

Determination 2008/42

Dispute about safety devices to small water heaters used in internal alterations on levels 4 and 5 of 60-64 Customhouse Quay, Wellington

1. The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ (“the Act”) made under due authorisation by me, John Gardiner, Manager Determinations, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department. The applicant is the owner, Menauke Limited, acting through a firm of consulting engineers (“the applicant”). The other party is Wellington City Council (“the territorial authority”). I have included McKee Fehl Contractors Ltd (“the contractor”) as a person with an interest in the matter.
- 1.2 The dispute arises from the territorial authority’s decision to issue a notice to fix to the building contractor about the installation of a number of 10 litre hot water heaters that the notice said did not comply with the Building Code².
- 1.3 The matter for determination is whether the hot water heater has the safety features required by Building Code Clause G12 “Water supplies”. The installation of the water heater is not the subject of this determination.
- 1.4 In this determination, unless otherwise stated, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

2. The building work

- 2.1 The building work is part of the internal alterations to an existing 9-storey building.
- 2.2 The 10 litre water heaters have been installed to the bathrooms and provide heated water to wash hand basins. A total of 5 water heaters have been installed.

¹ The Building Act 2004 is available from the Department’s website at www.dbh.govt.nz.

² The Building Code is available from the Department’s website at www.dbh.govt.nz.

- 2.3 The water heater is model KDU 102 manufactured in Austria by Austria Email AG. The water heaters are independently certified by ‘TUV Bayern Landesgesellschaft Osterreich GmbH’.
- 2.4 The water heater is equipped with the following devices:
- (a) A thermostat that sets the temperature to a minimum of 60°C to prevent the growth of legionella bacteria.
 - (b) A thermal fuse which will cut off the power when the water temperature exceeds at 90°C in the event that the thermostat fails.
 - (c) A cold water expansion valve (“expansion control valve”).

3. Background

- 3.1 A number of building consents have been issued in respect of alterations to the building. The consent for Stage 1 was issued in September 2006 and at least one further consent has been issued since this time as fitout work for individual tenancies in the building has progressed.
- 3.2 The water heaters approved by the territorial authority for use in the building was a Stiebel Eltron SNU. This water heater is available in 5 and 10 litre capacities. It is an open-vented water heater and serves a single fixture. It provides water to a maximum temperature of 85°C. I note Stiebel Eltron water heaters have a Standards Australia Watermark.
- 3.3 The applicant installed the model KDU 102 water heater without advising the territorial authority, either informally, or formally via an amendment to the building consent. (The territorial authority has advised that other amendments were made to the consented work without approval but those amendments are outside the scope of this determination.)
- 3.4 The territorial authority issued a notice to fix, dated 20 December 2007, that said:
- Water heaters have been installed in the building that do not comply with the New Zealand Building Code.
- To remedy the contravention . . . you must install water heaters and associated valvework that comply with New Zealand Building Code Clause G12 and with drain lines that discharge to an approved outfall.
- 3.5 In fax to the applicant, dated 8 January 2008, the territorial authority said:
- NZ Building Code Clause G12/ASI . . . requires water heaters to have temperature tempering valves, pressure relief valves and energy cut-off devices, all complying with specified New Zealand Standards. The installed Austrian water heaters do not comply with the NZ Building Code in this regard . . .
- 3.6 In an email to the applicant, dated 16 January 2008, in response to an enquiry to the Department about the matter, Departmental staff said:
- For standard size storage water heaters (say 180 litres) compliance with [G12.3.8] is achieved by using a TPR valve or [an] energy cut-out and a pressure relief valve.

However, the [territorial authority] can accept a temperature limiting device that will limit the temperature to below boiling point and hence limit the pressure. I suggest that you provide evidence of compliance with the manufacturing standard for the thermal [fuse] that is incorporated to limit the temperature . . .

This information was supplied to the territorial authority by the applicant.

3.7 In a faxed response to the applicant, dated 23 January 2008, the territorial authority said:

. . . it is the position of the [territorial authority] that a cold water expansion valve and TPR valve is required to relieve excessive pressure during both normal and abnormal conditions. It is also the [territorial authority] position that a separate electric thermostat and energy cut-off device is required in addition to these two valves.

3.8 The application for determination was received on 17 March 2008.

4. The legislation

4.1 The relevant Clause from the Building Code Clause G12 “Water supplies” says:

Clause G12.3.8 Vessels used for producing or storing hot water must be provided with safety devices that–

- (a) relieve excessive pressure during both normal and abnormal conditions; and
- (b) limit temperatures to avoid the likelihood of flash steam production in the event of rupture.

4.2 The relevant sections from the Acceptable Solution for Clause G12, G12/AS1, includes the following:

6.3 Operating devices

6.3.1 Electric and gas storage water heaters shall have their temperature controlled by a thermostat on each heating unit.

6.3.2 Open vented storage water heaters shall have a vent pipe . . .

6.3.3 Valve vented (unvented³) systems shall have:

- a) An expansion control valve
- b) A vacuum relief valve to prevent collapse of the storage water heater where it is not designed to withstand a full vacuum, and
- c) Valves complying with Table 6.

6.4 Safety devices

6.4.1 Valve vented (unvented) systems shall have in addition to Paragraph 6.3.3 the following safety devices:

- a) Combined temperature/pressure relief valve for systems with a working pressure greater than 120 kPa,
- b) Combined temperature/pressure relief valve or a pressure relief valve for systems with a working pressure less than 120 kPa,

³ In this context ‘unvented’ means not having an open vent

- c) An energy cut-off for each heating unit on gas and electric systems, and
- d) Valves complying with Table 6.

Table 6: Storage Water Heater Valves Paragraph 6.3.3 c) and 6.4.1 d)	
Valve type	Standard
Cold water expansion valves	NZS 4608 BS 6283: Part 1 AS 1357: Part 1
Temperature/pressure relief valve	NZS 4608 BS 6283: Part 3 AS 1357: Part 1
Non-return valves	NZS 4608 AS 1357: Part 1
Vacuum relief valves	NZS 4608 AS 1357: Part 2
Pressure reducing valves and pressure limiting valves	NZS 4608 BS 6283: Part 4 AS 1357: Part 2
Pressure relief valves	NZS 4608

5. The submissions

- 5.1 The applicant submitted copies of correspondence with the Department and the territorial authority and the notice to fix. The applicant provided technical information about the water heater and its performance, and evidence that it complied with the relevant British standards. The applicant also detailed other instances where the water heater had been used (including other floors in the same building) where its use had been accepted by the territorial authority.
- 5.2 The draft determination was sent to the parties for comment on 11 April 2008 and to clarify details that had not been supplied to me with the application.
- 5.3 The applicant accepted the draft but otherwise made a very limited response. The contractor made no submission.
- 5.4 The territorial authority did not accept the draft and made a comprehensive response. The territorial authority outlined the nature of the work, the building consents issued for the work, and the water heater approved for use in the consent. Its submission, dated 29 April 2008, is summarised as follows:
- The water heaters were either installed without amendment to an existing consent or without a consent at all. In the first instance the territorial authority was unable to issue a code compliance certificate in accordance with section 94 of the Act as the “as-built” work did not comply with the consent.
 - The territorial authority did not believe the water heater complied with the Building Code Clause G12 as the evidence presented did not show equivalence with the Acceptable Solution G12/AS1 and the standards it cited.
 - The territorial authority took the view the relief of abnormal pressure required the use of mechanical valvework to provide immediate release of excessive pressure. An energy cut-out device did not function adequately as a means of

reducing pressure. The territorial authority sought verification that the water heater would perform at a temperature of 90°C or higher.

- The primary valve for relieving normal pressure was the cold water expansion (“expansion control valve”) valve “to comply with [Building Code] Clause H1”. The territorial authority did have reasonable grounds on which to establish that the cold water expansion valves discharged to an “approved position”.
- The territorial authority interprets Clause G12.3.8 as requiring two separate safety devices: one to relieve pressure and one to limit temperature.
- The territorial authority was concerned that while a determination is site specific the applicant may attempt to use it as a generic approval of the product.
- If the determination considered that the product does meet the requirements of the Building Code, the territorial authority was concerned that this could be seen as condoning the actions of the applicant.

6. Discussion

Compliance with Clause G12.3.8

- 6.1 Clause G12.3.8 requires that water heaters have safety devices and operational devices that relieve excessive pressure during both normal and abnormal conditions, and limit temperatures to avoid the likelihood of flash steam production in the event of rupture.
- 6.2 The water heater used in this instance is valve-vented and has a maximum working pressure of 600kPa. The applicant has verified that the water heater has been certified in accordance with the appropriate British standards.
- 6.3 The performance requirements of Clause G12 and the means of compliance used in the Acceptable Solution G12/AS1 can be compared with the installed water heater as follows:

Performance requirements of Building Code Clause G12	Means of compliance		
	G12/AS1 (open-vented water heater)	G12/AS1 (valve-vented water heater)	KDU 102 water heater
Clause G12.3.8 (a): Normal pressure	Open vent	Expansion control valve	Expansion control valve

Performance requirements of Building Code Clause G12	Means of compliance		
	G12/AS1 (open-vented water heater)	G12/AS1 (valve-vented water heater)	KDU 102 water heater
Clause G12.3.8 (b): Normal temperature	Thermostat	Thermostat	Thermostat
Clause G12.3.8 (a): Abnormal pressure	Open vent	Pressure relief or TPR* valve	Not required (thermal fuse operates > 90°C)
Clause G12.3.8 (b): Abnormal temperature	Vent	TPR valve or Energy cut-off	Thermal fuse

* TPR: Combined temperature / pressure relief valve which relieves over temperature and over pressure situations

- 6.4 The water heater meets the requirements of the Acceptable Solution with respect to operational devices required for normal pressure and normal temperature.
- 6.5 With respect to abnormal pressure, the water heater does not have the specific safety devices described in G12/AS1. I note that an acceptable solution does not provide the only means of complying with the Building Code.
- 6.6 In this instance a thermal fuse has been provided to cut off the energy when the water is temperature is greater than 90°C. The operation of the thermal fuse means there is no need for a safety device as the water will not heat to a temperature greater than 90°C. Hence the water heater will not be able to generate the abnormal pressures that occur when water in a confined container is heated past 100°C.
- 6.7 With respect to abnormal temperature, the water heater uses an alternative solution by use of a thermal fuse that breaks and prevents the water being heated above 90°C.
- 6.8 As the thermal fuse prevents water from being heated above 90°C there is no need for an additional safety device to prevent flash steam production that might arise from rupture. It is noted that the expansion control valve will relieve normal pressure but it will also relieve some abnormal pressure.
- 6.9 I note that an energy cut off device is not the same as a thermal fuse. An energy cut off device can be reset by the user. A thermal fuse cannot be reset and needs to be replaced if it has been activated. The replacement of the fuse will provide a specific opportunity for the water heater to be checked to determine why the fuse was activated.

Response to the territorial authority's submission

- 6.10 I acknowledge the territorial authority's position with respect to the unapproved changes to the consented work made by the applicant and I do not condone the actions of the applicant. Section 94(1) of the Act specifically requires the territorial

authority to issue the code compliance certificate if the building work complies with the building consent. This places the onus on applicants for consent to ensure that the work is accurately documented and that amendments to the consent are also recorded and approved.

- 6.11 Applicants for a building consent, or an amendment to an existing building consent, should also provide the territorial authority with information to an acceptable standard to demonstrate code compliance. The better the information provided, the easier it is for a territorial authority to be satisfied on reasonable grounds that the proposed work will comply with the Building Code. In this instance, the water heater has been certified by a European certifying organisation. The approval process would have been assisted by the supplier of the water heater providing independent verification of the relevance of the European certification to the requirements of the New Zealand Building Code.
- 6.12 I do not accept the arguments presented by the territorial authority with respect to Clause G12.3.8 requiring two separate safety devices. A combined temperature and pressure relief valve will relieve both abnormal pressure and abnormal temperature.
- 6.13 As the water temperature will not exceed 90°C the water heater will not be subject to abnormal pressures. The expansion control valve will relieve normal pressure.
- 6.14 It is not disputed that the water heater has been fitted with an expansion control valve. The expansion control valve is an operation device used to meet the requirements of Clause G12. The device can also be seen as meeting the requirements of Clause H1 but this is not its primary function. The point to which the expansion control valve discharges is not part of the matter to be determined, however, this can be readily ascertained.

Conclusion

- 6.15 I conclude that the water heater has the safety devices necessary for it to comply with Building Code Clause G12.3.8.
- 6.16 I recommend that the applicant seek an amendment to the existing consent to formalise the changes to the consented work to the satisfaction of the territorial authority.
- 6.17 I emphasise that each determination is conducted on a case-by-case basis. Accordingly, the fact that a particular product or system been established as being code compliant in a specific situation does not necessarily mean that the same product or system will be code compliant in other situations. This determination should on no account be taken as any form of product endorsement, appraisal or certification.

7. The decision

- 7.1 In accordance with section 188 of the Act I reverse the territorial authority's decision to issue the notice to fix dated 20 December 2007.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 27 May 2008.

John Gardiner
Determinations Manager