



A Guide to Applying for a Building Consent for a Solar Water Heating System Installation

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Contents

1	About this Document	3
2	Introduction	3
3	Background	4
3.1	THE BUILDING ACT 2004.....	4
3.2	BUILDING CONSENT DOCUMENTATION.....	4
3.3	THE BUILDING CONSENT PROCESS.....	4
3.4	EARLY CONSULTATION IS IMPORTANT	5
3.5	CODE COMPLIANCE CERTIFICATE	5
3.6	BUILDING CODE REQUIREMENTS	5
4	Plans and Specifications	6
4.1	SCOPE OF WORKS.....	6
4.2	LEVEL OF INFORMATION	6
4.3	BUILDING CONSENT INFORMATION	7
4.4	COMPLIANCE DOCUMENTS AND ACCEPTABLE SOLUTIONS	7
4.5	G12/AS2 ACCEPTABLE SOLUTION SCOPE	8
4.6	ALTERNATIVE SOLUTION	10
5	Building Consent Application.....	10
5.1	GENERAL PROJECT INFORMATION	10
5.2	BUILDING DESCRIPTION.....	10
5.3	SPECIFIC PROJECT INFORMATION	11
5.3.1	INSTALLATION PLANS	11
5.3.2	SITE PLAN.....	11
5.3.3	FLOOR PLAN	12
5.3.4	EXTERIOR ELEVATIONS	14
5.3.5	SYSTEM SCHEMATIC	16
5.3.6	BUILDING CODE COMPLIANCE INFORMATION.....	17
	APPENDIX 1:BUILDING CODE CLAUSES	22
	B1 STRUCTURE.....	22
	B2 DURABILITY	25
	E2 EXTERNAL MOISTURE.....	27
	G12 WATER SUPPLIES	29
	H1 ENERGY EFFICIENCY.....	31
	APPENDIX 2: MODEL APPLICATION FORM FOR A G12/AS2 COMPLIANT INSTALLATION.....	33

1 About this Document

This guide has been prepared for people wishing to apply for a building consent for a solar water heating (SWH) Installation. Readers are expected to have some knowledge of the New Zealand Building Code and the building consent process.

This guide has been written to help SWH suppliers, builders, homeowners' agents and architects by explaining typical information needed for a SWH building consent application. It is not generally intended as a guide for homeowner acting as applicants, because preparing documentation for consent applications requires knowledge of the Building Code and building process, and more significantly how the proposed work would comply with the Building Code. Complying with the Building Code requires a thorough understanding of engineering and trades practices.

This document has been prepared by the Solar Industry Association (SIA) in consultation with the Energy Efficiency and Conservation Authority (EECA), and the Department of Building and Housing (DBH) as guidance information for applicants and consent authorities addressing applications for installation of solar water heating systems. The recommendations and suggestions in this guide are those of the association and are not mandatory and not intended to be prescriptive. This guide is not a substitute for professional advice, and should not be relied on as establishing compliance with the Building Code. It is not a Compliance Document under the Building Act 2004, and may be updated from time to time. The latest version is available from the SIA website (www.solarindustries.org.nz).

This Guide should be read in conjunction with Clause G12/AS2, specific Alternative Solutions produced by the association (in preparation) , and the Guidance Document associated with application of this Acceptable Solution published by the DBH (in preparation – drafts available from DBH)

2 Introduction

Legally the owner of a building has the responsibility to ensure that a building consent is obtained for any work undertaken on their building. Such works include the installation of a SWH system. They are also legally responsible to make sure enough detail is provided in the plans, specifications and other documentation for the building consent authority to issue a building consent. However as installation of a SWH system requires knowledge and experience of the techniques of installation, the application for a building consent should be completed on behalf of the owner by the SWH supplier. This guide focuses on how to obtain approval from a building consent authority for such an installation. It will help you prepare plans, specifications and documentation for a building consent application.

The basic information needed for a building consent application is similar across New Zealand. However, each local council or building consent authority is responsible for satisfying itself that the Code requirements will be met and each may process applications slightly differently. As a result there may be variations in the specific requirements from one area to another.

For a building consent to be issued, you need to demonstrate how the proposed installation will comply with the Building Code. However the Building Code sets out only the minimum performance standards.

It's important to remember that the building consent authorities who approve applications are looking for compliance with the Building Code. It's not their role to design the system or to monitor quality and aesthetics, except where this affects compliance with the Building Code. Nor are they mind-readers so they need to be provided with appropriate and adequate information on which to consider an application.

3 Background

3.1 THE BUILDING ACT 2004

The Building Act 2004 increased focus on the content and quality of plans and specifications submitted for a building consent.

Section 45 of the Building Act sets out in broad terms what an application for a building consent must contain. However, it does not define the form, content or quality of the plans and specifications, or other information needed to support an individual application.

The Building Act allows each building consent authority to determine what plans, specifications and other information it reasonably requires. This allows for differences to be managed locally, such as ways of storing and retrieving volumes of applications. However, it has led to inconsistency from one authority to another. This situation doesn't provide certainty for you or for building consent authorities.

We hope the approach set out in this guide will promote greater consistency and efficiency for this process.

3.2 BUILDING CONSENT DOCUMENTATION

This guide includes recommendations on the appropriate form and minimum content for a SWH installation building consent application. This includes the drawings, specifications and accompanying documents (other information), such as engineering certification and design reports. This guide also discusses associated issues, such as the appropriate role of manufacturers' data, alternative design, engineering and design calculations, and various other forms of technical statement or warranty. Some building consent authorities have specific requirements for building consent documentation, including:

- specific size, form and scale of individual drawings or the elements they contain
- requirements for certain line types, or thicknesses, or for lettering of a certain type or size.

Often these requirements are a result of the building consent authority's process for storing and retrieving building consent information (for example, digital storage). Although such requirements are not related to the Building Code or Building Act, it is useful to ask the building consent authority about any specific requirements it may have before lodging your building consent application.

NOTE: Building consent authorities may require other information, due to area-specific matters (such as known ground and environmental conditions), local district plan requirements, bylaws, or Local Government Act 2002 requirements. A project information memorandum (PIM) attached to the property file held by the authority would identify any issues for you in advance.

3.3 THE BUILDING CONSENT PROCESS

A SWH installation can only start on site after a building consent has been issued. Building consent authorities check that the documents submitted with a building consent application comply with the Building Code and conform with section 49(1) of the Building Act:

‘that the provisions of the Building Code would be met if the building work were properly completed in accordance with the plans and specifications that accompanied the application’.

Compliance with other requirements (such as health and safety, bylaws or a district plan) may be critical to the design of the project, even though they're not part of the building consent process. Therefore, you should consider these requirements as part of your project management and design.

A model consent application form for G12/AS2 compliant applications is appended in Appendix 2. This is a suggested form only but it will give applicants and consent authorities a summary of what information is required to demonstrate compliance to the Building Code. The model format allows a significant amount of

information applicable to each application to be standardised. This should limit the amount of duplication that could otherwise occur for what essentially are standard applications.

You will help the assessment process greatly if you ensure the building consent application documentation includes:

- a clear statement of whether the application is based on an Acceptable Solution or an Alternative Solution.
- a clear summary or report explaining how compliance with each relevant clause of the Building Code will be achieved, including any waiver or modification sought;
- a schedule or schedules of the materials, products and systems (and their maintenance requirements) proposed to be used in carrying out the installation.

Remember that consent authorities are not mind-readers so you need to ensure that they understand what is included in the scope of the project for which an application is being sought, and that you tell them of the methods of installation.

3.4 EARLY CONSULTATION IS IMPORTANT

Early consultation between the applicant and the building consent authority plays an important role. It helps reduce misunderstandings at the time of application, as any specific document requirements from the building consent authority can be taken into account.

3.5 CODE COMPLIANCE CERTIFICATE

It's important that all documentation relating to the building consent is complete, precise and has an accurate record of what has occurred on the site. The owner must apply for a code compliance certificate once the building work described in the building consent, with any subsequent approved amendments, has been completed.

The building consent authority must issue a code compliance certificate where it is satisfied that the building work complies with the building consent. Where the building consent authority is not satisfied, they may refuse to issue the code compliance certificate.

3.6 BUILDING CODE REQUIREMENTS

To obtain a building consent for a solar water heating installation the installation must be shown to comply with the relevant sections of the Building Code. SWH must comply with:

B1 – Structure

B2 – Durability

E2 – External Moisture

G12 – Water Supplies

H1 – Energy Efficiency

4 Plans and Specifications

4.1 SCOPE OF WORKS

The Building Act defines 'plans and specifications' as 'the drawings, specifications and other documents according to which a building is proposed to be constructed, altered, demolished, or removed'. These define the scope of work and should be clear and concise.

4.2 LEVEL OF INFORMATION

The plans and specifications must provide enough information for the consent authority and the building owner to understand the scope of work and its interaction with the elements of the building, particularly to ensure compliance to the structural and weather tightness aspects of the Building Code.

You will need to determine how much or how little detail is needed and how the information should be structured according to the nature of the work. Most building consent authorities will provide guidance on the documentation you need to submit with your building consent application forms (this may include check sheets such as in Appendix 2).

Typical guidelines of the level of detail are:

- Drawings should be clear and if handwritten neat, tidy and legible,
- Drawings should be specific to the SWH installation. Amended, second-hand and poorly legible information will not be accepted. Detail on a drawing showing existing building features, works that are not subject to the current application should be crossed out or deleted so that there is no confusion of what is within the scope of this work, eg on a drawing showing previous building alterations the existing features should be crossed out, so that only the work subject to this application is shown.
- Drawings should show all SWH system components and their location on the building including the location of relief valves and subsequent discharge points.
- A SWH system single line schematic layout drawing showing the positioning of valves, controllers and other system components, and their connection to existing services
- The drawings should show the location of components on roofs and their proximity to roof edges, load bearing walls and plumbing fixtures, eg gully for discharge of fluid from relief valves
- Applications can be supported by standard drawings showing details of installation methods but the drawings must be specific to the application under consideration.
- Photos should not be used unless embedded in the supporting documentation as all documentation has to be able to be stored digitally by the consent authority. Photos should be able to be clearly identified as relating to the building on which the solar system is to be installed. Photos also need to have good quality, size, clarity etc, and they must be clearly presented as part of the building consent application. Drawings work better as they can be scaled and modified. The other issue with photos is proving whether or not the photo belongs to the dwelling where the installation is being carried out.
- Information on the roof structure including rafter spacing, rafter and purlin member size, and any additional strengthening proposed.
- Where there are common details that may apply to a number of applications, eg fixing and penetration details these may be prepared as separate standard documents and attached to each application. Where the standard document has detail options, these may be shown, but the specific detail to be used on any specific application should be indicated.
- All details should be on drawings, not on separate loose leaf pages.

4.3 BUILDING CONSENT INFORMATION

Information in the plans and specifications needs to be project-specific.

Using general phrases such as 'refer to manufacturer's specification and/or requirements' or 'installed in accordance with best trade practice' is not sufficient. Manufacturers' specifications can change from time to time and 'best trade practice' is a standard that varies from individual to individual. It is also sometimes not clear who would be defined as the manufacturer anyway.

References to Standards and Compliance Documents need to be specific rather than general. Some Standards are cited (in whole or in part) in the Acceptable Solutions, while other Standards offer advice only. Some Standards may also contain a range of options.

Make reference to any Standards that are readily available to those involved in the building process. References to other industry guides, such as BRANZ publications, need to be specific and not general.

References need to:

- uniquely identify documents with titles and dates
- be specific as to the paragraphs/clauses to be followed, eg installed to Clause 6.21 of AS/NZS 3500.4 2007.

4.4 COMPLIANCE DOCUMENTS AND ACCEPTABLE SOLUTIONS

The Building Code, being performance-based, requires a certain level of performance to be achieved in buildings. Unlike prescriptive bylaws that existed before the Code came into force, it allows more than one way to achieve that performance. The Acceptable Solutions provided in the Compliance Documents (produced by the Department of Building and Housing) provide one means of demonstrating compliance with the Building Code. Building consent authorities must accept Compliance Documents as complying with the Building Code. Designers can provide an Alternative Solution, as long as they demonstrate to the building consent authority that the proposal will comply with the Building Code.

When applying for a building consent the application must make it clear upfront whether the route being followed is by way of an Alternative Solution or an Acceptable Solution. The consent authority will address the application differently according to which route is used.

If the Acceptable Solution route is used, then the application needs to meet the scope and requirements of the Acceptable Solution 100% (see Acceptable Solution scope below). If the application can't meet it 100% then the Alternative Solution route should be used.

Should you wish to pursue the Alternative Solution method then the onus is on the those submitting the application to prove that the installation complies with the relevant sections of the Building Code as above. The application should be laid out to address each of the clauses separately and provide evidence to back up the claim. This is where engaging with the building consent authority early can save a lot of time and effort.

In the Acceptable Solution route the Department of Building and Housing has effectively considered at all buildings in New Zealand and assessed the installation methods that would ensure the Building Code was met in every situation, eg every roof structure could take the SWH system components on the roof provided the specified loading conditions of the Acceptable Solution were met

Because the Department of Building and Housing has set out in the Acceptable Solution all those installation methods that would ensure compliance to the Building Code, the consent authority does not need to consider the methods further. For example if the installation complies with the Acceptable Solution then the council is bound to give the applicant a consent. The consent authority needs only to assure itself that the applicant will install the system in terms of the Acceptable Solution.

4.5 G12/AS2 ACCEPTABLE SOLUTION SCOPE

Clause G12 of the Building Code covers water supply. It sets out the requirements and then provides two Acceptable Solutions (AS1 and AS2) for meeting those requirements.

AS1 applies to all water supply works including the supply of hot water. AS2 relates only to solar heated water systems. For the supply of hot water from a solar energy source, AS1 and AS2 together apply as a means of meeting the Building Code requirements.

The scope of AS2 is very specific and only those installations that fit 100% within that scope may use the Acceptable Solution route for obtaining a building consent. The scope of the Acceptable Solution AS2 is set out in Table 1. If an application does not 100% fit the scope of AS2 then the application should be considered under the Alternative Solution route.

It should be noted that AS2 also incorporates the relevant sections of AS1. The two should be read together. AS2 also refers to the standard AS/NZS 3500.4. These three documents together cover all aspects of installation and should be specifically referred to within the application, rather than replicating the information in the application.

Table 1: Scope of Acceptable Solution G12/AS2

ACCEPTABLE SOLUTION G12 / AS2	G12 / AS2 SCOPE	MEANS OF COMPLIANCE
<p>If the installation meets the scope of G12/AS2 then the Acceptable Solution path may be used otherwise the solar water heating building consent will need to be applied for under the Alternative Solution path.</p> <p>The applicant must provide enough technical information to show that the installation meets the structural support limitations described in G12/AS2 clause 1.1.1a – h.</p>	<p>1.1.1 Where a building has not been specifically designed to support a solar water heater, this Acceptable Solution can be used for the support and fixing of a solar collector on buildings that meet the structural requirements specified in any of the following:</p> <ul style="list-style-type: none"> • NZS 3604: 1990 • NZS 3604: 1999 • NZS 4203 • AS/NZS 1170: Parts 0, 1, 2, 3 and NZS 1170: Part 5. <p>But only when all of the following requirements are met:</p> <p>a) The weight of solar collector, including frames, fittings, and heat transfer fluid, has a combined weight of no more than 22 kg per square meter (based on the gross area of the collector).</p> <p>The load density limit (22 kgs/m²) and the size limit (4 m²) is in place because roofs are designed to carry minimal additional load. Therefore these limits restrict the additional load of the solar collector panel to 88 kg and ensure that this load is spread over 4 m² of roof, ie distributed over the roof structure.</p>	<p>Provide information on the known or estimated date of construction of the roof along with any original design details.</p> <p>Where original engineering or architectural design information is not available or known then details on the size of rafters and purlins should be provided. Photos supporting measurements can be of advantage.</p> <p>Provide specifications on the size and weight of collectors including the weight of any supporting frame. A standard technical data sheet can be used but where different models of the collector are referenced on the data sheet it must be made clear which option is the subject of the application presented.</p> <p>The application must make it clear if an elevated frame is to be included in the proposed application.</p> <p>Example: Total weight per m² of collector and frame is 20.75 kg/m² as specified in Technical Data Sheets 1 (solar panel) and 2 (support frame) attached.</p>

	<p>b) The hot water storage tank is not installed on or above the roof.</p> <p>Tank on roof installations are not covered by G12/AS2 due to the additional load that the roof is required to take with these types of systems.</p>	<p>Show on a floor plan where the hot water storage tank is to be installed.</p> <p>Example: Tank is located in existing hot water closet as per floor plan attached.</p>
	<p>c) Where the hot water storage tank is located within the roof it has a maximum size of,</p> <p>200 litres when installed in accordance with NZS 3604:1999 Section 14 or</p> <p>450 litres when installed in accordance with AS/NZS 3500 part 4:2003 Section 5.</p>	<p>For tanks located within the roof space, state which clause the installation complies with.</p>
	<p>d) The roof has a pitch no greater than 45°</p>	<p>The angle of the roof from horizontal should be noted on the elevation plan supplied with the building consent application. Therefore state whether the installation complies and refer to the elevation drawing for details.</p> <p>Example: Roof pitch 40° as per elevation plan.</p>
	<p>e) The building is in a wind zone where wind speeds do not exceed 50 m/s (VH wind zone defined in NZS 3604:1999)</p> <p>Note: this specifically applies to applications involving an elevated frame.</p>	<p>Note in the application the wind zone for the area. Where there are known local variations from the official wind speeds provide referenced information.</p> <p>Information is required only where a elevated frame is included within the application.</p> <p>Example: Yes, wind loading is H, see site data above.</p>
	<p>f) The solar collector has an area no greater than 4 m²</p>	<p>The collector area is the gross area of the collector.</p> <p>Refer to product technical specification and note on any standard technical data sheet.</p> <p>Example: 3.8 m² see specification attached.</p>
	<p>g) The design snow loading for the building is less than 0.5 kPa as determined by NZS 3604:1999 Section 15.</p>	<p>In the application state the expected snow loading for the area. This could be included on a standard technical data sheet.</p>
	<p>h) either:</p> <p>i) the solar collectors are installed parallel to the roof cladding, or</p> <p>ii) where solar collectors are installed at a different pitch to the pitch of the roof:</p> <p>the pitch of the solar collector is not greater than 45° to the horizontal, and</p> <p>the building is in a wind zone where wind speeds do not exceed 44 m/s (H wind zone defined in NZS 3604: 1999), and</p> <p>the solar collector faces in the same compass direction as the section of roof the solar collector is installed on.</p>	<p>Provide details of the section the installation complies with and how it complies if required.</p> <p>Example: The panel is installed at 40°, the building is in wind zone xxx and the collector faces the same direction as the section of roof it is installed on.</p>

4.6 ALTERNATIVE SOLUTION

Where the scope of the Acceptable Solution AS2 cannot be met completely the application must be considered as an Alternative Solution.

Demonstrating compliance through the Acceptable Solution route can draw on parts of the AS2 where these are appropriate.

5 Building Consent Application

5.1 GENERAL PROJECT INFORMATION

The level of information/detail required for all building consents is:

“sufficient for any competent tradesperson to complete the works without the need to refer to a designer or to design any aspect of the work themselves, no more, no less”

Simply stating that a proposed work complies with the Building Code (or the Acceptable Solution) is not sufficient. You need to show how the proposed work would comply. For example, for a simple residential building the performance requirements of Clauses B1 and B2 can be achieved by demonstrating compliance with NZS 3604 Timber Framed Buildings and NZS 3602 Timber and Wood Based Products for Use in Building, which are referenced in B1/AS1 and B2/AS1 of the B1 and B2 Compliance Documents respectively. Where a part of the design does not comply with the chosen Acceptable Solution, you will need to demonstrate how that particular element or part element complies with the Building Code.

Using general details or a general statement of compliance with the Building Code in the specification is not sufficient to demonstrate compliance. The drawings and the details they contain must be specific to the work to be undertaken in terms of this application. You should clearly identify in the specification the particular materials and/or systems you intend to use.

Manufacturers should, as a matter of good practice, ensure the supporting information that they provide are clearly dated and include only relevant technical data on the selected material or product. Be mindful that some materials and products contain mixed technical and marketing data. (Refer to AS/NZS 1388 Guidelines for Technical Information for Building and Construction Products).

Where technical information is provided on a standard drawing, the source of that information should be clearly stated. If the information relates to claimed performance, the information should be signed off by an appropriate person. For example if a design for an elevated frame is set out as a specific standard then it should set out the conditions in which it is to be used and be signed by the authorising Chartered Engineer. It should be unnecessary to have to provide calculations as the Chartered Engineer is taking responsibility for the design in signing it off.

In general the level of evidence is much less when using the Acceptable Solution route, compared to the Alternative Solution route where original evidence may need to be provided.

5.2 BUILDING DESCRIPTION

The building consent application, supporting documentation and the issued consent will all be stored on the building file held by the consent authority. This becomes a part of the building owner's assets and may be reviewed by future potential building owners. It is important that the information on the application is accurate to ensure that the consent is properly attributed to the correct property. The details of the property legal title will normally be required so that information can be correctly stored.

5.3 SPECIFIC PROJECT INFORMATION

5.3.1 INSTALLATION PLANS

For the building consent authority to issue a building consent it needs to know the details of the work that will be carried out. The installation plans, specifications and technical information should be such that a person conducting the work could do without having been briefed on the work or seen the site. The building consent documentation acts as a permanent record of the work that has been done and is kept by the building consent authority. Therefore it is important for the plans to be accurate and contain all required details of the installation.

5.3.2 SITE PLAN

The purpose of the site plan is to show the location/s of the external work of the installation in relation to the building and boundaries. The typical information that should be included on the site plan for a SWH installation would be the location of the panels and tank if the tank is located outside the building, either on the roof or the ground. The sizes and locations of each element of the installation should be dimensioned and clearly identified as being the proposed work.

Freehand drawings are generally not of an acceptable quality to be accepted by the consent authority. As a minimum the drawing should be carried out with a ruler and to a scale relative to the base house drawing on which the SWH system drawing is being superimposed, showing the minimum details as shown below.

To save time and money having to draft a drawing from scratch, it is a common practice to utilize existing building construction drawings that were used to construct the premises. It is very important, that if these drawings are reused, the work that has already been carried out under a previous building consent is marked up as existing and that the new work of installing the SWH system is highlighted as the proposed work that is subject to the new building consent.

These drawings can sometimes become quite busy with notes and additional information for the new installation. One way around this is to trace the important information from the existing drawing to a new drawing and then add the SWH installation details.

Where no existing drawings of the property are available, the site details will need to be measured and transferred to a scaled drawing so that the consent authority can assess the proposed work. It is the responsibility of the applicant to provide a suitable level of information so that the consent authority can effectively assess whether the proposed building work, if carried out to the plans and specifications, will meet the Building Code.

The level of detail and quality of drawing should be related to the level of risk arising from the work. Where the work is simply an installation of a collector only to the roof then a lower level of accuracy and detail would generally be acceptable provided it is clear to the consent authority that the loading is minimal. Without such information, the consent authority has to assume that the worst case SWH loading could occur. As the consent authority staff assessing the application may not be familiar with SWH systems they may not be able to distinguish the difference between a collector only application and a tank on roof system, unless this is clearly obvious from the outset of the application. The manner of presentation of the supporting standard technical data can ensure the consent authority can quickly assess the level of risk posed by the work.

Where the solar water heating system is to be installed on a building for which there are no construction plans it may be necessary for plans to be drawn from scratch. It is not necessary that architectural level drawings be produced but a neat scale drawing of the part of the building on which the system is to be installed may be necessary. This can be produced by the supplier and can be ink and ruler and does not have to be CAD draughting quality. The key aspect is that it must be clear where on the building the system is to be located and the building structural features are obvious to the consent authority.

Table 2: Site plan

DRAWING TYPE	RECOMMENDED SCALE	MINIMUM RECOMMENDED DETAIL
SWH positioning (Note 1)	1:100 or 1:200	Direction of North Location of SWH collector panel including dimensions in metres to properly locate the SWH on the building (Note 2) Drain points of any external Temperature Pressure Relief (TPR) valves and the location of any external pipe work.

Note 1 Drawings may be combined

Note 2 This is important where the building is located very close to the boundary and the addition of a solar collector panel on the roof may affect the shade plane on the boundary. Some consent authority ask for the building location, including dimensions in metres to boundaries and recession plane lines. This is unnecessary when the work is on an existing building. It may be required, however, where a large elevated array of collectors relates to the effect on neighbours from the work.

Note 3 The position of the collector on the roof should be clearly denoted. If the system is to be installed on the ground, then its location in relation to the boundary and building should be shown.

5.3.3 FLOOR PLAN

If the SWH installation has internal components such as a tank, controller, or pipe work for example, then the location of these items needs to be shown on the floor plan. If an existing hot water tank is being replaced, this needs to be indicated. If an existing tank is being retrofitted, this needs to be shown as well. Is an existing tempering valve installed?

Cutting into existing hot store tanks is generally not allowed.

All residential dwellings now by law require smoke alarms. The minimum requirement is for a battery-powered device with a silence and test button. This also applies to alterations to existing dwellings (and includes installation of a SWH system). Therefore, the positions of existing smoke detectors need to be shown on the floor plan, or if there are no existing smoke detectors then new detectors will need to be installed before a Code of Compliance is issued. Battery operated alarms are sufficient.

Table 3: Floor plan

DRAWING TYPE	RECOMMENDED SCALE	MINIMUM RECOMMENDED DETAIL
Floor Plan	1:50 or 1:100	Locations of all internal components of the installation ie tank, controller, pump pipe work etc. Specify the products that will be used eg type of insulation on pipe work including form of weather protection on external insulation, material of pipe work, pipe nominal diameters, safety devices. This should reference any technical specification provided. Location of relief valve discharge points. Location of smoke detectors

Note 1 Drawings may be combined

Note 2 The more detail that is provided on the drawing the less explaining of the installation you should need to do. It also makes it easier for the consent authority to inspect the installation once it has been completed.

Note 3 What is the full scope of the work that is being done? Are the tank, TPR and tempering valves new or existing? The drawings should provide enough detail so that someone who hasn't seen the site knows what materials they need to take and how to conduct the work.

5.3.4 EXTERIOR ELEVATIONS

The purpose of an elevation plan is to provide a profile view of the solar panel and its effect on the maximum height to boundary angles (sunlight access planes) of the property. This will help the consent authority confirm compliance with planning requirements. It also shows the extent to which the collector panel inclination differs from the roof plane if a frame is used.

Where a collector only is installed on the roof in the plane of the roof and thus there will be no external effect on neighbours an elevation plan should not be necessary, provided it is made clear in the application that this is the case. (If information such as this is addressed in say a checklist in the standard technical data, then a consent authority does not have to seek it. Addressing these aspects in a checklist will make processing the application easier for the consent authority and reduce subsequent further information requests).

Table 4:Exterior elevation

DRAWING TYPE	RECOMMENDED SCALE	MINIMUM RECOMMENDED DETAIL
Exterior Elevation	1:50 or 1:100	Slope of the part of the roof on which the panel will be fixed. The position and slope of the panel if different from the roof. The daylight angle plane of the building and whether the solar panel installation will have any effect on it.

Note 1 Drawings may be combined

Note 2 A drawing may not be necessary as long as the potential effect on neighbours is addressed in the information provided.

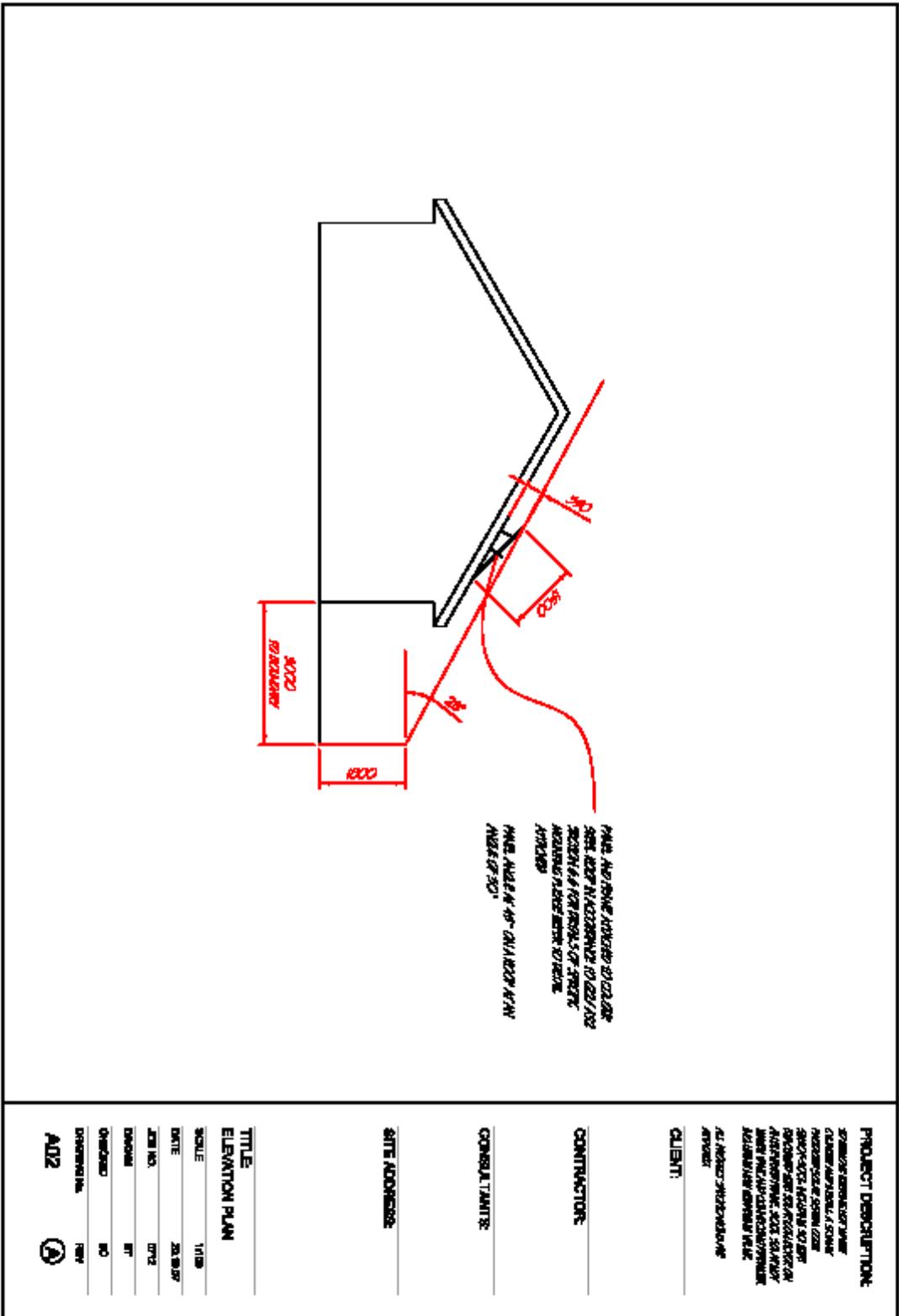


Figure 2: Example elevation plan

5.3.5 SYSTEM SCHEMATIC

The purpose of a system schematic plan is to provide a simple overview of the system and its important parts, such as the TPR valve, tempering valve, connections to the tank, temperature probe locations, isolating valves and drain down valves if applicable, so that the consent authority can see the configuration of the system that is to be installed.

Table 5: Scheme schematics

DRAWING TYPE	RECOMMENDED SCALE	MINIMUM RECOMMENDED DETAIL
System schematic	NA	Tank connection, safety devices, TPR valve, pump and temperature probe locations, isolation valves, pipe materials, insulation (thickness, location, and type including UV resistance if outside), location of relief valve discharge points (with information on appropriateness of receptor eg not PVC).

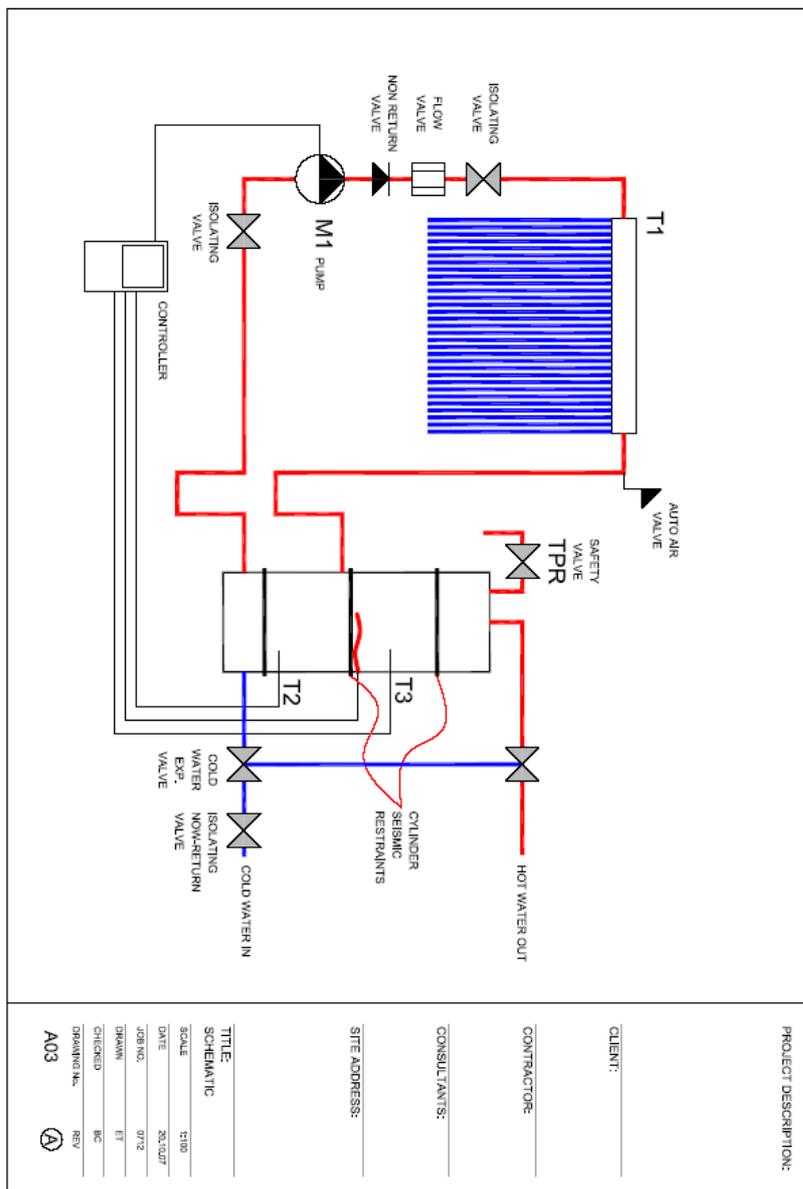


Figure 3: Example schematic drawing

5.3.6 BUILDING CODE COMPLIANCE INFORMATION

When completing the building consent application form you must show how the building design proposes to meet the requirements of each relevant clause of the Building Code. The level of information required will be different according to whether AS2 is used or not.

Table 6: Building Code compliance

BUILDING CODE CLAUSE	COMPLIANCE USING	SPECIFIC REQUIREMENTS	SPECIFIC MEANS OF COMPLIANCE
<p>B1 STRUCTURE</p> <p>OBJECTIVE:</p> <p>The objective of this provision is to:</p> <p>Safeguard people from injury caused by structural failure,</p> <p>Safeguard people from loss of amenity caused by structural behaviour, and</p> <p>Protect other property from physical damage caused by structural failure.</p> <p>FUNCTIONAL REQUIREMENT:</p> <p>Buildings, building elements and site work shall withstand the combination of loads that they are likely to experience during construction or alteration and throughout their lives.</p> <p>PERFORMANCE REQUIREMENTS:</p> <p>See Appendix 1 for full copy of Section B1 of the Building Code. Take special note of the performance requirements specified.</p>	<p>G12/AS2</p> <p>Once the installation is shown to comply with the scope of G12/AS2 then the fixing details should be specified with reference to the specific details in G12/AS2 section 6.</p>	<p>Section 6 Structural Support for Solar Water Heaters</p> <p>Once the additional load is shown to comply with the scope of G12/AS2,3 then Section 6 details the acceptable methods for attaching the additional weight to the structure.</p>	<p>It is important to be able to specify which of the fixing options that the installation will be utilising.</p> <p>Example: The solar panel will be directly fixed to the roof as shown in figure 10 and 11.</p>
	<p>OTHER</p> <p>Should the SWH installation not meet the requirements of the scope of G12/AS2 then specific structural design is required.</p> <p>It is up to the applicant to provide enough information to satisfy the building consent authority that the proposed installation will meet the performance requirements as stipulated in clause B1.</p> <p>Early consultation with the applicable consent authority regarding the information they will accept will be invaluable in this process.</p>	<p>A heavier solar collector panel may meet the Building Code requirements for some roofs. If the system is heavier or larger than the limits described in the Acceptable Solution, a structural assessment will be required to determine how much additional load the roof structure can support in each specific case. A copy of the original drawings of the house specifying the structural design standard used in the roof design will assist in this process. Depending on the level the weight requirement is exceeded, an engineer may need to determine the additional weight that the roof can support.</p>	<p>Documentation that may help with your building consent application:</p> <p>Specific structural assessment of the roof and its capacity to take additional load.</p> <p>Specific collector mounting details and engineering calculations or comparison to a G12/AS2 method</p> <p>Frame and truss calculations or producer statement that states the structure can take the additional load.</p>

BUILDING CODE CLAUSE	COMPLIANCE USING	SPECIFIC REQUIREMENTS	SPECIFIC MEANS OF COMPLIANCE
<p>B2 – DURABILITY</p> <p>OBJECTIVE:</p> <p>The objective of this provision is to ensure that a building will throughout its life continue to satisfy the other objectives of this code.</p> <p>FUNCTIONAL REQUIREMENT:</p> <p>Building materials, components and construction methods shall be sufficiently durable to ensure that the building, without reconstruction or major renovation, satisfies the other functional requirements of this code throughout the life of the building.</p> <p>PERFORMANCE REQUIREMENTS:</p> <p>See appendix 1 for full copy of section b2 of the building code. Take special note of the performance requirements specified.</p>	<p>G12/AS2</p> <p>G12/AS2 does not provide a specific solution but clarifies the requirement for solar water heaters in terms of their durability.</p>	<p>Section 7.1 Maintenance</p>	<p>Provide operation and maintenance manual that complies with the requirements of AS/NZS2712:2007 clause 2.9.2.</p>
		<p>Section 7.2 Durability</p>	<p>Proof of compliance may include, AS/NZS 2712 compliance certificate Producer Statement.</p>
	<p>OTHER</p> <p>The Alternative Solution and acceptable solution should be no different in terms of durability.</p>		<p>Proof of compliance may include, As above, International design and construction standards compliance certificate Product history.</p>

G12/AS2 sets out that the durability of a solar hot water system should be 15 years unless requiring to be replaced as identified in the owner’s manual. This durability requirement can be generally be expected to apply also to Acceptable Solutions. It should be noted that the manufacturers product warranty may be less than 15 years in which case it is expected that the homeowner will be taking an element of responsibility to follow the system manufacturers operating and maintenance instructions in order to achieve the 15 year durability requirement.

If retrofitting to an existing hot storage tank it is usually accepted that the existing tank is not part of the new work and so its durability does not have to be demonstrated. However the installer should recognise that they have a duty of care to the homeowner to point out any concerns they may have about the durability of the tank, particularly if subjected to the pressures and temperatures of being part of a solar system.

BUILDING CODE CLAUSE	COMPLIANCE USING	SPECIFIC REQUIREMENTS	SPECIFIC MEANS OF COMPLIANCE
<p>E2 – EXTERNAL MOISTURE</p> <p>OBJECTIVE:</p> <p>The objective of this provision is to safeguard people from illness or injury that could result from external moisture entering the building.</p> <p>FUNCTIONAL REQUIREMENT:</p> <p>Buildings must be constructed to provide adequate resistance to penetration by, and the accumulation of, moisture from the outside.</p> <p>PERFORMANCE REQUIREMENTS:</p> <p>See Appendix for full copy of Section E2 of the Building Code. Take special note of the performance requirements specified.</p>	<p>G12/AS2</p>	<p>Section 2 Materials</p> <p>Gives guidance on the selection and the compatibility of different materials, both in contact and where there is water transfer from one to the other.</p> <p>Tables indicate what combinations of material are deemed to comply and which are not.</p>	<p>Ensure that the combinations of materials that you are using comply with these tables and show compliance by reference to the tables and the technical specification of the collector, sealing glands/flashing and roof material.</p> <p>Example: EPDM washers will separate the aluminium support brackets of the collector from the colour steel roof as per section 6 figure 10 and 11 fixing requirements.</p>
		<p>Section 5.2 Weathertightness</p> <p>Provides acceptable roof penetration details.</p>	<p>Specify which penetration details will be used and provide specifications for products that will be used to seal the penetrations as per the specified detail. Provide details of how many penetrations, their size, and what their purpose is.</p> <p>Example 2 No penetrations in the roof are required 2 *. 60 mm holes for solar supply and return pipes as per figure 6 section 5.2 G12/AS2. See EPDM flexible boot specifications attached, location of penetrations shown on site plan.</p>
	<p>OTHER</p> <p>The Alternative Solution path will require assurance the materials will not deteriorate over time and evidence that the roof penetrations are water tight.</p>		<p>Evidence that the SWH installation including penetrations will meet the requirements of E2 of the building code may include:</p> <p>Engineering design, Producer statements, Applicable test certificates.</p>

BUILDING CODE CLAUSE	COMPLIANCE USING	SPECIFIC REQUIREMENTS	SPECIFIC MEANS OF COMPLIANCE
<p>G12 – WATER SUPPLIES</p> <p>OBJECTIVE:</p> <p>The objective of this provision is to– safeguard people from illness caused by contaminated water: safeguard people from injury caused by hot water system explosion, or from contact with excessively hot water: safeguard people from loss of amenity arising from– a lack of hot water for personal hygiene; or water for human consumption, which is offensive in appearance, odour or taste: ensure that people with disabilities are able to carry out normal activities and functions within buildings.</p> <p>FUNCTIONAL REQUIREMENTS:</p> <p>Buildings provided with water outlets, sanitary fixtures or sanitary appliances must have safe and adequate water supplies.</p> <p>PERFORMANCE REQUIREMENTS:</p> <p>See Appendix for full copy of Section G12 of the Building Code. Take special note of the performance requirements specified.</p>	<p>G12/AS2</p>	<p>3.1 Solar water heaters and components</p> <p>Specifies the design and construction standards that are acceptable under G12/AS2. Take special note of the MEPS exclusion clause comment under 3.1.2.</p>	<p>Provide test report for AS/NZS2712, and either AS/NZS4692.1, or MEPS registration no.</p>
		<p>3.2 Solar controller</p> <p>Specifies the requirements of the solar controller. The applicant should know the functionality of the controller to be used and how this will be setup to maximise system performance.</p>	
		<p>3.3 Sizing of system</p> <p>This requirement is to ensure that collectors are not oversized for their application, increasing the risk of stagnation and potential hot water dumping in summer.</p>	<p>Ensure system complies with G12/AS2 3.3.1</p>
		<p>3.4 Operating and Safety Devices</p> <p>Directly related to objective 2 of this clause “to safeguard people from injury”.</p>	<p>Ensure the requirements of G12/AS2 3.4.1 & 3.4.2 are met and that the location and drain point for the TPR valve are detailed in the plans attached; also that the product specifications for the TPR and tempering valve are provided, even if these are existing, as they may not be able to cope with the additional temperatures or heat input from the solar system.</p>
		<p>3.5 Protection from Legionella bacteria</p>	<p>Specify which clause of G12/AS2 3.5 for compliance.</p>
		<p>3.6 Protection from Frosts</p> <p>Also related to B2 Durability and H1 Energy Efficiency.</p>	<p>Ensure that the system has the appropriate level of frost protection as specified in G12/AS2 clause 3.6. Provide test AS/NZS2712 test report, or Refer to attached schematic if drain down system.</p>
		<p>5.0 Installation of Solar Water Heaters</p>	<p>Ensure that the installation complies with this clause.</p>
		<p>5.1 Wetback water heaters</p>	<p>If a wetback is installed, ensure the provided schematic includes the connections to the wetback, even if it is pre-existing.</p>

<p>H1 – ENERGY EFFICIENCY</p> <p>OBJECTIVE:</p> <p>The objective of this provision is to facilitate efficient use of energy.</p> <p>FUNCTIONAL REQUIREMENTS:</p> <p>Buildings must be constructed to achieve an adequate degree of energy efficiency, when that energy is used for-</p> <p>Modifying temperature or humidity or both; or</p> <p>Providing hot water to sanitary fixtures or sanitary appliances, or both; or</p> <p>Providing artificial lighting.</p> <p>PERFORMANCE REQUIREMENTS:</p> <p>See Appendix for full copy of Section H1 of the Building Code. Take special note of the performance requirements specified.</p>	G12/AS2	4.2 Solar orientation and inclination	Provide details of the panel inclination and orientation to show they meet the requirements of G12/AS2 clause 4.2.
	OTHER		

APPENDIX 1: BUILDING CODE CLAUSES

B1 STRUCTURE

New Zealand Building Code Clause B1 Structure

This Clause is extracted from the New Zealand Building Code contained in the First Schedule of the Building Regulations 1992.

16	<i>Building Regulations 1992</i>	1992/150
FIRST SCHEDULE— <i>continued</i>		
Clause B1—STRUCTURE		
Provisions	Limits on application	
OBJECTIVE		
B1.1 The objective of this provision is to:		
<ul style="list-style-type: none">(a) Safeguard people from injury caused by structural failure,(b) Safeguard people from loss of <i>amenity</i> caused by structural behaviour, and(c) Protect <i>other property</i> from physical damage caused by structural failure.		
FUNCTIONAL REQUIREMENT		
B1.2 <i>Buildings, building elements and sitework</i> shall withstand the combination of loads that they are likely to experience during <i>construction or alteration</i> and throughout their lives.		
PERFORMANCE		
B1.3.1 <i>Buildings, building elements and sitework</i> shall have a low probability of rupturing, becoming unstable, losing equilibrium, or collapsing during <i>construction or alteration</i> and throughout their lives.		
B1.3.2 <i>Buildings, building elements and sitework</i> shall have a low probability of causing loss of <i>amenity</i> through undue deformation, vibratory response, degradation, or other physical characteristics throughout their lives, or during <i>construction or alteration</i> when the <i>building</i> is in use.		
B1.3.3 Account shall be taken of all physical conditions likely to affect the stability of <i>buildings, building elements and sitework</i> , including:		
<ul style="list-style-type: none">(a) Self-weight,(b) Imposed gravity loads arising from use,(c) Temperature,		

FIRST SCHEDULE—*continued*

Provisions	Limits on application
(d) Earth pressure,	
(e) Water and other liquids,	
(f) Earthquake,	
(g) Snow,	
(h) Wind,	
(i) <i>Fire</i> ,	
(j) Impact,	
(k) Explosion,	
(l) Reversing or fluctuating effects,	
(m) Differential movement,	
(n) Vegetation,	
(o) Adverse effects due to insufficient separation from other <i>buildings</i> ,	
(p) Influence of equipment, services, non-structural elements and contents,	
(q) Time dependent effects including creep and shrinkage, and	
(r) Removal of support.	
B1.3.4 Due allowance shall be made for:	
(a) The consequences of failure,	
(b) The intended use of the <i>building</i> ,	
(c) Effects of uncertainties resulting from <i>construction</i> activities, or the sequence in which <i>construction</i> activities occur,	
(d) Variation in the properties of materials and the characteristics of the site, and	
(e) Accuracy limitations inherent in the methods used to predict the stability of <i>buildings</i> .	
B1.3.5 The demolition of <i>buildings</i> shall be carried out in a way that avoids the likelihood of premature collapse.	
B1.3.6 <i>Sitework</i> , where necessary, shall be carried out to:	

FIRST SCHEDULE—*continued*

Provisions	Limits on application
(a) Provide stability for <i>construction</i> on the site, and (b) Avoid the likelihood of damage to <i>other property</i> .	
B1.3.7 Any <i>sitework</i> and associated supports shall take account of the effects of:	
(a) Changes in ground water level, (b) Water, weather and vegetation, and (c) Ground loss and slumping.	

B2 DURABILITY

New Zealand Building Code

Clause B2 Durability

This Clause is extracted from the New Zealand Building Code contained in the First Schedule of the Building Regulations 1992 and amended by the Building Regulations 1997.

FIRST SCHEDULE—continued	
Clause B2—DURABILITY	
Provisions	Limits on application
<p>OBJECTIVE B2.1 The objective of this provision is to ensure that a <i>building</i> will throughout its life continue to satisfy the other objectives of this code.</p> <p>FUNCTIONAL REQUIREMENT B2.2 <i>Building materials, components and construction methods shall be sufficiently durable to ensure that the building, without reconstruction or major renovation, satisfies the other functional requirements of this code throughout the life of the building.</i></p> <p>PERFORMANCE B2.3.1 <i>Building elements must, with only normal maintenance, continue to satisfy the performance requirements of this code for the lesser of the specified intended life of the building, if stated, or:</i></p> <p>(a) The life of the building, being not less than 50 years, if:</p> <ul style="list-style-type: none">(i) Those <i>building elements</i> (including floors, walls, and fixings) provide structural stability to the <i>building</i>, or(ii) Those <i>building elements</i> are difficult to access or replace, or(iii) Failure of those <i>building elements</i> to comply with the <i>building code</i> would go undetected during both normal use and maintenance of the <i>building</i>. <p>(b) 15 years if:</p> <ul style="list-style-type: none">(i) Those <i>building elements</i> (including the <i>building</i> envelope, exposed plumbing in the subfloor space, and in-built chimneys and flues) are moderately difficult to access or replace, or	<p>Performance B2.3.1 applies from the time of issue of the applicable <i>code compliance certificate</i>. <i>Building elements</i> are not required to satisfy a durability performance which exceeds the <i>specified intended life</i> of the <i>building</i>.</p>

Provisions

- (ii) Failure of those *building elements* to comply with the *building code* would go undetected during normal use of the *building*, but would be easily detected during normal maintenance.
- (c) 5 years if:
 - (i) The *building elements* (including services, linings, renewable protective coatings, and *fixtures*) are easy to access and replace, and
 - (ii) Failure of those *building elements* to comply with the *building code* would be easily detected during normal use of the *building*.

B2.3.2 Individual *building elements* which are components of a *building system* and are difficult to access or replace must either:

- (a) All have the same durability, or
- (b) Be installed in a manner that permits the replacement of *building elements* of lesser durability without removing *building elements* that have greater durability and are not specifically designed for removal and replacement.

Limits on application

E2 EXTERNAL MOISTURE

New Zealand Building Code Clause E2 External Moisture

This Clause is extracted from the New Zealand Building Code contained in the First Schedule of the Building Regulations 1992.

SR2007/124	
<p>Clause E2–External moisture</p> <p>Provisions</p> <p><i>Objective</i></p> <p>E2.1 The objective of this provision is to safeguard people from illness or injury that could result from external moisture entering the <i>building</i>.</p> <p>Functional requirement</p> <p>E2.2 <i>Buildings</i> must be constructed to provide <i>adequate</i> resistance to penetration by, and the accumulation of, moisture from the outside.</p> <p>Performance</p> <p>E2.3.1 Roofs must shed precipitated moisture. In locations subject to snowfalls, roofs must also shed melted snow.</p> <p>E2.3.2 Roofs and exterior walls must prevent the penetration of water that could cause undue dampness, damage to <i>building elements</i>, or both.</p> <p>E2.3.3 Walls, floors, and structural elements in contact with, or in close proximity to, the ground must not absorb or transmit moisture in quantities that could cause undue dampness, damage to <i>building elements</i>, or both.</p> <p>E2.3.4 <i>Building elements</i> susceptible to damage must be protected from the adverse effects of moisture entering the space below suspended floors.</p> <p>E2.3.5 <i>Concealed spaces</i> and cavities in <i>buildings</i> must be constructed in a way that prevents external moisture being accumulated or transferred and causing condensation, fungal growth, or the degradation of <i>building elements</i>.</p>	<p>Limits on application</p> <p>Requirement E2.2 does not apply to <i>buildings</i> (for example, certain bus shelters, and certain <i>buildings</i> used for horticulture or for equipment for washing motor vehicles automatically) if moisture from the outside penetrating them, or accumulating within them, or both, is unlikely to impair significantly all or any of their <i>amenity</i>, durability, and stability.</p>

Provisions

Performance

E2.3.6 Excess moisture present at the completion of *construction* must be capable of being dissipated without permanent damage to *building elements*.

E2.3.7 *Building elements* must be constructed in a way that makes due allowance for the following:

- (a) the consequences of failure;
- (b) the effects of uncertainties resulting from *construction* or from the sequence in which different aspects of *construction* occur;
- (c) variation in the properties of materials and in the characteristics of the site.

Limits on application

New Zealand Building Code Clause G12 Water Supplies

The mandatory provisions for building work are contained in the New Zealand Building Code (NZBC), which comprises the First Schedule to the Building Regulations 1992. The relevant NZBC Clause for Water Supplies is G12.

Schedule	Building Amendment Regulations 2001
Schedule New clause G12 substituted in First Schedule of principal regulations	
Clause G12–Water Supplies	
Provisions	Limits on application
Objective	
G12.1 The objective of this provision is to–	
(a) safeguard people from illness caused by contaminated water;	
(b) safeguard people from injury caused by hot water system explosion, or from contact with excessively hot water;	
(c) safeguard people from loss of <i>amenity</i> arising from–	
(i) a lack of hot water for personal hygiene; or	
(ii) water for human consumption, which is offensive in appearance, odour or taste;	
(d) ensure that <i>people with disabilities</i> are able to carry out normal activities and functions within <i>buildings</i> .	Objective G12.1(d) shall apply only to those <i>buildings</i> to which section 47A of the Act applies.
Functional requirement	
G12.2 <i>Buildings</i> provided with water outlets, <i>sanitary fixtures</i> or <i>sanitary appliances</i> must have safe and <i>adequate</i> water supplies.	
Performance	
G12.3.1 Water intended for human consumption, food preparation, utensil washing or oral hygiene must be potable	
G12.3.2 A potable <i>water supply system</i> shall be–	
(a) protected from contamination; and	
(b) installed in a manner which avoids the likelihood of contamination within the system and the <i>water main</i> ; and	
(c) installed using components that will not contaminate the water.	
G12.3.3 A non-potable <i>water supply system</i> used for personal hygiene shall be installed in a manner that avoids the likelihood of illness or injury being caused by the system.	
G12.3.4 Water pipes and outlets provided with non-potable water shall be clearly identified.	

Provisions*Performance—continued*

G12.3.5 *Sanitary fixtures and sanitary appliances* must be provided with hot water when intended to be used for—

- (a) utensil washing; and
- (b) personal washing, showering or bathing.

G12.3.6 Where hot water is provided to *sanitary fixtures and sanitary appliances*, used for personal hygiene, it must be delivered at a temperature that avoids the likelihood of scalding.

G12.3.7 *Water supply systems* must be installed in a manner that—

- (a) pipes water to *sanitary fixtures and sanitary appliances* flow rates that are *adequate* for the correct functioning of those *fixtures and appliances* under normal conditions; and
- (b) avoids the likelihood of leakage; and
- (c) allows reasonable access to components likely to need maintenance; and
- (d) allows the system and any backflow prevention devices to be isolated for testing and maintenance.

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.

G12.3.9 A *hot water system* must be capable of being controlled to prevent the growth of legionella bacteria.

G12.3.10 Water supply taps must be *accessible* and usable for *people with disabilities*.

Limits on application

Performance G12.3.5(b) shall apply only to *housing*, retirement homes and early childhood centres.

Performance G12.3.10 applies only to those *buildings* to which section 47A of the Act applies.

Clerk of the Executive Council.

New Zealand Building Code

Clause H1 Energy Efficiency

The mandatory provisions for building work are contained in the New Zealand Building Code (NZBC), which comprises the First Schedule to the Building Regulations 1992. The relevant NZBC Clause for Energy Efficiency is H1, as amended 26 June 2000.

r 4	Building Amendment Regulations 2000	2000/119
<p>5 Clause H1 of code (energy efficiency provisions) replaced</p> <p>The First Schedule of the principal regulations is amended by revoking clause H1, and substituting the following clause:</p>		
<p style="text-align: center;">Clause H1—Energy efficiency provisions</p>		
Provisions	Limits on application	
<p>Objective</p>		
<p>H1.1 The objective of this provision is to facilitate efficient use of energy.</p>	<p>Objective H1.1 applies only when the energy is sourced from a <i>network utility operator</i> or a depletable energy resource.</p>	
<p>Functional requirement</p>		
<p>H1.2 Buildings must be <i>constructed</i> to achieve an <i>adequate</i> degree of energy efficiency when that energy is used for—</p>		
<p>(a) modifying temperature or humidity, or both; or</p> <p>(b) providing hot water to <i>sanitary fixtures</i> or <i>sanitary appliances</i>, or both; or</p> <p>(c) providing artificial lighting</p>	<p>Requirement H1.2(a) does not apply to <i>assembly service buildings, industrial buildings, outbuildings, or ancillary buildings</i>, or to plant and equipment provided to modify temperature, humidity, or both.</p> <p>Requirement H1.2(c) applies only to <i>commercial buildings</i> and <i>communal non-residential buildings</i> whose floor area is greater than 300 m².</p>	
<p>Performance</p>		
<p>H1.3.1 The <i>building</i> envelope enclosing spaces where the temperature or humidity (or both) are modified must be constructed to—</p>		
<p>(a) provide <i>adequate thermal resistance</i>; and</p> <p>(b) limit uncontrollable airflow.</p>	<p>Performance H1.3.2 applies only to <i>housing</i>.</p>	
<p>H1.3.2 Buildings must be <i>constructed</i> to ensure that the <i>building performance index</i> does not exceed:</p>		
<p>(a) 0.13 kWh in a <i>warm location</i>; and</p> <p>(b) 0.12 kWh in a <i>cool location</i>.</p>		

Provisions**Limits on application**

H1.3.3 Account must be taken of physical conditions likely to affect energy performance of *buildings*, including—

- (a) the thermal mass of *building elements*; and
- (b) the building orientation and shape; and
- (c) the airtightness of the building envelope; and
- (d) the heat gains from services, processes and occupants; and
- (e) the local climate; and
- (f) heat gains from solar radiation.

H1.3.4 Systems for the heating, storage, or distribution of hot water to *sanitary fixtures* or *sanitary appliances* must, having regard to the energy source used,—

- (a) limit the energy lost in the heating process; and
- (b) be constructed to limit heat losses from storage vessels, and from distribution systems connected to storage vessels.

Performance H1.3.4(b) applies only where individual storage vessels are 700 litres or less in capacity.

H1.3.5 Artificial lighting fixtures must—

- (a) be located and sized to limit energy use, consistent with the *intended use* of space; and
- (b) be fitted with a means to enable light intensities to be reduced, consistent with reduced activity in the space.

Performance H1.3.5 does not apply to lighting provided solely to meet the requirements of clause F6.

Marie Shroff,
Clerk of the Executive Council.

APPENDIX 2: MODEL APPLICATION FORM FOR A G12/AS2 COMPLIANT INSTALLATION

Background

A G12/AS2 compliant installation will be undertaken to standardised methods of installation which meet the requirements of the Building Code. Such applications will allow simplified processing procedures provided applicants submit applications that can easily demonstrate compliance to Acceptable Solution G12/AS2 of the Building Code. The processing procedures for these applications would be such that they should be able to be handled solely by the Lodgement Officer. Only applications not compliant to G12/AS2 would need to go to the consents processing staff.

The development and publication of G12/AS2 by the Department of Building and Housing provides standardised compliance requirements for the majority of SWH applications.

Many consent authorities will only allow an application to be processed by the Lodgement Officer for those specialist SWH system installers who have prior listing with the consent authority as having demonstrated that they have a level of competence to install SWH systems without detailed oversight by the consent authority. They are also likely to undertake random audits of installations rather than inspection of every installation. If audits show that installations are not in compliance to G12/AS2 then they may require subsequent applications to be fully reviewed by processing staff.

To achieve processing by the Lodgement Officer it would be necessary that an installation check sheet be filled out by the applicant with the detail necessary for the Lodgement Officer to see that the installation would be undertaken compliant to G12/AS2. The check sheet must be able to show all the required information which would be contained in a job specification along with site specific information.

The application would therefore have 3 parts:

- Check sheet demonstrating that all Building Code requirements are met
- Site specific information
- Job specification

The check sheet and job specification (Refer GD2 attached) would need to be signed off by the licensed plumber installer. By having the installer sign the check sheet the installer is agreeing that the application is truthful and that the installation will be undertaken as stated. In other words the installer is taking responsibility for compliance to the Building Code rather than the consent authority.

The site specific sheet would show all the property information, and include drawings to show where the system would be installed on the building, structural details etc.

At the end of the installation and after the system is commissioned the installer will sign an *Installation Certificate* for lodgement with the consent authority. (Refer GD4 attached). This is the guarantee to the home owner and the consent authority that the work has been undertaken as in the consent application.

Where the installer is signing off the work as complying to G12/AS2 the consent authorities may not inspect every installation but would audit works as they saw fit.

Demonstrated competence for installation

In order for applicants to be able to gain consents quickly by the Lodgement Officer it is expected that Council would require applicants to have prior demonstration of their competence to install to best practice. Council would establish criteria for demonstrating competence such as a pass in a Level 4 or 5 NZQA approved SWH installation course, or *Accreditation for Supply and Installation of SWH Systems* by the Solar Industries Association.

It is anticipated that consent authorities could also process fully at least three applications related to an installer before they listed them as being accepted for processing by the Lodgement Officer alone.

In addition if a consent authority found after say three audits that the installer was not following G12/AS2 then they could remove that applicant from the list.

Job Specification

The job specification would set out all the details of the work. This may be in a standard format (Refer GD3 attached) and would address all the standard installation procedures consistent with G12/AS2 to be used in the work. The job specification would be very specific to installation details so that a consenting officer undertaking an inspection on the completion of the work could clearly see what had been intended. Installation details set out in G12/AS2 would need to be specifically referenced.

Site specific information

The information required by the consent authority about the property and the associated specific buildings would be provided as per any application to the consent authority. This may be in a standard format (Refer GD1 attached). In addition information specific to the work eg location on the building. Would be provided in attached drawings.

Form GD1

APPLICATION FOR A BUILDING CONSENT FOR A G12/AS2 COMPLIANT SOLAR WATER HEATER

For applications for a building consent for solar water heating systems that are fully compliant with Clause G12/AS2 of the Building Code.

Application

I request that you issue a Project Information Memorandum and Building Consent for the building work described in this application.

Signed:.....

Dated:.....

Signature of:..... Owner or On behalf of and with the consent of the owner

Description of work (190 characters limit)

For Office use
Application No:
Property ID:
Fee paid: \$
Date received:
Name of Officer:
Date BC issued:
BC No:

Project value:

The Building

Street address of the building:

Legal description of land where the building is located: Lot No: DP:

The Owner

The Owner (as defined by the Building Act)

Full name:

Address: Street No/Name

Suburb:

City: Post Code:

Postal: Same as above

Box/street name:

Suburb

City: Post Code

Phone numbers: Daytime: Mobile:

After hours: Fax:

Email:

Full name:

Address: Street No/Name

Suburb:

City: Post Code:

Postal: Same as above

Box/street name:

Suburb

City: Post Code

Phone numbers: Daytime: Mobile:

After hours: Fax:

Email:

The Installer

Plumber's Name:

License Number:

Agent: (must be authorized by the owner to make this application)

Form GD2

APPLICATION CHECKSHEET & PROCESSING SHEET FOR A G12/AS2 COMPLIANT SOLAR WATER HEATER

Project Address:BC Number:

Application number:

Application checked by:	Date	Accepted? Yes / No	Time Spent

Applicant to provide information on all requirements including evidence of compliance.

Guidance Notes for Applicant:

- This form is only to be used for solar water heating system installations that are fully compliant with Clause G12/AS2 of the Building Code. Applications that are not fully compliant with G12/AS2 are to be considered using alternative solution verification methods.
- For processing to be able to be completed by the Lodgement Officer the application documentation must be fully complete. If there is any missing information the application will not be able to be processed and by the Lodgement Officer and will either be declined or passed to processing staff who will consider the application as an alternative solution application.
- The application for a building consent for a solar water heating system is to include this form with Form GD1 which must include the identifying information relating to the application and the property.
- The information provided in this check sheet along with the supporting information will form part of the conditions of consent. Applicants should be aware that identification of non compliance to any aspect included in the check sheet at a subsequent inspection will immediately be considered to be a breach of consent conditions.
- Supporting evidence of compliance is to be included in an attachment referred to as the Job Specification
- Where supporting information will be provided as evidence of compliance each aspect is to be uniquely identified in the compliance column.
- Reference to a published means of compliance eg reference to a drawing in G12/AS2 must reference actual clauses or drawings and not be a generic reference.
- Drawings must be clear and precise (not freehand) and dimensions must be included where relevant.
- The supporting information must be clear and informative so that a subsequent inspection would clearly know what had been intended and approved as part of the consent.
- At the completion of the works the applicant is to provide a Certificate of Installation (Form GD3) to be signed by the installer certifying that the works have been undertaken in terms of the information provided on this check sheet and the Job Specification.

Building Elements / Items To Be Checked	Means of Compliance,	Lodgement Officer confirmation
Site Plan: (Site layout drawing or aerial photograph with property / buildings highlighted is sufficient)		
Floor Plans: (All parts of the building where collector and tank are located are to be shown on a floor plan. • Load bearing walls in the vicinity of equipment on the roof are to be shown).		
• Hot water cylinder location shown		
• Smoke detectors complying with NZBC F7 indicated (<i>to comply with section 112 of the Building Act</i>)		
Roof Plan: • Show location of collectors		
• provide the dimensions of the collectors		
• Dimension panels from roof edges where near gable		
Recession angle compliance demonstrated where close to boundary		
Solar Heater Compliance: Listed on SIA website (www.solarindustries.org.nz) or Packaged system with test certificate verifying compliance with AS/NZS 2712 Make: _____ Model: _____ or Custom built system (details of system components with verification that each component complies with AS/NZS 2712 are to be provided)		
Show that new hot water storage tank complies with AS/NZS 4692.1		
B1 – Structure		
Confirm that the installation will comply fully with the scope of G12/AS2 (eg does not include a tank on the roof etc)		
Year first building constructed: __		
Provide information on the roof frame material, design type, frame spacing, purlin or tile batten sizes:		
Show that the building structure complies with Structural Standards outlined in G12/AS2		
Weight kg/sqm ____ Total weight of collector filled with fluid, frame and fittings (must be less than 22kg/sqm)		

Building Elements / Items To Be Checked	Means of Compliance	Lodgement Officer confirmation
Roof pitch less than 45°		
Wind Zone – (Must be less than VH)		
Solar collector area (must be less than 4m ²) ___m ²		
Snow load – altitude less than 40m (must be less than 40m)		
Solar collectors parallel to roof pitch (Y / N) If N – then –no more than 45° to horizontal – no higher than H wind zone – collector plane = roof plane		
Location of collector on the roof complies with Fig 2 G12/AS2 (Applicant to show dimension of panels from roof edges where near gable)		
Collector Fixing: • Show how collector fixing details comply with G12/AS2.		
• Show that fixing has at least 4 points of support per collector, 8 for collectors mounted at a different pitch to the roof pitch.		
• Show that outermost support is within 200m of collector edge.		
• Show that fixings do not compromise roof framing strength. (show that the diameter of fixing screws/bolts comply with f G12/AS2)		
• Show that the method of fixing the collector to the roof will ensure that there is no build up of debris or allow ponding of water.		
• Show that collectors fixed direct to roof have spacer blocks (refer to G12 / AS2 Fig.11)		
• Collectors fixed to roofing material only – Fixings comply with G12/AS2		
• For installation on tile cladding show how concrete tile straps or alternative tile fixing detail comply to G12 / AS2 6.3.4 –		
• Show that elevated mounting complies with G12 / AS2 6.4 and 6.5		
• show that collectors mounted at a different angle to roof pitch comply with G12 / AS2 6.6.		
Storage Tanks: Show whether the system includes a New or Existing hot water storage tank		
• For new tanks show the means of seismic restraint complies with NZBC G12 / AS1 6.11.4 (max 3604) or, section 203 of NZS 4603 (max 3506)		

Building Elements / Items To Be Checked	Means of Compliance	Lodgement Officer confirmation
Storage Tanks in the Roof Space: • Show the means of seismic restraint comply with: Max 200L NZS 3604 or specific design, or		
B2 – DURABILITY		
Provide evidence that the system will meet the durability requirement of 15 years or where specific advice is included in the owner’s manual on maintenance and replacement expectations in order to achieve the durability requirement of G12/AS2.		
Indicate the roof material:		
Show how contact complies with NZBC G12/AS2 Table 2		
Show how run-off complies with NZBC G12/AS2 Table 3		
Show how use of EPDM Boots with galvanised unpainted roofing complies with G12/AS2 2.1.2		
Show that any stainless metal is not in contact with galvanised roofing		
Show how storage tanks in the roof space have access of sufficient dimension for removal / replacement		
<u>Exposure Zone:</u> Provide evidence of the exposure zone in which the work is being undertaken.(NZS3604 Section 4)		
Provide evidence that the fixing materials are suitable for use in the exposure zone		
Show where drain lines terminate		
Confirm that relief valves do not discharge onto roofing /		
Describe the method of freeze protection to ensure compliance with section 3.6 of G12/AS2		
Confirm that all pipework inside and outside the insulated envelope of the building will be insulated		
Show how insulation to exterior pipework is waterproof and wrapped or similar to prevent premature degradation		
Show how all pipe penetrations will comply with section 5.2 of G12/AS2		
Show how sealing of fixing through roof will comply with 5.2.9 of G12/AS2		
Provide a schematic diagram showing Labeled pipe work appropriate to actual installation		
Polybutylene pipe systems used for circulating pipework between collectors and storage tanks requires verification from piping manufacturer for suitability as required by AS/NZS 2642.2:2008.		

Building Elements / Items To Be Checked		Means of Compliance	Lodgement Officer confirmation
Legionella Control: • Show how the system design and setup will control Legionella and complies with G12AS2 3.5			
Safety Devices: • Show the anti scalding method and stated temp set at 55 degrees celsius or 45 degrees celsius elderly / early childhood centres			
• Show how temperature control devices comply with G12/AS1 6.5 (<i>Thermostats / Energy cut outs</i>)			
• Describe relief valves and show how they comply with G12/AS1 6.6			
Show that the storage water heater capacity is at least 50litres per m ² of collector area			
Show that new hot water storage tank comply with NZS 4305			
Show that new hot water storage tank complies with AS/NZS 4692.2 (listing of the tank on www.energyrating.gov.au is adequate demonstration of compliance)			
Show how the supplementary heating controller will be set so that compliance with 3.2 of G12/AS2 is met. (controller setting must be such that solar gain is maximized)			

Form GD3

JOB SPECIFICATION TEMPLATE

The Job Specification should provide all the supporting information appropriate to demonstrating that the solar water heating installation will comply with the Building Code. Much of the information will be common to all applications and can be standardized so that the Job Specification text can be repeated for each application, being joined to site specific information.

Description of system

Provide a schematic diagramme of the system showing the components and how they will be laid out to make up the completed system. Name components so that it is clear what function each has.

On a plan of the building show the layout of the system.

PACKAGED SYSTEM DETAILS		
Solar water heater make:		
System Details:	Manufacturer:	
	Packaged SWH Make:	
	Model no:	
CUSTOM BUILT SYSTEM DETAILS		
Collector Details:	Manufacturer:	
	Model no:	
Hot Water Tank Details:	Manufacturer:	
	Model no:	
Controller Details:	Manufacturer:	
	Model no:	
Pump Details:	Manufacturer:	
	Model no:	
Insulation Details:	Manufacturer:	
	Model no:	
Tempering Valve:	Manufacturer:	
	Model no:	
TPR Valve:	Manufacturer:	
	Model no:	

Structural Compliance

Provide information that demonstrates the methods for confirming that the roof structure is adequate to support the system and that fixing methods will comply with G12/AS2.

Durability

The durability of components can be demonstrated by their history of use internationally. This may be supported by testing. Care should be taken to ensure that reference is to the model of system being installed and not to generic systems. This information is likely to be standardized for each job.

External Moisture

Provide information that demonstrates that the weather tightness of the building is not compromised by the installation of a solar water heating system.

Water Supplies

The methods of ensuring safe supply of water is likely to be standardized across most jobs.

Energy Efficiency

The means of ensuring efficient supply of hot water is likely to be standardised for many systems, depending particularly on the choice of supplementary heating control and specific settings. This may be common across many applications.

Form GD4

Installation Certificate: Installation of Solar Water Heating System.

Council:.....

Building Consent No:.....

Producer Statement issued by:.....

Licensed Plumber

Registration No.....

Address of installer:.....

Telephone Number for installer:.....

Product and Model Number installed:.....

Supplier of Product:.....

Registered Electrician (if applicable).....Registration No.....

Address of Property on which installed:.....

Location of installation:.....

Owner of Property on which installed:.....

Property description: Lot.....DP.....

The system has been installed such that the requirements of the New Zealand Building Code have been met. Plumbing work has been installed to meet the requirements of the Building Consent and standard AS/NZS3500.4.

The solar water heating system described above has been installed on a dwelling on the named property according to the Code of Practice for Manufacture and Installation of Solar Water Heating Systems in New Zealand and the conditions of the Building Consent.

The system has been located as shown on the drawings provided with the Building Consent Application. A check has been made by a suitably qualified person to ensure that the system is located over suitably sound load bearing walls and strengthening of roof framing has been undertaken where necessary according to the guidelines provided by the system supplier and meets the requirements of Approved Document B1 of the New Zealand Building Code.

The installation has been undertaken in terms of manuals and instructions from the solar water heating system supplier.

I certify that I have been appropriately trained in the installation of the named Product by the Product Supplier and operate under that Supplier's accreditation. As an independent solar water heating system installer I am covered by a current Public Liability Insurance Policy to a current value of \$.....

Licensed Plumber Signature:.....

Date:.....