IPART Energy Sustainability Schemes

Guide – Water Heater Product Acceptance – IHEAB – V1.1

Guide

June 2025

ESS »

Acknowledgment of Country

IPART acknowledges the Traditional Custodians of the lands where we work and live. We pay respect to Elders both past and present.

We recognise the unique cultural and spiritual relationship and celebrate the contributions of First Nations peoples.

Tribunal Members

The Tribunal members are:

Carmel Donnelly PSM, Chair
Dr Darryl Biggar
Jonathan Coppel
Sharon Henrick

Enquiries regarding this document should be directed to a staff member:

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The Independent Pricing and Regulatory Tribunal

IPART's independence is underpinned by an Act of Parliament. Further information on IPART can be obtained from IPART's website.

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About this document

This guide provides product applicants with application guidance for acceptance of eligible commercial water heating products under the Energy Security Safeguard schemes (**Safeguard**) in New South Wales.

Overview

The Safeguard provides financial incentives to install, upgrade or replace equipment to use less energy, and reduce electricity use at peak times. Where the activity involves installation of new or replacement water heating products, these must be on the list of products 'accepted' by the Scheme Administrator (Accepted Products List).

Water heaters must be accepted prior to the registration of energy savings certificates.

This document provides information on the requirements and process to get products published on the list.

Purpose

The purpose of this document is to help businesses or individuals planning to supply or install commercial water heating products under the Safeguard. It offers guidance on the product requirements outlined in the *Energy Savings Scheme Rule of 2009* (**ESS Rule**). It also provides instructions on how to apply for acceptance of air source heat pump water heater systems (Activity Definitions F16 and F17).

The guide only provides general information and should not be relied on as legal advice specific to your circumstances.

Is this guide for you?

You should use this guide if you are an:

- **Accredited Certificate Provider (ACP):** to understand product acceptance and ensure your implementations comply with the Safeguard's requirements.
- **Equipment manufacturer and/or distributor:** to supply equipment for use in the Safeguard, you need to understand product acceptance procedures and requirements.

Note: You must hold a TESSA account to apply for product approval.

You must be an authorised signatory to sign the declarations. You must provide authority evidence for this either at initial TESSA account registration, or later when adding users to your account.

If you are an **individual or business interested in activities** under the Safeguard, while not essential, understanding the product acceptance process can provide you with valuable insights into acceptable equipment and contribute to informed decision-making.

How to use this document

Before you apply for acceptance, you should read and understand all the relevant sections of this guide that apply to your water heater type. A good understanding of the application process and our requirements will assist you to lodge a complete application and aid a smoother application process.

- Section 1 – Equipment and performance requirements
- Section 2 – Evidence requirements and supporting documentation
- Section 3 – How to apply for product acceptance

Document Control

Version Number	Change Description	Date Published
V1.0	Initial publication after ending the combined application process with the Essential Services Commission via the VEU Registry. Applications must be submitted directly through TESSA. Information in the guide was adapted from the Commission's *Commercial and Industrial Air Source Heat Pump Water Heater Product Application Guide* which included NSW requirements. Changes include: • NSW specific requirements for electrical safety • Applying in TESSA • Updated modelling requirements to incorporate new (Type 104) model released in TRNAUS 24.6 version • Use of template declarations for all applications • Requiring a User Manual • Warranty requirement to comply with relevant legislation	23 June 2025
V1.1	Minor changes to authorised signatory requirements for application submissions	27 June 2025

1 Product equipment requirements

This section provides general information on product eligibility that must be provided as part of your application.

Key points

- Your application must meet all product performance and safety requirements to be listed on the Accepted Products List.
- Detailed equipment requirements are specified in each activity definition of the ESS Rule.

Products must meet the specified requirements in the ESS Rule to be listed on IPART's Accepted Products List and be eligible to create Energy Savings Certificates (**ESCs**).

We assess products to check whether they meet the minimum equipment requirements of the ESS Rule. The equipment requirements for commercial water heaters installed under Activity Definitions F16 and F17, as per the ESS Rule, are products must:

1. Meet their definition as an air source heat pump water heater per AS/NZS 4234.
2. Must achieve minimum annual energy savings of:
    - 60% when modelled in AS/NZS 4234 climate zone HP3-AU.[a]
    - 60% when modelled in AS/NZS 4234 climate zone HP5-AU.[a]
3. Must be certified to comply with AS/NZS 2712 if it has a storage volume less than or equal to 700L.

You can choose to apply for acceptance for one or both climate zones. In the instance where your product does not achieve ≥60% annual energy savings in a particular climate zone, the product may still be accepted for the other climate zone.

Products are only eligible to create certificates for installations in the climate zone where it was accepted.

Modelling procedures are outlined in Appendix A and discussed further in section 2.5.

[a] Refer to the Australian Building Codes Board Climate Zone Map to identify the relevant BCA climate zones

2 Evidence requirements

This section provides further details on the evidence requirements for specific activity definitions.

Key points

- Some requirements apply to all water heating products, while each activity definition also has its own requirements to be met.
- Documents submitted must match the product brand and model you apply for and be verifiable.
- Specific evidence is required on safety, product testing, application declarations, user manuals, and energy savings modelling.

Consult the relevant sections of the ESS Rule and this guide when preparing evidence for your application.

The evidence and information submitted in your application must be accurate and verifiable. Clauses 61 and 130 of Schedule 4A to the *Electricity Supply Act 1995* impose a maximum penalty of $11,000 and/or 6 months imprisonment for knowingly providing false or misleading information to the Scheme Administrator in NSW.

2.1 Electrical safety

Under the Gas and Electricity (Consumer Safety) Act 2017 **(Consumer Safety Act)**, some water heaters are identified as declared articles in NSW.[b] Declared articles must be approved by NSW Fair Trading or an approved equivalent, have the appropriate approval mark and follow the relevant safety standard before they can be sold in NSW.[c] You must demonstrate that your product complies with the NSW electrical safety requirements.

Pressure storage water heaters must meet AS/NZS 60335.2.21. Electric heat pumps must meet AS/NZS 60335.2.40.

ACPs and product applicants are responsible for understanding and complying with their obligations under the Consumer Safety Act.

We may remove a product from the Accepted Products List if we determine the product may be unsafe.

Product brands and model numbers entered in TESSA must reconcile precisely with the AS/NZS 2712 certificate and product data plates. If there are differences between documents, you must submit a manufacturer's declaration using the template provided (see section 2.3.2 for further details).

[b] Refer: NSW Government Gazette No 347 of 06 September 2024

[c] Refer: www.fairtrading.nsw.gov.au/help-centre/online-tools/approved-electrical-articles-register.

2.2 Test reports

Test reports demonstrate product performance specifications as tested by an authorised laboratory.

Independent test reports help determine if a product meets ESS requirements. You must submit an independent third-party verification of the product performance against established safety and performance standards.

All test reports must be produced by National Association of Testing Authorities (**NATA**) accredited (or equivalent) test laboratories and be less than 10 years old at the time of product application. Australian manufacturers can test their products in their own in-house NATA accredited laboratories.

Tests must be conducted:

- on the products as they are intended to be installed,
- to specifications in the associated standards, and in accordance with the latest updates to those standards, and
- test conditions must be included in the reports provided.

We will accept a representative test report for components if the differences between the tested component and those represented by the report are unlikely to affect the performance of the product(s).

The same principle applies if a prototype product is tested to represent a production unit. If the performance is different between the tested prototype and the production unit, we require test reports for the production unit to confirm the performance of the production unit and this should be further confirmed in the template declaration.

In some instances, we may require test report data directly from the laboratory.

2.3 Declarations

Declarations are required by applicants to confirm that the details provided in your applications are complete and correct. Detailed instructions are included in the templates on our website.

2.3.1 Combined Application and Controller Declaration

This mandatory document is required for all applications. Only a signatory user in TESSA can sign this declaration. An example completed Application and Controller Declaration template is provided in the Appendix C. The declaration has 2 parts to complete and is summarised below.

Application declaration

The application declaration confirms the applicant has read and understood this guidance. It also confirms the information provided is complete, true and not misleading in any way.

The declaration also gives authorisation to IPART to share information with other government agencies and contact them to obtain information on the applicants' products and performance in other schemes.

Controller declaration

Applicants must complete the controller declaration template for each heat pump product model number applied for. The template needs to provide sufficient detail to allow IPART to assess whether the product's operation aligns with the energy modelling and meets the eligibility requirements.

The Controller Declaration (see template) must include a detailed description of the controller operation and variables, list all the pump control set points, information about different modes and operations, including any user adjustable settings that may impact the energy use.

Information must be provided on:

- which mode the product is in by default when installed.
- how and when an electric booster element is used under each mode, if present.
- any seasonal changes to the controller settings and how it is achieved.
- the legionella control method under each mode, including non-modelled modes

Please note that sufficient information must be provided for each model to provide a full understanding of how the product operates.

2.3.2 Combined Manufacturer and Prototype Declaration

This is a combined template for both Manufacturer and Prototype Declarations. You can complete and submit one (or both) declarations as needed. The declaration has 2 parts to complete and is summarised below.

Manufacturer declaration

Manufacturer declarations are required to reconcile product information in some instances. It is required where different brands and/or model numbers are referenced in evidence, the applicant must submit a declaration that clearly reconciles the models applied for.

A manufacturer's declaration will not be accepted for AS/NZS 2712 certification, electrical safety certificates or product data plates.

Supporting documents with unexplained model variations are not accepted.

Manufacturer declarations must be digitally signed by the signatory user in TESSA. Instructions are included in the template.

The applicant must submit a manufacturer's declaration that includes a comparison of product specifications between the tested model and the model applied for in the application. The comparison should cover detailed information about the specifications listed below and any other specifications which might affect the performance of the components referred to in the declaration.

Product specifications for tanks:

- the insulation material and thickness
- the tank dimensions
- the water container material and wall thickness
- the position of fittings (element, thermostat, and openings for water in and out).

Prototype declaration

This form is only required if a prototype was tested. The products tested must have the same design, construction and performance as the final production units of the listed models to be installed under the ESS. This includes specifications of all components of the system, including tanks, heat pumps, etc.

We will use this information to determine whether a representative test report is acceptable. We will accept a product test report if the product specifications remain the same since the test.

2.4 User Manuals

Installation and operation manual(s) must be provided for all product applications. The manual(s) need to be high resolution, digitally searchable documents (not scans or images), cover all brands/models applied for and be consistent with other documentation. The text (including text in diagrams) must be in English.

We assess manuals to ensure they include:

- Sufficient and clear instructions for users to be able to operate products without trouble.
- Descriptions of the products, and their components, specifications and operation.
- Information about controller features and the operating modes. Default factory settings need to be clear and consistent with the controller declaration.
- Information about user adjustable settings, how they can be changed, recommended temperature values/ranges listed for these settings, processes for when/if it goes offline and their impact on user experience.
- A description for legionella control, listed temperatures and recommended actions for users after long shutdown periods.
- Information on warranties that comply with Australian Consumer Law.

2.5 Modelling requirements

Product modelling uses product specifications to simulate performance under standard conditions. It is used to determine whether a product meets ESS requirements and calculates potential energy savings.

2.5.1 Climate zones

A product does not need to meet the ≥60% annual energy savings threshold for both climate zones (HP5 and HP3).

If a product does not meet the requirement in one climate zone, you can apply for acceptance in the other climate zone. However, certificate creation will only be allowed for installations in the accepted climate zone.

You only need to submit modelling outputs for climate zones you are applying for.

2.5.2 Modelling Reports

AS/NZS 4234 recommends information to be included in modelling reports. Although it is not a requirement to produce or provide this report, it is strongly encouraged. The modelling report presents information in a more accessible way and simplifies the assessment of your products.

Where applicable, the AS/NZS 4234 report should include a summary outlining the calculation of the frost point penalty parameter FP1.

2.6 Document requirements

The documents required for all water heaters under activity definitions F16 and F17 are outlined in Table 2.1. Requirements dependent on your product's tank volume are outlined in Table 2.2, and

Table 2.3.

Table 2.1 Documentary evidence for all water heater product applications under activity definitions F16 and F17

Document	Evidence requirement
TRNSYS model decks, lists and outputs	TRNSYS files showing all input deck files[1], list files generated while modelling and output files showing final modelling results. If appropriate, include a file describing incident angle modifier. An AS/NZS 4234 modelling report is not a required evidence document, however it presents modelling data clearly and concisely allowing for a more efficient application process. It is recommended to provide this report if possible.
Declarations	Application and controller declarations are required for all applications. Manufacturer and prototype declarations are required where model numbers are not consistent across application documents or test reports are for a prototype model. See section 2.3 for further details.
User Manual	This document should be a digitally searchable document and include all the information identified in section 2.4. The information must be provided in English so a consumer can understand how the system works and the implications of changing modes/settings. The information must correlate with the information provided in other documents including TRNSYS modelling, Controller Declaration, manufacturers installation instructions.
AS/NZS 5125.1 or EN 14511 test report	The test report must contain all reporting requirements specified in the standard, including thermal performance of heat pump Coefficient of Performance and (**COP**) and power correlations. Test report must be digitally signed (verifiable signature) by testing lab. See Appendix B of this document for additional clarification.
Pump specifications (if applicable)	Pump test report, including measured flow rate and power in standard configuration, if not included in AS/NZS 5125.1 test report. For variable flow systems include a description of the flow rate control algorithm.
Heat Exchanger specifications (if applicable)	Test report or technical data sheet explaining all appropriate information about the heat exchanger.
Schematic of the system and bill of materials	Schematic diagram including all relevant control valves and flow meter if appropriate, heat pump flow and return pipes and sensor locations. Parts list including insulation included or specified for piping etc.
Dimensioned diagram of the tank	Dimensioned inner tank drawing including cold inlet and hot outlet positions, element position (if fitted), flow and return positions for all energy sources including heat pump and booster heater (if appropriate), and temperature sensor location(s). It is preferable to provide the volume above each of these locations in a table within the drawing.
Photograph of relevant data plate(s)	Photo of the product data plate for integrated heat pumps. For split or separate heat pumps photo of the tank data plate and heat pump unit data plate. Any other component data plates, including but not limited to circulating pump, heat exchanger and booster heaters.

Note 1: Template files supplied by IPART upon request. Please email: essproducts@ipart.nsw.gov.au

Table 2.2 Requirements for products with tank volume less than or equal to 700L

Document	Evidence requirement
Electrical Safety	Certificate of Approval demonstrating compliance with AS/NZS 60335.2.21:2013 +A1-2 (until 1 December 2026) or AS/NZS 60335.2.21:2023
AS/NZS 2712 certificate	Identifies conformity with AS/NZS 2712. The model number on the certificate must exactly match the product name on the data plate and application. **Note:** manifolded systems with total storage greater than 700L comprised of multiple tanks must still provide certificates for any tanks which are 700L or less.
Test reports: • AS/NZS 4692.1, or • AS/NZS 4552.2, or • AS/NZS 5263.1.2 (gas only)	The test report must include all the reporting requirements specified in the standard including thermal performance of all tanks, including electric heated tanks. For gas fired booster systems these must include start-up capacity, maintenance rate, pilot gas consumption, burner capacity, thermal efficiency, and standby energy consumption as appropriate.

Table 2.3 Requirements for products with tank volume greater than 700L

Document	Evidence requirement
Calculation report[1] • AS/NZS 4234	The test report must include all the reporting requirements specified in the standard including thermal performance of all tanks, including electric heated tanks. For gas fired booster systems these must include start-up capacity, maintenance rate, pilot gas consumption, burner capacity, thermal efficiency, and standby energy consumption as appropriate.

Note 1: Manifolded products that incorporate tanks with volume less than or equal to 700L also require AS/NZS 2712 certification

2.7 Naming conventions

It is important you apply clear naming conventions when preparing your application. Clear naming conventions facilitate a more efficient and timely document assessment.

Table 2.4 provides a list of recommended naming conventions that clearly describe what a document contains.

The naming conventions in Table 2.4 are not prescriptive and can be varied slightly provided the names facilitate easy identification of each document.

Failure to provide clearly labelled documents may significantly increase the time it takes to process your application.

We recommend the use of the following standard document naming convention:

Brandname_ModelNumber_XYZ

Where XYZ is a suffix from the table below that clearly describes the document.

Table 2.4 Recommended naming conventions for application documents

Document	Suffix (_XYZ)	Document type(s)
TRNSYS model(s)	_[*load size*]_[*climate zone*] i.e.: _Medium_Z3 _Medium_Z5 _Small_Z3 _Small_Z5	.lst .DCK .out .txt
Standard test reports or certifications	_[*Insert standard number*] i.e.: _4234 _2712 _5125 _4692 _4552 _5263	.pdf
Pump specifications	_PumpSpecs	.pdf
Controller Declaration	_ControllerDec	.pdf
User Manual	_Manual	.pdf
No load system operation test result	_NoLoad	.pdf
Schematic of the system and bill of materials	_Schematic	.pdf
Dimensioned diagram of the tank	_Dimension	.pdf
Photograph of relevant data plate(s) including tanks, heat pumps, boosters etc.	_DataPlate	.pdf
Manufacturer's installation instructions	_InstallationInstructions	.pdf
Electrical Safety	_ElectricalSafety	.pdf

3 Submit your application

Key points

- Ensure you have all required documents and information prior to applying.
- Similar products (i.e. from the same series) can be submitted together.

3.1 How to apply

It is essential you complete these steps for a quick and smooth application process:

1. Read this guide to get familiar with the acceptance process.
2. Understand requirements specific to your calculation method and activity definition.
3. Get your authorised signatory designated in TESSA to sign your declarations. See declaration requirements in section 2.3.
4. Gather all required evidence.
5. Name your documents with our naming conventions in Table 2.4.
6. Check your evidence matches the model(s) you apply for.

   Note: If evidence doesn't match, it will slow down the acceptance process. This will result in a Request for Information (**RFI**).

7. Submit a case in TESSA, input your product data, and attach all required documents.

   Note: Duplicate model numbers are automatically rejected by TESSA.

Note: for security reasons **TESSA does not accept .zip files**. Individual file uploads are required.

Applications require several attachments to be uploaded with your initial application. TESSA is limited to allow up to **75 attachments** in your initial application. Only submit documents required for your NSW application. In addition, TESSA:

- allows a **maximum of 8 products** per application
- allows files sizes **up to 20MB** per attachment, and
- **may run slow** when processing many attachments.

*We recommend you limit your initial application to **only 4 products**, where each product has unique modelling files.*

3.2 Information requests and application reviews

We will issue a Request for Information (**RFI**) if we identify issues that require clarification, explanation or if information is missing.

We issue RFIs through TESSA. You must respond to RFIs within 90 days. We may reject your application if you do not respond within this timeframe. We may also request information if requirements change (e.g. the ESS or PDRS Rule is amended) while we process your application.

We generally give you up to 2 RFIs to provide the required information. You may withdraw your application at any time. We will refuse your application if you are unable to demonstrate that the product meets requirements.

Our timeline for application reviews can vary. It depends on application volumes, information quality, and RFIs needed.

3.3 Apply for multiple products

We encourage applicants to submit multiple similar products in a series jointly for ease of processing (where possible).

Products can share some or all the same evidence documents in certain circumstances where:

- Physical characteristics, modes and control settings are the same
- Differences in products do not impact performance (e.g. booster element always off, different anode types)

In such cases, you may be eligible for a joint application and where applicable, you can submit the same:

- AS/NZS 5125.1 test reports
- AS/NZS 4692 test reports
- AS/NZS 2712 safety certification (if all models are contained in one certificate)
- electrical safety evidence (if applicable)
- TRNSYS modelling, and associated AS/NZS 4234 report
- schematic and tank diagram
- User manuals (all models must be listed in the document)

If you are considering a joint submission but aren't sure the products in your series would qualify, please contact us directly to discuss your application.

In your application, please identify any differences (even minor) in the models you submit. This will help with efficient and timely processing of your application.

3.4 Duplicate models

You cannot apply for duplicate models in TESSA. The system will automatically reject your application.

We do not process applications for products that are already accepted. For example, if your product was already accepted under an earlier version of AS/NZS 4234, we will not accept a new application with different values.

However, if your product requires acceptance across different calculation methods, please contact our team to discuss the next steps.

Please note there are different requirements and values to submit for Home Energy Efficiency Retrofits (**HEER**) and Installation of High Efficiency Appliances for Business (**IHEAB**) calculation methods. These cannot be submitted jointly.

Appendices

A Annual Energy Calculation Method for Commercial and Industrial Heat Pump Water Heaters

This section provides details on how to carry out product modelling to provide all necessary information about your product.

A.1 TRNSYS

Modelling must be conducted in accordance with AS/NZS 4234:2021 and SA/SNZ MP 104:2021[a] with the following:

1. Use the TRNSYS program or extensions of the software in the TRNSYS modelling package. TRNAUS V24.6 or later, must be used for modelling.
2. Templates provided with this version of TRNAUS must be used with minimal changes. Where changes are made to the template decks, a clear description of the reason for the change must be included in the TRNSYS deck files[b].
3. The first two lines of the output file must remain unchanged. If the modeller wishes to report more information, an additional printer unit can be incorporated below the existing units.

It is required to ensure that the product can deliver the selected load above 45°C, and to determine the annual energy savings in climate zones HP3-Au and/or HP5-Au.

The modelling must be carried out on the system's default setting and the TRNSYS deck must be adapted to match the product's control logic. The heat loss values in the model must match the AS/NZS 4692.1 test reports.

Calculate the annual electrical energy use (*HPElec*), and the annual gas energy use (*HPGas*), (if applicable, such as for gas boosted heat pump water heater systems), using the following TRNSYS input parameters:

a. The following daily load profile, and weekend multiplier must be used to define the daily energy delivery (dyengy) and load draw-offs (ldflw):

```
UNIT 14 TYPE 14 Daily Load Profile
PARAMETERS 48
0, 0.025      2, 0.025
2, 0.025      4, 0.025
4, 0.05       6, 0.05
6, 0.08       8, 0.08
8, 0.08       10, 0.08
10, 0.04      12, 0.04
12, 0.04      14, 0.04
14, 0.04      16, 0.04
```

[a] SA/SNZ MP 104: 2021 is the Miscellaneous Publication for the Modelling of heated water systems in accordance with AS/NZS 4234, using TRNSYS

[b] Template files supplied by us upon request. Please email: essproducts@ipart.nsw.gov.au.

```
16, 0.03      18, 0.03
18, 0.03      20, 0.03
20, 0.03      22, 0.03
22, 0.025     24, 0.025

UNIT 11 TYPE 14 Weekend Multiplier
PARAMETERS 8
0, 1.17       120, 1.17
120, 0.575    168, 0.575

*Seasonal daily energy delivery - varies month to month
dyengy = [13,1] * [11,1] * ComPeakLoad
*Commercial systems mass flow rate for 1 h load flow period in kg/h
ldflw = dyengy*[14,1]/(TLOAD-Tcold)/0.00418
```

Note: [13,1] is the seasonal load pattern, TLOAD = 45°C, and Tcold is the cold water temperature, as defined in AS/NZS 4234. ComPeakLoad is the peak daily winter load as defined by the TRNSYS modeller (in the deck file), such that the system meets the performance requirements (see item 3 below).

b. Heat pump water heaters must be rated for each climatic zone, HP3-AU or HP5-Au as specified in AS/NZS 4234, for which certificates are to be claimed. The weather data to be used for each climatic zone is supplied with the deck and include files.

c. If drinking water is to be supplied and a temperature control strategy is used to inhibit the growth of legionella, the modelling of the product must show compliance with the legionella control requirements specified in AS 3498, or other applicable legislation.

d. Tank heat loss for a storage tank must be determined in accordance with:
   - AS/NZS 4692, AS 4552 or AS/NZS 5263.1.2, for individual tanks with a capacity less than or equal to 700L; or
   - AS/NZS 4234:2021 Appendix E for individual tanks with a capacity greater than 700L.

e. Heat pump performance must be determined in accordance with AS/NZS 4234, SA/SNZ MP 104 and AS/NZS 5125.1 with the following variations:
   - Power and COP can be defined either via the AS/NZS 5125.1 Power and COP correlation functions, or via a set of EN 14511 (and EN 14825 for variable speed compressors) performance results which form performance maps of Power, COP and/or capacity (two out of three) as functions of air and water temperature. The remaining variable (capacity (Q), COP or Power) is then defined by the equation Q = COP x Power (kW).
   - If the AS/NZS 5125.1 Power and COP correlation functions are used:
     – For test tanks with a capacity greater than or equal to 700L, a tank heat loss calculation in accordance with AS/NZS 4234 can be used for the AS/NZS 5125.1 calculations of heat pump capacity, rather than the tank heat loss tested to AS 4692.
     – Large stand-alone heat pumps with large storage tanks may be tested according to the modifications to AS/NZS 5125.1 specified in AS/NZS 4234 (Energy produced by the test unit may be measured with a flow meter and temperature sensors on the inlet and outlet of the unit).

  - For heat pumps containing variable speed compressors, the *COP* and *Power* functions must be modified as specified in AS/NZS 4234. A template TRNSYS deck implementing this for a PV powered heat pump water heater is provided with AS/NZS 4234.

- If EN 14511 (and EN 14825 for variable speed compressors) performance results are used to create performance maps of Power, COP and/or capacity (two out of three) as functions of water and air temperatures, the performance results must:
  - Include at least one water temperature greater than or equal to the maximum water temperature required during normal operation (typically the thermostat temperature, such as 60˚C). This is to ensure that the TRNSYS model does not extrapolate thermal performance above the measured water temperature. It is recommended that additional water temperatures are also tested as defined by the manufacturer, such as the low (35˚C), intermediate (45˚C), medium (55˚C) and high (65˚C) water temperatures specified in EN 14511, to improve the accuracy of the heat pump performance map provided.
  - Be tested against the following three outdoor air conditions:
    - The standard rating condition (7˚C DB, 6˚C WB) as defined in EN 14511.
    - For Class A[c] products, the condition (2˚C DB, 1˚C WB), or, for Class B products, the lowest outdoor air condition at which the heat pump can operate, with a wet bulb temperature that is between 1 and 2.5 degrees less than the dry bulb temperature (e.g. 5˚C DB, 4˚C WB).
    - Either the EN 14511 higher temperature test condition (12˚C DB, 11˚C WB) or the AS/NZS 5125.1 test condition 2 (18-20˚C, DP 11-14˚C), to ensure that the low temperature behaviour between this point and the lowest test condition is accurately captured.

  Additionally, to improve the accuracy of the heat pump performance map, it is recommended that additional testing is undertaken at air temperatures, defined by the manufacturer/supplier, such as AS/NZS 5125.1 test conditions 2 (18-20˚C, DP 11-14˚C) and 3 (30-34˚C, DP 14-18˚C).

  For heat pumps containing variable speed compressors, the *COP* and *Power* performance maps evaluated in accordance with EN 14511 must be modified as a function of the compressor speed or heating capacity based on either additional testing in accordance with EN 14825, or a default table of *Power* and *COP* adjustments provided within AS/NZS 4234. A template TRNSYS deck implementing this for a PV powered heat pump water heater is provided with AS/NZS 4234.

[c] as defined in AS/NZS 5125.1 Clause 5.2

- If using EN 14511 (and EN 14825 for variable speed compressors) results, a low temperature operation penalty is not required, however, an additional set of data points for the performance map must be calculated by linearly extrapolating the result for the rating condition and the low temperature test condition to the lowest air temperature required for the simulation. This is to prevent the performance values from the low temperature test condition being used directly for temperatures below this point.
- A performance map based on AS/NZS 5125.1 results is not suitable for use.
- Standby power consumption must be tested in accordance with either AS/NZS 5125.1 or EN 14511 and included in the TRNSYS model.
- Water pump performance must be separately included in the TRNSYS model if a water pump is used, unless it has clearly been included in the AS/NZS 5125.1 correlation functions. It must be evaluated to give power consumption (W) as a function of fluid flow rate (L/min), over the complete range of control parameters, in accordance with AS/NZS 4234.
- Where units are modular in design, the test data from one module may be applied to systems comprised of multiple identical modules.

f. The modelled lengths of piping must be based on the following:

- For a stand-alone heat pump, the length of piping between the heat pump and the tank must be the manufacturer's specification or 5m (each way), whichever is larger.
- For a pre-heat tank with series boosting, the length of piping between the pre-heat tank and the series auxiliary booster or finishing tank must be the manufacturer's specification or 10m, whichever is the larger. If the auxiliary booster is integral with the pre-heat tank, then the actual pipe lengths must be used.
- If the finishing tank is heated by a recirculating instantaneous auxiliary booster, the length of piping between the finishing tank and booster must be the manufacturer's specification or 2m (each way), whichever is larger.
- The diameter of all connecting piping must be equal to the manufacturer's specifications.
- If manufacturer's specifications for the thermal conductivity of the pipe insulation are provided, then those specified values are to be used. If no specifications are provided, then the default values of 0.06 W/mK must be used for closed cell foam insulation and 0.1 W/mK for rubberised insulation or polytube or fibre insulation.

g. The heat pump must only be modelled as operating at air temperatures within its declared operating range, which must be evidenced by the manufacturer's documentation.

h. All other input parameters and control strategies must be those used in the actual heat pump water heater, subject to modification by any other overriding section of this appendix.

4. Select a peak daily winter load, *ComPeakLoad*, for each climate zone in accordance with the scale of the installation. The loads should be such that the heat pump water heater achieves at least 60% annual energy savings and a minimum delivery temperature of 45°C for each zone in which certificates are to be created.

5. The percentage energy savings for the purpose of defining the peak daily winter load must be calculated using the following equation:

$$Energy\ Savings\ (\%) = \frac{RefElec - HPElec - HPGas}{RefElec} \times 100$$

where:

RefElec = the reference annual electrical energy use, as defined in item 5, (GJ/a).

HPElec = the annual electrical energy use of the heat pump water heater, as calculated in item 2, (GJ/a).

HPGas = the annual gas energy use of the heat pump water heater, as calculated in item 2 (GJ/a).

6. Determine the reference annual electrical energy use, RefElec, (GJ/a) of an electric reference water heater supplying the same hot water load, as follows:
   a. The heat loss from the reference system must be 5% of the hot water load, therefore use a factor of 1.05.
   b. The average seasonal load multiplier to be used is 0.905.
   c. Multiply number of a days in a year (365) by average seasonal load multiplier (0.905), by heat loss factor percentage (1.05) by the peak daily winter load, *ComPeakLoad*.

$$RefElec = 365\ \times 0.905 \times\ 1.05\ \times ComPeakLoad$$

7. Peak Daily Winter Load, ComPeakLoad, Annual Electrical Energy Use, HPElec and Annual Gas Energy Use, HPGas, should be entered to four decimal places. The final result of "annual purchased energy savings (%)" is published with a precision of two decimal places.

A.2 TRNSYS Modelling Guidelines

These TRNSYS Modelling Guidelines specify the format and structure required for the TRNSYS deck files, and the default values to be used in certain circumstances. They must be adhered to in using the method specified above in section **Error! Reference source not found.** of this appendix.

Deck Layout

- All Include Files must be at the top of the deck immediately after the SIMULATION statement and the timestep must be 0.02h or less.
- The chosen time step must be an exact divisor of the shortest load draw off period.
- The TOLERANCE statement must be 0.005, 0.005 or less for relative tolerances.
- Each load draw-off event must be applied over a period of 1h for commercial and industrial heat pump water heaters.

- Use the template deck structure supplied on the IPART website, unless the Scheme Administrator approves otherwise in writing. Except for the product parameters, the template decks must be used without modification unless the product has features not covered by the example decks. There are different template decks for different types of heat pump water heaters.
- Integral heat pump water heaters with wrap-around, micro-channel and submerged condensers must be modelled using type 104 tanks. Types 138 and 238 are no longer acceptable.
- Files supplied with the deck files must not be modified.
- All constants must be towards the top of the deck.
- All product parameters used in the deck file must be consistent with the values provided in the test reports and other relevant documents.
- The output, list and other output file names must be the same as the deck name except for the file type.
- The output printers in the example decks must not be modified. Additional printers may be used if required.

Simulation Display

- Simulation output: A TYPE 25 printer must be included in the deck. This must output the following results: the zone, peak daily winter load, percent energy savings, heat pump water heater annual electrical energy use, heat pump water heater annual gas energy use, minimum delivery temperature, time at which minimum delivery temperature occurs, annual energy delivered below 45°C.
- Energy balance: A monthly energy balance in a TYPE 28 output unit must be included in the deck. This must include a full system energy balance i.e. heat pump input + boosting + pump input – load – pipe losses – tank losses – change in internal energy.
- Runtime graph: A runtime graph (TYPE65) must be included in each deck showing at least: Hot water delivery temperature, heat pump inlet temperature, heat pump outlet temperature, load.

Controller Default Settings

For a simple temperature difference pump controller, the minimum turn off temperature difference must be 1K.

Piping models

All piping must be modelled using the TYPE 31 pipe routine.

Instantaneous gas heater defaults

- If an instantaneous gas booster has not been assessed for electric power consumption during standby under AS 4552 or AS/NZS 5263.1.2, then a value of 10W must be used. If the electrical power consumption during burner operation is not available, then a value of 50W must be used.
- If the startup heat loss has not been assessed under AS 4552 or AS/NZS 5263.1.2, then a default value of 0.5MJ must be used.
- AS 3498 requires water heating to a minimum of 70°C for a preheat system with an inline instantaneous gas booster when the preheat tank temperature is less than 55°C. If a gas booster trigger temperature less than the gas booster set point temperature is used, then specifications for the gas booster control logic must be provided. If specifications for the gas booster control logic are not provided, the trigger temperature used for rating purposes must be equal to the gas booster set point temperature at all times.

Stratification option for pumped circulation tanks

- For finishing tanks where the water temperature is heated with a separate pumped recirculation loop, "Uncontrolled flow pumped circulation" must be assumed unless:
  - the return from the recirculation booster loop to the tank is in the top 2/3 of the tank; and
  - the recirculation flow rate is below 1 L/min per kW thermal power added by the external booster; and
  - the booster tank recirculation water turnover rate is less than 1 tank volume per hour.
- For all other tanks and/or energy sources, thermal stratification of the storage tank must be modelled as per AS/NZS 4234. For storage tanks with more than one energy source, both must satisfy the stratification criteria in order for a controlled flow (stratified) model to be used.
- For a storage tank modelled with uncontrolled flow, set Mode60 = 2 in the TRNSYS deck, and set the number of tank derivatives to 10 as follows.

```
Mode60 = 2

…

derivatives 10

60 60 55 55 50 50 45 45 40 20
```

- For a storage tank modelled with controlled flow, set Mode60 = 1 in the TRNSYS deck, and set the number of tank derivatives to 20 as follows.

```
Mode60 = 1

…

derivatives 20

60 60 55 55 50 50 45 45 40 40
```

30 30 25 25 20 20 20 20 20 20

Dip tubes

For a tank with dip (or snorkel) tube, the heat transfer between the stored tank water and the water flowing inside the dip tube is usually small compared to the heat capacitance rate of the water flowing through the tube. In this case the temperature of the water supplied to the heat pump inlet pipe, or the load, must be the tank temperature at the dip (or snorkel) tube inlet (not its connection to the tank). Evidence of any dip (or snorkel) tubes must be included in tank drawings supplied.

Units

The units system used in TRNSYS is m, kg, h and kJ. All energy transfer rate parameters must be converted from W to kJ/h (multiply Watts by 3.6 to get kJ/h).

Heat Pump sensor location

The tank is modelled as a stratified tank with 10 or 20 nodes of equal height dividing up the tank volume. The tank node corresponding with the position of the heat pump control sensor must be calculated and updated in the TRNSYS deck input file.

The top node is output number 22. The bottom node is number 23. For a 10-node tank, nodes i = 2 to 9 are output number = 22+i, where i = 1 is at the top and i = 10 is at the bottom.

For example, if there is 145L volume above heat pump temperature sensor in a 300L tank, then the fractional volume above = 145/300 = 0.48. Therefore, the node number = 0.48*10 = 4.8. This is rounded up to the next whole integer; i = 5. The output number = 22+5 = 27.

In the deck this would be written as:

Eqn 1

Tcontrol = [60,27]

Heat Pump Performance Data

- If the heat pump unit has been tested according to AS/NZS 5125.1, use either of the following templates:
  - HP_Integral_5125.dck (for integral heat pumps)
  - HP_Standalone_5125.dck (for stand-alone heat pumps)
- Power and COP coefficients are to be taken from the AS/NZS 5125.1 test report.

- For stand-alone heat pumps, ensure that the temperature difference between the water and ambient ((Tin-Tamb) or (Tave-Tamb)) corresponds with the set of Power and COP coefficients used, and the equation in the "Heat pump" section of the TRNSYS input file is consistent with this.

```
*heat pump average temperature

Tave = ([12,1]+[22,1])/2

Tin = [12,1]

*Use (Tin-Tamb) OR (Tave -Tamb) for dT1 as per AS/NZS5125 test report

dT1 = Tin - Tamb
```

- If the heat pump unit has been tested according to EN 14511, then use one of the TRNSYS templates utilising the Type 42 air-to-water heat pump component. This includes all templates except the "HP_integral_5125.dck" and "HP_standalone_5125.dck", which use testing from AS/NZS 5125.1.

Required heat pump performance data is heating capacity, and power consumption. Data can be provided for up to 10 ambient air temperature points, and up to 5 entering water temperature points. Performance data will be linearly interpolated between points during the simulation, but no extrapolation will occur. Conditions outside the range of provided data will be at the constant value of the outer limit.

If the lowest air temperature tested is above the minimum air temperature in the weather files, an additional set of data points must be provided manually, using linear extrapolation for each water temperature, based on the lowest two ambient temperature data points, to calculate the heat pumps performance at the minimum air temperature required for modelling, which is below the low temperature test point conditions.

In the tables below, an example for capacity (C($T_{ambient}$, T_{water})) and power (P($T_{ambient}$,T_{water})) and resulting data file format is shown. The ambient and water temperature points do not need to be equally spaced, but data must be provided for the ranges:

$$T_{\mathrm{w,min}} \leq \text{Entering water temperature} \leq T_{\mathrm{w,max}}$$

$$T_{\mathrm{a,min}} \leq \text{Ambient air temperature} \leq T_{\mathrm{a,max}}$$

where $T_{w,min}$ is the minimum tested water temperature; $T_{w,max}$ is the maximum tested water temperature; $T_{a,max}$ is the maximum tested air temperature; and $T_{a,min}$ is the minimum air temperature in the weather files for the zone(s) in which incentives are going to be claimed (the minimum across all weather files).

Table A.1 Heat capacity data for a map of ambient and entering water temperatures (Ambient air temperatures (˚C))

Entering Water Temp (˚C)	Ambient air temperature (˚C)									
	-5	0	5	10	15	20	25	30	35	40
20	C(20,-5)	C(20,0)	C(20,5)	C(20,10)	C(20,15)	C(20,20)	C(20,25)	C(20,30)	C(20,35)	C(20,40)
30	C(30,-5)	C(30,0)	C(30,5)	C(30,10)	C(30,15)	C(30,20)	C(30,25)	C(30,30)	C(30,35)	C(30,40)
40	C(40,-5)	C(40,0)	C(40,5)	C(40,10)	C(40,15)	C(40,20)	C(40,25)	C(40,30)	C(40,35)	C(40,40)
50	C(50,-5)	C(50,0)	C(50,5)	C(50,10)	C(50,15)	C(50,20)	C(50,25)	C(50,30)	C(50,35)	C(50,40)
60	C(60,-5)	C(60,0)	C(60,5)	C(60,10)	C(60,15)	C(60,20)	C(60,25)	C(60,30)	C(60,35)	C(60,40)

Table A.2 Power consumption data for a map of ambient and entering water temperatures

Entering Water Temp (˚C)	Ambient air temperature (˚C)									
	-5	0	5	10	15	20	25	30	35	40
20	P(20,-5)	P(20,0)	P(20,5)	P(20,10)	P(20,15)	P(20,20)	P(20,25)	P(20,30)	P(20,35)	P(20,40)
30	P(30,-5)	P(30,0)	P(30,5)	P(30,10)	P(30,15)	P(30,20)	P(30,25)	P(30,30)	P(30,35)	P(30,40)
40	P(40,-5)	P(40,0)	P(40,5)	P(40,10)	P(40,15)	P(40,20)	P(40,25)	P(40,30)	P(40,35)	P(40,40)
50	P(50,-5)	P(50,0)	P(50,5)	P(50,10)	P(50,15)	P(50,20)	P(50,25)	P(50,30)	P(50,35)	P(50,40)
60	P(60,-5)	P(60,0)	P(60,5)	P(60,10)	P(60,15)	P(60,20)	P(60,25)	P(60,30)	P(60,35)	P(60,40)

The data from these tables must be normalised by the rated capacity and rated power at a selected rating ambient air temperature, T_{a_rate}, and rating entering water temperature, T_{w_rate}.

$$\bar{C}(T_{water}, T_{ambient}) = \frac{C(T_{water}, T_{ambient})}{C(T_{w\,rate}, T_{a\,rate})}$$

$$\bar{P}(T_{water}, T_{ambient}) = \frac{PT_{water}, T_{ambient}}{P(T_{w\,rate}, T_{a\,rate})}$$

Data file input format (example file "HP_Data.dat"):

20 30 40 50 60 !entering water temperatures

-5 0 5 10 15 20 25 30 35 40 !ambient temperatures

$\bar{C}(20,-5)$ $\bar{P}(20,-5)$! normalised capacity and power at 20C entering water, -5C ambient

$\bar{C}(20,0)$ $\bar{P}(20,0)$! normalised capacity and power at 20C entering water, 0C ambient

$\bar{C}(20,5)$ $\bar{P}(20,5)$! normalised capacity and power at 20C entering water, 5C ambient

…… (skipped lines)

$\bar{C}(20,40)$ $\bar{P}(20,40)$! normalised capacity and power at 20C entering water, 40C ambient

$\bar{C}(30,-5)$ $\bar{P}(30,-5)$! normalised capacity and power at 30C entering water, -5C ambient

$\bar{C}(30,0)$ $\bar{P}(30,0)$! normalised capacity and power at 30C entering water, 0C ambient

…… (skipped lines)

$\bar{C}(30,40)$ $\bar{P}(30,40)$! normalised capacity and power at 30C entering water, 40C ambient

…… (skipped lines)

$\bar{C}(60,40)$ $\bar{P}(60,40)$! normalised capacity and power at 60C entering water, 40C ambient

Save the performance data file as "Brandname_ModelNo_HPMap.dat".

In-direct systems

Choose the ExternalHX TRNSYS template deck file. The user must define the UA value of the external heat exchanger between the storage tanks and the load supply. The default overall heat transfer coefficient for water-water HX is 1000 W/m^2/K. The user may change this value with supporting evidence and also provide the heat exchanger area.

A.3 Variable thermostats

Products with variable thermostats which facilitate user override are acceptable. The thermostat should be set at the temperature that is stated in the control declaration. Please ensure the modelling

- is conducted on the systems default setting, unless the system does not reset after boost mode (refer Section **Error! Reference source not found.**)
- accounts for any auxiliary boosting regime
- settings are within the range of settings available for the actual product
- achieves the following related Australian Standards requirements
  - minimum delivery temperature of 45˚C is achieved, and
  - products must comply with legionella requirements under AS 3498 for all settings.

Settings must be clear and consistent across the test reports, control declaration and the User Manual.

ⓘ **Note**: If a user manually activates boosting and the system resets to its default boost mode within 24 hours, that manual boost can be ignored in modelling. If it doesn't reset automatically, the boosted mode must be treated as active in modelling.

A.4 Load delivery

The system must report the minimum delivery temperature under the selected load as specified in AS/NZS 4234. The purpose of this requirement is to ensure the consumer has sufficient hot water through periods of low solar gain or low ambient temperatures.

Water heaters must be capable of delivering all hot water above 45˚C. Products with large deadbands may be at risk of failing to meet this requirement. If your product has a large deadband that would allow the temperature to fall below 45˚C, you must provide information that describes how the product can still meet this requirement.

The modelling procedure allows for the use of auxiliary boosting to meet this requirement.

A.5 User controlled boosting

The input parameters and control strategies used to calculate the annual energy use for step 2 in the method in Appendix Aare subject to modification if the product allows users to manually boost the heating capacity.

User controlled boosting allows a user to manually override the default boost mode to satisfy a short-term high demand for hot water. This feature may only operate once per day.

Where the system:

- automatically resets to the default boosting mode within 24 hours of the user changing it, the boosting can be ignored.

- does *not* automatically reset to the default boosting mode within 24 hours of the user changing it, the boosting mode activated by the manual control must be considered always active.

A.6 Presentation of results

Results from your modelling and the associated test reports must be entered into TESSA accurately. You must enter values for all relevant fields.

All values must be rounded to 2 decimal places.

Total thermal capacity is the sum of the thermal capacity of all heat pumps and booster elements. For example, a system comprised of a 60kW heat pump and a 10kW electric element would have a total thermal capacity of 70kW.

A.7 Refrigerant Global Warming Potentials (GWP)

A list of refrigerants (including alternative refrigerants) and their global warming potential (GWP) values can be found in the Intergovernmental Panel on Climate Change (IPCC) fourth assessment report, 2007 and the Department of Climate Change, Energy, the Environment and Water website.

B AS/NZS 5125 reporting requirements

When testing heat pump water heaters, Appendix F of AS/NZS 5125 specifies the minimum data reporting required in the test report. Test reports must have Coefficient of Performance (**COP**) and power graphs that are consistent with the values submitted in the TRNSYS modelling.

Test reports should include the "Start and Finish Point Measured Data" from the test to show the end temperature of the test and prove the heat pump can heat up water temperature appropriately.

Clause F6.2 of AS/NZS 5125 requires graphs of measured values (test) against the values established through regression analysis are included in the report. Measurements should be linear. The regression must be a reasonable representation of actual performance and the reported regression r-squared value. If there are any outliers or significant differences this must be clearly explained in the test report. The graphs must show appropriate behaviour for the products submitted.

Where issues are found we may request further information, get test data directly from the labs, or require products to be re-tested. If issues cannot be resolved, we may refuse your application.

Examples are shown below.

Figure 1. Example COP regression graph

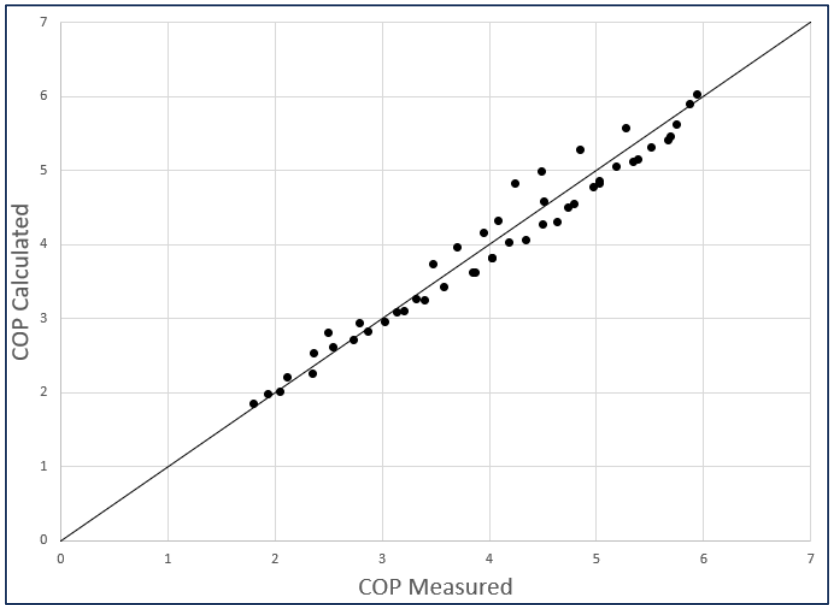
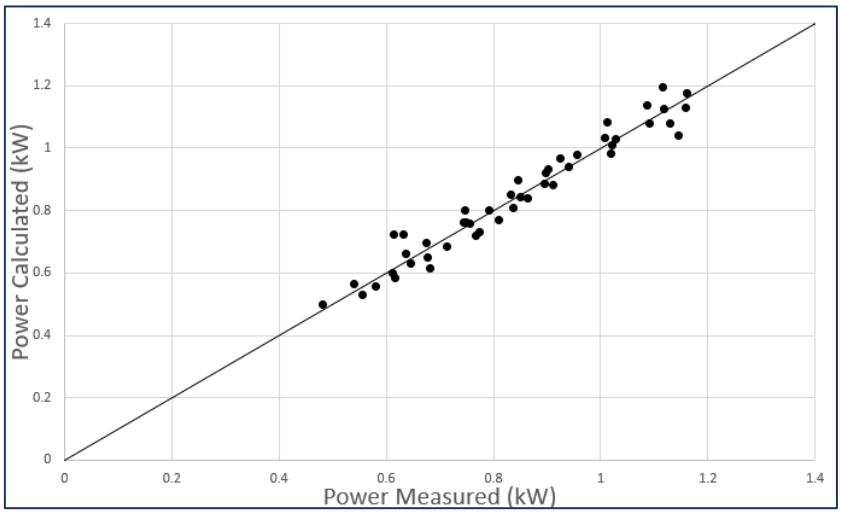


Figure 2. Example Power regression graph



C Controller Declaration template

Below is a completed example of the mandatory declaration for water heaters. See section 2.3.1 for details and explanation of the required information.

The Controller Declaration must be submitted on TESSA with your application.

Instructions to use this template:
To use this template, you will need to:

- submit a user manual that is clear and consistent with installation and settings listed below
- provide details and attach any additional information with further descriptions (where relevant)
- complete the relevant sections of the form
- have the form signed by an authorised signatory for the applicant (as designated in TESSA). If the applicant is not the original equipment manufacturer, the applicant has a legal duty to exercise due diligence and confirm the provided information in this declaration form is correct. The applicant is responsible to abide by the relevant laws and regulations, including and not limited to the NSW Energy Savings Scheme Rule of 2009, in their business practice
- provide proof that the signatory is authorised by the company
- the original equipment manufacturer is the name of the company that manufactures the products
- use the available copies (#1 - #4) of this declaration form if different products in the application have different settings and features.

TESSA Account/Applicant Name:	Water Heaters Pty Ltd
Product Type:	Commercial and industrial heat pump water heater (F16/F17)
Original Equipment Manufacturer:	ABC Heaters Inc
Application for State:	NSW only
Application Details:	
Number of products:	6
Brand(s) & Model Number(s):	*Note: it's recommended to include up to 4 product model numbers per application for products that have unique modelling, and up to 8 product model numbers for products that share modelling.*

#	Brand Name	Model Number
1	Water Heaters	300L-W
2	Water Heaters	500L-W
3	Smart Water Heaters	300L-S
4	Smart Water Heaters	500L-S
5	Global Water Heaters	300L-G
6	Global Water Heaters	500L-G

1. Product operation and control logic (complete applicable fields and provide details where required):

a) Heat pump type is:	Non-Integrated
b) Heat pump (refrigeration cycle only) ambient temperature operating range: minimum:	-10 °C to a maximum: 45 °C
c) Heat pump operation is controlled by:	Hot water setpoint value
d) Default controller operating mode:	Standard
e) Default temperature setpoint:	Fixed (specify value in cell) 65 °C
f) Default temperature setpoint deadband:	Other (provide details below) °C Varies depending on month: 10 (Jan-Jun), 15 (Jul-Dec)
g) Describe pump operation and modulation:	Pump maintains constant outlet water temperature from heat pump at 65C

2. Booster operation and control logic (complete applicable fields and provide details where required):

a) Product is equipped with a booster:	Electric element
b) Simultaneous operation of product and booster is:	Not allowed
c) Booster operation is controlled by:	Hot water setpoint value Element operates outside heat pump operating range
d) Default temperature setpoint:	Fixed (specify value in cell) 75 °C
e) Default temperature setpoint deadband:	Fixed (specify value in cell) 5 °C

3) Legionella control:

a) Compliance to AS 3498 is achieved by:	Heating at least 45% of the stored water volu
b) Legionella control is achieved by heating the stored water using:	
i) Heat pump (refrigeration cycle):	Yes
ii) Booster:	No
iii) Other *(provide details)*:	

4) Control flexibility:

a) For sections 1, 2 & 3, users can:	
i) Change operating settings:	Yes
ii) Settings revert to factory default:	Yes (provide details) Revert every: 24 hrs

Clauses 61 and 130 of Schedule 4A to the *Electricity Supply Act 1995* imposes a maximum penalty of $11,000 and/or 6 months imprisonment for knowingly providing false or misleading information to the Scheme Administrator in NSW.

On behalf of Water Heaters Pty Ltd, I confirm that the information I have provided is complete and accurate. I am aware that there are penalties for providing false and misleading information in this form.

Signature	Sign digitally
Name	John Smith
Position	R&D Manager
Company	Water Heaters Pty Ltd
Date signed	20/06/2025

X _____