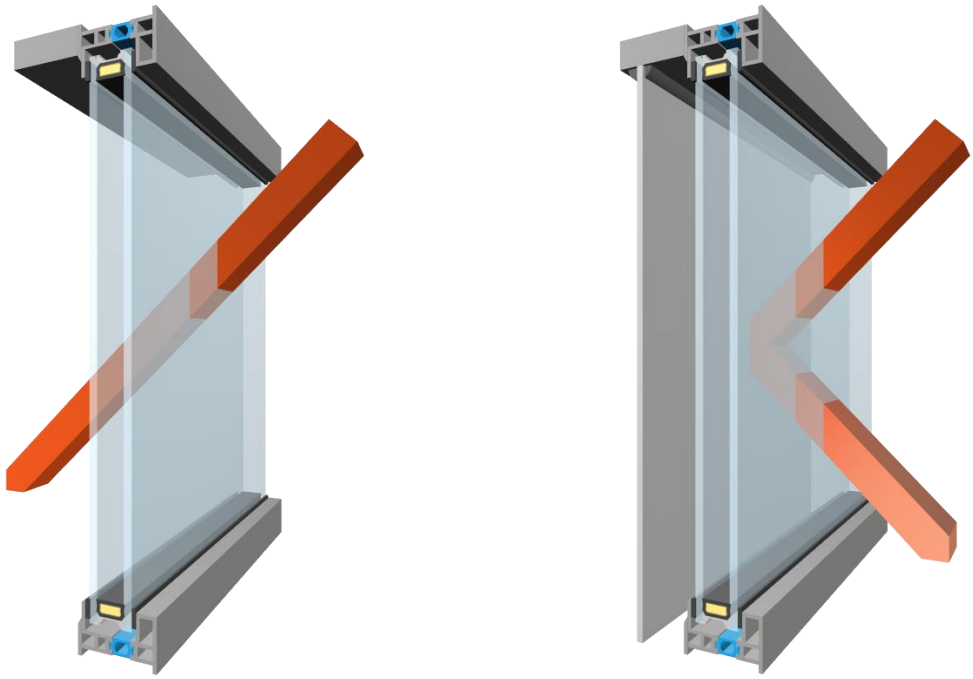
THERMAL SAFETY 2D
THE INFLUENCE OF BLINDS

Blinds installed behind glazing will influence the temperature of glass exposed to incident sunlight, by reflection of incident solar energy back onto the glazing and by trapping heated air against the inner surface of the glazing.

REFLECTED SOLAR ENERGY

Blinds would be expected to reflect a portion of incident solar energy back into the glazing, with the colour of the blinds influencing the amount of sunlight reflected. Light coloured blinds will typically reflect a greater amount of solar energy back into the glazing, compared to darker coloured blinds.



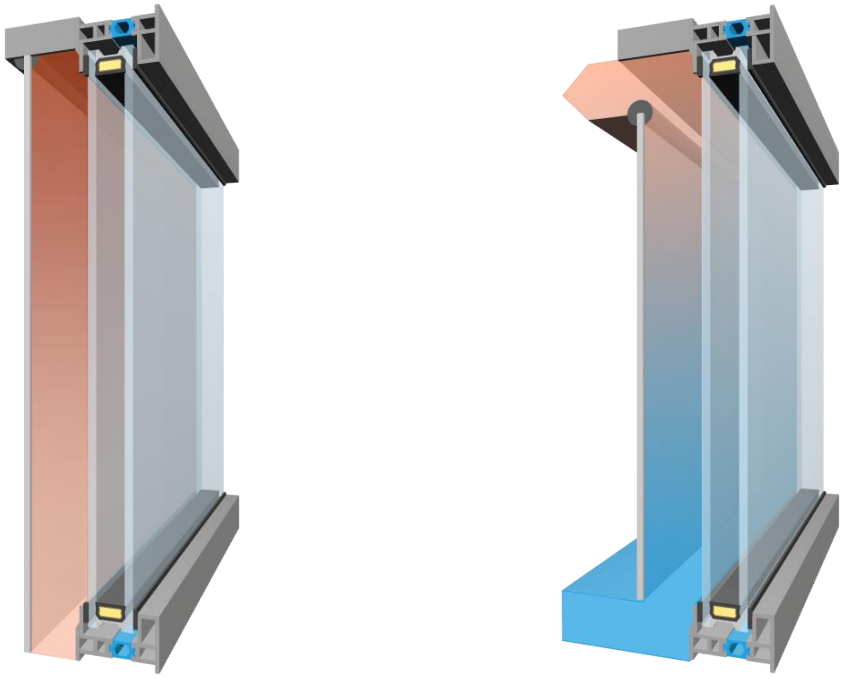
No Blinds Blinds

Figure 1 - Illustration of Blind Reflectance

HEAT BUILD-UP BEHIND THE GLAZING

As well as reflecting solar energy back into the glazing, the blinds, and the air space between the blinds and the glazing, will heat up due to exposure to incident sunlight. The level of heat build-up in the space between the blinds and glazing will be dependent on the level of ventilation provided for warmer air to escape, through the stack effect.

With sufficient gaps at the top and bottom of the blinds, as well as distance from the glazing, warm air can rise out from the space and will not build up to the same extent behind the glazing. The below parameters will determine whether, for the purpose of calculation, the blinds are considered ventilated, unventilated or blackout styles.

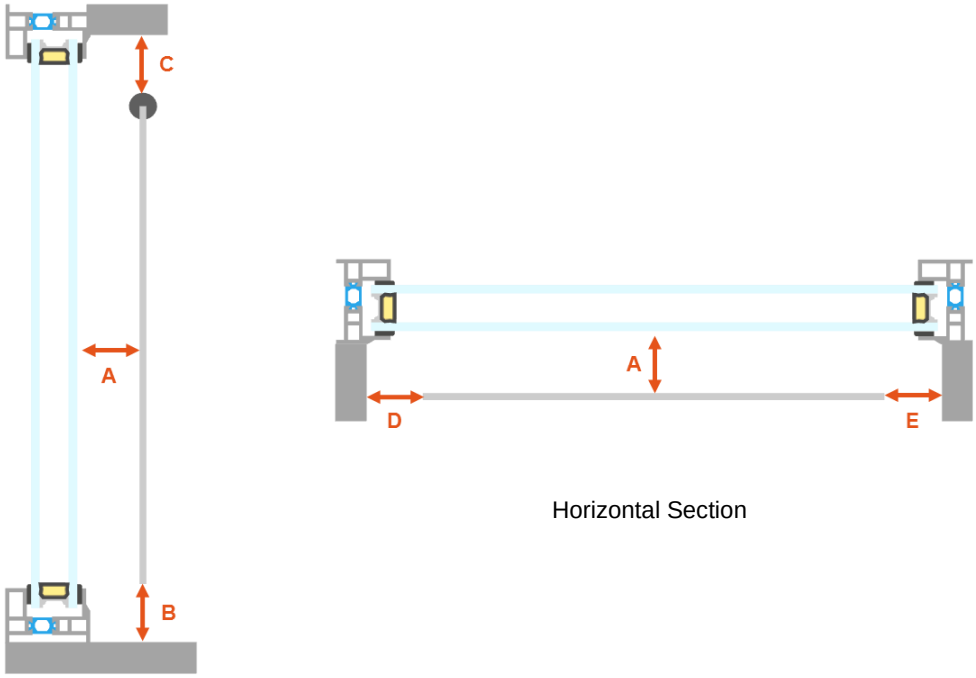


No Ventilation Ventilation

Figure 2 - Illustration of Blind Ventilation

Table 1 - Requirements for Blind Ventilation in Calculation

Blind Condition	Dimensional Requirements (mm)
Ventilated	A, B and C ≥ 50
Unventilated	A, B and C ≥ 25 Or A, B, D and E ≥ 25
Blackout	A, B or C < 25



Vertical Section

Horizontal Section

Figure 3 - Blind Ventilation Dimensions

All of the dimensions must be above the required value. For example, a 50 mm gap at the bottom of the blinds and from the glazing will allow air to flow in. However, if there is no gap at the top of the blinds, warmer air won't be able to escape.

BLIND STYLE

As well as the gaps present around the blinds, the style of the blind will also influence the potential for ventilation. Venetian blinds, or slats, typically will allow airflow, to some degree, through the construction of the blinds themselves. Screen and roller blinds are typically considered to be a solid material with no porosity or gaps within the construction to allow warm air to move away from the glazing.

INFLUENCE ON CALCULATED TEMPERATURE DIFFERENCES

The influence of blinds on the calculated temperature differences is simplified based on the aforementioned conditions, ventilated, unventilated and blackout style, as well as the colour of the blind, and is defined by a temperature increase to modify the calculated temperature differences (ΔT_c), as below;

Outer Pane: $$\Delta T_{c;1} = \left[\Delta T_{b;1} + T_{bl;1} + T_{bu;1}\right] \cdot F_S \cdot F_F$$

Inner Pane: $$\Delta T_{c;2} = \left[\Delta T_{b;2} + T_{bl;2} + T_{bu;2} + C_F \cdot (T_i - T_e)\right] \cdot F_S \cdot F_F$$

When both backups (see **Thermal Safety Document 2E**) and blinds are present, they will be considered to be mutually exclusive, as where they overlap, one will exclude the other. As such, the worst case situation is taken when assessing thermal safety.

Table 2 - Blind Factors for Calculation

Pane	Condition	Colour	U≥2.5 W/m²K	U<2.5 W/m²K
Outer	Ventilated	Dark	0	0
		Light	6	4
	Unventilated	Dark	0	0
		Light	6	4
	Blackout	Dark	5	5
		Light	5	5
Inner	Ventilated	Dark	6	4
		Light	8	6
	Unventilated	Dark	7	5
		Light	11	8
	Blackout	Dark	18	25
		Light	18	25