How to use WERS
(window energy rating scheme)

The window energy rating scheme (WERS) ranks residential windows for their energy performance in typical housing anywhere in Australia. It will tell you whether a given window is suitable for the climate or not.

WERS is independent of any one manufacturer and acts as a fair, rigorous and credible system for testing performance claims.

Rated windows in WERS get from 0 to 5 stars for both cooling (summer) and heating (winter), depending on how they rank against the alternatives.

WERS rates the performance of a window, not the performance of the amount of windows used in a design.

WERS complements manufacturer's existing standards for wind, water penetration and safety (AS 1288 and AS 2047).

WERS enables residential windows to be rated and labelled for their energy and comfort impact on a whole house, in any Australian climate. For a general introduction to glazing. [See: Glass Overview]

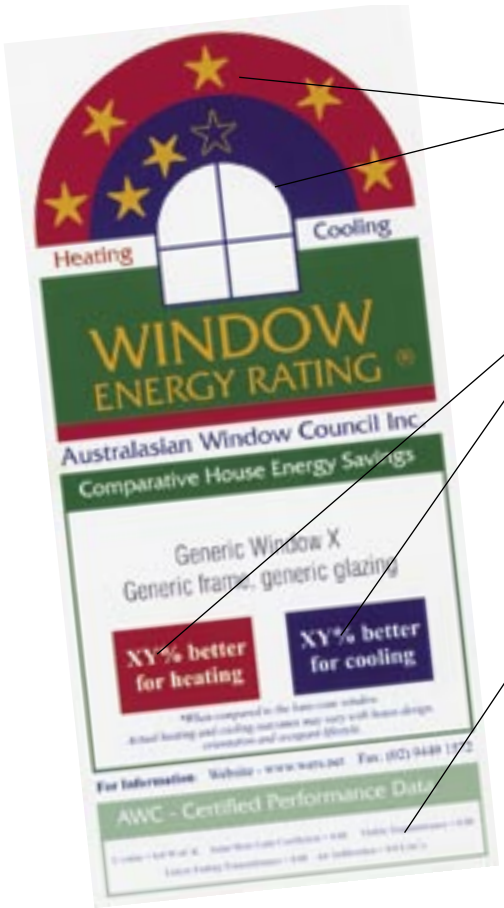
WERS AND OTHER RATING SCHEMES

The WERS ratings complement other energy rating schemes for consumer appliances, vehicles and buildings. The certified data from WERS plugs into the Nationwide House Energy Rating Scheme (NatHERS) and is used to provide star ratings for houses. For more information on NatHERS. [See: Rating Tools]

THE SKYLIGHT ENERGY RATING SCHEME (SERS)

In addition to WERS, a Skylight Energy Rating Scheme (SERS) has been developed. Some skylight manufacturers are currently using the system. It provides similar information to WERS, adjusted to skylight heating and cooling performance as well as additional information about daylighting performance.

THE WERS WINDOW RATING LABEL



The label includes:

Easy to understand star ratings for cooling and heating performance. The more stars, the more energy-efficient the window.

Indicative percent reduction in heating and cooling needs for the whole house, compared with base-case, single-glazed, standard aluminium window. The higher the percentage, the more you will save on your energy bills by installing the window.

Basic thermal, solar and optical performance data including the U-value for the window; the Solar Heat Gain Coefficient; Visible Transmittance; Fabric Fading Transmittance and Air Infiltration [See: Glazing Overview] for explanations of these terms. These figures help to determine if the window is right for your specific application and climate.

THE BASIS FOR THE STAR RATINGS

Rating of a window for energy performance starts with establishment of basic solar, thermal and optical properties of the glazing unit and window frame. These properties are determined by a combination of laboratory measurements and computer simulations.

Most windows can be rated through computer simulation alone. Occasionally, unusual or complex products may need to be measured by physical testing to establish their basic thermal behaviour.

Air infiltration must be measured according to procedures meeting Australian standard AS 2047. If air leakage data is not available, conservative default values are used as an input to the rating process.

Basic data for the window assembly is then plugged into the NatHERS software to determine the annual energy impact of the window on "a model house". This is a measure of the amount of annual (heating) energy that must be added to a house, and the amount of annual (cooling) energy that must be removed to keep the house within a comfortable temperature range.

WERS ranks windows in terms of their whole-house energy improvement when compared to the base-case window (a single-glazed clear window with a thermally unbroken aluminium frame). The rankings are then used to generate star ratings for cooling (summer and solar control performance) and heating (winter performance).

Separate scales of 0-5 stars for heating and cooling impact are expressed in half-star increments. This gives 11 levels of performance, which is sufficient to distinguish different products without confusing consumers.

The scales have been determined by rating 27 generic windows (see table next page) with the 5-star benchmark applying to products that have a high performance for heating and cooling but are also readily available on the Australian market.

The base-case window (WIN01) has zero stars for cooling but receives one star for heating due to its solar gain in winter, see "WERS star rating for generic windows".

Generic windows are not real products but are intended to represent products that are available on the Australian market. The star rating of many "real" products can be estimated by finding the generic window that is most similar.

A generic rating assigns default, conservative star ratings and basic solar/thermal data to a product according to the closest match in the list of generic windows.

A custom rating is an exact rating for a real product based on the results of a computer simulation using real data for the window. Custom ratings are generally a better option for manufacturers as they allow their product to be distinguished from others.

Some "real" products are already available on the Australian market that exceed the 5 star scale. The WERS rating scale will need to be adjusted in the future to allow for this.

WERS is based on extensive international research and experience and has been developed specifically for Australian conditions. The star ratings are valid for all orientations, all Australian climates and a wide range of window sizes, and both raised timber and concrete slab-on-ground floors. WERS ratings will be less accurate where there are:

> Very large glass areas where the total glass area is greater than 35 percent of the floor area, or

> Large areas of overhead glazing, including sunspaces, attached conservatories and large skylights.

WHAT TO LOOK FOR

Windows will carry a sticker certifying that the window has been energy rated. The star ratings are shown at the top of the sticker.

Heating performance is shown in red. Cooling performance is shown in blue.

The sticker also shows how much the window will reduce the energy used for heating and cooling compared to the base-case window (a single-glazed, standard aluminium window).

The higher the number, the more you will save on your energy bills. At the bottom of the sticker is some AWC-certified data on the thermal, solar and optical performance of the window.

As well as a sticker, the window manufacturer will issue a certificate and marketing material for the window type. This will show the same information as the sticker and spell out in detail the energy performance of the window. The window will be ranked against alternatives, either from the same company or its competitors.

USING WERS TO SELECT THE RIGHT WINDOW

The WERS ratings are independent of both climate and orientation but both these factors need to be considered when selecting the right window.

The three basic steps to select a window using the WERS rating are:

1. Identify the climate classification for your site.
2. Follow the window selection guidelines for your climate type and identify generic window types that might be suitable.
3. Compare the WERS star ratings for the suitable generic windows with products recommended by your local distributor and make a selection based on cost and performance.

1. Climate classification

Selection of the best window to use will depend on climate zone. For example, in Cairns a large, clear window will usually lead to overheating, discomfort and a need for cooling - either natural or artificial. The same window used in Hobart may improve comfort and save on heating energy because it admits beneficial solar heat. Home owners in these differing climates have different needs. To deal with this, WERS divides Australia into three climate classes.

This map can help to determine your climate class.

Heating climates are colder climates where at least 70 percent of the annual energy use predicted by NatHERS is used for heating.

Cooling climates are warmer climates where at least 70 percent of the annual energy use is used for cooling.

Mixed climates require significant amounts of both heating and cooling energy during the year.

The heating fraction is the percentage of annual energy used, as predicted by NatHERS, to heat the house. The table shows the climate classes and heating fractions for Australian capital cities.

This map can help to determine your climate class.

CITY	CLIMATE CLASS	HEATING FRACTION
Darwin	Cooling	0%
Brisbane	Cooling	19%
Perth	Mixed	31%
Sydney (Airport)	Mixed	57%
Adelaide	Mixed	68%
Melbourne	Heating	80%
Canberra	Heating	88%
Hobart	Heating	98%

2. Window selection guidelines

NatHERS has been used to model the energy use of a typical three bedroom detached house in three locations. Sydney was chosen to represent a mixed climate, Canberra was chosen to represent a heating climate and Townsville was selected to represent a cooling climate.

Simulations were conducted using all of the 27 generic windows types under WERS. The results were used to develop window selection guidelines for each climate type. The guidelines for each climate class are summarised in the following fact sheets:

Mixed climate - Glazing Solutions for Temperate Climates.

Heating climate - Glazing Solutions for Alpine and Cool Temperate Climates.

Cooling Climate - Glazing Solutions for Tropical, Subtropical and Hot Arid Climates.

Just choosing the 'right' window is not sufficient to ensure good energy performance. Consider also good passive design techniques such as orientation and shading. [See: Passive Design Introduction]

The heating star rating is important in heating climates, the cooling star rating is important in cooling climates and both ratings should be considered in mixed climates

Additional information on window selection can be found in [See: Glazing Overview] and the references at the end of this fact sheet.

Using the available window selection guidelines, you should be able to identify one or more generic window types that are suitable for your situation. Your window supplier will also be able to assist with the selection process.

3. Select a real window

Once you have identified the generic window types that are suitable for your situation, compare these with the window types available from your local supplier.

Look for windows that match or exceed the star ratings for the suitable generic windows and then make your final selection based on price, appearance and style.

HOW TO OBTAIN A WERS RATING

To participate in WERS, window makers must obtain ratings for their products from a rating organisation that is accredited by the Australasian Window Council. Their windows must meet all Australian standards, including AS2047-1999 (Windows in Buildings-Selection and Installation) and AS 1288-1994 (Glass in buildings - selection and installation).

WERS forms part of the quality assurance that smart manufacturers offer their customers. It is all about certified performance.

ADDITIONAL KEY REFERENCES

Window Energy Rating Scheme *Training Manual*, *Version 1.0*. Available from the Australasian Window Council Inc. (info@wers.net). WERS website, www.wers.net

Australian Window Association, www.awa.org.au

Efficient Windows Collaborative, www.efficientwindows.org

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WERS STAR RATINGS FOR GENERIC WINDOWS

Window Number	Glazing	Frame	Cooling Stars	Heating Stars
1	3mm single clear	Al, standard industry typical	zero	★
2	3mm single clear	Timber or uPVC	½	★★
3	single solar control, pyrolytic low-e	Al, standard industry typical	★★★	★½
4	single solar control, pyrolytic low-e	Al, thermally improved	★★★	★★½
5	single solar control, pyrolytic low-e	Timber or uPVC	★★★	★★½
6	3/6/3 clear IG, air fill	Al, standard industry typical	★½	★★½
7	3/6/3 clear IG, air fill	Al, thermally improved	★★	★★★½
8	3/6/3 clear IG, air fill	Timber or uPVC	★★	★★★½
9	3/12/3 clear IG, air fill	Al, standard industry typical	★½	★★★
10	3/12/3 clear IG, air fill	Al, thermally improved	★★	★★★★
11	3/12/3 clear IG, air fill	Timber or uPVC	★★	★★★★
12	3/12/4 pyrolytic low-e IG, argon fill	Al, standard industry typical	★★	★★★★
13	3/12/4 pyrolytic low-e IG, argon fill	Al, thermally improved	★★½	★★★★½
14	3/12/4 pyrolytic low-e IG, argon fill	Timber or uPVC	★★½	★★★★★
15	5mm toned	Al, standard industry typical	★½	zero
16	5mm toned	Timber or uPVC	★½	★★
17	5mm supertoned	Al, standard industry typical	★½	zero
18	5mm supertoned	Timber or uPVC	★★	★
19	5/6/5 toned IG with air fill	Al, standard industry typical	★★★	★½
20	5/6/5 toned IG with air fill	Al, thermally improved	★★★	★★½
21	5/6/5 toned IG with air fill	Timber or uPVC	★★★	★★★
22	5/12/4 supertoned low-e IG with argon fill	Al, standard industry typical	★★★★	★★
23	5/12/4 supertoned low-e IG with argon fill	Al, thermally improved	★★★★½	★★★½
24	5/12/4 supertoned low-e IG with argon fill	Timber or uPVC	★★★★½	★★★½
25	6/10/4 supertoned low-e IG with argon fill	Al, standard industry typical	★★★★½	★★
26	6/10/4 supertoned low-e IG with argon fill	Al, thermally improved	★★★★★	★★★
27	6/10/4 supertoned low-e IG with argon fill	Timber or uPVC	★★★★★	★★★½

Notes: Damage-weight transmittance (Tdw) applies to glazing only.

1. Negative % heating 'improvement' means performance is worse than base-case window 1.
2. Eg. window 15 certificate will read, "14% worse for heating".
3. Subscript 'w' denotes whole-window property.
4. Subscript 'c' denotes glazing-only property.