PROCEDURE FOR ACCREDITING SOFTWARE UNDER THE NATIONWIDE HOUSE ENERGY RATING SCHEME

Software incorporating the Australian Government endorsed calculation engine

NatHERS National Administrator

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Foreword

Thermal assessment software, often described as house energy rating software, has often been used to inform the quality of building design, or to test compliance with building or planning standards.

The Nationwide House Energy Rating Scheme (NatHERS) is an Australian Government scheme designed to facilitate the improvement of dwelling thermal performance, improve the quality of residential energy rating software and promote their use by Australian industry.

This Software Accrediting Procedure is limited to the process used to recognise (accredit) a new software tool or new version of an existing tool under the Nationwide House Energy Rating Scheme. Separate but related Protocols exist to facilitate the use software for building regulation (ABCB Protocol for House Energy Rating Software), and for organisations that wish to register Assessors (Protocol for Assessor Accrediting Organisations).

ABCB Protocol for House Energy Rating Software

On 1 January 2003, minimum energy efficiency measures for houses were introduced into BCA Volume Two. The measures include a Verification Method that allows suitable house energy rating software, based on climate regions, to be used to demonstrate compliance with BCA Performance Requirement P2.6.1. The ABCB publishes a Protocol for house energy rating software to facilitate the use of software as a BCA Verification Method. The ABCB Protocol was revised (version 2006.1 of May 2006) to cover the use of what is termed 2nd generation house energy rating software.

The ABCB Protocol contains a testing regime for simulation software being used for building regulation assessment but does not contain a testing regime for recognition by the Nationwide House Energy Rating Scheme. The ABCB Protocol notes that software manufacturers will need to provide suitable evidence that demonstrates that their software has undergone appropriate testing and quality assurance. This Software Accrediting Procedure is consistent with the testing and quality assurance requirements of the ABCB Protocol.

Need for a Procedure for Accrediting Software

The suitability of software for building or planning regulatory use will depend on the software developer demonstrating to the NatHERS National Administrator via a testing procedure that the software is of an appropriate standard of functionality and that it provides results that are within a certain tolerance of expected assessment rating. Additionally, this Software Accrediting Procedure is expected to provide one path for providing evidence of suitability required by the Australian Building Codes Board.

Background

Energy rating software has been available for some time under the Nationwide House Energy Rating Scheme, which provides a standardised approach for energy rating of houses throughout Australia. Although the Scheme is not mandated, its 'Star Rating' system is now recognised as one means of demonstrating compliance with the BCA Performance Requirements for the energy efficiency of the fabric of dwellings.

The Scheme was developed by the State and Territory energy agencies and the Australian Government, in conjunction with the CSIRO. It is administered by the Energy Efficiency Working Group (EEWG), on behalf of the Ministerial Council on Energy, through the Department of Climate Change and Energy Efficiency, which is the Scheme's National Administrator.

In 2005 the Scheme and the Australian Government endorsed calculation engine was substantially upgraded to incorporate modelling calculations that reflect the increased computing capacity of modern computers. This upgrade has enabled better modelling of energy flows and increased accuracy in describing how spaces in a building interact with each other and with the outside environment.

The energy loads and the associated star ratings specified in this Software Accrediting Procedure were developed for, and set by, the EEWG.

Aims of the Software Accrediting Procedure

The primary aim of the Software Accrediting Procedure is to provide a legal basis for accrediting a house energy rating software product for use under the Nationwide House Energy Rating Scheme.

The Software Accrediting Procedure is not intended to be used as a driver for implementing the Nationwide House Energy Rating Scheme (a responsibility of the energy agencies), or for changing the Scheme, or for changing the Building Code of Australia (a responsibility of the building regulatory agencies).

The Scheme, including the energy star rating figures, may be subject to revision from time to time as the Scheme is improved and developed. The Software Accrediting Procedure may, therefore, be amended as necessary.

Process for revising the Software Accrediting Procedure

Due to the separation of responsibilities for housing energy efficiency matters between the State and Territory energy agencies and the building control Administrations, any changes to the Nationwide House Energy Rating Scheme, including changes to the Software Accrediting Procedure, should be:

- developed in consultation between the energy agencies and the building control Administrations within each State and Territory as described by the Memorandum of Understanding for the Nationwide House Energy Rating Scheme agreed by the Ministerial Council on Energy and the Australian Building Codes Board;
- documented by the Scheme's National Administrator;
- where necessary assessed for regulatory impact, in accordance with the requirements of the Office of Regulation Review (ORR) - public consultation is required by the ORR for significant regulatory changes; and
- referred to building control Administrations for agreement to amend the ABCB Protocol and specific BCA references.

PROCEDURE FOR ACCREDITING HOUSE ENERGY RATING SOFTWARE

1. Definitions

Scheme – The Nationwide House Energy Rating Scheme is a framework that allows various computer software tools to rate the potential thermal efficiency of Australian dwelling envelopes. The Scheme defines the minimum scope of assessment coverage, mandatory settings, and assessment rules that must be used by all software tools accredited to the Nationwide House Energy Rating Scheme.

National Administrator – The Nationwide House Energy Rating Scheme is administered by the Energy Efficiency Working Group (EEWG), on behalf of the Ministerial Council on Energy, through the National Administrator. Currently the National Administrator is the Department of Climate Change and Energy Efficiency.

ABCB Protocol – The protocol to facilitate the use of house energy rating software as a BCA Verification Method.

Software Accrediting Procedure – The procedure used to accredit software to the Nationwide House Energy Rating Scheme.

Australian Government endorsed calculation engine – the calculation engine developed by CSIRO for the Ministerial Council on Energy.

Regulation Mode – A functional mode of the software that allows energy performance and star ratings to be produced to meet the needs of building or planning regulation.

2. Scope

This Software Accrediting Procedure describes the essential elements of suitable software, including the minimum scope of assessment coverage, the use of standardised data input files, minimum output documentation, and software support. In addition this Software Accrediting Procedure describes the minimum testing and quality assurance process for demonstrating compliance with the Nationwide House Energy Rating Scheme.

This Software Accrediting Procedure is limited to thermal performance assessment software used for the purpose of achieving a regulatory assessment in the form of either a Star Rating or Energy Performance Assessment. This mode of operation is described as Regulation Mode. Other modes of operation are allowable for accredited software for the purpose of providing additional information to software users.

3. Limitation of Software Accrediting Procedure

The Software Accrediting Procedure has been developed specifically to allow accreditation of those software products that incorporate the Australian Government endorsed calculation engine developed for the Ministerial Council on Energy.

4. Features of the software

4.1 General

All elements addressed by the software must be classified as either minimum features (see Clause 4.2) or optional features (see Clause 4.3).

All features must have appropriate instructions to assist the user.

4.2 Minimum features

Details of the following elements, including the materials, their properties including relative location, must be addressed using the latest version of the Australian Government endorsed calculation engine, and include:

- Floor and floor enclosure assembly.
- External walls.
- Roof and ceiling assembly, including the configuration.
- Windows, skylights, roof lights and other glazing.
- Sealing against infiltration.
- Internal walls.
- Zoning.
- Internal sensible and latent heat loads.
- Air movement through ventilation openings and breeze paths.
- Air movement due to fixed mechanical devices including ceiling fans.
- Overshadowing by building elements and adjacent structures.
- Shading by adjustable indoor and outdoor devices including curtains and blinds.
- House size correction as per the factors published on www.nathers.gov.au

Material performance characteristics must be based on product testing or calculations conducted according to the relevant Australian, ISO or industry recognised international standard, or correspond to those published on www.nathers.gov.au.

4.3 Optional features

Software also addressing other aspects of a building's energy performance may receive accreditation under the Scheme provided sufficient evidence is provided describing the scientific basis for such additional calculations. Examples of optional features include:

- Heating equipment.
- Cooling equipment.
- Heating and cooling distribution systems.
- Control systems.

4.4 Climate data

Climate data employed must be obtained from the "Australian Climate Data Bank for Use in the Estimation of Building Energy Use", which consists of Reference Meteorological Year

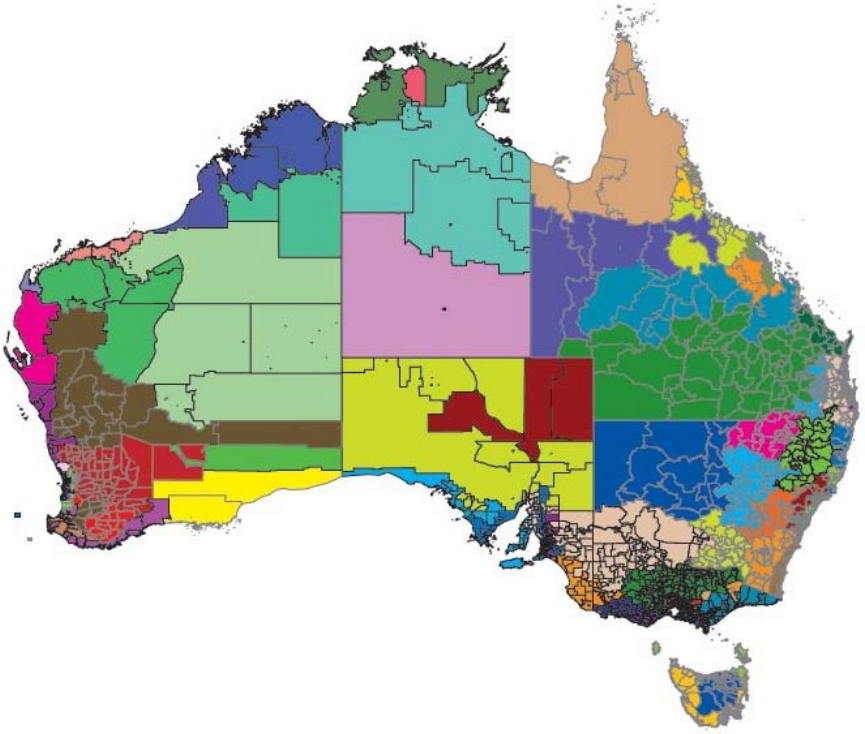
climate data derived from the Australian Bureau of Meteorology weather data for a period no less than 1976 to 2004.

In 2005 the NatHERS National Administrator released climate data for 69 climate regions and the associated postcode allocations as recognised by the Scheme at that time. These locations are shown in Figure 1 and a list is provided in Table 1. A list of all climate regions and associated postcode allocations are published on the Scheme website www.nathers.gov.au. Where the software does not cover all recognised climate regions, the limitation must be stated.

Climate data from the "Australian Climate Data Bank for Use in the Estimation of Building Energy Use" is available through organisations licensed by the NatHERS National Administrator.

The number of climate regions and the associated postcode allocations may be changed by the National Administrator with notification of the change published on the Scheme website www.nathers.gov.au. Software accredited under the Scheme maintains accreditation only if the climate zones and associated postcode allocations are updated to the published data within 12 months of the date published.

Figure 1



Note:

This map can be viewed in enlargeable format on the NatHERS web site, www.nathers.gov.au.

4.5 Dwelling operational details

The Scheme defines a number of settings that are mandatory for accredited software in Regulation Mode. The following is a list of the dwelling operational settings:

- Internal sensible and latent heat loads based on the values given in Table 2, with suitable adjustments for the house size and area of each space as defined in section 6.1.
- Particular spaces are conditioned according to the hours defined in Table 5.
- Particular spaces are maintained to a comfort level defined by the heating thermostat settings in Table 6.
- The cooling initiation is to be based on the Effective Temperature method of calculating thermal comfort and include the effect of air movement in that space.
- A cooling thermostat setting that varies according to the climate region, as given in Table 3.
- All external openings being operable at all hours, although a factor restricting the operation of external and internal openings may be incorporated to reduce the number of operations to one per each three-hour period.
- Operation of indoor and outdoor adjustable shading according to the criteria defined in Table 7.

Note that the above loads, hours of operation and thermostat settings represent a conservative approach to house occupancy for comparative testing purposes to determine ranking of energy and comfort performance. Actual use of any particular house will vary from hour to hour, day to day, and year to year according to many factors such as occupant number, age, sex, lifestyle, occupation, wealth, and health. The dwelling operational details are not designed to reflect a particular household during a specific lifecycle stage, but instead are designed to allow a fair and reasonable comparison between buildings on the basis of the potential to be comfortable in each space according to its designed function.

The dwelling operational details may be changed by the National Administrator with notification of the change published on the Scheme website www.nathers.gov.au. Software accredited under the Scheme maintains accreditation only if the dwelling operational details are updated to the published data within 12 months of the date published.

5. Thermal assessment calculation

Thermal performance calculations must be based on well-established models that are in accordance with the principles of thermodynamics and fluid mechanics. Calculation methodology used in the software additional to that used by the 'Australian Government endorsed calculation engine' must be documented and be available for inspection.

The Star rating assessment for each climate region must be based on the set of starbands determined by the Scheme and published by the National Administrator on the Scheme website www.nathers.gov.au.

6. Output presentation

To enable houses of different sizes to be compared within a single climate zone, the energy rating must be calculated on the basis of energy loads per square metre of conditioned floor area.

For the purposes of this Software Accrediting Procedure, the outputs must be presented in terms of energy loads of the building adjusted for house size as stated in 6.1 for any particular climate region of Table 1 and expressed as:

- heating and cooling loads separately, in MJ/m^2 of conditioned floor area per annum (sensible and latent cooling loads where available); and
- total heating and cooling load, in MJ/m^2 of conditioned floor area per annum, with associated 'star rating' in accordance with Table 4.

6.1 Area correction factor

Smaller houses have a greater surface area compared to their floor area than larger houses. Because heat flow through the building fabric depends on the surface area, without a correction factor smaller houses of the same shape and materials will have higher energy loads per unit of floor area. This effect is exacerbated because often window areas as a percentage of floor area are often relatively larger in small houses than in larger houses, and because heat flows through windows are generally the largest.

In Regulation Mode, star ratings are to be based on energy loads that have been adjusted by an area adjustment factor (AAF). The AAFs are determined by the Scheme and published by the National Administrator on the Scheme website www.nathers.gov.au. For a building sharing a surface with another building or buildings, the AAF is to be multiplied by the total outer surface area of the building divided by the sum of the total outer surface area and the total area of all surfaces that are shared with the other building.

The current AAFs increase the energy load for buildings larger than 200 m^2 conditioned floor area and decrease the energy load for buildings smaller than 200 m^2 conditioned floor area. The size of the adjustment depends on the conditioned floor area and the climate zone.

7. Testing, Validation and Quality Assurance

Energy rating software, including any update or new version, is required to undergo appropriate testing, validation and quality assurance before being accredited under the Scheme. Records of testing and quality assurance must be kept and be made available to the National Administrator.

Software must be tested using a standard set of base building designs and associated specification sheets available from the National Administrator. These base building designs listed represent a range of typical houses designs as appropriate for various climatic regions.

Software must be tested using variations of the base building designs to explore the impact of specific material or building design changes on the performance assessment of the base building. The building designs and specification sheets are designed to explore the impact of:

- Insulation levels
- Window opening (effective aperture size)
- Floor type (concrete slab v raised timber)
- Roof type (attic v flat)

- Mass
- Glazing type
- Glazing to floor area ratio
- Orientation
- Infiltration

All base buildings and associated variations must be tested using climate regions containing the cities representing cool temperate, temperate, warm temperate, hot humid, tropical, and hot arid zones, and consideration of inland and coastal climates, namely Canberra, Melbourne, Adelaide, Sydney, Mildura, Perth, Brisbane, Townsville, Charleville and Broome.

All test results should be compared to the related building assessments published on www.nathers.gov.au and evidence documented as described in Section 9.

Testing must be managed by a suitably qualified and experienced expert for example a person who has met the needs of the relevant national qualification "Building Thermal Performance Assessment (Residential)".

8. Training of users

A training program for users must be available and designed to meet the needs of the relevant national qualification "Building Thermal Performance Assessment (Residential)".

9. Evidence of suitability of software

The purpose of an accreditation test for applicant software is to provide assurance that all software tools accredited under NatHERS deliver comparable regulatory results without any significant systematic bias towards either over or underestimating thermal loads. The accreditation test to determine this outcome is as follows:

For the simulation sample[1] of base buildings and associated variations across required climate regions:

a) All the individual simulations must achieve the following minimum result:
   i) the simulated heating load is within either ±10% or ±10 MJ/m^2 of the benchmark load[2]; and the simulated cooling load is within either ±10% or ±10 MJ/m^2 of the benchmark load.

AND

b) **At least 95 percent** of the individual simulations must achieve the following more stringent result:

i) the simulated heating load is within either ±5% or ±5 MJ/m^2 of the benchmark load; and the simulated cooling load is within either ±5% or ±5 MJ/m^2 of the benchmark load; OR

[1] Where there are any specific house configurations that the applicant software cannot model, these configurations will not form part of the simulation sample and thus not contribute to the accreditation test results. The applicant software will consequently be excluded from modelling these configurations in its usage for regulatory purposes and a clear statement of these limitations will be evident in the user manual, the appropriate input screens and the printed output.

[2] Refer Section 6 – Output Presentation.

ii) if condition b)i) is not met, the combined heating and cooling load expressed as a star rating must be not more than ±0.25 stars different from the benchmark combined heating and cooling load expressed as a star result; and

c) A sufficiently detailed user manual exists to provide guidance for software users; and

d) A training program exists to meet the needs of the relevant national qualification.

A request for the software to be accredited under the Nationwide House Energy Rating Scheme, a copy of the software, and all evidence of suitability of the software, should be sent to:

NatHERS National Administrator
Building Energy Efficiency Branch
Department of Climate Change and Energy Efficiency
GPO Box 854
CANBERRA ACT 2601

10. Process for upgrading software

Energy rating software accredited by the National Administrator under the Nationwide House Energy Rating Scheme must meet the requirements of this Software Accrediting Procedure. The software providers are responsible for validating any subsequent upgrade using this Software Accrediting Procedure if that upgrade leads to an average change in Star rating greater than 1.0% against the previously validated version.

Any revisions, updates or new versions must be identified by a unique number or other form of designation.

The National Administrator should be advised, in writing and provided with a copy, of any new upgrade of the software. Where necessary, validation documentation for revisions to software must be provided to the National Administrator. Correspondence should be sent to:

NatHERS National Administrator
Building Energy Efficiency Branch
Department of Climate Change and Energy Efficiency
GPO Box 854
CANBERRA ACT 2601

11. Period of software accreditation

Accreditation of a software product under the Nationwide House Energy Rating Scheme is valid for the commercial life of the product or until that product is changed or upgraded by the software provider, or evidence is provided to the National Administrator by a suitably qualified expert that the product does not now meet the requirements of the Software Accrediting Procedure.

Table 1. Climate regions

Climate region No.	Location	Latitude	Longitude
1	Darwin Airport	12.4 S	130.9 E
2	Port Hedland	20.4 S	118.6 E
3	Longreach	23.4 S	144.3 E
4	Carnarvon	24.9 S	113.7 E
5	Townsville	19.3 S	146.8 E
6	Alice Springs	23.8 S	133.9 E
7	Rockhampton	23.4 S	150.5 E
8	Moree MO	29.5 S	149.9 E
9	Amberley	27.6 S	152.7 E
10	Brisbane	27.4 S	153.1 E
11	Coffs Harbour MO	30.3 S	153.1 E
12	Geraldton	28.8 S	114.7 E
13	Perth Armidale	31.9 S	115.9 E
14	Williamtown AMO	30.5 S	151.7 E
15	Adelaide	32.8 S	151.8 E
16	Sydney RO	34.9 S	138.6 E
17	Nowra RAN	33.9 S	151.2 E
18	Charleville	35.0 S	150.5 E
19	Wagga AMO	26.4 S	146.3 E
20	Melbourne RMO	35.2 S	147.5 E
21	East Sale	37.8 S	145.0 E
22	Launceston	38.1 S	147.1 E
23	Canberra Airport	41.4 S	147.1 E
24	Cabramurra	35.3 S	149.2 E
25	Hobart	35.9 S	148.4 E
26	Mildura AMO	42.8 S	147.5 E
27	Richmond NSW	34.2 S	142.1 E
28	Weipa	33.6 S	150.8 E
29	Wyndham	12.7 S	141.9 E
30	Willis Island	15.5 S	128.1 E
31	Cairns	16.3 S	150.0 E
32	Broome	16.9 S	145.8 E
33	Learmonth	18.0 S	122.2 E
34		22.2 S	114.1 E

Table 1. Climate regions (Continued)

Climate region No.	Location	Latitude	Longitude
35	Mackay	21.1 S	149.2 E
36	Gladstone	23.9 S	151.3 E
37	Halls Creek	18.2 S	127.7 E
38	Tennant Creek	19.6 S	134.1 E
39	Mt Isa	20.7 S	139.5 E
40	Newman	23.4 S	119.7 E
41	Giles	25.0 S	128.3 E
42	Meekatharra	26.6 S	118.5 E
43	Oodnadatta	27.6 S	135.5 E
44	Kalgoorlie	30.8 S	121.5 E
45	Woomera	31.2 S	136.8 E
46	Cobar AMO	31.5 S	145.8 E
47	Bickley	32.0 S	116.1 E
48	Dubbo Airport	32.2 S	148.6 E
49	Katanning	33.7 S	117.6 E
50	Oakey	27.4 S	151.7 E
51	Forrest	30.8 S	128.1 E
52	Swanbourne	32.0 S	115.8 E
53	Ceduna	32.1 S	133.7 E
54	Mandurah	32.5 S	115.7 E
55	Esperance	33.8 S	121.9 E
56	Mascot AMO	33.9 S	151.2 E
57	Manjimup	34.2 S	116.1 E
58	Albany	35.0 S	117.8 E
59	Mt Lofty	35.0 S	138.7 E
60	Tullamarine (Melbourne Airport)	37.7 S	144.9 E
61	Mt Gambier	37.8 S	140.8 E
62	Moorabbin	38.0 S	145.1 E
63	Warrnambool	38.3 S	142.4 E
64	Cape Otway	38.9 S	143.5 E
65	Orange Air Port	33.4 S	149.1 E
66	Ballarat	37.5 S	143.8 E
67	Low Head	41.1 S	146.8 E
68	Launceston Airport	41.5 S	147.2 E
69	Thredbo Valley	36.5 S	148.3 E

Table 2. Internal sensible and latent heat loads

The heat loads in Tables 2a and 2b are for a 160 m^2 dwelling with two adults and two children, with a floor area split of 80 m^2 for all the living areas and 80 m^2 for all the bedroom areas. Proportional adjustments should be made for houses with different total areas, and for individual spaces with different areas.

The load is for the one hour period up to the time stated i.e. a time of 1:00 am indicates the period between midnight and 1:00 am.

Table 2a Internal sensible and latent heat loads - For living spaces, including kitchens

Time	Sensible heat load (Watts)				Latent heat load (Watts)
	Appliances and cooking	Lighting	People	Total	
1:00 am	100	0	0	100	0
2:00 am	100	0	0	100	0
3:00 am	100	0	0	100	0
4:00 am	100	0	0	100	0
5:00 am	100	0	0	100	0
6:00 am	100	0	0	100	0
7:00 am	100	0	0	100	0
8:00 am	400	180	280	860	400
9:00 am	100	180	280	560	200
10:00 am	100	0	140	240	100
11:00 am	100	0	140	240	100
Noon	100	0	140	240	100
1:00 pm	100	0	140	240	100
2:00 pm	100	0	140	240	100
3:00 pm	100	0	140	240	100
4:00 pm	100	0	140	240	100
5:00 pm	100	0	140	240	100
6:00 pm	100	300	210	240	150
7:00 pm	1100	300	210	1610	750
8:00 pm	250	300	210	760	150
9:00 pm	250	300	210	760	150
10:00 pm	250	300	210	760	150
11:00 pm	100	0	0	100	0
Midnight	100	0	0	100	0

Table 2b Internal sensible and latent heat loads - For living spaces that do not include a kitchen

Time	Sensible heat load (Watts)				Latent heat load (Watts)
	Appliances and cooking	Lighting	People	Total	
1:00 am	0	0	0	0	0
2:00 am	0	0	0	0	0
3:00 am	0	0	0	0	0
4:00 am	0	0	0	0	0
5:00 am	0	0	0	0	0
6:00 am	0	0	0	0	0
7:00 am	0	0	0	0	0
8:00 am	180	280	460	140	180
9:00 am	180	280	460	140	180
10:00 am	0	140	140	70	0
11:00 am	0	140	140	70	0
Noon	0	140	140	70	0
1:00 pm	0	140	140	70	0
2:00 pm	0	140	140	70	0
3:00 pm	0	140	140	70	0
4:00 pm	0	140	140	70	0
5:00 pm	0	140	140	70	0
6:00 pm	300	210	510	105	300
7:00 pm	300	210	510	105	300
8:00 pm	300	210	510	105	300
9:00 pm	300	210	510	105	300
10:00 pm	300	210	510	105	300
11:00 pm	0	0	0	0	0
Midnight	0	0	0	0	0

Table 2c Internal sensible and latent heat loads - For bedrooms				
Time	**Sensible heat load (Watts)**			**Latent Heat load (Watts)**
	Lighting	**People**	**Total**	
1:00 am	0	200	200	100
2:00 am	0	200	200	100
3:00 am	0	200	200	100
4:00 am	0	200	200	100
5:00 am	0	200	200	100
6:00 am	0	200	200	100
7:00 am	0	200	200	100
8:00 am	0	0	0	0
9:00 am	0	0	0	0
10:00 am	0	0	0	0
11:00 am	0	0	0	0
Noon	0	0	0	0
1:00 pm	0	0	0	0
2:00 pm	0	0	0	0
3:00 pm	0	0	0	0
4:00 pm	0	0	0	0
5:00 pm	0	0	0	0
6:00 pm	0	0	0	0
7:00 pm	0	0	0	0
8:00 pm	100	0	100	0
9:00 pm	100	0	100	0
10:00 pm	100	0	100	0
11:00 pm	100	200	300	100
Midnight	0	200	200	100

Table 3: Cooling thermostat settings

Climate region	All conditioned spaces (°C)
1	26.5
2	27.0
3	27.0
4	26.0
5	26.5
6	26.5
7	26.0
8	26.0
9	26.0
10	25.5
11	25.0
12	25.0
13	25.0
14	24.0
15	25.0
16	25.0
17	25.5
18	24.5
19	27.0
20	25.0
21	24.0
22	23.0
23	22.5
24	24.0
25	23.0
26	23.0
27	25.0
28	24.5
29	26.0
30	27.5
31	26.5
32	26.5
33	27.0
34	26.5
35	26.0

Climate region	All conditioned spaces (°C)
36	26.0
37	27.0
38	27.0
39	27.0
40	28.0
41	27.5
42	28.0
43	27.0
44	26.0
45	26.0
46	26.5
47	24.5
48	25.0
49	24.5
50	25.0
51	25.5
52	25.0
53	24.5
54	25.0
55	24.0
56	24.5
57	23.5
58	23.5
59	23.0
60	24.0
61	23.5
62	24.0
63	23.0
64	23.0
65	23.0
66	23.5
67	23.0
68	23.5
69	22.5

Table 4: Nationwide House Energy Rating Scheme star criteria (energy loads in MJ/m^2 conditioned floor area.annum)

Climate region	Location	Star rating																			
		0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
1	Darwin	853	773	706	648	598	555	516	480	446	413	381	349	317	285	253	222	192	164	140	119
2	Port Hedland	643	569	507	455	411	373	340	310	284	260	237	215	194	172	151	131	111	93	76	62
3	Longreach	654	550	465	396	340	294	257	226	200	178	159	141	124	107	90	74	58	43	29	18
4	Carnarvon	209	181	157	137	120	105	93	82	73	66	59	53	47	41	36	31	27	22	18	14
5	Townsville	337	309	283	259	238	218	200	183	168	153	140	127	114	103	92	81	71	61	52	44
6	Alice Springs	681	562	464	385	321	269	228	196	170	148	130	113	99	84	70	56	43	29	17	7
7	Rockhampton	344	295	255	222	194	171	152	136	122	110	99	90	80	71	63	54	46	38	31	24
8	Moree	597	481	388	315	258	214	180	155	135	119	106	94	83	71	60	47	35	24	14	7
9	Amberley	407	334	275	226	187	157	132	113	97	85	75	67	59	52	45	38	31	24	18	12
10	Brisbane	245	203	167	139	116	97	83	71	62	55	48	43	38	34	30	25	21	17	13	10
11	Coffs Harbour	286	232	188	153	125	103	86	73	63	55	49	44	39	34	29	24	19	15	11	7
12	Geraldton	349	285	233	191	158	132	112	96	83	73	64	57	50	43	36	29	22	16	10	5
13	Perth	483	387	311	251	204	167	139	118	102	89	79	70	61	52	44	34	25	17	9	4
14	Armidale	801	661	545	451	375	314	266	227	195	169	147	128	110	93	76	60	43	27	13	1
15	Williamtown	429	349	284	232	191	159	133	114	98	86	76	67	58	50	42	34	26	19	12	6
16	Adelaide	584	480	394	325	270	227	192	165	143	125	109	96	83	70	58	46	33	22	11	3
17	Sydney East	286	230	184	148	120	98	81	68	58	50	44	39	35	30	26	22	17	13	9	6
18	Nowra	517	423	346	284	235	195	164	140	121	105	92	81	70	60	50	40	30	20	12	5
19	Charleville	525	434	359	298	249	209	177	151	131	114	100	87	76	66	56	45	35	26	17	9
20	Wagga	804	663	548	455	380	321	273	235	204	178	156	137	118	100	82	64	47	30	15	3
21	Melbourne	676	559	462	384	321	271	230	198	171	149	131	114	98	83	68	54	39	25	13	2
22	East Sale	791	653	541	449	376	317	269	231	201	175	153	133	115	98	80	63	46	30	15	2
23	Launceston	895	740	615	513	431	366	314	272	237	208	183	160	138	117	95	74	53	33	15	1
24	Canberra	957	792	657	547	458	387	330	284	247	216	189	165	142	120	99	77	56	35	17	2
25	Cabramurra	1666	1404	1188	1012	870	753	658	580	513	454	401	352	303	255	208	160	114	71	33	1
26	Hobart	876	723	598	498	417	354	303	262	229	202	177	155	134	113	92	71	51	31	14	0
27	Mildura	660	541	444	367	305	256	218	187	163	143	126	110	96	81	67	53	38	25	13	3
28	Richmond	555	450	365	298	245	203	171	146	127	112	99	87	77	66	55	44	34	23	14	7
29	Weipa	830	743	671	611	560	517	479	445	414	384	355	326	296	266	237	207	179	153	130	111
30	Wyndham	1229	1071	943	839	754	685	626	576	530	488	447	406	364	321	278	234	192	154	121	95

Table 4: Nationwide House Energy Rating Scheme star criteria (energy loads in MJ/m^2 conditioned floor area.annum) (Continued)

Climate region	Location	Star rating																			
		0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
31	Willis Island	427	391	359	330	305	282	261	242	224	207	191	176	160	146	132	118	105	93	81	71
32	Cairns	330	302	276	253	232	214	197	181	167	153	140	128	117	105	94	84	74	64	56	48
33	Broome	732	652	585	531	486	448	416	387	360	335	310	285	260	234	208	182	157	134	115	99
34	Learmouth	511	439	379	330	290	256	228	204	184	166	149	134	119	104	89	74	60	47	35	25
35	Mackay	275	248	224	202	183	165	150	136	123	112	102	92	83	75	68	60	53	47	40	34
36	Gladstone	220	191	167	146	129	114	101	90	81	73	66	59	53	48	42	37	32	28	23	19
37	Halls Creek	755	649	563	492	434	387	348	315	286	259	235	211	187	162	138	114	90	69	50	34
38	Tennant Creek	631	545	473	414	366	325	291	262	236	213	191	170	150	129	109	89	70	52	36	22
39	Mt Isa	656	560	481	417	363	320	284	253	227	205	184	164	145	126	108	90	72	55	40	28
40	Newman	631	527	442	373	318	273	237	207	183	162	144	127	111	95	80	64	49	35	22	11
41	Giles	517	429	357	298	252	215	185	161	142	126	111	98	86	73	61	49	36	25	15	7
42	Meekatharra	437	358	293	241	200	167	141	120	104	91	79	70	60	52	43	34	25	17	10	4
43	Oodnadatta	596	495	412	344	289	244	208	179	155	135	118	103	90	77	64	51	39	27	16	7
44	Kalgoorlie	490	396	320	259	211	173	144	122	105	91	80	70	61	52	43	34	25	17	9	3
45	Woomera	552	446	362	295	243	203	172	148	130	115	102	90	79	67	55	43	31	20	10	3
46	Cobar	580	469	379	308	253	210	176	151	131	115	101	89	78	67	55	44	32	21	11	4
47	Bickley	595	485	397	325	269	224	189	161	140	122	107	94	82	70	58	46	34	22	12	4
48	Dubbo	627	513	421	347	288	241	205	176	153	134	118	103	90	76	63	49	36	23	12	3
49	Katanning	664	537	436	354	290	241	202	172	149	130	114	100	87	74	61	48	34	22	11	2
50	Oakey	485	391	315	256	210	174	147	126	110	98	87	78	69	60	50	41	31	22	14	8
51	Forrest	498	401	324	262	213	175	146	124	107	93	82	72	63	53	44	35	25	16	8	2
52	Swanbourne	284	231	187	152	124	102	84	71	60	51	45	39	34	29	25	20	15	11	7	3
53	Ceduna	499	406	331	271	223	186	157	134	116	101	89	78	68	58	47	37	27	17	9	2
54	Mandurah	412	332	269	218	179	148	125	107	93	82	73	65	57	49	41	33	25	17	10	5
55	Esperance	430	351	286	233	191	158	132	111	95	82	71	62	54	46	38	30	22	14	7	1
56	Mascot	352	284	230	186	151	125	104	88	75	66	58	51	45	39	32	26	20	14	9	5
57	Manjimup	687	565	465	384	318	266	224	191	164	143	124	108	93	79	65	51	38	24	12	2
58	Albany	558	457	374	307	253	210	176	149	127	110	95	83	71	60	50	39	29	19	9	1
59	Mt Lofty	1173	987	833	706	603	518	448	391	342	301	264	230	198	166	136	105	76	48	22	1

Table 4: Nationwide House Energy Rating Scheme star criteria (energy loads in MJ/m^2 conditioned floor area.annum) (Continued)

Climate region	Location	Star rating																			
		0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
60	Tullamarine	797	663	552	462	388	328	280	241	209	182	158	138	118	100	82	64	47	30	15	2
61	Mt Gambier	849	702	582	484	405	341	290	250	216	189	165	144	124	105	86	67	48	31	15	1
62	Moorabbin	742	615	511	426	357	301	256	220	190	165	144	125	108	91	75	58	43	27	13	1
63	Warrnambool	867	716	593	493	413	349	298	258	224	197	173	151	130	110	90	70	51	32	15	2
64	Cape Otway	708	593	497	418	353	301	257	222	193	168	146	127	109	92	76	59	43	28	14	2
65	Orange	1156	964	807	679	575	492	424	369	324	285	250	219	189	159	130	101	72	46	22	2
66	Ballarat	1045	874	734	618	525	448	386	335	293	257	225	197	169	143	117	91	66	42	20	2
67	Low Head	668	554	460	384	322	273	233	201	175	153	133	116	100	85	69	54	39	24	11	0
68	Launceston Air	1048	867	719	600	505	428	367	318	278	245	215	188	162	137	112	86	61	38	17	0
69	Thredbo	1471	1238	1045	888	759	655	569	499	439	387	341	298	257	216	176	136	98	61	28	1

Table 5: Conditioned hours

The Scheme requires that for an energy assessment, certain types of spaces must be maintained at a thermally comfortable level appropriate to the designed function of that space, and during the periods associated with common usage for that function.

In Regulation Mode, accredited software must condition at least living and sleeping spaces according to the following schedule.

- For living spaces, conditioning being available from 0700 to 2400.
- For sleeping spaces, conditioning being available from 1600 to 0900.

Other types of spaces must be tested for thermal comfort during the periods associated with common usage for that function.

Table 6: Heating thermostat settings

In Regulation Mode the schedule of minimum heating thermostat settings is as follows:

- For living spaces (including kitchens and other spaces typically used during the waking hours): a heating thermostat setting of 20^{o} Celsius.
- For sleeping spaces (including bedrooms, bathrooms and dressing rooms, or other spaces closely associated with bedrooms): a heating thermostat setting of 18^{o} C from 0800 to 0900 and from 1600 to 2400; and a heating thermostat setting of 15^{o} C from 0100 to 0700.

Table 7: Indoor and outdoor adjustable shading settings

In Regulation Mode the schedule of indoor and outdoor adjustable settings are as follows:

Indoor adjustable shading

- Closed at 1800, open at 0700.
- Closed if outdoor temperature exceeds Cooling thermostat setting + 2.5°C
- Closed when incident direct solar irradiance on glazing exceeds 200 W/m^2.

Outdoor adjustable shading

- Closed if outdoor temperature exceeds *T*, where:
    - *T* = Cooling thermostat setting - 0.5°C, except
        - If Cooling thermostat setting - 0.5°C > 26.0°C, *T* = 26.0°C
        - If Cooling thermostat setting - 0.5°C < 24.0°C, *T* = Cooling thermostat setting
- Closed when incident direct solar irradiance on glazing exceeds 75 W/m^2.