS2 Paragraph 2.0 Materials for *foul water drainage systems"*.

Clause 3.19 Delete Clause.

Clause 4.4 Replace "inspection shafts" with "access point" in this Clause.

Clause 4.6.6 This applies only to *Housing*.

COMMENT:
Housing is a classified use defined in Clause A1 of the Building Code

Section 14 Delete section.

Clause 4.6.6 deals with Overflow Relief Gullies.

4.6.6 is within the 2018 and 2021 versions of AS/NZS 3500.2

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Housing is defined within Schedule 1 of the Building Regulations (Clause A1 Classified Uses) and is shown here.

> **2.0 Housing**
>
> **2.0.1** Applies to *buildings* or use where there is self care and service (internal management). There are three types:
>
> **2.0.2 Detached dwellings**
>
> Applies to a *building* or use where a group of people live as a single household or family. Examples: a holiday cottage, boarding house accommodating fewer than 6 people, dwelling or hut.
>
> **2.0.3 Multi-unit dwelling**
>
> Applies to a *building* or use which contains more than one separate household or family. Examples: an attached dwelling, flat or multi-unit apartment.
>
> **2.0.4 Group dwelling**
>
> Applies to a *building* or use where groups of people live as one large extended family. Examples: within a commune or marae.

In fact, there are 7 types of listed classified building uses referenced in the NZBC, being:

1. Housing
2. Communal Residential
3. Communal Non-Residential
4. Commercial
5. Industrial
6. Outbuildings
7. Ancillary

So in essence, if you are working on designing a sanitary system for a building that is not defined as housing, the ORG theoretically can be omitted.

There can be a multitude of reasons that an ORG cannot be physically installed in a building other than a housing building: boundary constraints, overland flood paths, client directives, height issues, just to name a few.

However, experience of blocked drains and surcharges spilling sewage inside the lowest fixtures within a building tells us that it is good practice to ensure there is at least 1 x ORG on every single building type.





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At least one overflow relief gully is required per property
(except in rare circumstances as below)

AS/NZS 3500 clause 4.6.6.1 says at least one overflow relief gully shall be installed in the drain [with the exceptions defined – see AS/NZS 3500.2:2021 Plumbing and Drainage, Part 2: Sanitary plumbing and drainage for further details].

G13 / AS2: 3.3.2 In order to provide overflow relief for the drainage system, every building used for housing shall be provided with at least one gully trap….

NOTE: In multi-unit developments (such as a row of terraced / town houses) each property requires its own overflow relief gully / gully trap.

When an ORG isn't required

There are some **rare circumstances** where an ORG is not required. For example:

- A toilet block with a concrete floor sloping out of the building.
- Where the site is fully covered by the building and a reflux valve is installed.
- Lowest floor level with a fixture more than 3 metres above ground level.

AS/NZS 3500 4.6.6.6 Omission of overflow relief gully

An overflow relief gully may be omitted where –

a) The drain serves fixtures in a toilet block or an amenities building and is located in a park or reserve, provided the floor of the building is graded to fall towards an external doorway;

b) The site is entirely built on and it is not possible to locate the gully in any alternative location and the fixtures on the ground floor discharge through a reflux valve to the sewer by gravitation;

c) The lowest fixtures connected are located on floor levels that are 3m or more above ground surface level at the point of connection to the sewer; or

d) An alternative overflow relief point, equal to or the equivalent cross-section area of the drain served, is provided to the drainage system.

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Key points

Overflow Relief Gullies (ORG) / Gully Traps should:

a) Be positioned so that the top of the gully dish is no less than 150mm below the overflow level of the lowest sanitary fixture served by the drainage system (i.e. floor level of the house with a bathroom floor drain).

b) Have a grating that will allow surcharge (i.e. pop out).

c) Be located in a visible position, and be accessible for maintenance. Wastepipes entering a gully trap must not go so far in that they prevent access via the gully when unblocking a drain.

d) Be installed so that surcharge cannot enter into or under buildings.

   a) AS/NZS 3500.2:2021 Plumbing and Drainage

      i. 75mm step down within 300mm to allow drainage away from the ORG.

   b) AS2/G13

      i. The overflow level of the gully dish no less than:

         25mm above paved surfaces, or

         75mm above unpaved surfaces.

e) Be installed such that stormwater (or debris) cannot enter the foul sewer.

   a) Paving that surrounds the gully trap should be graded to steer all surface water away from it.

f) Ensure that all waste pipe connections to the gully trap remain watertight to prevent the ingress of ground water.

This can be demonstrated by adopting either *Acceptable Solutions and Verification Methods For New Zealand Building Code Clause G13 Foul Water*, or *AS/NZS 3500.2 Plumbing and drainage, Part 2: Sanitary plumbing and drainage*, or another method, achieving the mandatory building code requirements and being approved by the Building Consent Authority (BCA).

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Alternatives

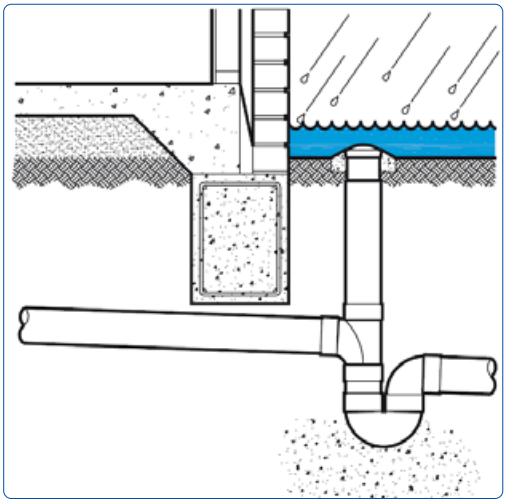
If it is not possible to prevent the ORG / gully trap from becoming flooded with stormwater there are products on the market that prevent stormwater inflows whilst still providing relief if the downstream sewer blocks. Adoption of these alternatives requires local BCA approval.



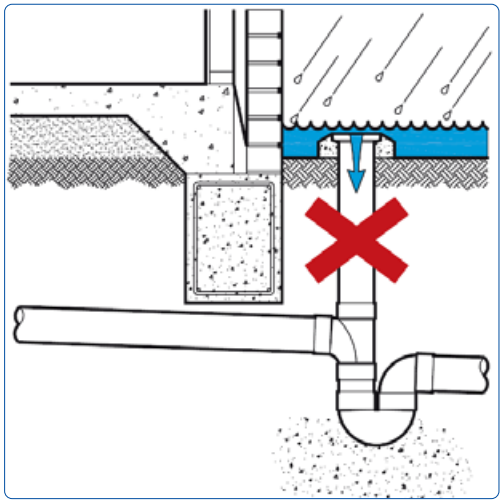
The Overflow Relief Cap is an anti-stormwater inflow device (ORC) which seals against stormwater inflow to sewer drains from house laterals during flood conditions, whilst also providing venting and sewer overflow relief. The ORC can be retrofitted into an existing house drain arrangement in place of a conventional PVC gully dish, or to prevent stormwater entry into an Overflow Relief Gully exit point.

The Solution…

The Overflow Relief Cap in an anti-infiltration device (OCR), which seals against stormwater infiltrating sewer drains during flood conditions, whilst providing effective vent and overflow relief functions.



Typical OCR device installation



OCR device sealing against water ingress

New products are constantly on the market – check with your plumbing suppliers if there are new products available.

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After you have finished (but others haven't)!

Typically, final landscaping isn't complete when the drain laying is complete.

You need to check the landscaping plans and communicate with clients about ORG / gully trap requirements. Make sure that a deck isn't going to be built over the overflow relief gully / gully trap so it can't be accessed.

It is important to consider the drainage path of the ORG, as any spill from the ORG should be able to drain away quickly without causing damage and not build up around the ORG itself.

It is a good idea to take good records (photographs) to show that the ORG / gully trap was compliant at the time of installation.

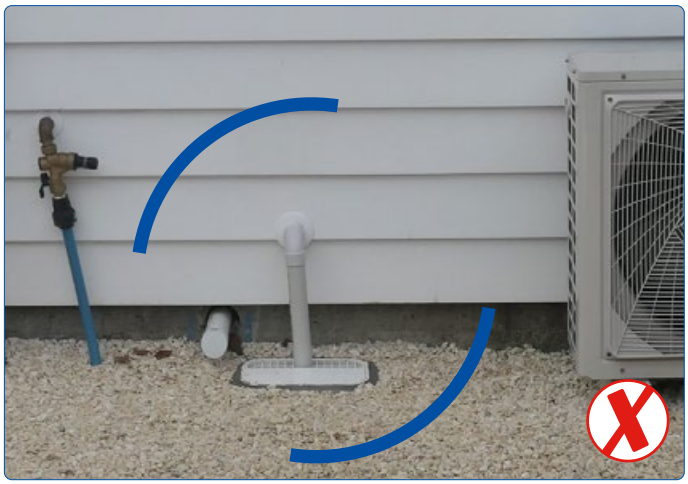
Failure to comply with the requirements could see the Drainage Inspection failed and rework required.

And remember, stormwater entering the foul sewer network causes sewer overflows, with sewage entering our streams and the ocean! And no-one wants to be swimming in sewage!

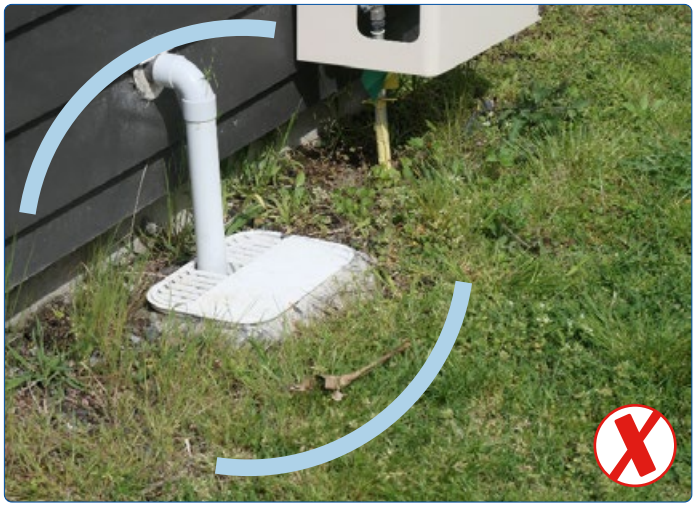


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Non-compliant examples.











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Test your knowledge on this topic

Answers on page 124

Q1. The modifications within G13/AS3 amend AS/NZS 3500.2 clause 4.6.6 to only require an Overflow Relief Gully to be installed in what type of building?

Q2. Fill in the gaps:

The overflow level of the gully dish should be installed no less than:

i) _____ mm above paved surfaces, or

ii) _____ mm above unpaved surfaces.

Notes

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07

Topic 07:
Gas Cooking Appliance Installation

There’s a lot which gasfitters need to know to ensure cooking appliances are installed correctly. This topic sets out some of the common faults found in cooking appliance installation as well as covering key aspects for correct installation.

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Introduction

Why was this topic chosen?

Correct installation is paramount for a safe functioning gas appliance, or any gas installation for that matter.

Feedback received by the Board indicates domestic type gas cooking appliance installations are being installed incorrectly on a regular basis, not just localised to one area but countrywide.

This is concerning and potentially poses a danger to the public, home and building owners.

What are we going to cover?

Within this section of CPD we will look at the following points with respect to gas cooking appliances:

- Examples and common themes of incorrect domestic installations.
- Issues and potential consequences of incorrect installations.
- General ventilation requirements.
- Example templates for good installations.
- An overview of commercial installations.
- Summary the topic.

Incorrect Installation Examples

What is going wrong?

Information the Board has been receiving narrows many aspects of incorrect installations down to these common areas:

- Incorrect clearances
- Incorrect hose installations
- Incorrect hose selection
- Inadequate restraints
- Missing stabilisation devices (anti tip)
- Incorrect pressure settings
- Missing test points
- Missing isolation valve/s
- Incorrect LPG bottle placements
- Incorrect location of the appliance (i.e., in a garage)
- Use of multi-layer pipework as a final connection
- Leaking joints (new installations!)
- Inadequate ventilation

From the bullet points above one can argue that almost all areas of a gas cooker installation are involved!

There is a huge number of clauses within AS/NZS 5601.1 relating to the installation of gas cookers/hobs, too many to include and cover every single clause for this year's CPD, however we will cover some of the main items that have been brought to the Board's attention recently.

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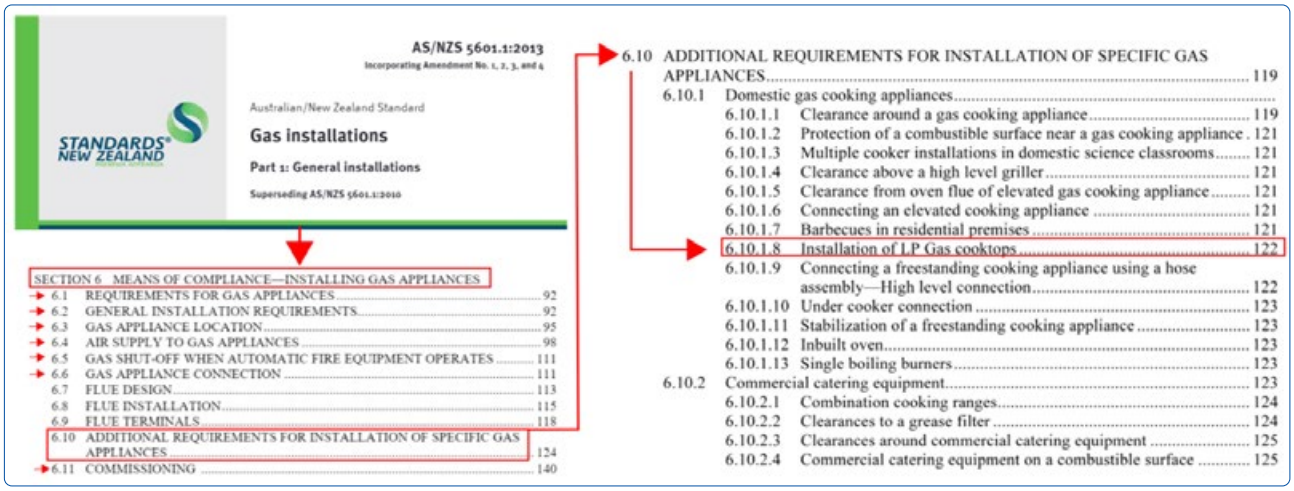
Examples of Incorrect Installations

Let's have a look at real life examples of installations that demonstrate poor and non-compliant installation practices.

AS/NZS 5601.1 5601.1, specifically Section 6, provides the means of compliance in respect to the installation of gas appliances. Within this section there is a subclause for "additional requirements for the installation of specific gas appliances", in this case Domestic Gas Cooking Appliances (6.10.1), and Commercial Catering Cooking Appliances (6.10.2).

The below is a snip from Section 6.10 indicating what is covered within this section.

Figure 1: Section 6 means of Compliance – Installing gas Appliances



As you can see from the above list, there are specific requirements for these appliances over and above the generic requirements for gas appliances.

Within this CPD we will not cover every single item, but concentrate on areas where the Board have become aware of poor installation practices.

Please ensure you read and understand each specific requirement before installing a gas cooking appliance.

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Incorrect Connection to the Appliance

Clause 6.10.1.6 provides two means of connecting the gas cooking appliance, being:

- Annealed copper; or
- A hose assembly.

The snip below is Clause 6.10.1.6 in full.

6.10.1.6 *Connecting an elevated cooking appliance*

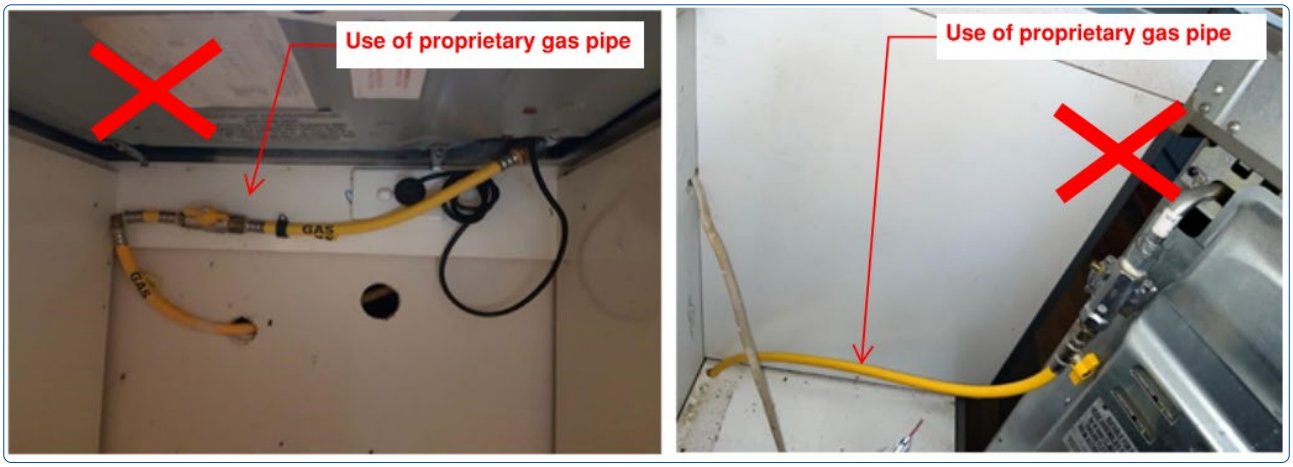
The final *gas* connection to an *elevated cooking appliance* shall be of adequate length to allow sufficient withdrawal of the *appliance* for disconnection and be either—

(a) annealed copper pipe; or

(b) a *hose assembly*.

NOTE: The *appliance* may need to be secured against accidental movement if installed on a hard surface.

Figure 2: Examples of poor connection choices



We also need to be aware that some manufacturers do not allow annealed copper coil connections. Always read the manufacturer's installation instructions properly before starting the actual installation.

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Figure 3: Examples of poor connection choices



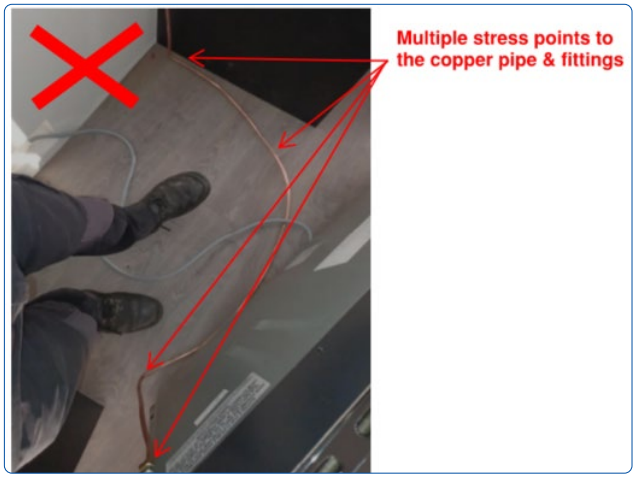
When using annealed copper as a means of connection for freestanding cookers, consider the effects of excessive bending, loading on joints and undesirable loadings on the connection points to the appliance.

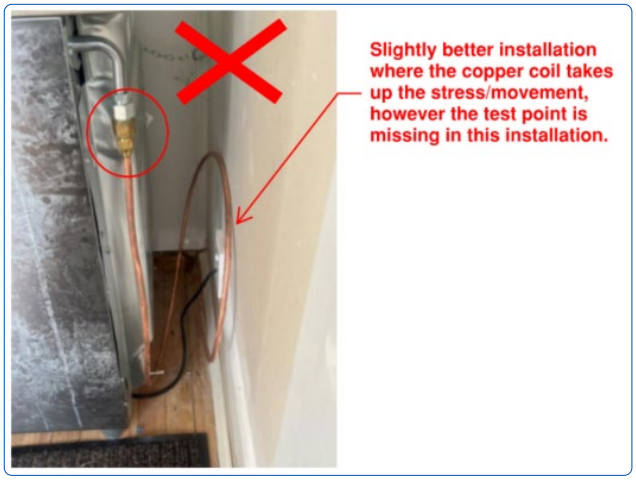
Typically, a decent well measured copper coil is utilised behind the cooker to enable the cooker to be removed for cleaning/maintenance purposes, however many installations with poorly installed copper pipework demonstrate undue stress on the point of connection and along the copper itself.

Two simple means to prevent the stress are to:

1. Ensure adequate lengths of coils – there should be enough large loops to enable the free-standing cooker to be pulled out as required.
2. Secure the copper to the appliance and wall to prevent stress on the connection points.

Figure 4: Examples of undue stress being placed on fittings





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Missing or Incorrect Appliance Restraint

Why is the appliance restraint important?

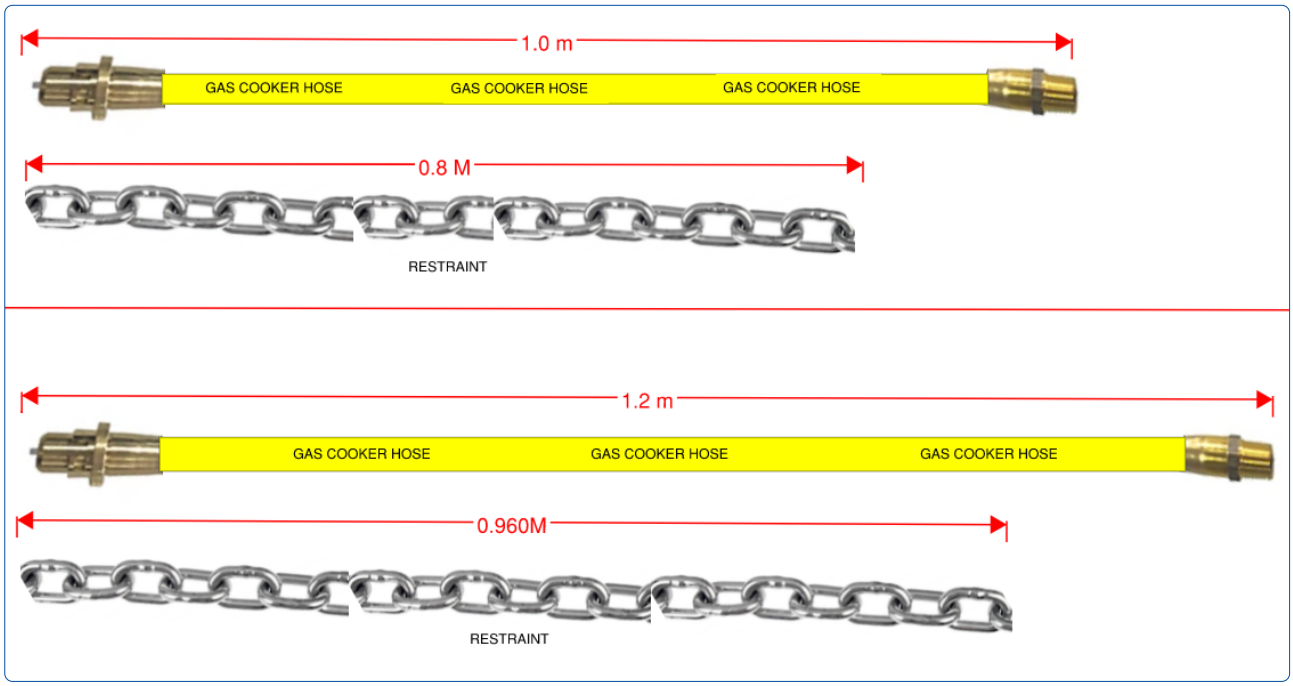
With no restraint there is a high chance that damage will occur to the gas hose assembly and/or copper coil connection every time the cooker is pulled out or potentially moved during an earthquake event.

The restraint is to be no more than 80% of the total length of the gas hose, so the appliance will come to a stop before any stress is placed on the gas hose assembly.

What is the allowable hose length for a gas cooker?

The standard says: “The Hose assembly shall be between 1 m and 1.2 m”.

Figure 5: Example of hose length compared with restraint length



What is also often missed during the installation stage is that restraints for gas appliances installed in New Zealand are to be designed in accordance with NZS 4219.

Gasfitters are not structural or seismic engineers, however gasfitters need to know and understand the principles behind the correct selection of restraints and fixings of the restraints.

It is assumed that all-in-one restraint kits sold at the plumbing merchants are complying with NZS 4219 in respect to the region in which they are being sold and distributed.

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Figure 6: Hoses and copper under stress due to inadequate (or missing restraints)



Missing Anti-Tip Device

Why is an anti-tip device important?

Quite simply, it prevents serious injuries or even death if the gas oven tips over.

All freestanding cookers, even electric ones, are required to be sold with an anti-tip bracket/device. Unfortunately it appears many installers either do not install them, or install the device so badly it does not do the job it was made for in the event the appliance does tip over.

What does AS/NZS 5601.1 say?

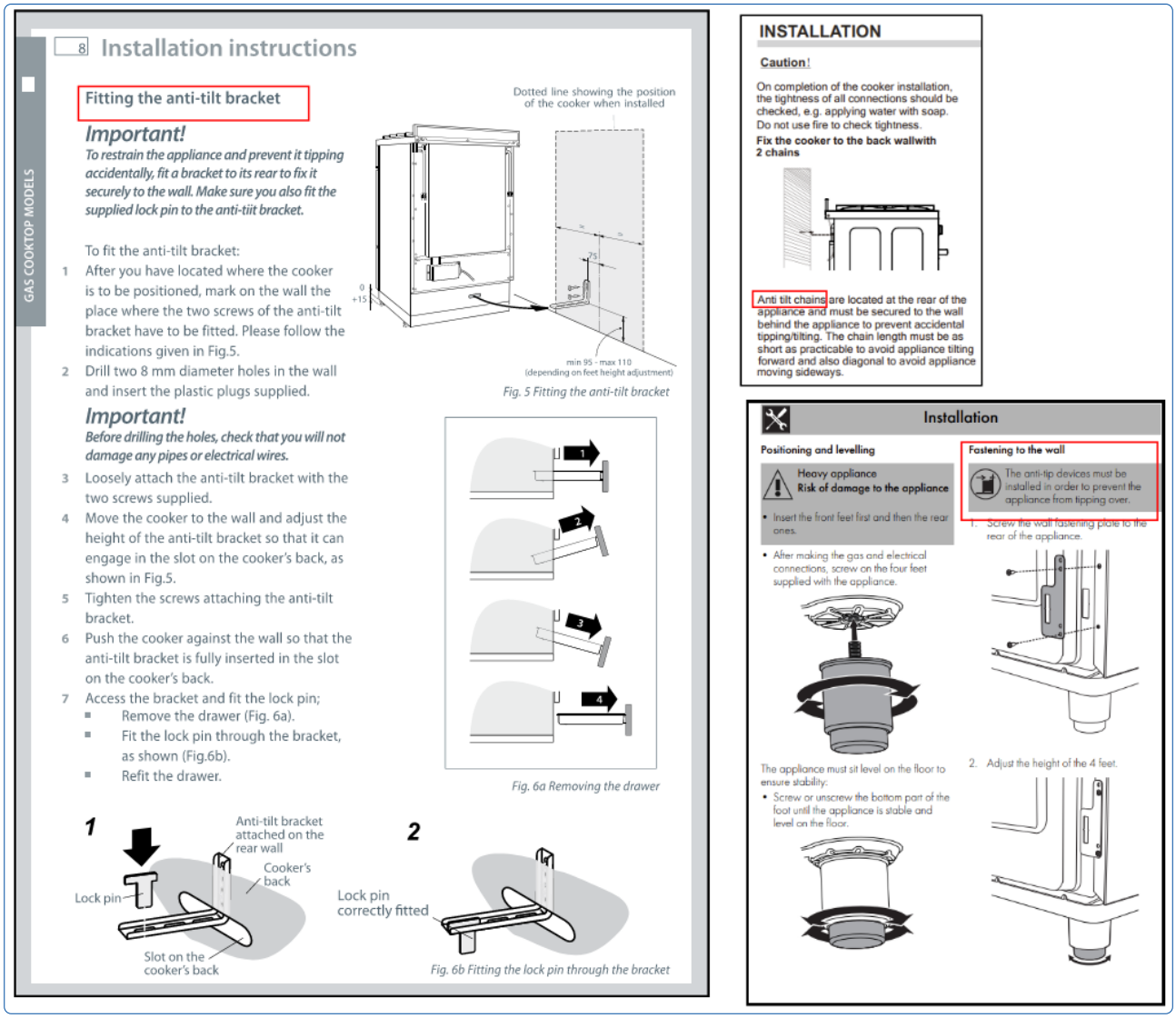
Clause 6.10.1.11 is replicated below:

> 6.10.1.11 Stabilization of a freestanding cooking appliance.
>
> The method recommended in the manufacturer's instructions to prevent the tilting of a freestanding cooking appliance, when in the installed position, shall be used.

Thus, the Standard refers us to the manufacturer's literature/installation manual.

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Figure 7: Anti-Tilt' Examples from Manufacturer's Literature



Missing Test Points

Why do we need a test point?

For any gas system to function safely and efficiently, gas pressures must be correct at different times, and in different parts of the system. Using a test point not only allows us to measure these pressures, but also provides a means to test for soundness.

The pressure in the pipework will be different at varying times during the day, depending whether the appliance/s are being used or not.

Three terms that often confuse people in respect to pressures are:

- appliance pressure
- working pressure
- static pressure

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Let's briefly look at these three different pressures within the system.

Figure 8: Pressures

Name	Description	Test Point Location
Appliance pressure	The operating pressures of the appliance when that appliance is burning gas (operating). When an appliance is burning gas (operating) there is obviously gas flowing through the pipes and the appliance. Because the gas can flow to the burner relatively freely, the pressure of the gas will always be lower than when there is no gas flowing at all (static pressure). Reason for testing: to determine that the appliance is operating within the specifications set down by the manufacturer. These are often not correctly set and cause the appliance not to operate correctly.	At the appliance
Working pressure	Working pressure is the pressure in the pipework when at least one appliance is operating. When an appliance is burning gas (operating) there is a flow of gas through the pipes. Because the gas can flow relatively freely through the system, the pressure of the gas in the pipework will always be lower than when there is no gas flowing at all (static pressure). If the gas pipe sizing is not correctly calculated, this is unable to be achieved.	At any suitable point between the regulator and the appliance control valves
Static pressure	Also known as lock-up pressure. The pressure within the gas system when the system is at rest – with no appliances operating, i.e., Burners are turned off. With no appliances operating, the system is pressurised but there is no gas flowing – the system is static, or still. The pressure builds up in the pipework until the pressure on the outlet side of the regulator reaches the point at which the regulator closes. Once closed, the regulator effectively shuts off the gas and locks the pressure within the system. **NOTE:** Static pressure is the maximum pressure that should occur at any time in the system.	At any suitable point between the regulator and the appliance control valves

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Figure 9: Test Point Location at the appliance (freestanding cooker example)

Term	Static pressure	Appliance Pressure	Working pressure
Burner Controls	Closed	Open	Open
Test Point	At pipework	At appliance	At pipework
Alternative names	Lock up pressure	Test or burner pressure	No other known names

Incorrectly Operating Appliances

Without a test point installed at the appliance, you won't be able to verify the working pressure of the appliance against the information on the data plate and the manufacturer's installation instructions.

Many freestanding cookers run at 2kPa when using natural gas. Yet these cookers, whether knowingly or unknowingly, are being installed with off-the-shelf pre-set 1 kPa regulators, so that the appliance is always running inefficiently and underperforming. This creates dissatisfaction for both homeowners and suppliers, whose products attract criticism when they would operate as designed if installed correctly.

Which also leads to the question "are these cookers being commissioned correctly?"

Figure 10: Example NZ sold gas cooker @ 2kPa for natural gas

Product code	Burner type	Number of burners	Injector size in mm		Nominal gas consumption per burner
			Natural gas	Primary aeration natural gas	
	Auxiliary	1	0.72	–	3.6 MJ/h
	Semi rapid	2	0.97	–	6.3 MJ/h
	Rapid	1	1.18		10.8 MJ/h
	Wok	1	1.49	–	13.68 MJ/h
	Grill (top gas)	1	1.22	6 × 18mm, 2 sides	10.08 MJ/h
	Oven (bottom gas	1	1.3	2 × 18mm, 2 sides	13.68 MJ/h

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The standard clearly states that a test point is required at the inlet of the gas appliance, specifically Clause 5.11.4, as below:

Figure 11: Clause 5.11.4 AS/NZS 5601.1 2013

5.11.4 Pressure test points

Pressure test points shall be *accessible* and provided at, or adjacent to, the —

(a) outlet of *gas pressure regulators* installed in the *gas pipework*;

(b) inlet and outlet of *pressure* raising devices installed in the *gas pipework*;

(c) outlet of the venting device of a *double block and vent safety shut-off system*;

(d) inlet of a gas appliance, if no appropriate test point is incorporated in the gas appliance; and

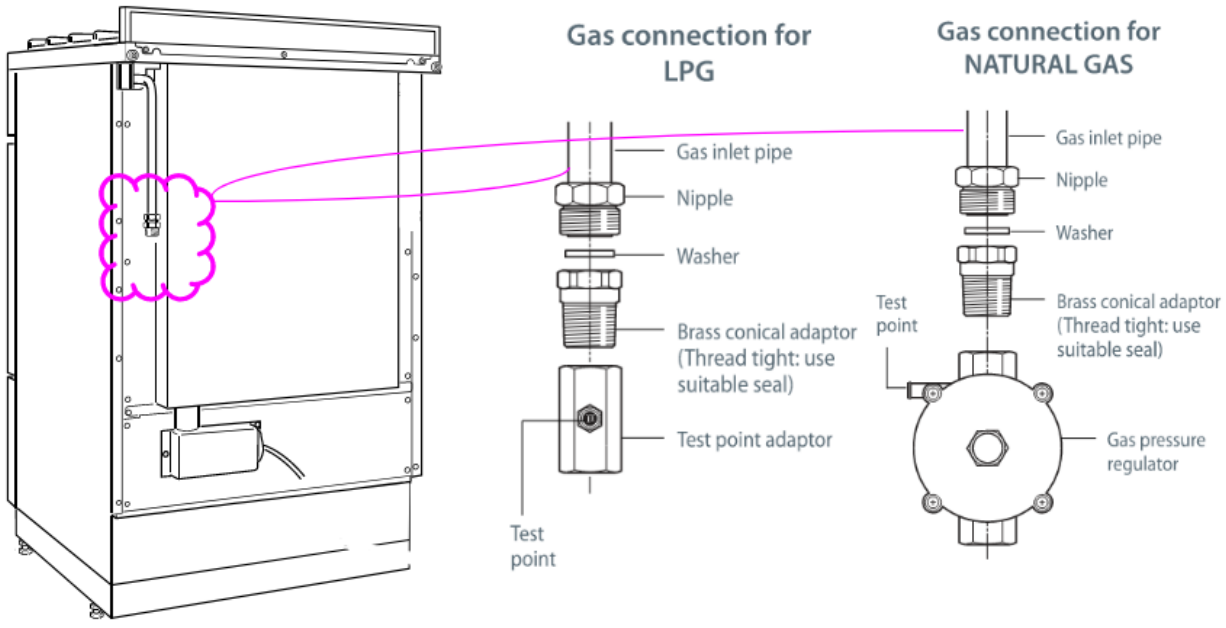
(e) where a permanent *pressure* gauge is fitted, a provision to fit an alternate test point shall be provided.

Where *pressures* exceed 7 kPa, *pressure test points* shall be of the self-sealing type.

NOTE: For *pressures* exceeding 7 kPa, the testing equipment should include a mechanical connection to the test point.

With LPG installations it is not adequate to simply fit a test point at the gas bottle. Because there will be additional friction and pressure losses throughout the system, an appliance test point is also required to ensure correct commissioning and testing.

Figure 12: Test Point Location at the appliance (freestanding cooker example)



Incorrect Clearances

Why do we need clearances?

The protection of combustible surfaces when installing gas appliances is critical for achieving a safe gas installation. This can be attained by installing the appliances with the clearances prescribed in AS/NZS 5601 or manufacturer's installation instructions (whichever is the greater), or where these clearances can't be achieved, by protecting the combustible surface.

Inadequate protection to the combustible surface can lead to a dangerous gas installation, and in a worst case scenario result in a fire.

A gas appliance shall be installed so the surface temperature of any nearby combustible surface will not exceed 65°C above ambient.

This can be avoided if the correct method of providing protection for combustible surfaces is implemented.

When installing a domestic gas cooking appliance, AS/NZS 5601.1: 2013 Gas installations Part 1: General installations explains that the required clearance distance between a gas cooking appliance and a rangehood or exhaust fan must be in accordance with the manufacturer's relevant instruction.

Where clearances are not specified by the manufacturer, then clearance distances must be as described in AS/NZS 5601.1: 2013.

Clearances provide a safe buffer between open flame cooking appliances which can flare up during the cooking process and ignite grease-laden filters.

Figure 13: No protection to standard painted gib type board



Overhead Clearances for Rangehoods and Exhaust Fans

What's the difference between the two?

Rangehood:

A mechanical extraction unit to collect air from above a cooking appliance – this air passes through a filtration type system, and then the unit either discharges the air externally, or reticulates it back into the room. Typically, in a domestic residential setting the air will discharge out of the building via some sort of fire-resistant ducting. Rangehoods are especially designed for kitchens.

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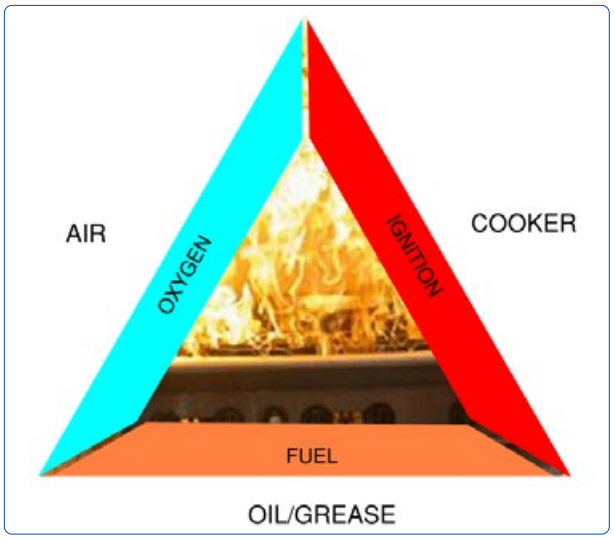
Exhaust Fan:
A mechanical device other than a rangehood that moves air from one space to another, usually out of the building. Think of an extractor fan used in a bathroom as an example. Exhaust fans typically have smaller blades, are less powerful, and do not remove cooking particulates as effectively as rangehoods.

Why do we need minimum distance?

Fires happen in kitchens, nearly half of which are caused by the ignition of cooking materials. Some of these also spread into the kitchen rangehood or ductwork. Once a fire is in the duct it can move quickly, fuelled by grease and oil, and ignite flammable materials outside the duct if ignition can be further achieved.

The cooking appliance, rangehood and surrounding air form the perfect combustion triangle.

Figure 14: Example combustion triangle



Remember: the job of a rangehood or exhaust fan is to extract air, not to supply it for purposes of combustion!

Figure 15: Examples of Kitchen Fires



One means of reducing the fire risk is to ensure a safe and adequate clearance from the top of the cooking appliance to the underside of the rangehood, and/or adjacent surfaces. Refer AS/NZS 5601.1 for clearance requirements.

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Cooker versus benchtop

An often overlooked factor is the height of the finished top of the cooker in relation to the height of the adjacent benchtop and the side of the kitchen cabinet.

If the cooker sits lower than the finished height of the bench top, then the side of the cabinet/benchtop is potentially exposed to high temperatures and/or flame exposure, thereby creating a fire risk.

The simplest solution is to ensure the top of the cooker sits 10mm above the finished height of the bench top. If it sits lower, then some form of approved protection is required to be fitted to the face of the cabinet/benchtop adjacent to the cooker unless you can prove that it is non-combustible.

If you cannot confirm that the surrounding surfaces are non-combustible, they should always be treated as combustible.

Figure 16: Examples of a good installation with the raised 10mm



Figure 17: Examples of poorly installed freestanding cookers/clearances



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LPG installations including bottle location

LPG bottle installation compliance has been covered previously within CPD 2017, yet there are still instances where the Board has been notified of incorrect LPG installations. Let's look at some poor examples.

Figure 18: 9kg bottle installations – incorrect



Why is bottle placement important?

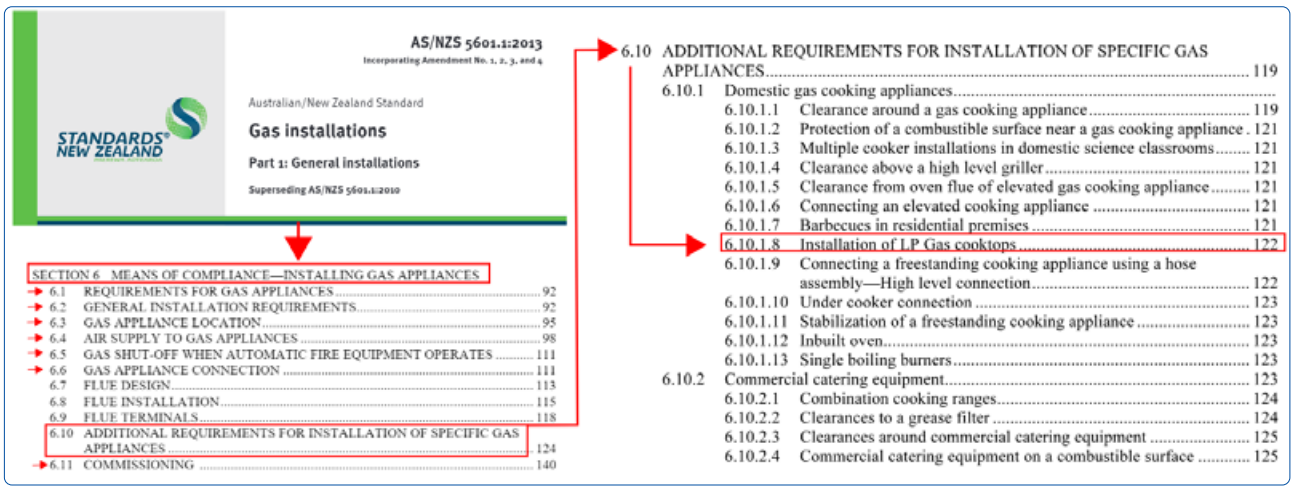
The rules around gasfitting are based on safety considerations. Correct bottle placement is paramount.

Remember that when the LPG bottle is filled, the compressed gas changes to a liquid state, hence the word "liquid" in LPG. In fact, when the bottle is filled, 83% of the volume of the bottle will be liquid whilst the remaining space is used to pressurise and keep the liquid below the dip tube.

Importantly, if the liquid gas is exposed to atmospheric pressure, it will instantly change state and undergo a very rapid expansion to around 270 times its liquid volume! What does that mean? That means that for every 1 litre of liquid that escapes, around 270 litres of gas is released! Now that is a lot of gas!!

Section 6 of AS/NZS 5601.1 has a subclause specific to the installation of LPG cooktops.

Figure 19: Section 6 – LPG Gas Cooktops



AS/NZS 5601.1:2013
Incorporating Amendment No. 1, 2, 3, and 4

STANDARDS NEW ZEALAND

Australian/New Zealand Standard

Gas installations

Part 1: General installations

Superseding AS/NZS 5601.1:2010

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It is good trade practice to always install gas bottles outside of the building.

Key points within 6.10.1.8 are replicated below:

Figure 20: Section 6 – LPG Gas Cooktops cont

6.10.1.8 *Installation of LP Gas cooktops*

NOTE: For safety, *LP Gas cylinders* should be located outside the building. See Appendix J for guidance on installation.

LP *Gas* cook tops shall be installed as in Clause 6.10.1.1 and Clause 6.10.1.2.

The following apply for connection to the cooktop:

(a) Hose assemblies manufactured for *LP Gas* use shall be used.

(b) Hoses shall not pass through walls or dividers.

(c) Copper piping shall be used where the piping from the *LP Gas cylinder* to the *LP Gas* cook top, passes through a wall or *cupboard*.

In New Zealand, where the LP Gas cylinder is located inside, the following conditions apply:

(i) The *cylinder* connection system shall be suitable for *indoor* use.

(ii) *Cylinders* shall not be more than 25 litres water capacity (9 kg *cylinder*).

(iii) The *cylinder* shall not be in the same compartment as a power point or electrical *appliance*, for example waste disposal unit or dishwasher.

(iv) The compartment in which the *cylinder* is located shall be ventilated directly to the outside of the building, with a vent of at least 1 000 mm^2 at low level.

(v) Hoses in excess of 1 m shall not be used.

(vi) Jubilee clips shall not be used.

Leaks!

No new installation should ever be left with a leak.

Before we delve into examples of gas leaks, let's first have a quick look at gas accidents involving gas cooking appliances.

Every year Worksafe provide an annual report of Electrical and Gas accidents; the 2022 version can be found via the link below.

Electrical and gas accidents 2022 annual report | WorkSafe

Let's look at the data over 30 years.



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Figure 21: Worksafe NG and LPG Gas Accidents – 30 years

Cookers and Ovens	
Natural Gas	LPG
A total of 38 (18%) notifiable natural gas accidents involved cookers or ovens. Twelve of 38 cooker or oven accidents resulted in 1 fatality and injury to 14 people.	Of the 453 notifiable LPG accidents reported, 132 (29%) involved cookers or ovens. Out of the 132 notifiable accidents involving cookers or ovens, 98 resulted in 17 fatalities and injury to 129 people.
Cookers and ovens accounted for 76 (12%) of reported non-notifiable natural gas accidents.	Cookers and ovens accounted for 103 (17%) of reported non-notifiable LPG accidents.

When comparing the accident ratios of Natural Gas and LPG, LPG has a notably greater number of fatalities and injuries.

Why is that?

Firstly, LPG is used in both the North and South Islands, so unlike Natural Gas it is country wide. Secondly, it is also used recreationally, in caravans, boats, baches, BBQ's, just to name a few. And thirdly, the characteristics of LPG make it inherently more dangerous than Natural Gas.

It is a matter of concern that when reviewing the percentages of gas accident causes over the past 30 years, incorrect assembly, connection, installation, or alteration comes top at 35%. The full breakdown is provided in the table below.

Figure 22: Worksafe NG- and LPG-caused Gas Accidents – 30 years

Period 1993 – 2022	
Main cause	**Percentage %**
Assembly, connection, installation, alteration	35%
Operation error	15%
Lack of maintenance	15%
Design	7%
Procedure	9%
Carelessness	9%

Now let's go back to leaks. The gasfitter should have completed the correct tests for soundness before the completion of the installation. Yet what if leaks are still occurring?

Testing of gas installations was covered in CPD 2017, and it may be prudent to revisit that CPD as a refresher. Past CPD booklets are available on the PGDB website, a link is provided below:

Plumbers, Gasfitters, and Drainlayers Board (*pgdb.co.nz*)

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Are we allowed a leak?

Surprisingly you are allowed a pressure drop – but only for existing installations in respect to AS/NZS 5601, and only for installations up to 30 litres or less. The allowable pressure drop varies depending on the total volume of pipework that is being tested – the larger the volume, the smaller the allowable pressure drop will be. Depending on who certifies the job, many certifiers will not accept a pressure drop within an existing installation. This is classed as good trade practice and every installation should be leak free. This was also part of CPD 2017.

How much is 30 litres in respect to domestic gas pipework? Remember different pipe systems have different internal diameters.

The table below provides a guide. Note the difference with internal diameters and the lengths. This also applies to water pipe systems, and is especially important when working out dead leg volumes.



Figure 23 – Examples of gas leaks

Figure 24: Examples of different volumes up to 30 litres

	NZS Copper		PEX-AL-PEX		AS Type B Copper	
Pipe Size (NB)	ID	Length	ID	Length	ID	Length
15 mm	13.0 mm	220 m	11.8	275 m	10.8 mm	328 m
20 mm	19.6 mm	100 m	14.4	184 m	16.9 mm	134 m
25 mm	25.6 mm	58 m	19.6	100 m	22.0 mm	79 m
32 mm	32.0 mm	37 m	25.5	58 m	29.0 mm	45 m

Volumes above are estimated as guidance only (pipe only, no fittings)

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Isolation Valves

Are isolation valves required?

The table below is excerpted from Table 6.4 and only shows isolation valve requirements in respect of cooking appliances.

Figure 25: Excerpt of Table 6.4 "Requirements for provision of a means of isolation for an appliance"

	Is means of isolation required? Type of premises	
Appliance Type	**Single Residential**	**Commercial/industrial or residential apartment buildings**
Cooking Appliances	Optional	Yes

This table tells us that an isolation valve is an optional requirement for cooking appliances in a standard standalone domestic house. But some manufacturers' instructions class them as mandatory.

If it is optional, why do some gasfitters still install them?

Many gasfitters will treat it as good trade practice for numerous reasons, some of which are listed below:

- Provides the homeowner with a quick, safe and accessible means of isolation in the event of a leak.
- Provides a safe isolation point if a gas appliance needs to be physically removed for maintenance without disrupting any other gas appliances in the house.
- Allows other gas appliances to continue to operate when maintenance is being carried out on the cooking appliance. This prevents the need to relight/recommission other gas appliances which may have needed to shut down when maintenance was being performed on the cooking appliance.
- Allows part of the installation to be tested for soundness and recorded on the gas certificate as so.

What are the Ventilation Requirements?

Every gas-burning appliance needs fresh air for combustion. Appliances such as gas cookers/hobs both consume combustion air from the surrounding room/space in which the appliance has been installed, and also discharge the products of combustion into that same space. We therefore need:

- an adequate supply of fresh air, and
- an adequate ventilation to disperse the products of combustion.

Remember: we need to ventilate not just for the gas appliance, but also for people.

At rest, an adult will consume around 15 litres of air per minute. Air itself enters buildings through gaps between doors and windows, through suspended wooden floors, and can even percolate through the fabric of a building!

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However, many modern homes are built with greater airtightness in mind for a thermally efficient, warmer, drier home. This has the drawback of reducing the house's ability to "breathe" compared to a house built, say, in the 1960s.

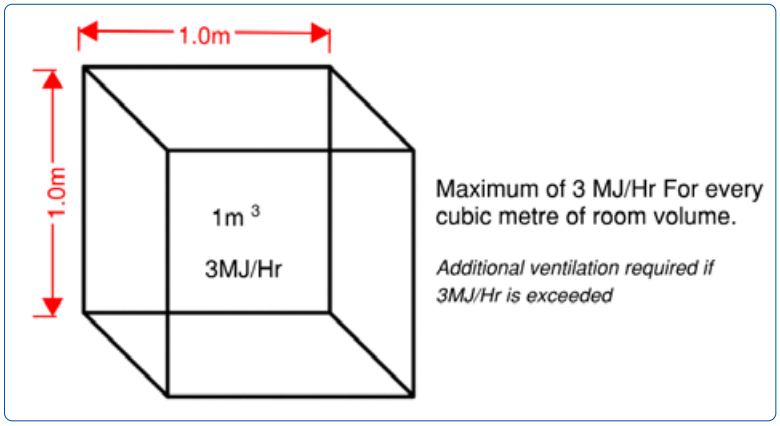
Air entering buildings via gaps etc is referred to as adventitious ventilation, which we have all learnt extensively about during our apprentice years.

While adventitious ventilation will obviously be different in every circumstance, AS/NZS 5601.1 clause 6.4 provides a calculated maximum of the appliance input to the room volume, being 3 MJ/hr per cubic metre of room volume.

What does that mean in simple terms?

For every cubic metre a maximum of 3MJ/hr is allowed. If this figure is exceeded then additional ventilation requirements must be met.

Figure 26: Example 1m³ to 3MJ/Hr



How do we calculate that?

Let's go through two simple scenario exercises below:

We have a typical 39 MJ/hr dual fuel freestanding cooker that is to be installed into a standard domestic household kitchen.

AS/NZS 5601.1 tells us that adventitious ventilation is considered adequate provided the input of the appliance is less than 3 MJ/hr for every 1m³.

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Scenario 1

The first kitchen layout is arranged as the diagram below. It is an open plan arrangement with the total area approximately 132m^3.

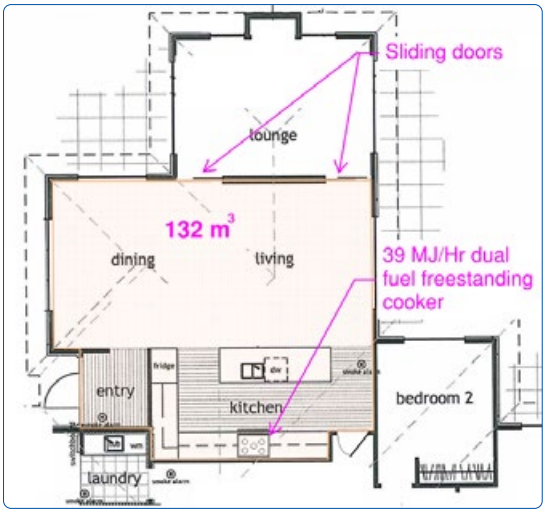


Figure 27: Scenario 1

There are a couple of methods to work this out.

The first is to divide the MJ rating of the appliance by the room volume.

39 MJ/Hr ÷ 132m^3 = 0.29

0.29 is less than 3, so no additional ventilation is required.

One other method often used by manufacturers is to provide the minimum room size, whereby we divide the input of the appliance by 3:

39 MJ/Hr ÷ 3, which gives us a minimum room volume of 13m^3

Our room size is 132m^3 which is acceptable, and does not require additional ventilation.

Here is a question to ponder, what about the rangehood?

What does that do during operation? … It draws air out of the space, so how is the air being replenished?

Scenario 2

Near the end of construction, the client decided to completely change the kitchen layout. The same cooker range has now been shifted into the small butler's cupboard with a sliding door – effectively this room is sealed off if the door is closed.

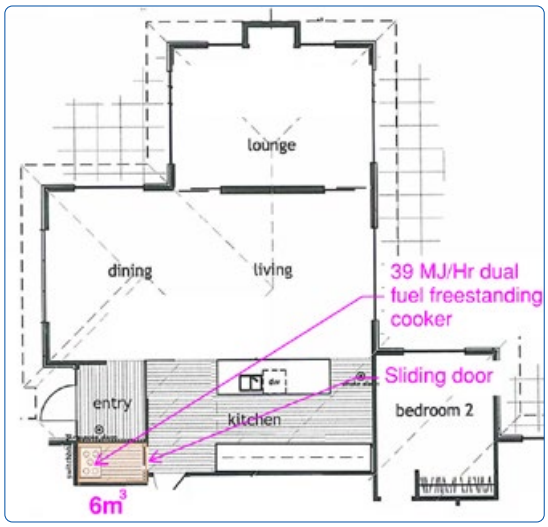


Figure 28: Scenario 2

This butler's cupboard is approximately 6m^3

Our minimum allowable room volume was calculated in scenario 1, being 13m^3.

This new room size is 6m^3, therefore additional ventilation is now required to be introduced into this installation.

Or double check:

39 MJ/Hr ÷ 6 = 6.5

6.5 is greater than 3, therefore additional ventilation is required.

As you can see from this small exercise, shifting the range into a smaller area has created a ventilation issue which now requires this space to be ventilated via calculated openings and/or a calculated mechanical means.

This type of example, even though a domestic one, also provides a good reminder that many commercial kitchens are similar, albeit in a larger space.

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When was the last time you …

- Calculated the room volume of the kitchen?
- Calculated the actual amount of air being removed from the space via the overhead rangehoods?
- Calculated the required fresh air when the above is taken into consideration?
- Checked and verified that the mechanical engineer has correctly calculated the required volume of fresh air? (Usually in commercial situations)

Remember, if we refer to the Plumbers Gasfitters and Drainlayers Act 2006, ventilation is considered Gasfitting under this legislation, and so you should be checking, confirming, and verifying adequate ventilation is available on every job that you carry out!

Why is there no difference in space requirements for natural gas and LPG?… The air-gas requirements are different, aren't they?

Correct, the air-gas ratios are distinctly different, however the heating values of the gases are also distinctly different.

Figure 29: Characteristics of Gas

	Natural Gas	LPG
Air-Gas Ratio	10-1	25-1
Heating Value	40 MJ/m^3	102 MJ/m^3

Gas appliances are designed to produce a certain amount of heat. This is usually indicated on their rating plate as the number of megajoules per hour (MJ/h).

As LPG has a higher heat value (more MJ per cubic metre) than natural gas, an appliance will burn less LPG than NG to produce the same amount of heat.

Let's take a simple example based on the above figures.

We have an appliance rated at 40 MJ/hr. To achieve complete combustion it will require the following air and gas requirements.

When reviewing the table below, notice that both gases use the same amount of combustion air for the same result!

Figure 30: Air-gas ratio example

Appliance rated @40 MJ/hr	Quantity of Gas	Quantity of air for combustion
Natural Gas	1000 litres (1.0m^3)	10,000 litres (10.0 m^3)
LPG	400 litres (0.4m^3)	10,000 litres (10.0 m^3) (25 litres of combustion air per litre of gas)

The other point to note with gas cookers/hobs is their intermittent use within a domestic situation. They are not being used 24/7 – the majority of the time they are used early evening to cook dinner, not all burners will be turned on (nor will they all be on full), and the burners may be used anywhere from a couple of minutes

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to an hour depending on the food being prepared. The intermittent use of flueless appliances such as gas cookers/hobs feeds into the methodology of the calculation of 3MJ/hr per cubic metres of room volume.

For further reading and reference to ventilation, visit the Board website and download the 2020 CPD which also covered in greater detail the ventilation of gas appliances, including the testing of negative air pressures within a space/enclosure.

What Does a Good Installation Look Like?

A good installation will have all the required aspects from AS/NZS 5601.1 and any additional specific manufacturer's requirements.

If we use a simple checklist like the one below, it provides a great start to help ensure your installation is a good installation.

Example Check Sheets

The quick checklist tables below are provided as a simple prompting guide when installing a gas hob or cooker.

The guide is not exhaustive in respect to every single clause within AS/NZS 5601.1.

We recommend you develop your own Q&A checklist and use it every time you install a cooking appliance.

Figure 31: Hob Example Quick Checklist

Item	✓	✗	N/A	Comments
Appliance Declaration				Have you checked the Gas Appliance Supplier Declarations of Compliance Database?
Appliance isolation valve				Does the appliance require an isolation valve?
Appliance test point (at appliance)				Has an appliance test point been installed?
Appliance Regulator				Is the appliance regulator set to the correct operating pressure as per the appliance data plate?
Hose Assembly (if used as final connection)				Is the hose of the correct class type, correct size and length (1000mm-1200mm), not passing through wall, floor etc. and not having a joint?
Clearances to combustible material				Do the side and back clearances comply? i.e. is the burner at least 200mm away from a combustible surface?
Protection of combustibl e materials				Does the installed protection comply? Is there a compliant splashback installed? Is the material behind the covering correct?

Continued …

Item	✓	✗	N/A	Comments
Toughened Safety Glass used as a Splashback?				Does the glass comply with AS/NZS 2208 and is it clearly identified as toughened glass?
Rangehood clearance				Do all clearances comply with AS/NZS 5601 and the manufacturer's instructions?
Ventilation				Is there adequate ventilation? Have calculations been carried out to verify?
LPG bottle location/installation				Is the LPG bottle installation compliant?
LPG injectors				If using LPG, has the appliance been converted from NG to LPG including changing jets and altering aeration as required? Has an identifying label been attached to the appliance to identify LPG is being used?
Manufacturer's instructions				Have all the additional manufacturer's requirements been met?
Gas Type				Is the gas type clearly identified on the appliance?

Figure 32: Free Standing Cooker Example Quick Checklist

Item	✓	✗	N/A	Comments
Appliance Declaration				Have you checked the Gas Appliance Supplier Declarations of Compliance Database?
Appliance isolation valve				Does the appliance require an isolation valve?
Appliance test point (at appliance)				Has the appliance test point been installed?
Appliance Regulator				Has the appliance regulator been set to the correct operating pressure as per the appliance data plate?
Hose Assembly & type (if used as final connection)				Is the hose of the correct class type, correct size and length, not passing through wall, floor etc?
Bayonet height position/location				Has the bayonet connection been installed at the correct height? i.e approximately the same height as the cooker connection point?
Bayonet location				Is the bayonet connection within 150mm of the side of cooker?
Clearances to combustible material				Do the side and back clearances comply? i.e is the burner 200mm away from a combustible surface?
Protection of combustible materials				Does the installed protection comply? Is there a splashback installed?

Continued …

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Item	✓	✗	N/A	Comments
Toughened Safety Glass used as a Splashback?				Does the glass comply with AS/NZS 2208 and is it clearly identified as toughened glass?
Cooker height vs bench height				Is the cooker 10mm above the height of the bench?
Rangehood clearance				Do all clearances comply?
Ventilation				Is there adequate ventilation? Calculation been carried out to verify?
Anti-tip device				Has the anti-tip device been installed?
Restraint				Is a separate restraint correctly installed? (80% of the hose length)
Appliance support				Is the supporting floor structurally sound?
Electrical connection				Is the electrical connection hardwired?
LPG bottle location/installation				Is the LPG bottle installation compliant?
LPG injectors				If using LPG, has the appliance been converted from NG to LPG? Has an identifying label been attached to the appliance to identify LPG is being used?
Additional Manufactures instructions				Have all the additional manufacturer's requirements been met?
Gas Type				Is the gas type clearly identified on the appliance?

Summary

We have looked at good and bad examples of domestic gas cooker installations.

The gas installation rules are based around safety – if the installation is not safe then that presents an untenable risk to the building's occupants.

It's important as the certifying gasfitter to ensure all installations are safe and compliant with AS/NZS 5601.1 including any specific manufacturer's instructions in respect to the gas appliance installation.

Small oversights can potentially have consequences which are catastrophic, even though unintended.

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Test your knowledge on this topic

Answers on page 125

Q1. An appliance restraint shall be no greater than what percentage of the length of the hose assembly?

_____

Q2. A gas appliance shall be installed so the surface temperature of any nearby combustible surface will not exceed what?

_____

Q3. AS/NZS 5601.1 clause 6.10.1.6 provides what two means of connecting the gas cooking appliance?

i) _____

ii) _____.

Notes

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08

Topic 08:
Journey of a Complaint:
Unauthorised Work

This topic sets out the Board's process for prosecuting people who carry out unauthorised sanitary plumbing, gasfitting or drainlaying.

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Prosecuting people for criminal offences

Under the Plumbers, Gasfitters, and Drainlayers Act 2006 (Act) the Board has the role of bringing prosecutions against people for breaches of any legislation relating to sanitary plumbing, gasfitting, or drainlaying.

Offences under the Act relating to sanitary plumbing, gasfitting, and drainlaying

The Act itself creates a number of offences relating to sanitary plumbing, gasfitting, and drainlaying.

Under the Act, it is a criminal offence to:

- make a false or misleading declaration or representation for the purposes of obtaining registration or licence (for themselves or another person)
- do anything to make a person believe they are registered or licensed when they are not
- use any words, titles, or initials in association with their business which would make a person believe they are registered or licensed when they are not
- hold themselves out as being registered or licensed when they are not
- do or assist in doing sanitary plumbing, gasfitting, or drainlaying when they are not authorised
- employ a person to do or assist in doing sanitary plumbing, gasfitting, or drainlaying who is not authorised
- fail to comply with a condition of an employer licence
- intentionally or negligently do, cause, or permit sanitary plumbing, gasfitting, or drainlaying to be done in a way that is dangerous to life
- knowingly permit or pay an unauthorised person to do sanitary plumbing, gasfitting, or drainlaying
- intentionally hinder or obstruct an investigator appointed to investigate a complaint about sanitary plumbing, gasfitting, or drainlaying
- fail or refuse to surrender a limited certificate, certificate of registration, or licence to the Board within 10 days following a demand from the Registrar.

Both individual people and bodies corporate (eg companies) can be charged with criminal offences under the Act. This is different from disciplinary offences where only registered people can be charged with a disciplinary offence. The penalty for committing any of these criminal offences is a fine.



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Investigating complaints of criminal conduct

When the Board receives a complaint about a registered person it must follow the process set out in the Act for dealing with that complaint. This was covered in the 2023 CPD topic, Journey of a complaint.

There is no process in the Act for dealing with complaints about a possible criminal offence. However, the Board will usually follow a very similar process to deal with these complaints.

First, a Complaints Officer will assess the complaint and conduct some preliminary enquiries. If it looks like a criminal offence or offences may have been committed, one of the Board's investigators will begin an investigation into the matter.

As with an investigation into a possible disciplinary offence, an investigation into a possible criminal offence will involve the investigator talking to the people who may have been involved or who may have knowledge about the offending. They will collect all the information they can about the complaint and may also conduct additional inquiries such as searching social media to see if the person has been advertising themselves as able to do plumbing, gasfitting, or drainlaying work. The investigator will also check the Board's database for any authorisation history and check whether the Board has had any other complaints or notifications (intel) about the person for similar conduct.

Proving someone has committed a criminal offence

All criminal offences are made up of a number of parts or "elements" and to prove that a person has committed a criminal offence, the investigator must be able to prove they have committed all the elements of the offence. Below are two of the offences in the Act broken down into the elements making up the offence.

Offence of unauthorised plumbing

"Every person commits an offence and is liable on conviction to a fine not exceeding $10,000 who does, or assists in doing, any sanitary plumbing in breach of section 8" (section 123(1)(a) of the Act)

Elements of the offence:

Every person – must be able to identify the person

Does or assists in doing – must be able to show they carried out the work

Sanitary plumbing – must be able to show the work that was done comes within the definition of sanitary plumbing in section 6 of the Act

In breach of section 8 – must be able to show the person was not registered and licensed or authorised to do sanitary plumbing at the time they did the work (for this it is necessary to know exactly when the work was done)

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Offence of holding themselves out as being registered and licensed to do gasfitting

"Every person commits an offence and is liable on conviction to a fine not exceeding $10,000 who, not being registered or licensed under Part 2 in respect of a particular class of gasfitting work, in any way holds himself or herself or itself out as being so registered or licensed" (section 122(a)(iii) of the Act)

Elements of the offence:

Every person – must be able to identify the person

Not being registered or licensed – must be able to show the person was not registered or licensed or otherwise authorised to do gasfitting at the relevant time (for this it is necessary to know exactly when they did the thing)

In any way – must be able to show they did something such as issuing a gas certificate

That holds them out as being registered or licensed – only licensed certifying gasfitters can issue gas certificates therefore implying they are a licensed certifying gasfitter

If the investigator is unable to prove each and every element of an offence, it is not possible to bring charges against a person.

Proving the elements of an offence

Proving the elements of an offence requires evidence. This can be in the form of witnesses, witnesses' statements, or documentary evidence. The investigator will also get a technical review of the work done from one of the Board's technical advisors.

Taking the example of unauthorised plumbing referred to above, the kinds of evidence which would be needed to provide the offence would include:

- A witness, such as a homeowner who had engaged the unauthorised person, who could say:
  - the address where the work was done
  - the dates on which the work was done
  - what work was done
  - who carried out the work
  - how they knew the person had done the work (eg did they see them doing it?)
- A witness, such as one of the Board's technical advisors, who could say that the work that was done was sanitary plumbing as defined in section 6 of the Act and could therefore only be carried out by someone who was authorised to do sanitary plumbing.
- A witness, such as the Board's Operations Manager, who could say that the person was not registered and licensed or otherwise authorised to do sanitary plumbing at the time they carried out the work.

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The kinds of documentation which may be useful evidence include quotes or invoices issued by the unauthorised person for the work, photographs of the work, details of any payments made to the unauthorised person for the work, and any advertising or promotional material where the person talks about doing plumbing work and/or bathroom renovations.

To prove that a registered practitioner has committed a disciplinary offence, the investigator must only persuade the Board that it is *more likely than not* that they have committed the offence. This is because disciplinary proceedings are civil proceedings and the standard of proof required for civil proceedings is the *balance of probabilities*.

For criminal offences, the standard of proof required is the criminal standard and this is *beyond reasonable doubt*. This means the Judge hearing the case must have no real doubt that the person who has been charged has committed the offence. This is a higher threshold and requires convincing evidence. Any doubt about any aspect of the charge will be interpreted in the accused person's favour.

Bringing criminal charges in the District Court

Criminal charges under the Act are brought by the Registrar on behalf of the Board, not the investigator as with disciplinary matters. The charges are brought in the District Court, in the Registry (branch) closest to where the offending took place. The Board is represented by a lawyer who is called the prosecutor.

As with the disciplinary process, there are a number of administrative steps that must be taken in relation to criminal charges before the matter reaches a hearing. These steps can take a long time as the District Court has a very high workload and more serious criminal offending such as violence and drug-related charges are given priority. In addition, in the last two years the Court has been dealing with a significant backlog of cases that built up during the pandemic and this has created even longer delays in getting matters to a hearing.



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A defended hearing

Where a person is charged with a criminal offence but chooses not to plead guilty, the matter proceeds to a criminal hearing. This occurs before a District Court Judge who will hear the evidence in the case and make a determination on whether or not the person is guilty of committing the offence (or offences) they have been charged with.

The process for a criminal prosecution is very similar to the process followed in a disciplinary hearing.

It begins with the prosecutor presenting the case against the person charged, who is called the defendant. The prosecutor will:

- Make opening submissions setting out what the charges are against the defendant and why the evidence will prove that the defendant has committed the offences they have been charged with.
- The prosecutor will then have their witnesses present their evidence.
- The defendant, or their lawyer if they have one, will be able to question or cross-examine the witnesses, challenging their evidence or putting alternative explanations for matters to them for them to agree or disagree with.

Once the prosecutor has presented their opening submissions and evidence, the defendant gets to make their opening submissions and have their witnesses give evidence. The prosecutor can then question the defendant's witnesses and challenge them in the same way the defendant was allowed to challenge the prosecution witnesses.

Once the defendant's witnesses have given their evidence, the prosecutor makes closing submissions. This is where they say why the evidence of their witnesses proves all of the elements of the charges against the defendant and why they are therefore guilty of committing a criminal offence. Following this, the defendant gets to make their closing submissions to the Judge saying why they have not committed an offence, or why the prosecutor has failed to prove beyond reasonable doubt that they have committed the offence.

When the Judge has heard from both parties, they will adjourn the hearing and "reserve their decision". This means the Judge will go away and consider all the information that they have heard and make their decision. When they have made their decision, they will issue a written decision.

Sentencing hearing

If, following a defended hearing, the person is found guilty of committing a criminal offence, they must be sentenced by the Court. This will occur in a separate hearing that will be scheduled after the Judge has released their decision finding the defendant guilty.

A defendant may choose to plead guilty to criminal charges rather than defend them and, in that case, the matter proceeds straight to a sentencing hearing.

The process for sentencing in the District Court is similar to the process the Board follows in disciplinary hearings. The prosecutor is given the opportunity to make submissions on what they consider to be the important features of the case and what sentence they think the Court should impose. The defendant then gets to say what things they think the Court should take into account and what sentence they think the Court should impose.

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Having heard from both of the parties, the Judge will usually give their sentencing decision straight away.

The sentences the Court can impose for the different criminal offences are set out in the Act. The sentences for most of the offences are a fine up to $10,000. Offences relating to gasfitting carry fines of up to $50,000 for an individual or $250,000 for a body corporate. The reason the fines for offences relating to gasfitting are higher is because of the immediate and serious dangers risked when gasfitting work is not done correctly, such as carbon monoxide poisoning and explosion. Parliament, who set the fines, considered that the dangers with sanitary plumbing and drainlaying, while still potentially significant, were less immediate and therefore a less serious threat.

In some cases, the Judge can also consider ordering a person convicted of a criminal offence to pay reparation to the victim of their offending. Reparation is financial compensation for any losses the victim has suffered as a result of the defendant's offending. This would include such things as any remediation costs the victim has incurred or any money they have paid to the defendant for work which the defendant never carried out.

Fines that are imposed for criminal offences are paid by the convicted person to the Court. The Court will then pay a percentage of the fine on to the Board. If the Court orders reparation, the convicted person must pay the reparation to the Court, which the Court then pays on to the victim.

Most people fined for committing criminal offences pay the fine (and reparation) off in installments, a process that may take many years.

Successful recent prosecutions

Unauthorised sanitary plumbing and drainlaying

In March 2023, the Board successfully prosecuted a person for multiple counts of doing sanitary plumbing and drainlaying without an authorisation. They were also charged with a representative charge of using words or titles in connection with their business that may cause a person to believe they were registered or licensed. A representative charge is a single charge representing numerous or continuing instances of the offending behaviour.

The charges related to sanitary plumbing and/or drainlaying work carried out at 12 properties between late 2019 and 2021. The person had previously held an exemption under supervision authorisation for sanitary plumbing and drainlaying for a number of years. But this authorisation had expired at the end of October 2019. As well as carrying out unauthorised work during this time, the person also took deposits from a number of people for plumbing and drainlaying work which he then never carried out.

The person pleaded guilty to all of the charges. In the sentencing hearing, as well as hearing from the prosecutor and the person's lawyer, six victim impact statements were read to the court describing the effect the offending had had on some of the victims. In sentencing the person, the Judge stated that he would have imposed a fine of around $17,850. However, reparation was being sought in the case given the victims' losses and the Judge elected to impose no fine but full reparation. The person was ordered to pay $57,297.26 to the victims.

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Company employing unauthorised people to do gasfitting

In May 2023, the Board successfully prosecuted a plumbing company for two counts of employing unauthorised people to do gasfitting work. The work was carried out at two commercial premises in Auckland. The company arranged for a licensed certifying gasfitter to inspect and certify the work at both premises, which he did without knowing the people who had carried out the work were unauthorised. While there were no defects with the work, the company was aware in both cases that the people they sent to do the work were unauthorised.

The company pleaded guilty to both charges. The Judge recognised that the charges involved two separate premises, the work was high risk, and the company should have known better than to employ unauthorised people to do gasfitting work. They considered that these were aggravating factors of the offending (factors that made the offending more serious). The Judge accepted that the company had pleaded guilty to the charges and had not been prosecuted for this type of offending before, which were factors in their favour.

The company was fined $3,600.

Unauthorised person holding themselves out as registered and licensed

In March 2023, the Board successfully prosecuted a person for two counts of doing gasfitting when unauthorised, one count of doing an act intended to cause a person to believe they were registered and licensed, and one count of using words or titles in connection with their business that may cause a person to believe they were registered or licensed. The person had previously held an exemption under supervision authorisation to do gasfitting, but at the time he carried out the work in this case, his authorisation had expired. The person advertised on Facebook as being able to carry out sanitary plumbing and gasfitting.

The person did gasfitting work at two residential properties and issued a gas certificate for the work in both cases. The work at one of the properties was found to be defective, involving a gas leak, and both certificates were incorrect and invalid as they had not been lawfully issued. The person had also previously been warned by the Board for advertising and carrying out unauthorised sanitary plumbing and gasfitting without an active authorisation.

The person failed to attend his hearing at court which proceeded without him. He was found guilty of all the charges and was fined $5,300.

Why a complaint may not result in a prosecution

The Board often hears from practitioners that they have told the Board about some unauthorised work but nothing has been done about it. The Board understands that practitioners may feel frustrated and dissatisfied when this happens. However, there are a number of reasons why a complaint about unauthorised work may not result in a prosecution.

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Insufficient information

As described above, the Board needs certain information in order to be able to charge a person with a criminal offence. It is not enough to be told '*person X is doing unauthorised work in Invercargill*'. The Board needs to be able to prove that person X did specific work at a specific place on a specific date when they were not authorised. This is because:

- without knowing what work person X did, the Board is not able to prove they did restricted sanitary plumbing, gasfitting, or drainlaying
- without knowing where the work was done, the Board is not able to prove that person X did the work
- without knowing when the work was done, the Board is not able to prove they did not hold an authorisation allowing them to do the work at that time.

The Board therefore needs both specific information and detailed information to be able to prove to the Court that person X has committed a criminal offence by carrying out restricted work without an authorisation.

People unwilling to give evidence

The Board receives many calls from practitioners who may have gone to a property to remediate sanitary plumbing, gasfitting, or drainlaying work that they learn has been carried out by an unauthorised person. That person can often be the homeowner, a builder the homeowner has hired to do renovations, or a "handyman". The practitioner may tell the Board about the unauthorised work but say they do not want to be identified as the person who told the Board about it and do not want to be involved in any prosecution.

The Board recognises that a practitioner may have good reasons for not wanting their identity known or for being involved in a prosecution. Investigating and prosecuting a person for a criminal offence may take a long time and may involve the practitioner in being interviewed by the investigator, provide a written statement, and giving evidence in court.

In some cases the Board may be able to find someone else who would be willing to give evidence of what work was done and by whom. If a builder or handyman has done the work and the homeowner was not aware they could not do it, the homeowner may be willing to give the necessary evidence. However, if the homeowner did the work and learns they could be prosecuted for doing it, they are unlikely to want to help the Board. And in those circumstances, if the practitioner will not be involved, the Board would not have the evidence needed to charge the homeowner with unauthorised work.

When investigating a complaint about a registered person, the Board has powers under the Act to require people to provide necessary information. However, the Board has no such power when it comes to criminal offending. So if an investigator cannot get information they need about a possible criminal offence voluntarily, they cannot compel anyone to provide that information.

Rules about which prosecutions can be brought

There are rules around bringing criminal prosecutions in the courts. They are called the *Solicitor-General's Prosecution Guidelines*. The Board is required to comply with these rules in relation to charging people with criminal offences under the Act.

The rules recognise that not all breaches of the law are equal. Some criminal offences are far more serious than others. Given that the resources of the courts are limited and that the courts are under significant pressure from growing demand, the rules require any agency wishing to bring a criminal charge to first

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assess their case against a number of criteria to determine whether or not the charges should be laid. Those criteria include such things as:

- how serious the offence is (this is done by looking at the maximum sentence that could be imposed for the offence and the sentence likely to be imposed in that particular case)
- whether the offence is likely to be continued or repeated
- whether the offence is common
- whether the defendant has created a serious risk of harm
- whether the offence resulted in serious financial loss to someone.

While practitioners and the Board know and understand the significance of criminal offending in relation to the trades, for the courts and the public such offending does not seem that serious. For this reason, the Board may not be able to justify bringing charges for minor or less serious breaches. Or, alternatively, the Board may bring the charges and the courts will only impose a very small fine. Small fines do not act as a deterrent to people committing these offences and for some people whose business may involve them doing unauthorised work, the small fines may seem an acceptable cost of doing business. As the Board does not want to encourage this thinking, it may elect not to bring charges which would not attract a reasonable penalty that would deter such people.



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What happens to complaints that are not prosecuted

Information that the Board receives about possible criminal offending which it cannot investigate or take any further is not simply disregarded by the Board. All such information is recorded in an intel register kept by the Board, regardless of how unclear or uncertain it is.

Such information may be nothing more than a notation on the intel register that '*on [date], the Board received a call from a practitioner/member of the public that person X has been doing sanitary plumbing work in the Wairarapa and they are not an authorised plumber. The practitioner/member of the public did not want to make a formal complaint*'.

The Board's complaints and investigations team regularly monitor and review the intel received and they will try and follow it up to see if they can gather more information. This may involve calling the person who provided the information (if they are willing to leave their contact details), and just talking through what they have told the Board. They may also go online and check sites such as Facebook, LinkedIn, and Instagram to see if they can find more information.

Where possible, the complaints and investigations team will try and gather enough information to open an investigation with a view to seeing whether it is possible to charge the person with a criminal offence. Or they may write to the person telling them that it is a criminal offence to do sanitary plumbing, gasfitting, or drainlaying without an authorisation and they risk being prosecuted if they are doing this. A person who is doing unauthorised work who has received a warning from the Board previously for unauthorised work is far more likely to be prosecuted and the warning will be used in court to show the defendant knew that what they were doing was criminal but continued to offend regardless. This will then be used to seek a higher fine than might otherwise have been imposed.

Intel about criminal offending is also used by the Board's investigators when conducting compliance visits around the country. These visits involve residential and commercial building sites where people completing restricted sanitary plumbing, gasfitting, and drainlaying are spoken to about whether they are authorised to carry out such work. In 2023, the Board visited 180 such sites and spoke to 362 people.

Unauthorised work complaint statistics

In the 11 months from 1 January 2023 to 1 December 2023 the Board:

- received 46 complaints about unauthorised work
- conducted 23 investigations into unauthorised work
- laid 40 criminal charges, including:
    - 9 charges for claiming to be registered or licensed when the person was not
    - 31 for carrying out sanitary plumbing, gasfitting, or drainlaying when unauthorised
- Obtained 9 convictions for criminal offending relating to sanitary plumbing, gasfitting, and drainlaying.

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Test your knowledge on this topic

Answers on page 125

Q1. The Plumbers, Gasfitters and Drainlayers Act 2006 lists 11 criminal offences. Name two of these offences.

_____.

_____

Q2. The standard of proof required for a criminal charge is 'beyond reasonable doubt.' What does 'beyond reasonable doubt' mean?

_____

_____.

Notes

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09

Topic 09:
Self-Contained Vehicles

In December 2023, the new Self-Contained Vehicles system began which the Board is responsible for administering.

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Introduction

New Zealand's new self-contained vehicles (SCV) system began on 7 December 2023.

Changes were made to the Plumbers, Gasfitters and Drainlayers Act 2006 and the Freedom Camping Act 2011 to establish a new regulatory system for certifying and registering SCVs used for freedom camping.



The Plumbers, Gasfitters and Drainlayers' Board is the regulator of the SCV system.

We've answered some of the most common questions we get about the SCV system in this section.

You can find more information on our website (*www.pgdb.co.nz*).

NOTE: The new self-contained vehicles system does **not** change or affect gasfitting requirements in any way.

What are the changes and why have these changes been made?

Under the new SCV system, a vehicle can be certified as self-contained if it meets new requirements and specifications contained in the Plumbers, Gasfitters, and Drainlayers (Self-Contained Vehicles) Regulations 2023 (**Regulations**). At a high level, to be certified as self-contained vehicles must have:

- a means of loading water into the vehicle securely and in a way that does not contaminate that water
- a water supply system that stores and conveys water in a secure manner that prevents contamination of the water
- a fixed toilet that is permanently fixed to the vehicle and can be emptied without removing the base
- a wastewater system that both stores and collects greywater and blackwater securely and hygienically
- a ventilation system that removes odours from the vehicle and minimises the extent to which foul air and gases can enter the vehicle
- a sink that is installed safely and drains to the wastewater system's tank
- rubbish storage that is secure and fit for purpose, and
- a means of disposing of wastewater hygienically to an appropriate outfall.

These changes were part of wider freedom camping legislation reforms, which aim to protect Aotearoa's natural environment, reduce the impact of freedom camping and increase public trust in freedom camping.

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What is the Board's role as regulator?

As regulator of the SCV system, the Board is responsible for receiving applications from and appointing 'Certification Authorities' (individuals and organisations who offer self-containment certification services); providing guidance to Certification Authorities and other stakeholders; investigating complaints and compliance issues in relation to Certification Authorities; and maintaining a national register of self-contained vehicles (**Register**).

How is the Board funded to regulate the SCV system?

The funding the Board receives from practitioners (in the form of fees and a levy) is not, and cannot be, used to fund the Board's operations as regulator of the SCV system.

There are two ways the Board receives funding under the SCV System:

- an application fee paid by prospective Certification Authorities, and
- a $120 (incl GST) levy collected from vehicle owners every time a certificate of self-containment is issued (in most cases, every four years).

The levy paid by vehicle owners is intended to meet the costs of the Board in performing or exercising its functions, powers, and duties relating to the SCV system.

What is the timing for these changes?

A transitional period is in place until 7 June 2025.

Key dates are:[1]

- **7 June 2024**: No more inspections and certifications under the old 'blue warrant' system. Blue warrants issued before this date are still valid, but all new inspections and certifications must be undertaken in accordance with the new 'green warrant' system.
- **7 December 2024**: Rental vehicles intended to be used for freedom camping must be certified under the new green warrant requirements and display their green warrant as evidence of self-containment (blue warrants are no longer valid for rental vehicles, but remain valid for privately-owned vehicles).
- **7 June 2025**: The transitional period ends, and all self-contained vehicles wishing to freedom camp must be certified under the new requirements and display their green warrant as evidence of self-containment (blue warrants are no-longer valid for anyone).

1. Subject to any extension to the transitional period the government may introduce. Head to our website for the most up-to-date information.

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Who can issue certificates of self-containment?

Certification Authorities are responsible for appointing and managing vehicle inspectors, issuing certificates of self-containment (**Certificates**), and making entries in the Register.

Certification Authorities are appointed by the Board following an application process.

Anyone who has the necessary procedures in place (set out in the Regulations) can apply to be a Certification Authority.

Until 7 June 2025, Certifying Plumbers are deemed to be Certification Authorities (and Vehicle Inspectors). That means Certifying Plumbers who want to work as a Certification Authority (or a Vehicle Inspector) don't need to go through the formal application process; but they will need to enrol with the Board to get access to the Register and comply with the same rules that apply to all Certification Authorities.

If you are interested in doing this work, please head to our website (*www.pgdb.co.nz*) to learn more.

What do Certification Authorities do?

Certification Authorities appoint Vehicle Inspectors, issue Certificates and make entries into the Register:

- **Appointing and managing Vehicle Inspectors** – Vehicle Inspectors will complete inspections to assess whether vehicles meet the requirements for self-containment contained in the Regulations. They will provide Certification Authorities with the information they need to make certification decisions. Certification Authorities will manage Vehicle Inspectors to ensure they are performing their role effectively and with integrity.
- **Issuing certificates of self-containment** – Certification Authorities issue Certificates and warrant cards for vehicles. They arrange for their appointed Vehicle Inspectors to inspect the vehicle and assess whether it meets the requirements for self-containment, ensure that the Vehicle Inspector carries out the inspection in accordance with the Regulations, and consider the findings of the inspection and issue a Certificate.
- **Using the Register** – Once the Vehicle Inspector has completed the vehicle inspection form, the Certification Authority will enter the relevant details into the Register, create a Certificate and warrant card, and print these and issue them to the vehicle owner.

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What happens during an inspection to certify a vehicle as self-contained?

Vehicle Inspectors are appointed by Certification Authorities and carry out inspections to assess whether vehicles meet the requirements for self-containment. The Board has issued guidance for how these inspections must be carried out.

The standards of self-containment are performance-based rather than prescriptive; they do not specify required tank capacities, pipe diameters, types of fixings or installation methods (for example). The Board provides guidance for Vehicle Inspectors and Certification Authorities so that they can interpret the requirements and promote high standards and consistency in approaches to vehicle inspections and certifications.

To receive a green warrant, an SCV must meet requirements in relation to its water supply system, fixed toilet, wastewater system, ventilation system, sink, and rubbish storage. All the requirements must be capable of servicing the maximum number of occupants.

Once the inspection is complete, the Certification Authority will review the results of the inspection and decide whether to certify the vehicle as self-contained. The Certification Authority will be responsible for issuing a certificate and warrant card.

More information?

Head to our website at ***www.pgdb.co.nz***

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Test your knowledge on this topic

Answers on page 125

Q1. Until 7 June 2025, Certifying Plumbers are deemed to be Certification Authorities (and Vehicle Inspectors). To work as a Certification Authority, Certifying Plumbers must what?

_____

Q2. What are the two ways the Board is funded to regulate the Self-Contained Vehicles system?

i) _____

ii) _____.

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Test your knowledge answers

Answers to the quiz qustions

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Topic 1 – Insights from BCAs

Q1. 2m

Q2. As-builts are important because they record minor changes to help demonstrate compliance

Q3. UV resistant

Topic 2 – Updates to codes and standards Part 1: AS/NZS 3500 series

Q1. 25mm

Q2. 6m

Q3. 2 litres

Topic 3 — Updates to codes and standards Part 2: AS/NZS 5601

Q1. 1m

Q2. 650mm

Q3. The update prohibits multilayer gas pipe being installed above-ground external to a building

Topic 4 - New Products and Technology

Q1. The bedroom

Q2. Commercial buildings and residential apartments

Q3. Provides emergency isolation of the gas in case of a break in the line

Topic 5 - Changes to drinking water legislation in NZ

Q1. The drinking water regulator

Q2. For all water suppliers. For everyone except a domestic self-supply

Q3. Everyone except a domestic self-supply, which is a single house with its own water

Topic 6 - Gully traps and sewer overflows

Q1. Dwelling

Q2. i) 25mm above paved surfaces, or

ii) 75mm above unpaved surfaces.

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Topic 7 – Gas cooking appliance installation

Q1. 80%

Q2. 65°C above ambient

Q3. i) Annealed copper pipe

ii) A hose assembly

Topic 8 – Journey of a complaint

Q1. Any of the following answers:

1. make a false or misleading declaration or representation for the purposes of obtaining registration or licence (for themselves or another person)
2. do anything to make a person believe they are registered or licensed when they are not
3. use any words, titles, or initials in association with their business which would make a person believe they are registered or licensed when they are not
4. hold themselves out as being registered or licensed when they are not
5. do or assist in doing sanitary plumbing, gasfitting, or drainlaying when they are not authorised
6. employ a person to do or assist in doing sanitary plumbing, gasfitting, or drainlaying who is not authorised
7. fail to comply with a condition of an employer licence
8. intentionally or negligently do, cause, or permit sanitary plumbing, gasfitting, or drainlaying to be done in a way that is dangerous to life
9. knowingly permit or pay an unauthorised person to do sanitary plumbing, gasfitting, or drainlaying
10. intentionally hinder or obstruct an investigator appointed to investigate a complaint about sanitary plumbing, gasfitting, or drainlaying
11. fail or refuse to surrender a limited certificate, certificate of registration, or licence to the Board within 10 days following a demand from the Registrar

Q2. The Judge hearing the case must have no real doubt that the person who has been charged has committed the offence.

Topic 9 – Self-contained vehicles

Q1. Enrol with the Board to have access to the Self-Contained Motor Vehicles Register

Q2. i) An application fee paid by prospective Certification Authority

ii) A $120 (incl GST) levy collected from vehicle owners every time a certificate of self-containment is issued

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