Nationwide House Energy Rating Scheme

Software Accreditation Protocol - New Homes 2025

Version 20241122

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Enquiries about the protocol and the reaccreditation process can be directed to:

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Version (YYYYMMDD)	**Amendments / actions**
20241122	SAPs Thermal and Whole of Home have been combined into a single document. SAP NCC 2025 excludes "new accreditations", instead focussing on reaccreditation and minor updates. Added a note about non accredited mode (section 2). EOI step has been removed from section 3, this is a reaccreditation only SAP. Whole of Home accuracy requirements: integer tolerances have been specified in addition to percentage tolerances (Table 2). Apartment centralised services testing scenarios added to Whole of Home (Table 13, Table 14, Table 15, Table 16), this is a holding text until release of centralised services method, it is expected to remain much the same when final, (noted 18.09.2024). This SAP only applies to software tools using the Chenath Engine (section 2.2.1)

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1. Introduction

This document is the overarching document for the Nationwide House Energy Rating Scheme (NatHERS) Software Accreditation Protocol (SAP) for new homes. The SAP is a series of documents which provide the necessary requirements for software tools to model energy ratings and obtain and maintain accreditation under NatHERS. Software (or Tool) Providers must comply with these to become accredited for assessments.

The SAP includes two streams:

- Thermal - the software tool requirements to generate an energy rating based on the shell of a dwelling and the estimated energy use for heating and cooling.
- Whole of Home (appliances and systems) - builds on the thermal rating and focusses on the software tool requirements to generate a Whole of Home score based on the home's appliances (heating and cooling appliances, hot water systems, lighting, pool/spa pumps, cooking and plug loads) and systems (on-site energy generation and battery storage).

This document must be read in conjunction with:

- all governance and technical documents referred to in Section 5 below and
- any additional information specified by the NatHERS Administrator (NA).

1.1. Background: NatHERS software energy rating streams

Thermal star rating

The calculations are based on the estimated heating and cooling energy needed to maintain comfort (thermal performance). This is determined by the dwelling's design, construction materials, climate, and assumptions about how the building is used and occupied.

CSIRO's Chenath Engine is the underpinning calculation engine that NatHERS accredited software tools link to or need to align with, significant calculations are performed in the accredited software tool.

Whole of Home score

The Whole of Home performance calculations occur in the backend of accredited software tools in accordance with the NatHERS Whole of Home Calculations Method (the Method) and rely on outputs of the Chenath Engine.

The calculations estimate the:

- energy consumption of fixed appliances including heating and cooling appliances, hot water systems, cooking, lighting and pool and spa pumps and
- energy production and storage of systems of on-site energy production from photovoltaic (PV) cells and associated battery storage.

NatHERS Certificate

NatHERS accredited software tools produce an energy rating report in the form of a NatHERS certificate (by accredited assessors) or a rating report (by a non-accredited assessor i.e. rater), which can be used to:

- ensure the residential dwelling meets the mandatory energy efficiency requirements for new homes and major renovations under the National Construction Code (NCC)
- compare the energy efficiency of various home designs
- advise prospective home buyers about the thermal performance of a home.

1.2. Using this document

This document is for software providers seeking software reaccreditation or implementing updates to their accredited software. Prospective providers seeking accreditation for new software must contact the NatHERS Administrator for further information.

Reaccreditation

Reaccreditation is undertaken to maintain alignment across the tools. It occurs every three years and typically aligns with the three-yearly updates of the NCC. The process usually includes major updates such as changes to the climate files and the addition of new building features.

Minor updates

Updates and fixes are implemented by accredited tools from time to time to facilitate innovation and amend minor errors. The rating impact of these must be limited so as not to substantially alter existing regulatory arrangements. Minor updates are often initiated by the software provider, but sometimes in response to issues identified by other parties.

2. Mandatory inputs, outputs and conditions of NatHERS accredited software

This section provides the accuracy requirements, a summary of key data sets, calculation rules and materials which need to be incorporated, applied and generated by software tools.

To understand the accreditation process, software providers must read this Protocol in conjunction with documents listed in Section 5: Information sources, and other documents specified by the Administrator.

Accredited mode

To comply with requirements under the NCC, energy efficiency ratings must be calculated by NatHERS accredited software tools run in accredited mode (also referred to as regulation mode). This ensures calculations for energy ratings are accurate, representative of Australian conditions and comparable across NatHERS accredited tools, different types of dwellings and locations.

NatHERS accredited software tools may also have non-regulatory modes of operation for the purpose of providing additional information and functionality for users, for example for research purposes. These non-regulatory modes of operation are not covered by this Protocol and are not to be supported by tool providers as a tool for NCC compliance.

2.1. Software accuracy requirements

The consistency and accuracy of thermal (Table 1) and Whole of Home performance (Table 2) ratings is fundamental to the objectives of NatHERS.

2.1.1. NatHERS new home benchmark tool

Results must be accurate across a range of dwellings and produce results consistent with the benchmark tool AccuRate Home for new homes.

2.1.2. Thermal accuracy requirements

For reaccreditation, software tools must be tested against the benchmark tool using 6 NatHERS dwelling designs in all 69 NatHERS climate zones. The reaccreditation accuracy requirements are set out in Table 1.

Table 1: Reaccreditation accuracy requirements - thermal

Condition		Parameter	Specification
	Condition 1	≤ ±3 %	Conditioned floor area tolerance. (The reported floor area is measured up to the inside edge of the dimensioned wall).
AND	Condition 2	100%	Heating load difference: ≤ ±10 % or ≤ ±10 MJ/m^2 p.a. AND Cooling load difference: ≤ ±10 % or ≤ ±10 MJ/m^2 p.a.

Condition		Parameter	Specification
AND	Condition 3a	≥ 95%	Heating load difference: ≤ ±5 % or ≤ ±5 MJ/m^2 p.a. AND Cooling load difference: ≤ ±5 % or ≤ ±5 MJ/m^2 p.a.
	OR		
	Condition 3b	≥ 95%	≤ ±0.2 stars
AND	Condition 4	≤ 75%	Limited simulation bias - less than 75% of star ratings shall exceed the benchmark results

2.1.3. Whole of Home accuracy requirements

For reaccreditation software tools must be tested by simulating the relevant dwellings, climate zones and Whole of Home scenarios (section 4.3). The accuracy requirements for reaccreditation are detailed in Table 2. The tolerances include both percentages and integers (e.g. kWh including converted MJ values).

Table 2: Reaccreditation accuracy requirements - Whole of Home

Module[a]	Maximum tolerance	
	Condition 1 100% of all simulations	Condition 2 95% of all simulations
Heating electric	10% or 20 kWh	5% or 10 kWh
Heating gas	10% or 20 kWh	5% or 10 kWh
Heating wood	10% or 20 kWh	5% or 10 kWh
Cooling	10% or 20 kWh	5% or 10 kWh
Hot water gas	10% or 20 kWh	5% or 10 kWh
Hot water electric	10% or 20 kWh	5% or 10 kWh
Lighting	10% or 20 kWh	5% or 10 kWh
Pool	10% or 20 kWh	5% or 10 kWh
Cooking gas	10% or 20 kWh	5% or 10 kWh
Cooking electric	10% or 20 kWh	5% or 10 kWh
Plug load	10% or 20 kWh	5% or 10 kWh
Solar PV generation	10% or 20 kWh	5% or 10 kWh
Total electric	10% or 20 kWh	5% or 10 kWh
Total gas	10% or 20 kWh	5% or 10 kWh
Total wood	10% or 20 kWh	5% or 10 kWh
Import electric	10% or 20 kWh	5% or 10 kWh
Export electric	10% or 20 kWh	5% or 10 kWh
Net electric	10% or 20 kWh	5% or 10 kWh
Energy value	10% or 20 dollars	5% or 10 dollars
Whole of Home rating	5	2

[a] Where a value is not displayed in the software tool, it may be inferred by applying alternative metrics

2.1.4. Minor updates for thermal and Whole of Home

For minor updates, two processing pathways are available:

- Simulation method — where the accuracy requirements are compared against the most recently released tool version. The accuracy tolerances are set out in Table 3.
- The proposal and preliminary impact assessment as outlined in the ABCB Protocol for the development of National Construction Code referenced documents -- Nationwide House Energy Rating Scheme (NatHERS) Supplement.

Table 3: Minor change rating divergence limits

Percentage of simulations	Star rating tolerance	Whole of Home score tolerance
100%	≤ ±1 star	≤± 10 points
99%	≤ ±0.2 stars	≤± 2 points

2.2. Thermal provisions

2.2.1. Chenath Engine

This SAP only applies to software tools using the Chenath Engine and addresses requirements for software tools which directly link to and use the CSIRO Chenath Engine. The Chenath Engine performs the majority of calculations required to produce a thermal energy rating.

CSIRO maintains and improves the Chenath Engine and makes it available to link to other NatHERS software tools. The Chenath Engine integrates inputs from front-end software to calculate and produce energy ratings.

Front-end software tools intending to use the Chenath Engine must be capable of:

- producing a scratch file to be sent to the Chenath Engine
- converting the Chenath Engine output text files into an adjusted energy load.

The front-end software tool must also have a valid Chenath licence with CSIRO to be accredited.

The key roles of front-end software tools versus the Chenath Engine for desktop software are summarised in Table 4.

The Chenath Repository (https://hstar.com.au/Home/Chenath) provides an open-source library of key documents, including methodologies, algorithms and rules implemented in AccuRate and the Chenath Engine. Further documents and how to obtain them are listed in Section 5.

Note: Any change to the Chenath Engine that is approved by the NatHERS Steering Committee for release may result in new benchmark results. Where the rating changes are outside the minor update tolerances, accredited software tools may need to meet these new results as requested by the NatHERS Administrator, by retesting as outlined in Section 3, in order to comply with NatHERS software tool accuracy requirements.

Table 4: Key thermal inputs and behavioural settings

Inputs and behavioural settings	What does the accredited software tool do?	What does Chenath do?	More information
Climate zones and weather data			
NatHERS climate zones and weather data NatHERS divides Australia into 69 regions, or climate zones, with similar climatic conditions. For each NatHERS zone there is corresponding hourly climate data for meteorological variables of temperature, humidity, wind speed and solar radiation over a one-year period. The climate data, which is representative of average climatic conditions, allows the energy performance of a building to be simulated for any given location.	• Stores NatHERS climate zone files (unique zone ID number, town/city, postcode, longitude and latitude) — provided by NatHERS • Stores hourly weather data files (*.txt file) — provided by NatHERS • Writes appropriate weather file name to scratch file • Allows Chenath to access weather data	• Reads weather file name and path from scratch file • Accesses the weather file content from the front-end software for simulation	• Interactive NatHERS Climate Zone Map • Postcode to climate zone look-up table
Operational behaviours			
Internal heat loads NatHERS has set assumptions on internal heat loads and the consequent need for active heating and cooling. The heat loads include latent heat (related to the change in moisture content in the air) and sensible heat (generated by occupants, cooking, lighting and electrical appliances not related to the change in the moisture content in the air). NatHERS accredited software tools must calculate the heat load for each hour in each dwelling zone.	• Calculates hourly internal heat loads for each dwelling zone • Writes data to scratch file	• Reads hourly internal heat loads for each dwelling zone from scratch file for simulation	• Hstar portal – heat load tables

Inputs and behavioural settings	What does the accredited software tool do?	What does Chenath do?	More information
Occupancy hours thermostat settings NatHERS requires all spaces to be identified as conditioned or unconditioned zones, based on the function of the space (how it is occupied), for example: living area, bedroom and laundry. This enables appropriate thermostat settings to be allocated to each dwelling zone. **Thermostat settings** NatHERS has thermostat settings for heating and cooling at temperatures that people feel comfortable. NatHERS accredited software tools must incorporate hourly heating and cooling thermostat settings to maintain each zone's unique thermal comfort level. **Adjustable shading** NatHERS accredited software tools must apply standardised schedules of indoor and outdoor adjustable shade settings. These settings are derived from the likely operation of shading devices during particular times of the day, under particular weather conditions.	• Stores occupancy constants library (occupancy hours, thermostat settings, shading device operation rules for each climate zone and dwelling zone) – original *.dat files provided by CSIRO) • Determines occupancy-related data for each dwelling zone • Writes occupancy data to scratch file	• Reads occupancy data for each dwelling zone from scratch file for simulation	• Hstar portal – thermostat settings
Infiltration calculations NatHERS calculates hourly air changes for each dwelling zone. These are influenced by the terrain, dwelling height above ground, number and nature of ceiling penetrations, windows and doors, and the characteristics of the roof and sub-floor spaces.	• Calculates infiltration parameters for each dwelling zone • Writes infiltration parameters to scratch file	• Reads infiltration parameters from the scratch file for simulation	• Infiltration Calculations in AccuRate, Dong Chen, CSIRO
Wind pressure coefficient (C_p) This measures the wind pressure on an opening relative to the dynamic wind pressure based on the dwelling footprint, dwelling height, wind direction, wall orientation and associated wing walls.	• Calculates the c_p values for the scratch file	• Uses the c_p values and other related information to calculate the air flow rate through openings	• Calculation of c_p values for scratch file

Inputs and behavioural settings	What does the accredited software tool do?	What does Chenath do?	More information
Physical items			
Thermal properties of building materials NatHERS accredited software tools must use standard thermal resistance and thermal capacitance data for all materials, as outlined in *Material Properties Used in NatHERS Software Tools*. "Materials" include normal materials, insulation (bulk) materials and air gaps. These materials are generic and the inclusion of a material/product by a commercial name is generally not supported. However, if a generic material cannot be selected and a product or material needs to be considered for inclusion, please refer to the *Process for including (the properties of) new materials into NatHERS accredited software*.	• Stores materials library file - original *.csv file provided by CSIRO • Writes material number and thickness to scratch file	• Stores materials library file (binary format) • Reads materials itemised in scratch file and matches this with the material properties in the binary format library, for simulation	•
Windows NatHERS accredited software tools must be able to incorporate data from two windows libraries. **NatHERS default windows** The original default windows library consists of 136 generic windows that can be used when the full information about the windows of a dwelling are not available at the time of rating. **WERSLink default window library** The windows available in this library are specific windows available on the Australian market. Each window has been tested and approved using Australian Fenestration Ratings Council (AFRC) protocols. **WERSLink custom window library** The WERSLink custom window library is regularly updated by the Australian Glass & Window Association (AGWA) and needs to be updated by software tools on a regular basis.	• Stores default and custom windows libraries as *.csv files. ○ CSIRO provides default windows library ○ AFRC provides custom windows library • Writes window system ID and corresponding windows features to scratch file	• Stores default and custom windows information in binary format libraries • Reads window library name (default or custom) and window system ID in scratch file and matches this to corresponding window in one of the binary format libraries	•
Getting results			
Total energy load NatHERS software must calculate the total average energy load, and the average heating and cooling loads over the total conditioned floor area, in MJ/m^2 per annum.	• Nil	• Calculates energy loads based on inputs and provides numbers to front-end software tools.	

Inputs and behavioural settings	What does the accredited software tool do?	What does Chenath do?	More information
Area correction factor Once Chenath has calculated the energy loads, NatHERS software tools must apply an area correction factor. This accounts for the difference in total building surface area to floor area ratio in small versus larger dwellings, as well as dwellings with a partially shared external envelope (walls, floors or ceilings), by ensuring the heat transfer through the building fabric is proportionate to the total building surface area and that smaller dwellings are fairly compared with larger ones.	• Calculates adjusted total energy load (applies area correction factor formula)	• Nil	• Microsoft Word - AreaAdjustment 20110127.doc (hstar.com.au) • Automatic Zone Volume Calculation and Simple Roof Space Generation (hstar.com.au)
Star rating The NatHERS star ratings range (zero to ten stars in 0.1 star increments) for each climate zone is called a starband. A total adjusted energy load (MJ/m^2 p.a.) has been determined for each 0.1 star increment for each NatHERS climate zone. This information is provided in a starbands conversion table. NatHERS accredited software tools must determine the total adjusted energy[b] load (MJ/m^2 p.a.) and convert this into a star rating using the starbands conversion table. This enables a fair comparison of buildings in different regions despite the variability in weather conditions across Australia.	• Determines the star rating based on the total adjusted energy load provided in the starbands conversion table.	• Nil	

2.2.2. Fixed data sets - thermal

Accredited mode requires software tools to demonstrate they incorporate, at a minimum, data sets (i.e. fixed inputs and calculations) including:

- NatHERS climate zones and weather data
- postcode climate zone master list
- internal heat loads
- occupancy hours, thermostat settings and adjustable shade settings
- thermal properties of building materials
- default window libraries: WERSLink and NatHERS
- custom window library: WERSLink
- infiltration calculations
- area correction factor

[b] Including ceiling fan wattage

- starbands conversion table
- ceiling fan settings
- C_p (wind pressure coefficient) values
- openings and perforation factors
- NatHERS new home software standardisation document

For additional features not listed above, see the latest version of the NatHERS Technical Note. This includes building orientation, terrain exposure, external sun obstructions, internal zoning and associated conditioning, floor and wall types, windows and shading and thermal bridging.

2.3. Whole of Home provisions

2.3.1. Whole of Home Calculation Method (the Method)

The Method provides the equations and assumptions that support the modelling of energy performance, as well as context and explanations as to how these settings were derived.

2.3.2. Whole of Home appliances and systems

To calculate the Whole of Home performance, the estimated heating and cooling energy use from the thermal performance calculation is combined with the estimated energy consumption of appliances and the potential of on-site energy production from photovoltaic (PV) cells and associated battery storage. The Whole of Home appliances and systems include:

- heating and cooling
- hot water systems
- lighting
- pool/spa pumps (and heating in the future)
- plug-in appliances
- cooking and
- on-site solar energy generation and storage.

2.3.3. Modules and calculations

The Whole of Home front-end software must be capable of applying the Chenath Engine energy load outputs and apply equations and assumptions for each of the modules as provided in the Whole of Home Method. A summary of the occupancy settings is provided in Table 5 and the modules and their components are provided at Table 6.

Table 5: Whole of Home occupancy settings

Elements	Comments
Number of occupants	Based on total floor area, excluding garage
Patterns of occupation	Two profiles: all day and workday
Calculation of Whole of Home performance using the two occupation profiles	The process of blending the two thermal outputs together for a single thermal profile

Elements	Comments
Thermostat settings	Heating and cooling defined for 8 NatHERS thermal zones
Pattern of conditioning	Daytime and night-time conditioning based on occupancy profiles
Internal heat gains	Hourly sensible and latent heat gains based on people, lights, cooking and appliances
Ventilation	Opening and closing of doors and windows based on occupancy profiles
Shading	Operation of operable shade devices as defined in the Chenath scratch documentation

Table 6: Whole of Home modules and module components

Modules	Components	Comments
Heating and cooling	Default appliances	Heating and cooling device types based on fuel type, and energy consumption and efficiency
	Hourly loads	Calculated by Chenath based on occupancy profiles and appliance type
	Energy use	A function of the hourly energy use and load for a zone, coefficient of performance for the specified appliance and system loss
	Appliance demand	Sum of the load in each zone (hourly) for the specified appliance
	Zones without specified conditioning devices	Apply relevant heating and or cooling devices
	Under-sized units	Determination of whether appliance demand exceeds known appliance size for specified efficiency. For assessor guidance
	Apartment centralised heating and cooling	Based on the NatHERS apartment centralised services method
Hot water	Hot water demand	Number of occupants multiplied by nominal litres per person per day
	Location	Heating technology and postcode determine the location zone grouping (1 to 5)
	Hot water system type	Category based on fuel type and storage vs tankless operation
	Energy calculation	Function based on hot water demand, location and hot water system type
	Solar PV diverters	Function for calculating energy flows for electric hot water systems that employ a solar PV diverter as a primary operating function. The HWS becomes a pseudo battery (stores energy as hot water rather than electricity)
	Apartment centralised hot water	Based on the NatHERS apartment centralised services method
Lighting	Annual load	A function of Watts per square metre, average hours use per day and total floor area, not including garage
	Hourly load	Based on the number of hours per day (reflecting monthly factor) lights are assumed to be on

Modules	Components	Comments
Pools and spas	Pool volume	Actual or estimated (based on surface area) volume
	Base pump size	Base size (kW) correlated with pool size
	Pump energy	A function of pump size and efficiency (single, dual, multiple speed)
	Energy Star rating	Star rating for a pool pump, issued under GEMS
On-site energy generation and storage	Solar PV	A function to calculate annual electricity generation in kilowatt hours (kWh) based on array size, orientation and inverter capacity (kW).

2.4. Special exemptions

Software providers may apply for an exemption from modelling a particular dwelling feature. To be eligible, either:

- the software provider must demonstrate that the level of impact is minor, i.e. can be absorbed by standard SAP tolerances or, if this is not possible
- the software may need to be excluded from particular features, and will be listed as an accreditation exemption as part of accreditation.

The Administrator will consult and analyse the impacts of option/s (e.g. relevant stakeholders, effectiveness, interim versus longer term solutions, timeframes, costs) and undertake a risk assessment/s. The Administrator will make a recommendation, which may be subject to NatHERS Steering Committee consideration where necessary. The special exemption process avoids software accreditation delays and provides rigour and transparency in decision-making. This process is outlined in the Standard Operating Procedure — Feature exemption application.

2.5. Conditional accreditation

Software may be eligible for conditional accreditation before full accreditation is achieved. Conditional accreditation is an option that allows tools to become accredited before being able to meet 100% of the SAP requirements. This allows software to be used for regulatory purposes in some, but not all the accreditation requirements. For example, a software may be conditionally accredited for thermal ratings and thermal certificates but not for Whole of Home ratings or Whole of Home certificates. Conditional accreditation terms will be agreed between the software provider and the Administrator.

Conditional accreditation will be confirmed in the software accreditation documentation and must also be declared on the software website and the NatHERS website.

2.6. NatHERS certificates, rating reports and stamps

NatHERS accredited software tools must be able to produce certificates and rating reports as outlined in Table 7. The documents must apply the specifications in the NatHERS certificate and Stamp Fields Specifications document and the design templates.

Table 7: Certificate, rating report and stamp requirements

Item	Accredited and non-accredited versions
Certificate	
Single dwelling - thermal	Required
Single dwelling - Whole of Home	Required
Class 2 summary - thermal only	Required
Class 2 summary - Whole of Home	Required
Class 1 summary - thermal only	Optional
Class 1 summary - Whole of Home	Optional
Stamp	
Single	Required
Class 2 summary	Required
Class 1 summary	Optional

NatHERS certificates and rating reports can be generated through the HSTAR online certification portal managed by the CSIRO (queries.hstar.accurate@csiro.au). Alternatively, the functionality of creating a NatHERS certificate can be embedded in the software tool's own portal. The certificates and rating reports and associated floor plans must be accessible to the Administrator or their agent and Assessor Accrediting Organisations (AAOs) for quality assurance purposes. The Administrator shall also be provided with access to generate certificates for the purpose of iterative testing.

Data of all NatHERS certificates and rating reports **must be** made available to CSIRO for inclusion on the Australian Housing Data website at https://ahd.csiro.au/ in accordance with the Terms and Conditions of software accreditation.

2.7. NatHERS accredited software tool terms and conditions

In addition to items raised above, further accreditation requirements are included in the Terms and Conditions. The intent of the Terms and Conditions is to protect the software provider and Administrator, define communication and data management and prevent incorrect or deceptive use of the software by users.

A software provider is required to adhere to the terms and conditions which, in summary, include:

- conditions or events which will end accreditation
- conditions for variation of agreement
- terms and conditions which a software provider must impose on users of the software when the software is used in accredited mode and non-accredited mode
- incorporating reasonable changes to the software tool
- software tool version management
- cyber security

- software user support
- restrictions on NatHERS certificate generation based on the accreditation status of the assessor
- cooperating with AAO quality assurance activities
- Administrator's access to data and software
- limitation of Administrator's liability and indemnity
- software provider's minimum insurance
- use of NatHERS trademark
- records management
- responsibility for costs
- confidentiality and privacy
- dispute resolution.

2.7.1. Requirements imposed on licensed software users

To avert the incorrect or deceptive use of the software, the Administrator must have the ability to obtain from software providers appropriate and satisfactory information relating to an assessor's use of the software and creation of NatHERS certificates or rating reports.

The software provider must impose conditions on a licensed user as provided in the Terms and Conditions. This enables the Administrator or an AAO to conduct quality assurance, audits and investigations, and to pass on the findings to appropriate parties (state and territory authorities and regulators, local councils, building certifiers/surveyors, builders and architects, homeowners).

3. Steps to maintain accreditation

This section details the processes for reaccreditation or implementing minor updates. Testing details are provided at Section 4. In summary, the steps are:

- Preparation - section 3.1
  - Software provider: research and clarify requirements of reaccreditation and minor updates
- Test and submit - sections 3.2 and 4
  - Software provider: test the software and submit material
- Due diligence and feedback - section 3.3
  - Administrator: review the submission and provide feedback
- Follow-up + final submission - section 3.4
  - Software provider: respond to feedback from the Administrator, then submit the final package
- Decision and confirmation - section 3.5
  - Administrator: finalise accreditation
- Release software - section 3.6
  - Software provider: release software version.

3.1. Preparation — software provider

Reaccreditation

The software provider must work with the Administrator to familiarise themselves with proposed NCC and other software updates, as well as any revised requirements, conditions and processes of reaccreditation.

Minor updates

The software provider must liaise with the Administrator (who in turn may need to liaise with the Australian Building Codes Board) to:

- confirm the appropriate testing or other evidence to demonstrate compliance with rating divergence requirements and
- discuss the timeline for release, including any special requirements.

3.2. Test and submit — software provider

Precise software testing is required to ensure the software tool meets the accuracy requirements (Section 2.1). Testing materials and processes are detailed in Section 4.

In brief, the Administrator will:

- outline the testing requirements (dwellings designs and climate zones)
- confirm whether or not independent testing is required
- provide the test pack documentation and files.

Submission

When testing is complete, the software provider will submit the relevant material to the Administrator (admin@nathers.gov.au), listed in:

- Table 8 — Submission checklist – reaccreditation
  (Not all items need to be submitted simultaneously)
- Table 9 — Submission checklist - minor updates.

The Summary Class 1 and Class 2 certificates, rating reports and stamps, should be based on a minimum of two dwellings. The information may be drawn from:

- deidentified ratings in the software provider's archives/library or
- SAP dwelling 610 (one for Class 2 summaries) and SAP dwelling 200 for Class 1 summaries.

Table 8: Submission checklist — reaccreditation

Item	Reaccreditation
Test result spreadsheet and software rating file	Dwellings: ☐ 200TBV ☐ 200StLC ☐ 200StMC ☐ 200StBV ☐ 500 ☐ 610
Beta version of software	☐
NatHERS certificates accredited	☐ Single dwelling 500 ☐ Summary Class 2 ☐ Summary Class 1 (optional)
NatHERS stamps	☐ Single dwelling 500 ☐ Summary Class 2 ☐ Summary Class 1 (optional)
Rating report	☐ Single dwelling 500 ☐ Summary Class 2 ☐ Summary Class 1 (optional)
Rating files used to generate summary certificate/report/stamp	☐
Access to certificate portal	☐
Training manual / user guide	☐
Evidence of Chenath licence	☐
Terms and Conditions – in principle agreement and proposed draft amendments/customisations	☐
Any other material requested by the Administrator	☐

Minor updates

Table 9: Submission checklist – minor updates

Item	Rating method	Proposal and preliminary impact assessment method
Evidence to support compliance with divergence limits	Test results (for each dwelling) spreadsheet	Proposal to support "minor" update
Rating files	Rating files for each dwelling simulated	Only if and as requested by Administrator
Beta version of software	Yes	Yes
Minor update request form	Yes	Yes
NatHERS certificates and stamps	Only if and as requested by Administrator	Only if and as requested by Administrator
Access to certificate portal and capability to generate certificates	Only if and as requested by Administrator	Only if and as requested by Administrator

3.3. Due diligence and feedback — Administrator

The Administrator (or their agent) will undertake due diligence on the submitted documentation and software files. This may include:

- spot checking rating results provided in the testing results spreadsheet
- modifying corresponding features in the applicant's and benchmark rating files to compare results to determine rating congruence – the Administrator will work with the software provider to resolve any concerns
- ensuring the certificate and stamp fields are designed and populated correctly
- reviewing fixed data inputs.

The Administrator will outline outstanding issues requiring resolution from the software provider.

Minor updates

The process for minor updates is detailed in the Standard Operating Procedure: Minor Updates, available from the NatHERS Administrator upon request.

3.4. Follow-up and final submission — software provider

The software provider will address any outstanding issues identified by the Administrator. Where disagreement exist and concerns are unable to be resolved, the Administrator may initiate an independent verification process.

When all issues have been addressed, the software provider will submit any outstanding items listed in the table relevant to the particular accreditation process:

- Table 8: Submission checklist — reaccreditation
- Table 9: Submission checklist – minor updates.

3.5. Decision and confirmation — Administrator

Reaccreditation

Once the software tool satisfies the minimum NatHERS accreditation requirements (Section 2) the Administrator will notify the NatHERS Steering Committee (NSC). Where special conditions are stipulated, NSC approval may be required, which may influence the final decision. The Administrator (on behalf of the NSC) will then offer NatHERS software re/accreditation to the software provider. The Accreditation Notice (letter of offer) must be countersigned and the Terms and Conditions agreed to by the software provider in order for accreditation or reaccreditation to take effect.

Unsuccessful applicants can make modifications to their software tool and reapply by submitting new simulation results.

Minor updates

Once the submission has been reviewed by the Administrator, applications are forwarded to the Australian Building Codes Board (ABCB) for information. Subsequently, unless further queries have been identified, the Administrator will advise the software provider that they may proceed with releasing the new version of the software. The Administrator may stipulate special conditions, if any, including communications, release timeframe and transition timeframes. This will occur on a case-by-case basis, depending on the urgency of the update.

3.6. Release and phase out — software provider

Release new version

Any revisions, updates or new versions of NatHERS accredited software tools must be identified by a new version number.

The Administrator will work with the software provider to determine the timing and communications of the release of a new version of the NatHERS accredited software tool, including updating the NatHERS website. The most appropriate software release timelines and transitioning arrangements will depend on a number of factors, including the scale of the impact on NatHERS and the regulatory environment as the higher priority.

Where critical issues arise, meaning the impacts on NatHERS are critical or major, the cause must be addressed immediately or within a period specified by the Administrator. Examples of critical or major impacts include but are not limited to:

- the tool consistently overstates the star rating
- NCC regulatory requirements are breached
- evidence of fraudulent practices
- no workaround for critical functionality or critical data and/or
- misleading or incorrect information displayed on the certificate.

Where the impacts on NatHERS are negligible/low, the timing of the release of the new version is at the software provider's discretion. The impact is considered to be negligible/low if the new version or the update:

- does not affect accreditation requirements, ratings, regulatory requirements
- is a minor inconvenience only
- is of a cosmetic or typographical nature.

Transition rules

Software transition rules, which must be implemented by the software provider, will be specified by the Administrator. These include:

- Class 1 thermal performance rating can only be started in the latest version of the software.
- Class 2 thermal performance rating, if it is the first in the development, can only be started in the latest version of the software.

Exemptions may apply where the assessor has a written request from a regulator to use a retired version or where the Administrator has been advised of blanket exemptions agreed with jurisdiction building administrators[c].

Accessing retired versions

Superseded versions of the software tool will remain accredited as per the Accreditation Notice. It is however imperative to ensure assessors move immediately or as quickly as possible to the most current version of the software.

3.7. Period of accreditation and withdrawal of accreditation

Accreditation is granted to a major software tool version (including its minor versions resulting from minor updates) in accordance with the Accreditation Notice. Accreditation Notices are written confirmation granting NatHERS accreditation to a particular new major version as well as extending continued accreditation to retired versions.

The period of accreditation is generally three years. Where possible, the accreditation term and expiry will align with major updates associated with the NCC amendment cycle. However:

- the software provider may seek a 12-month extension of accreditation
- the Administrator may agree to extend the accreditation on the same or varied Terms and Conditions as appropriate.

[c] Both major and minor versions, when they are superseded by a new major or minor version become "retired". Retired versions can only be used for new ratings if the assessor has a written request from a regulator (the relevant certifier/building surveyor that will be certifying the documentation set for building approval), and should not be used for ratings not yet finalised wherever possible. Retired versions will be itemised in the new Accreditation Notice to ensure their long-term legitimacy.

Accreditation of a software tool version(s) may be withdrawn if:

- ownership or control of the software tool is transferred from the software provider to another entity, or
- the software provider or software tool breaches requirements set out in the Software Accreditation Protocol Terms and Conditions.

Further information: NatHERS Software Accreditation Terms and Conditions

3.8. Costs

The Administrator does not impose a fee for accreditation. However:

- all stages of accreditation of software tools must be prepared and lodged at the expense of the software provider, including any costs from engaging an independent tester and
- if further information is required to clarify or validate information in the application, this must be provided at the software provider's expense.

4. Software testing: methods and materials

The consistency and accuracy of thermal performance ratings is fundamental to the objectives of NatHERS. This chapter details the testing procedures and materials for accreditation, reaccreditation and software updates.

AccuRate Home and AccuRate Enterprise are the commercial software tools developed by CSIRO to interface with the Chenath Engine. NatHERS accredited software tools are assessed relative to AccuRate Home for NCC 2025 as a benchmark to ensure they meet minimum accuracy requirements for reaccreditation and updates.

If the software provider fails to satisfy the requirements relating to a new version, or where an update of a previously accredited software tool is being reaccredited, and testing indicates a significant impact on the rating output of the software tool, the Administrator (on behalf of the NatHERS Steering Committee) may withhold accreditation of the updated software tool.

4.1. Testing materials - thermal

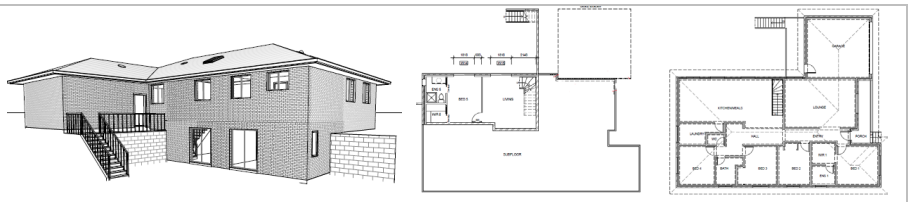
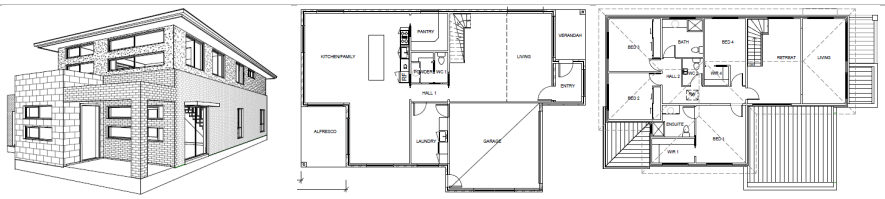
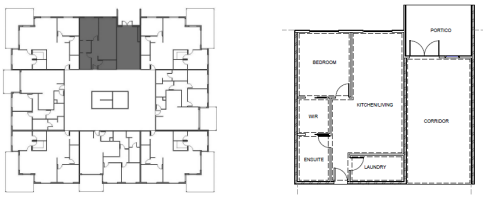
4.1.1. NatHERS testing dwelling designs

The NatHERS thermal SAP dwellings for reaccreditation include five Class 1 and one Class 2 designs (Figure 1). The SAP dwellings for minor updates are generally two Class 1 (200 TBV and 500) and one Class 2 (610) dwelling.

Each dwelling design (available from the NatHERS Administrator) has unique specifications to test particular building features. The specifications explore the impact of:

- thermal bridging
- insulation levels and types
- window types, including glass, frame type and size
- glazing to floor area ratio
- floor construction, ventilation and coverings
- roof construction and colour e.g. attic, hip roof, concrete or flat
- wall construction and colour, solar absorptance, including thermal mass
- internal walls adjacent to subfloors and roof spaces
- internal zoning, including double height voids, apartment corridors and basements
- orientation
- terrain and exposure (impact of elevation)
- external shading from shade structures and neighbouring buildings
- infiltration e.g. windows, doors, exhaust fans
- ceiling penetrations
- other key construction techniques that may apply to particular NatHERS climate zones, such as building styles in tropical and cyclone prone areas.

Figure 1: NatHERS test dwelling designs

200 5-bedroom split level brick veneer Variations: ☐ **200 TBV**: Timber frame brick veneer – no thermal bridging ☐ **200 StBV**: Steel frame brick veneer ☐ **200 StLC**: Steel frame light cladding ☐ **200 StMC**: Steel frame metal cladding	
500 4-bedroom double storey	
610 1-bedroom ground floor apartment	

4.2. Testing processes - thermal

The testing steps described in this section are a general guide only and in some circumstances may be modified if deemed necessary by the Administrator.

Entering dwelling features into the software tool

Testing involves inputting SAP dwelling design specifications (available from the Administrator on request) into the software tool and recording the simulation results.

If a specification on the drawings appears ambiguous, refer to the AccuRate benchmark rating file which may clarify the specifications of an item. Please contact the Administrator if AccuRate does not provide clarification as required.

Recording results – test results spreadsheet

The Administrator will provide the test result spreadsheet for reaccreditation testing. This is prepopulated with benchmark results for each dwelling in each climate zones. It includes the area adjusted heating, cooling and total energy loads (megajoules/m^2/p.a.), star ratings and the dwelling's conditioned floor area. When the software provider enters their simulation results, the spreadsheet will calculate a pass/fail for each component and indicate whether the results fall within tolerances, compared to the benchmark tool.

For minor updates, the software provider will submit the minor update test result spreadsheet.

Generating certificates and stamps

For reaccreditation processes, the certificates, rating reports and stamps need to be generated to ensure their fields are correctly designed and populated. The required certificates, rating reports and stamps for new, reaccreditation and minor update processes are itemised in Table 8 and Table 9.

Submitting results

Once testing is complete, the software provider will submit the test results spreadsheet, software rating files and beta version to the Administrator at admin@nathers.gov.au and at least one secondary submission email as advised by the Administrator. Note that the beta version of the software tool is not required for the EOI phase.

Reaccreditation

The software provider must test dwellings 200 TBV, 200 StBV, 200 StLC, 200 StMC, 500 and 610 in all NatHERS climate zones. However, the Administrator and software provider will need to consult and confirm that the dwellings and climate zones are appropriate to test for the features being corrected/updated.

Minor updates

The standard test dwellings are 200TBV, 500 and 610, must be tested in all NatHERS climate zones. This requirement may be varied and alternative dwellings and/or testing procedures may be specified if these standard designs do not test for the proposed feature which is the subject of the update. In this case, dwelling features may be modified (by agreement with the Administrator) and an alternative dwellings may be specified by the Administrator.

Simulations must be done using the beta version of the software tool and results compared to the current public version of the tool's simulation results.

Test results must include a dwelling identifier, climate zone number, the star ratings calculated by the current version on the market and the proposed new version and the difference between these star ratings.

4.3. Testing materials – Whole of Home

4.3.1. NatHERS testing dwelling designs

The SAP dwellings designs used in Whole of Home testing include two Class 1 (SAP 200 TBV and SAP 500) and one Class 2 (SAP 610) designs (Figure 1). Reaccreditation entails modelling all three dwellings, whereas minor updates are generally limited to two designs depending on what features are being updated.

4.3.2. Appliances

The fixed appliance and system modules for calculating energy use and production in the Whole of Home tool include:

- heating
- cooling
- hot water systems
- lighting
- cooking
- plug loads
- pool pumps
- on-site energy generation and storage.

4.3.3. Climate zones and categories

Eleven NatHERS representative climate zones are used for Whole of Home testing. These cover each of the states and water heater zones, and are based on historic certificate volume. The representative climate zones are provided in Table 10.

Table 10: Whole of Home representative climate zones

NatHERS climate zone number	NatHERS climate zone name	Postcode	Category
1	Darwin	800	Hot
3	Longreach	4730	Hot
10	Brisbane	4000	Hot
13	Perth (Breton Bay)	6043	Mixed
27	Mildura	3500	Mixed
28	Richmond (NSW)	2753	Mixed
16	Adelaide	5000	Mixed
24	Canberra	2600	Cold
26	Hobart	7000	Cold
60	Tullamarine	3043	Cold
69	Thredbo	2625	Cold

4.4. Testing scenarios

Reaccreditation

Testing scenarios assess how closely the software tool meets the accuracy requirements when compared to the benchmark tool.

In buildings without centralised services the scenarios include three dwellings with 20 appliance scenarios each, spread across 11 representative climate zones. The scenarios are listed at Table 11. Table 12 shows each zone's occupancy setting: "primary" is predominantly daytime and "secondary" is predominantly nighttime.

In buildings with centralised services refer to Table 13, Table 14 and Table 15 below.

Table 11: Whole of Home simulation scenarios (confirm with Administrator before testing)

Scenario	Heating and cooling												Hot Water		Lighting	Solar PV													Battery		Pool		Cooking	
	Primary						Secondary											Array 1			Array 2			Array 3											
	Heating	Rating	Value	Cooling	Rating	Value	Heating	Rating	Value	Cooling	Rating	Value	Type	STCs	Power density (w/m2)	Size (kW)	No. of arrays	Orien-tation	Slope (deg)	(kW)	Orien-tation	Slope (deg)	Size	Orien-tation	Slope (deg)	Size	Inverter size (kW)	Technology	Size (kWh)	Size	Pump speed	Cooktop	Oven
1	Non ducted reverse cycle	ZERL	1.5	Non ducted reverse cycle	ZERL	1.5	Nil (default)	n/a Default	0	Nil (default)	n/a Default	0	Electric storage small	-	5	0	0	0	0	0	0	0	0	0	0	0	0	None	0	0	Single	Electric	Electric
2	Non ducted reverse cycle	ZERL	3	Non ducted reverse cycle	ZERL	3	Non ducted reverse cycle	ZERL	2	Non ducted reverse cycle	ZERL	2	Electric storage large	-	5	3	1	0	0	3	0	0	0	0	0	0	3	None	0	50000	Single	Electric	Electric
3	Non ducted reverse cycle	2013 fixed	2	Non ducted reverse cycle	2013 fixed	2	Non ducted reverse cycle	2013 fixed	1	Non ducted reverse cycle	2013 fixed	1	Electric instantaneous	-	5	5	1	45	15	5	0	15	0	0	15	0	5	None	0	50000	Single	Induction	Electric
4	Non ducted reverse cycle	2013 variable	4	Non ducted reverse cycle	2013 variable	4	Non ducted reverse cycle	2013 variable	3	Non ducted reverse cycle	2013 variable	3	Gas storage 4.0 star	-	5	6.5	1	315	22.5	6.5	0	22.5	0	0	22.5	0	5	None	0	50000	Single	Gas	Electric
5	Ducted reverse cycle	ZERL	1.5	Ducted reverse cycle	ZERL	2.5	Ducted reverse cycle	ZERL	1.5	Ducted reverse cycle	ZERL	2.5	Gas storage 5.0 star	-	5	10	1	0	22.5	10	0	22.5	0	0	22.5	0	8.5	Lithium-Ion	10	25000	Dual	Gas	Electric
6	Ducted reverse cycle	ZERL	3.5	Ducted reverse cycle	ZERL	4.5	Ducted reverse cycle	ZERL	3.5	Ducted reverse cycle	ZERL	1.5	Gas instantaneous 4.0 star	-	4	10	2	45	22.5	5	315	22.5	5	0	22.5	0	8.5	Lead acid	10	25000	Dual	Gas	Electric
7	Ducted reverse cycle	2013 fixed	1.5	Ducted reverse cycle	2013 fixed	1.5	Ducted reverse cycle	2013 fixed	1.5	Ducted reverse cycle	2013 fixed	1.5	Gas instantaneous 5.0 star	-	4	10	3	0	22.5	4	90	22.5	3	270	22.5	3	8.5	Zinc Bromine	10	25000	Dual	Gas	Electric
8	Ducted reverse cycle	2013 Variable	3	Ducted reverse cycle	2013 Variable	3	Ducted reverse cycle	2013 variable	3	Ducted reverse cycle	2013 variable	3	Gas instantaneous 6.0 star	-	4	10	2	0	22.5	5	270	22.5	5	0	22.5	0	8.5	Lithium-Ion	15	75000	Multi	Gas	Electric
9	Gas ducted	Gas Ducted	4	Ducted evaporative	n/a	15	Gas ducted	Gas Ducted	4	Ducted evaporative	n/a	15	Gas instantaneous 7.0 star	-	4	6.5	1	0	22.5	6.5	0	22.5	0	0	22.5	0	5	Lead Acid	15	75000	Multi	Gas	Electric
10	Gas ducted	Gas Ducted	5	Ducted evaporative		15	Gas ducted	Gas Ducted	5	Ducted evaporative	n/a	15	Solar-electric	17	4	6.5	1	0	22.5	6.5	0	22.5	0	0	22.5	0	5	Zinc Bromine	15	75000	Multi	Gas	Electric
11	Gas ducted	Gas Ducted	6	Ducted evaporative	n/a	15	Gas ducted	Gas Ducted	6	Ducted evaporative	n/a	15	Solar-electric	27	3	0	0	0	0	0	0	0	0	0	0	0	0	None	0	0	Single	Gas	Electric
12	Gas space heater	Gas Space	4	Evaporative cooler	n/a	15	Non ducted reverse cycle	ZERL	2.5	Non ducted reverse cycle	ZERL	3.5	Solar-electric	38	3	0	0	0	0	0	0	0	0	0	0	0	0	None	0	0	Single	Gas	Electric
13	Gas space heater	Gas Space	4.5	Evaporative cooler	n/a	15	Non ducted reverse cycle	ZERL	3.5	Non ducted reverse cycle	ZERL	4.5	Solar-gas	17	3	0	0	0	0	0	0	0	0	0	0	0	0	None	0	0	Single	Gas	Gas
14	Gas space heater	Gas Space	5	Evaporative cooler	n/a	15	Nil (default)	n/a Default	0	Nil (default)	n/a Default	0	Solar-gas	27	3	0	0	0	0	0	0	0	0	0	0	0	0	None	0	0	Single	Gas	Gas
15	Wood Heater	n/a	1	Evaporative cooler	n/a	15	Nil (default)	n/a Default	0	Nil (default)	n/a Default	0	Solar-gas	38	3	0	0	0	0	0	0	0	0	0	0	0	0	None	0	0	Single	Gas	Gas
16	Electric Resistance	n/a	1	Nil (default)	n/a Default	0	Electric resistance heater	n/a Electric Resistance	1	Nil (default)	n/a Default	0	Heat-pump	18	5	0	0	0	0	0	0	0	0	0	0	0	0	None	0	0	Single	Electric	Electric
17	Nil (default)	n/a Default	0	Nil (default)	n/a Default	0	Nil (default)	n/a Default	0	Nil (default)	n/a Default	0	Heat-pump	27	5	0	0	0	0	0	0	0	0	0	0	0	0	None	0	0	Single	Induction	Electric
18	Ducted reverse cycle	2013 fixed	2.5	Ducted reverse cycle	2013 fixed	3.5	Ducted reverse cycle	2013 fixed	2.5	Ducted reverse cycle	2013 fixed	3.5	PV Diverter	Type 1	5	10	1	0	22.5	10	0	22.5	0	0	22.5	0	8.5	None	0	0	Single	Electric	Electric
19	Ducted reverse cycle	2013 Variable	2	Ducted reverse cycle	2013 Variable	2	Ducted reverse cycle	2013 variable	2	Ducted reverse cycle	2013 variable	2	PV Diverter	Type 2	5	10	1	0	22.5	10	0	22.5	0	0	22.5	0	8.5	None	0	0	Single	Induction	Electric
20	Nil (default)	n/a Default	0	Nil (default)	n/a Default	0	Nil (default)	n/a Default	0	Nil (default)	n/a Default	0	PV Diverter	Type 3	5	10	1	0	22.5	10	0	22.5	0	0	22.5	0	8.5	None	0	0	Single	Electric	Electric

Table 12: Heating and cooling to zone mapping

Conditioned zone name	Primary	Secondary	Default[4]
SAP 200			
WIR 5	N	Y	N
Ens 5	N	Y	N
Bed 5	N	Y	N
Living	Y	N	N
Lounge	Y	N	N
Entry	Y	N	N
Bed 1	N	Y	N
Ens 1	N	Y	N
Bed 2	N	Y	N
Bed 3	N	Y	N
Bed 4	N	Y	N
Kitchen/meals	Y	N	N
WIR 1	N	Y	N
Hall	Y	N	N
WC	N	N	Y
SAP 500			
Kitchen family	Y	N	N
Pantry	N	N	Y
Living	Y	N	N
Hall 1	N	N	Y
Powder	N	N	Y
WC 1	N	N	Y
Bed 1	N	Y	N
WIR 1	N	Y	N
Ensuite	N	Y	N
Bed 2	N	Y	N
Bed 3	N	Y	N
Bed 4	N	Y	N
Retreat	Y	N	N
Hall 2	N	N	Y
WC 2	N	N	Y
WIR 4	N	Y	N
SAP 610			
Bedroom	N	Y	N
Kitchen/living	Y	N	N
Ensuite	N	Y	N
WIR	N	Y	N

[4] Default system is as per the Whole of Home Calculation Method

Simulation scenarios – centralised services

Eight apartment centralised services scenarios in two buildings (Table 13) need to be tested. The associated building inputs are provided at Table 14 and technical inputs at Table 15 (hot water) and Table 16 (heating and cooling). Dwelling 610, available from the NatHERS Administrator, is used for all scenarios.

All dwellings are assumed to have:

- lighting density of 5 W/m^2
- electric oven and electric cooktop
- no solar PV
- no pool or spa.

Table 13: Centralised services scenarios

Scenario	Building	Heating	Cooling	Hot water	Hot water efficiency (COP)
1	Building 1 mid-rise	Air-cooled PAC	Air-cooled PAC	Heat pump	2.5
2	Building 1 mid-rise	Atmospheric boiler	Air-cooled chiller	Electric instant	0.97
3	Building 1 mid-rise	Air-cooled PAC	Water-cooled chiller	Gas instant	0.82
4	Building 1 mid-rise	Atmospheric boiler	Air-cooled chiller	Gas storage	0.82
5	Building 2 high-rise	Air-cooled PAC	Air-cooled PAC	Heat pump	2.5
6	Building 2 high-rise	Atmospheric boiler	Air-cooled chiller	Electric instant	0.97
7	Building 2 high-rise	Air-cooled PAC	Water-cooled chiller	Gas instant	0.82
8	Building 2 high-rise	Atmospheric boiler	Air-cooled chiller	Gas storage	0.82

Table 14: Centralised services building inputs

Input	Building 1 Mid-rise	Building 2 High-rise
Number of SOUs	80	400
Number of pumps	2	4
Number of storage tanks	2	4
Supply temperature (°)	65	65
Pipe length unconditioned	200	800
Pipe length conditioned	600	3200
Length of HVAC duct to assessed SOU	70	42
Length of HVAC piping to assessed SOU	52	38

Table 15: Centralised hot water scenario modelling inputs	
Calculation of total thermal loss from pipes	
Weighted average thermal conductivity of the pipe material within conditioned areas (J/m.K)	382
Weighted average thermal conductivity of the pipe material within unconditioned areas (J/m.K)	382
Weighted average thermal conductivity of the pipe insulation within conditioned areas (J/m.K)	0.022
Weighted average thermal conductivity of the pipe insulation within unconditioned areas (J/m.K)	0.022
Weighted average inner radius of pipes within conditioned areas	0.01783
Weighted average outer radius of pipes within conditioned areas (m)	0.01905
Weighted average outer radius of pipe insulation within conditioned areas (m)	0.041
Weighted average inner radius of pipes within unconditioned areas (m)	0.02678
Weighted average outer radius of pipes within unconditioned areas (m)	0.028
Assumed set-point temperature of conditioned areas (°C)	Heating set-point 19°C. Cooling is the value prescribed in Appendix A of the NatHERS Whole of Home Calculations Method.
Temperature of unconditioned areas (°C)	Hourly temperature profile based on Typical Meteorological Year (TMY) data representative of each climate zone – refer to NatHERS Whole of Home Calculations Method
Hourly hot water energy requirement – heat pump	
COP_{HP} = average coefficient of performance for heat pumps	2.5
$N_{Inst.-Elec.}$ = quantity of heat pumps (number of)	1
$E_{standby}$ = standby energy requirement of heat pumps (MJ/hour, electricity)	0.036
$t_{standby}$ = amount of time in standby (hour)	0.9
Calculation of hourly start-up losses	
$N_{Start-up}$ = daily number of start-up events	13
S = start-up heat capacity (MJ)	0.5
$T_{DHW-Supply-Temp.}$ = supply temperature of DHW system (°C)	70
Calculation of total heat loss for tank	
d_i = tank inner diameter (m)	0.8
d_0 = tank outer diameter (m)	1.02
h_i = inner height of tank (m)	1.99
k = insulation thermal conductivity (MJ/mK)	0.036
x_1 = tank side insulation thickness (m)	0.11
x_2 = tank top insulation thickness (m)	0.05
x_3 = tank bottom insulation thickness (m)	0.05
Number of tanks	1

ΔT = temperature difference of tank surface temperature and stored water temperature (°C)	Assumed stored water temperature: DHW[5] supply temperature ($T_{DHW\text{-}Supply\text{-}Temp.}$). Assumed tank surface temperature: ambient temperature ($T_{ambient}$)
$Q_{Fittings}$ = heat losses through tank openings and fittings (MJ_{th})	
A_0 = tank opening (e.g. thermostat pocket) (m)	0.000962113
$d_{tank\text{-}pipe\text{-}Uninsul.}$ = uninsulated pipe or fitting (e.g. PTR valve) (m)	0.035
$d_{tank\text{-}pipe\text{-}Insul.}$ = insulated pipe or fitting (m)	0.1524
d_i = tank inner diameter (m)	0.8
Calculation of hourly circulation pump energy requirement	
$\eta_{DHW\text{-}Pump+Motor}$ = efficiency of circulation pumps (%)	0.8
$\eta_{DHW\text{-}Pump}$ = efficiency of the pump component within the DHW pump system (%)	0.75
$\eta_{DHW\text{-}Motor}$ = efficiency of the motor component within the DHW pump System (%)	0.75
$P_{DHW\text{-}Pump}$ = rated power of circulation pump (MJ/hr)	0.216

Table 16: Centralised heating and cooling scenario modelling inputs

Systems - cooling	
Electric air-cooled packaged air conditioning (PAC) system	3
Electric air-sourced variable refrigerant flow/ variable gas - refrigerant volume (VRF/VRV) system	3
gas atmospheric boiler	0.86
Electric condensing boiler	0.86
Electric boiler	0.97
Electric reverse-cycle air-water 2-pipe heat pump	3
Electric reverse-cycle water-water 2-pipe heat pump	3
Systems – heating	
Air-cooled Chiller	4.048
Air-cooled packaged air conditioning (PAC) system	3
Air-sourced variable refrigerant flow/ variable refrigerant volume (VRF/VRV) system	3
Reverse-cycle air-water 2-pipe heat pump	3
Reverse-cycle water-water 2-pipe heat pump	3
Water-cooled Chiller	5.867
Water-cooled packaged air conditioning (PAC) system	3
Water-cooled variable refrigerant flow/ variable refrigerant volume (VRF/VRV) system	3
Hourly thermal loss of ducts within conditioned and unconditioned areas under cooling scenario (MJr)	
$R_{duct\text{-}a}$ = Weighted average thermal resistance of the duct material including insulation within conditioned areas (J/m.K).	1.2
$R_{duct\text{-}b}$ = Weighted average thermal resistance of the duct material including insulation within unconditioned areas (J/m.K).	2

[5] DHW – domestic hot water

$A_{Cond.}$ = total surface area of ducts within conditioned areas (m2)	124.32
$A_{Uncond.}$ = total surface area of ducts within unconditioned areas (m2)	17.76
TH-SA-Temp. = Nominal Temperature of supply air under heating Conditions (oC)	35
TC-SA-Temp. = Nominal Temperature of supply air under Cooling Conditions (oC)	15
Calculation of total thermal Loss from pipes	
Weighted average thermal conductivity of the pipe material within conditioned areas (J/m.K)	382
Weighted average thermal conductivity of the pipe material within unconditioned areas (J/m.K)	382
Weighted average thermal conductivity of the pipe insulation within conditioned areas (J/m.K)	0.022
Weighted average thermal conductivity of the pipe insulation within unconditioned areas (J/m.K)	0.022
Weighted average Inner radius of pipes within conditioned areas (m)	0.02
Weighted average outer radius of pipes within conditioned areas (m)	0.022
Weighted average outer radius of pipe insulation within conditioned areas (m)	0.035
Weighted average Inner radius of pipes within unconditioned areas (m)	0.025
Weighted average outer radius of pipes within unconditioned areas (m)	0.028
Weighted average outer radius of pipe insulation within unconditioned areas	0.041
supply Temperature of chilled W system (oC)	6
Total energy requirement for HHW/CHW pump	
PHHW-heating = HHW design pump power (J/s)	405.485027
ηHHW-pump = efficiency of the pump component within the HHW pump system of heating loop (%)	0.75
ηHHW-motor = efficiency of the motor component within the HHW pump system of heating loop (%)	0.759
Condenser water pump	
PC-Condenser-pump = design pump power for Condenser Water pump of Cooling loop (J/s)	405.485027
ηC-Condenser-pump = efficiency of the pump component within the Condenser pump system of Cooling loop (%)	0.75
ηC-Condenser-motor = efficiency of the motor component within the Condenser pump system of Cooling loop (%)	0.759
EC-CP-LC = Energy requirement of maintaining the required flow for Legionella control for cooling tower design of the Cooling loop (MJ/a, Electricity)	
Cooling Tower	
PC-CT = Cooling tower design power of cooling loop (J/s)	253.4281419
ηC-CT = Cooling tower efficiency of cooling loop (%)	0.759

Total energy requirement for condenser pump of heating loop	
PH-Condenser-pump = design pump power for condenser water pump of heating loop (J/s)	405.485027
ηH-condenser-pump = efficiency of the pump component within the condenser pump system of heating loop (%)	0.75
ηH-condenser-motor = efficiency of the motor component within the condenser pump system of heating loop (%)	0.759
EH-CP-LC = Energy requirement of maintaining the required flow for Legionella control for cooling tower design of the heating loop (MJ/a, electricity)	
Calculation for total energy requirement for AHUs or FCUs under heating scenario	
PH-AHU/FCU = total design power of AHUs/FCUs of heating loop (J/s)	202.7425135
ηH-AHU/FCU-WA = weighted average AHU/FCU efficiency of heating loop (%)	0.75
ηH-AHU/FCU-n = efficiency of individual AHUs and FCUs of heating loop (m3/s)	0.75
VH-AHU-FCU-n = design air flow rate of individual AHUs or FCUs of heating loop (m3/s)	0.0169
VH-Cond. = total air flow rates supplied to conditioned zones at the reference hour under heating scenario (m2)	0.0169
VH-total = total air flow rate of all AHUs or FCUs combined of heating loop (m3/s)	0.1352
Calculation for total Energy Requirement for AHUs or FCUs	
PC-AHU/FCU = total design power of AHUs/FCUs of Cooling loop (J/s)	202.7425135
ηC-AHU/FCU-WA = weighted average AHU/FCU efficiency of Cooling loop (%)	0.75
ηC-AHU/FCU-n = efficiency of individual AHUs and FCUs of Cooling loop (m3/s)	0.75
VC-AHU-FCU-n = design air flow rate of individual AHUs or FCUs of Cooling loop (m3/s)	0.0169
VC-Cond. = total air flow rates supplied to conditioned zones at the reference hour under Cooling Scenario (m2)	0.0169
VC-total = total air flow rate of all AHUs or FCUs combined of Cooling loop (m3/s)	0.1352

4.4.1. Data entry

Testing involves inputting SAP dwelling design specifications (available from the Administrator on request) and appliance scenarios as listed in Table 11 and Table 12 for decentralised appliances, and Tables 13 to 16 for centralised services, into the software tool and recording the simulation results.

If a specification appears ambiguous, please contact the Administrator.

4.4.2. Recording results – test results spreadsheet

The Administrator will provide the test result spreadsheets. These are prepopulated with benchmark results, including the Whole of Home energy results, and the NatHERS Whole of Home rating metric result for each dwelling in each climate zone. When the software provider enters

their simulation results, the spreadsheet will calculate a pass/fail for each component and indicate whether the results fall within tolerances, compared to the NatHERS benchmark tool.

For minor updates, the software provider will submit the minor update test result spreadsheet.

4.4.3. Generating certificates and stamps

For new and reaccreditation testing, certificates and stamps need to be generated to ensure certificates and stamps are correctly designed and populated. The required certificates and stamps are itemised in Table 8 and Table 9.

4.4.4. Submitting results

Once testing is complete, the software provider will submit the test results spreadsheet and, except for the EOI stage, software rating files and beta version to the Administrator at admin@nathers.gov.au.

Reaccreditation

The software provider will test dwellings 200, 500 and 610 in 11 NatHERS climates. However, the Administrator and software provider will need to consult and confirm that the dwellings and climate zones are appropriate to test for the features being corrected/updated. This consultation may need to be repeated if test results reveal changes to the NatHERS Whole of Home rating results in excess of the maximum threshold.

Minor updates

The standard test dwellings are 200TBV, 500 and 610, must be tested in all NatHERS climate zones. This requirement may be varied and alternative dwellings and/or testing procedures may be specified if these standard designs do not test for the proposed feature which is the subject of the update. In this case, dwelling features may be modified (by agreement with the Administrator) and an alternative dwelling may be specified by the Administrator.

Simulations must be done using the beta version of the tool and results compared to the current public version of the software simulation results.

Test results must include a dwelling identifier, climate zone number, the NatHERS Whole of Home rating result calculated by the current version on the market and the proposed new version, and the difference of these.

5. Information sources

The software provider must ensure they understand and apply aspects of the information referred to in Table 17. Further information relating to NatHERS is available at www.NatHERS.gov.au.

Methodologies, algorithms and rules implemented in Accurate and the Chenath engine are key elements of rating software. Table 17 below is a collection of documentation for the NatHERS guides and materials. This list is subject to updates as new information and regulatory requirements emerge.

Table 17: NatHERS documentation

Document	Available from
NatHERS Technical Note • Principles for ratings in accreditation mode	nathers.gov.au/resources
Conflict of interest declaration form	admin@nathers.gov.au
Decimal-point Star bands Used in Accurate V1.1.4.1, Dong Chen, June 2013	CSIRO
NatHERS default windows library	admin@nathers.gov.au
Minor update request form	nathers.gov.au
NatHERS Climate Files	admin@nathers.gov.au
NatHERS Interactive Map	nathers.gov.au
NatHERS Software Accreditation Terms and Conditions	nathers.gov.au
NatHERS Star bands – 0.1 star increments spreadsheet	admin@nathers.gov.au
Postcode to climate zone look-up table (spreadsheet)	admin@nathers.gov.au
Process for including (the properties of) new materials into NatHERS Accredited Software	nathers.gov.au
NatHERS software standardisation document	nathers.gov.au
Software testing dwelling designs (detailed drawing sets of all dwellings)	admin@nathers.gov.au
Software test results spreadsheet – new accreditation and reaccreditation	admin@nathers.gov.au
Software test results spreadsheet – minor update(s)	admin@nathers.gov.au
Standard Operating Procedure – minor updates	nathers.gov.au
Standard Operating Procedure – Feature exemption application	nathers.gov.au
Trade mark / published guidelines	nathers.gov.au
WERSLink default windows library	admin@nathers.gov.au

Table 18: CSIRO documentation / references

Document	Available from
AccuBatch V2.0 User Manual, Dong Chen CSIRO, March 2010	https://publications.csiro.au/rpr/download?pid=csiro:EP101114&dsid=DS4
Accurate and the Chenath Engine for Residential House Energy Rating, Dong Chen 2016	hstar.com.au/Home/Chenath
Accurate Fan Speed Calculation, Dong Chen, CSIRO Sustainable Ecosystems, June 2018	CSIRO
Accurate Sustainability V2.3.3.13, Internal Heat Gain Estimation from Occupants and Appliances, Dong Chen, May 2018	CSIRO
Area Correction Factors in Accurate v1.1.4.1, Dong Chen, 2012 • Treatment of the area adjustment for buildings with partially shared external envelope (walls, floors or ceilings)	hstar.com.au/Home/Chenath
Calculation of *cp* values for SCRATCH file, 8 August 2015	CSIRO
Fan Speed and Target Area for Large Size Ceiling Fans Dong Chen, CSIRO Energy, June 2021	
Starbands 20200610	CSIRO
Default windows library	tbd
Description of input data file for the Accurate simulation engine V3.21 (AccurateEngine.exe), February 2019 • How to write a scratch file for Chenath	CSIRO
Material Properties Used in NatHERS Software Tools, 2012 – updated May 2022, Dong Chen • A list of material properties used in NatHERS software tools	nathers.gov.au
Infiltration Calculations in Accurate V2.0.2.13, Dong Chen, 2013	hstar.com.au/Home/Chenath
Modelling of Roof spaces, Sub-floors and Non-Vertical Air Gaps in the Accurate Engine, October 2003	CSIRO
Openings and Perforations Used in Accurate, Dong Chen, June 2014, modified August 2014	CSIRO