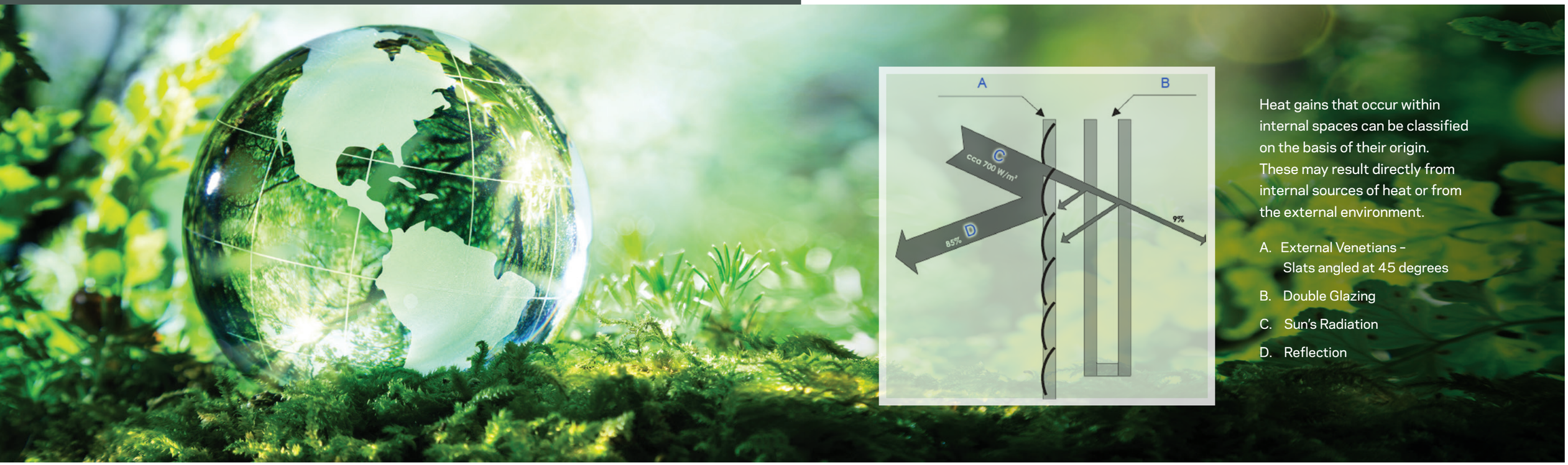
Effectiveness of ev80 & ev93D External Venetians

ISO 13785-1
BCA COMPLIANT
AS 1530.3-1999
CERTIFIED NON-COMBUSTIBLE



Heat gains that occur within internal spaces can be classified on the basis of their origin. These may result directly from internal sources of heat or from the external environment.

A. External Venetians – Slats angled at 45 degrees

B. Double Glazing

C. Sun's Radiation

D. Reflection

External versus Internal Shading Systems

Many reputable studies have been conducted into the efficiency of external and internal shading systems. Research findings by Australian Institutions and summary figures are available through the CSIRO. The objective with any shading device is, of course, to keep the inside temperature in a range where our bodies feel comfortable and perform at their best. It has been well established that these temperatures range between 18° and 25° Celsius. To achieve and maintain this comfort zone we need to spend valuable energy cooling and heating our homes and workplaces.

External Venetians from evaya are:

1. Adjustable for maximum exclusion of solar radiation relative to the suns position.
2. Adjustable to reflect light internally whilst also excluding heat.
3. Adjustable to maintain a high degree of direct view.
4. Adjustable to manage natural light without glare.
5. Adjustable to maintain a high degree of privacy whilst excluding heat.
6. Retractable to allow entire views through windows.
7. Able to allow and maximise winter solar heat gain.
8. Retractable for maintenance or window cleaning.
9. Self Cleaning.

Thermal Energy

Heat sources produce thermal energy which acts to directly increase air temperature. This thermal load may be absorbed by water vapour.

Internal sources of heat gain production include, but are not limited to, body heat, lighting, machinery and heat passage between rooms.

Heat gains from the external environment are caused by the passage of solar radiation through mediums and structures such as walls, ceilings, glazed window surfaces, doors and the infiltration of external air.

External Heat Gains have a decisive impact on the thermal load of buildings. Window design, surface area and orientation are all factors which affect this loading dramatically.

Utilising the innate properties of aluminium, which provides high solar radiation reflection and low absorption and transmission values, the ev80 & ev93D act to effectively reduce:

- household energy requirements.
- carbon dioxide and greenhouse gas emissions.
- expenditure.

Locally and environmentally, these systems maximise internal light and thermal comfort levels whilst allowing external views to be maintained.

evaya

Effectiveness of ev80 & ev93D External Venetians

Effective use of External Venetians

As a general rule, the ev80 and ev93D are lowered in the vertical or closed position and raised in the horizontal position (90 degrees). The slats can be tilted and rotated at various angles between these parameters. This may be altered, if required, with a maximum 160 degree operating range possible for the ev80.

To reduce heating energy requirements in Winter

In the space between a window and a closed external venetian, an air pocket forms which prevents heat from being transported outside. Buildings with unshaded windows will emit radiation towards the outside environment and experience significant energy loss as a result.

The slats act as an effective radiation shield to prevent the loss of heat. The amount of solar radiation and light entering through the glazing can also be incrementally controlled. Simply tilting the units allows sunlight to be focused into a room which assists with passive warming during the cooler months.

To reduce cooling loads in Summer

- Open the windows whenever the outside temperature is lower than the temperature inside the building.
- Close the windows when the outside temperature exceeds the inside temperature.
- If it is necessary to ventilate a room during high outside temperatures, do so briefly and intensively.
- Use cross ventilation whenever possible.
- Over the entire day keep the system in a closed position such that there is just enough light to eliminate the need for artificial lighting. (The visible spectrum of solar radiation contains a great deal of thermal energy which will heat up the room).
- Adjust the slats in such a way that ideal lighting is maintained using daylight for the whole day.
- Avoid using artificial lighting, noting that daylight provides the room with four times the brightness per watt, which in turn means that artificial lighting heats the room up to four times as much as daylight. In addition and most importantly, daylight increases people's sense of comfort.
- In the evening, they should be opened to enhance night-time cooling results.

ISO 13785-1
BCA COMPLIANT
AS 1530.3-1999
CERTIFIED NON-COMBUSTIBLE

evaya

Effectiveness of ev80 & ev93D External Venetians

Another important fact:
In achieving these results external venetians reduce daylight only by 20%

External Venetians Outperform Internal Shading Devices

Benchmarks set by the "German Industry Standard VDI" show external venetians outperform internal systems.

External venetians installed over glass areas with a northerly or westerly aspect prevent over 85% of heat entering a room whereas internal systems allow nearly 5 times as much energy to pass.

To achieve and maintain the same temperature with internal shading devices, larger investment in cooling systems is required.

Without external venetians it will cost on average 115% more to maintain and 140% more to run a buildings heating and cooling system.

Limits of Internal Applications

To achieve similar cooling results internally the air between the glass and the internal blind needs to be exchanged up to 20 times per hour. In situations where the glass area is more than 65% of the total wall area satisfactory results cannot be achieved by means of internal solar control.

Passage of heat flow through windows by convection and solar radiation

Heat passage by convection is determined by the window surface and the heat passage coefficient. (The higher the quality of glazing, the lower the coefficient), this is negligible in this instance.

The greatest contributor to heat flow through windows is solar radiation. Heat passage is calculated by determining the area of the windows surface exposed to the sun and its shading coefficient (s).

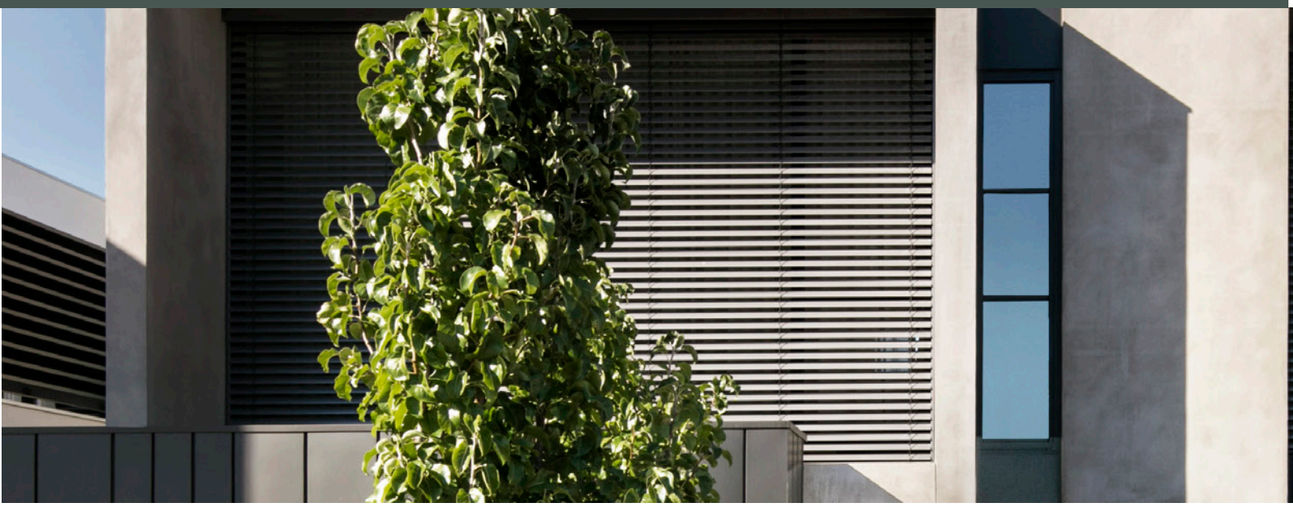
The shading coefficient expresses the percentage of radiation passing through a window. The value of this coefficient is determined by the type of glazing and shading affecting the window.

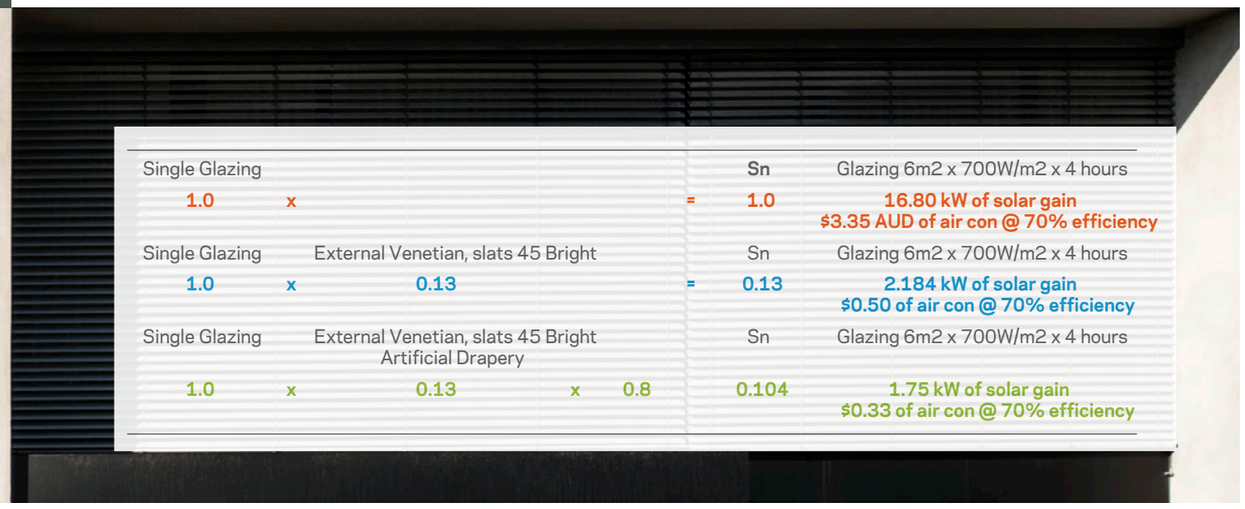
	NO SOLAR PROTECTION	INTERNAL VENETIANS	EXTERNAL VENETIANS	REFLECTIVE GLASS 66/44 WITH INTERNAL VENETIANS	REFLECTIVE GLASS 36/26 WITH INTERNAL VENETIANS
HEAT PENETRATION	90%	63%	13.50%	34%	20%
LIGHT PENETRATION	100%	80%	80%	66%	36%

ISO 13785-1
BCA COMPLIANT
AS 1530.3-1999
CERTIFIED NON-COMBUSTIBLE

evaya

Effectiveness of ev80 & ev93D External Venetians





Shading Co-Efficients

The table below clearly demonstrates that the use of External Venetians will reduce the heat passage through glass by 85% compared to utilising no shading at all.

The dollar values provided are based on approximate costs of electrical power per kW and values will vary according to the supply type.

Table of shading coefficients for various glazing types:

Glazing Type	S	Shading Method	S
Single glazing	1.0	Internal blinds, slats 45 - light	0.56
Double Glazing	0.90	Internal blinds, slats 45 - mid	0.65
Single Dethermal Glazing	0.70	Internal blinds, slats 45 - dark	0.75
Internal Standard Glazing	0.60	External Venetian, slats 45-light	0.15
Reflective Single Glazing	0.70	External Venetian, slats 45- bright	0.13
Reflective Single Glazing, superior quality	0.24	External Awnings, inner space ventilated	0.30
External Reflective Glazing	0.60	Internal Blinds, inter space ventilation	0.50
Double Reflective Glazing, superior quality	0.30	Reflective Curtains - light external reflective layer	0.60
Coloured Glazing - Light	0.80	Reflective Curtains - dark external reflective layer	0.70
Coloured Glazing - Dark	0.70	Cotton Drapery – artificial fibre	0.80
Reflective foil- Dark	0.25		
Reflective foil - Light	0.42		
Glass with wire insert	0.80		

Shading & Insulation

External Venetians also act as barriers against cold winter nights, and will reduce household energy costs in 2 ways:

1. The upfront investment into a smaller cooling and heating unit.
2. Ongoing savings in running and maintenance costs.

Solar Heat Gain is not appreciably reduced by using either single or double glazing if the glazing is unprotected.

Double Glazing provides the additional benefit, over single glazing, of a more stable and lower ambient temperature environment when used in conjunction with an External Venetian.
Light and highly reflective slat colours will act to provide maximum solar heat gain protection.
Other non-variable external shading, such as fabric blinds, window films, performance glazing or fixed shading, either block the entrance of natural light, retain and reflect heat and limit or obscure external views.

Summary

Streamlined and functional, the ev80 and ev93D are capable of efficiently shading large expanses of glass whilst at the same time creating a striking facade. Their unique design means they can be operated to allow the entrance of natural light without glare, all the while maintaining exterior views.

The aluminium slats can be either tilted to varying angles or retracted by remote control, switch operation or integration with CBUS and Building Management Systems. Incorporation of Sun and Wind Sensors means optimal operating parameters may be achieved automatically.

The ev80 and ev93D range are available for residential, commercial and architectural applications and can be found wherever high performance shading systems are required. Both are engineered and produced at our administration and manufacturing plant located on the Mornington Peninsula. This not only ensures we can provide unique lead times, it also means that critical client support is readily available.

ISO 13785-1
BCA COMPLIANT
AS 1530.3-1999
CERTIFIED NON-COMBUSTIBLE

evaya