A Guide to Meeting the Requirements of AS/NZS 2712:2007

Introduction

This Guide is to assist those wishing to obtain certification that their solar and heat pump water heating components or systems meet the standard AS/NZS 2712:2007. The Guide sets out the level of information that needs to be provided to the certifying party by the component or system supplier, and the tests that are required for critical aspects of the standard.

Background

In New Zealand the Building Act 2004 provides for the regulation of building work, which includes the system design, construction and installation of Solar Water Heaters. The Energy Efficiency and Conservation Authority (EECA) also has requirements for systems, for involvement in Government Assistance Schemes and the Solar Industries Association for listing as a Complying Solar Water Heating Product and participation in the industry scheme for Accreditation for Solar Water Heating System Supply and Installation respectively. In each case the requirements are based on specified standards and a level of demonstrated testing or review.

The standard AS/NZS 2712:2007 sets out product technical standards. A checklist for testing or review of methods of demonstrating that a product meets AS/NZS 2712 for New Zealand is set out below. The checklist is an expansion of Table A1 in the standard and clarifies requirements for which there is no stated test method in some aspects of the table.

The checklist is based on a mix of independent testing and supplier warranty. The level of public assurance for solar water heating products that is considered necessary by EECA and the Solar Industries Association is not such that every aspect of the product should be independently tested. Under New Zealand consumer law it is only necessary that suppliers are able to demonstrate how they meet the relevant regulatory requirements. Their word does not always have to be independently tested as the purchaser of a solar water heating system is covered by the general consumer law requirements that if a supplier says that they meet the standard that the statement is truthful.

EECA and the Solar Industries Association and other stakeholders have collectively agreed on the following checklist for AS/NZS 2712: 2007 as applying to New Zealand.

Scope

The Standard AS/NZS 2712:2007 is based on establishing requirements for individual system components, and the requirements for a system as a whole. This allows the components to be used to make up a custom-built system (typically a retrofit of components to an existing hot water storage tank), and for a packaged system that has been designed as an integrated whole with specified and optimised energy performance. The methods below for demonstrating how the requirements of the standard can be met are set out in a manner that deals with the components and then the system.

The checklist is based on families of systems. Where systems within a family are similar then separate testing of the components or the system is not necessary and type testing can be applied to the family. Systems considered within a family should have each of the following characteristics within 10% of each other:

- Hot water storage tank volume
- Area of the same collector type
- Pump capacity and fluid flow settings
- Supplementary heating to be set to identical times and temperatures of operation.
- Ratio of area of collector/tank volume
- Heat Transfer Fluid characteristics

To allow components to be used in a custom built application the components are tested as if installed to a worst case sized hot water storage tank. The worst case system arrangement is set out in clause 7.4.3.1 of AS/NZS 2712:2007 which is that the tank volume to collector aperture area ratio is no greater than 50 L/m^2. Once tested to this requirement the custom built system is deemed to meet the standard when connected to any tank where the tank volume to collector aperture area ratio is no less than 50 L/m2.

Responsibilities

The methods set out below refer to a supplier providing information. The supplier is defined as the party who is responsible for ensuring the system components meet the requirements of AS/NZS 2712:2007 and is responsible for packaging the system or

installing the components in a custom build application. The supplier may be a manufacturer of components or may import them for integration into a system.

Suppliers are required to provide summary descriptions of systems tested so that all components can be linked to the test reports. These will also be the description that this system will be sold under thus allowing customers to easily identify the components and test results.

NOTE: AS/NZS 2712:2007 covers the product but it does not cover the products use or installation, which are covered by AS/NZS 3500.4 and AS/NZS 3500.5. These standards are integral as means of demonstrating compliance to the Building Code in Clause G12/AS2.

1 CONTAINERS

AS/NZS 2712 Section	Description	How to meet requirement
2.2	Material in contact with drinking water	Supplier to supply a statement that their product meets the requirements of clause 2.2 of the standard
3.2	Construction and performance of containers	Supplier to provide test report from accredited laboratory that demonstrates container has been constructed to meet requirements of AS/NZS4692.1 (for electrical cylinders) and/or AS 4552 (for gas cylinders)
	Minimum Energy Performance Rating Tanks installed as part of a pumped solar water heater where the tank is separately mounted from the collector must comply with the minimum tank insulation requirements of AS/NZS 4692.2	Supplier to provide test report or listing on www.energyrating.gov.au
3.3	Marking of containers	Test facility to review against requirements of clause 3.3 of standard.

2 COLLECTORS

2.1 ABSORBER

AS/NZS 2712 Section	Description	How to meet requirement
2.2	Material in contact with drinking water	Supplier to provide a statement stating that their product meets the requirements of clause 2.2 of the standard
4.2.2	Fluid ways of absorbers	Test certificate that product has passed the hydrostatic test requirements of AS/NZS60335.2.2. Supplier to provide a statement that their product meets the other requirements of clause 4.2.2 of the standard

2.2 COLLECTOR MATERIAL AND CONSTRUCTION

AS/NZS 2712 Section	Description	How to meet requirement
4.3.1	Thermal Insulation of Collector	Supplier to provide a statement that their product meets the requirements of clause 4.3.1 of the standard
4.3.2	Collector Casing	Supplier to provide a statement that their product meets the requirements of clause 4.3.2 of the standard
4.3.3	Sealing Materials	Supplier to provide a statement that their product meets the requirements of clause 4.3.3 of the standard
4.3.4	Evacuated Tube Collectors	Supplier to provide a statement that their product meets the requirements of clause 4.3.4 of the standard including details of how loss of vacuum is indicated. (Testing Lab to test loss of vacuum condition as specified by supplier and confirm indication occurs)
4.3.5	Loss of water due to glazing failure	Test facility to carry out testing as required to determine if the requirements described in section 4.3.5 of the standard are met.

4.4.1	Securing of Glazing	Supplier to provide a statement that their product meets the requirements of clause 4.4.1 of the standard
4.4.2	Thickness of Flat plate Glazing	Supplier to provide a statement that their product meets the requirements of clause 4.4.2 of the standard and in addition provide details how the product meets the requirement. Also the supplier must print the standard the glazing complies with in the product specifications.
4.4.3	Glass Breakage	Supplier to provide a statement that the glazing installed is toughened glass and in addition the supplier must print on the specification sheet that the glazing is toughened glass. Else test as required in Appendix C of the standard to determine compliance to 4.4.3
4.4.4	Glazing Weather Resistance	Supplier to provide a statement that the glazing installed is glass and therefore complies with the requirements of 4.4.4. Else the supplier to provide appropriate test report from independent laboratory in accordance with method described in 4.4.4
4.5.2	Systems with collectors Design to resist Stagnation Conditions	Test facility to carry out testing as required in Appendix B of the standard to determine compliance to 4.5.2
4.5.3	Systems Designed to avoid Stagnation Conditions	Supplier to provide a statement that their product meets the requirements of clause 4.5.3 of the standard including details of how the system is designed to comply with 4.5.3(a)
4.6	Impact resistance	Test facility to carry out testing as required in Appendix C method 1 or method 2 of the standard to determine that the requirements of 4.6 are met or have permanent marking as specified in 4.6b or 4.6c
4.7	Protection Against Ingress of water	Test facility to carry out testing as required in Appendix D of the standard to determine requirements of 4.7 are met.
4.8	Protection against freezing	Test facility to carry out testing as required in Appendix E of the standard to determine requirements of 4.8 are met.

4.9.1	Provisions for Mounting	Supplier to provide a statement that their product meets the requirements of clause 4.9.1 of the standard
4.9.2	Strength	Supplier to provide a statement that their product meets the requirements of clause 4.9.2 of the standard. Strength test as required in 4.9.2 of the standard to determine requirements of 4.9.2 are met.
4.10	Marking	Test facility to review against requirements of clause 4.10 of standard. To clarify the requirements: labeling as per clause 4.10 (a) to (g) is required on a permanent part of the panel, any removable components (including glass tubes) are to be clearly and indelibly marked in accordance with 4.10 (a) to (c) so as to show traceability to the manufacturer and the design of the component.

3 PUMPS AND CONTROLLERS

3.1 GENERAL

AS/NZS 2712 Section	Description	How to meet requirement
2.2	Material in contact with drinking water	Supplier to provide a statement that their product meets the requirements of clause 2.2 of the standard

3.2 PUMPS

AS/NZS 2712 Section	Description	How to meet requirement
6.2.1	Construction	Supplier to provide a statement that their product meets the requirements of clause 6.2.1 of the standard.
6.2.2	Collector Circuit flow rate	Supplier to provide a statement that their product meets the requirements of clause 6.2.2 of the standard including how they meet the requirements.

3.3 CONTROLLERS

AS/NZS 2712 Section	Description	How to meet requirement
6.3.1	Design	Supplier to provide a statement that their product meets the requirements of clause 6.2.3 of the standard.
6.3.2	Pump and Controller instructions	Test facility to review documentation with respect to clause 6.3.2 requirements

4 SOLAR WATER HEATING SYSTEMS

4.1 GENERAL

AS/NZS 2712 Section	Description	How to meet requirement
2.2	Material in contact with drinking water	Supplier to provide a statement that their product meets the requirements of clause 2.2 of the standard
2.3	Facilities for Installation	Supplier to provide a statement that their product meets the requirements of clause 2.3 of the standard and can be fixed as per AS2
2.4	Facilities for Maintenance	Test facility to compare product installation instructions with requirements of 2.4
2.5	Pipes	Supplier to provide a statement that their product meets the requirements of clause 2.5 of the standard
2.6.1	Requirement for protection	Supplier to provide a statement that their product meets the requirements of clause 2.6.1 of the standard as well as providing a description and specification of the equipment necessary to meet the requirements.
2.6.2	Rating of Relief Valves	Supplier to provide a statement that their product meets the requirements of clause 2.6.2 of the standard as well as providing a copy of the calculations as detailed in section 2.6.2 of the standard and specifications of protection valves. (note: Test lab should be able to provide this calculation)
2.7	Over Temperature Protection	Supplier to provide compliance certificate for a) Electric AS/NZS 60335.2.21 and / or b) Gas AS 4552 if applicable
2.8	Supplementary Heating Unit	Supplier to provide compliance certificate for a) Electric AS/NZS 60335.2.21 and / or b) Gas Heating NZS 5262 if applicable

4.2 SYSTEM INSTRUCTIONS

AS/NZS 2712 Section	Description	How to meet requirement
2.9.1	Installation instructions	Test facility to review against requirements of clauses of 2.9.1 of the standard.
2.9.2	Operation and maintenance instructions	Test facility to review against requirements of clauses of 2.9.2 of the standard.

4.3 HEAT TRANSFER FLIUD

AS/NZS 2712 Section	Description	How to meet requirement
5.3.1	Stability	Supplier to provide a statement that their product meets the requirements of clause 5.3.1 of the standard
5.3.2	Approvals	Supplier to provide a statement that their product meets the requirements of clause 5.3.2 of the standard included in the statement should be the name of the fluid used and its concentration. Else a supplier statement that this section does not apply the product because it is not a single wall heat exchanger with a pressurized primary fluid.
5.3.3	Indicator colour	Supplier to supply statement of what colorant the indicator is. If it is a listed suitable colorant then pass else test as per requirements 5.3.3
5.3.4	Water as a heat transfer fluid	Supplier to provide a statement that their product meets the requirements of clause 5.3.4 of the standard

4.4 HEAT EXCHANGER DESIGN AND CONSTRUCTION

AS/NZS 2712 Section	Description	How to meet requirement
5.4.1	Materials	Supplier to provide a statement that their product meets the requirements of clause 5.4.1 of the standard
5.4.2	Strength of Materials	Supplier to provide a statement that their product meets the requirements of clause 5.4.2 of the standard
5.4.3	Support	Supplier to provide a statement that their product meets the requirements of Clause 5.4.3 of the standard
5.4.4	Over -pressure test-internal	Test facility to carry out testing as required in 5.4.4 of the standard to determine requirements described in 5.4.4 are met.
5.4.5	Facilities for drainage and filling	Test facility to review installation and maintenance documentation and compare with clause 5.4.5 requirements
5.4.6	Maintenance of Heat transfer fluid level in vented heat exchange systems	Test facility to review installation and maintenance documentation and compare with clause 5.4.6 requirements

4.5 HEAT EXCHANGER MARKING

AS/NZS 2712 Section	Description	How to meet requirement
5.5.1	General	Test facility to review product labeling and compare with clause 5.5.1 requirements
5.5.2	Pressure Information	Test facility to review product and compare with clause 5.5.2 requirements
5.5.3	Leakage indication	Test facility to review customer information and compare with clause 5.5.3 requirements

5.5.4	Systems with non toxic heat transfer fluids other than water	Test facility to review product labeling and compare with clause 5.5.4 requirements
5.5.5	Systems with toxic heat transfer fluids	Test facility to review product labeling and compare with clause 5.5.5 requirements

4.6 SOLAR WATER HEATER SYSTEMS

AS/NZS 2712 Section	Description	How to meet requirement
7.3	Air Vent	Supplier to provide a statement that their product meets the requirements of clause 7.3 of the standard and details of how it meets these requirements.
7.4.2	Thermal performance	AS/NZS2984 Test report or AS/NZS4234 Test report (note: this requires that an AS/NZS 2535 panel performance test be carried out)
7.4.3	No-Load System Operation	Test facility to carry out testing as required in Appendix F of the standard to determine requirements of 7.4.3 are met.

5 HEAT PUMP WATER HEATERS

5.1 SYSTEM PERFORMANCE

AS/NZS 2712 Section	Description	How to meet requirement
8.2	System Performance	AS/NZS2984 Test report for solar boosted Heat Pump Water Heaters or AS/NZS4234 Test report (note: The Method to carry out this performance evaluation is currently under development)

5.2 REFRIGERANT

AS/NZS 2712 Section	Description	How to meet requirement
8.3.1	Refrigerant Type	Supplier to provide a statement that their product meets the requirements of clause 8.3.1 of the standard, in addition the supplier must provide the specification of the refrigerant being used.
8.3.2	Maximum charge of Refrigerant	Supplier to provide a statement that their product meets the requirements of clause 8.3.2 of the standard, in addition the supplier must specify the maximum charge figure.

5.3 DESIGN AND CONSTRUCTION

AS/NZS 2712 Section	Description	How to meet requirement
8.4.1	Materials	Supplier to provide a statement that their product meets the requirements of clause 8.4.1 of the standard.
8.4.2	Over-temperature Protection	Supplier to provide a statement that their product meets the requirements of clause 8.4.2 of the standard, as well as specifying the over

		temperature protection device to be used.
8.4.3	System pressures and Temperature	Supplier to provide a statement that their product meets the requirements of clause 8.4.3(a) (b) (c) of the standard. Also provide the following additional information; a) Provide details of how the product complies with 8.4.3a including calculations b) Provide details of how the product complies with 8.4.3b including calculations
8.4.4	Circulating Pump Construction	Supplier to provide a statement that their product meets the requirements of clause 8.4.4 of the standard.
8.4.5.1	Controllers for Circulating Pumps and Supplementary heating - Design	Supplier to provide a statement that their product meets the requirements of clause 8.4.5.1 of the standard.
8.4.5.2	Controllers for Circulating Pumps and Supplementary heating - Instructions	Test facility to review documentation with respect to 8.4.5.2 requirements
8.4.6	Pressure relief	Supplier to provide statement that their product meets the requirements of clause 8.4.6, giving details of how the product meets the requirements either by 1) Statement of the mass of the refrigerant used and confirming it is less than table 8.1 in standard. or 2) Statement of the mass of the refrigerant used and confirming it is greater than table 8.1 in the standard and providing the specification/s of the pressure relief or limiting devices that are required and their respective AS/NZS1677.2 Compliance Certificates.
8.4.7	Heat Exchangers	Supplier to provide a statement that their product meets the requirements of clause 8.4.7 of the standard and provide the appropriate AS/NZS1677.2 Compliance Certificate

5.4 INSTRUCTIONS AND MARKINGS

AS/NZS 2712 Section	Description	How to meet requirement
8.5.1	Installation Instructions	Test facility to review installation documentation with respect to clause 8.5.1 requirements.
8.5.2	Marking	Test facility to review product markings with respect to clause 8.5.2 requirements