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CLIENT REPORT


Thermal modelling to determine the U-value of an aluminium bifold door

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A product datasheet was provided for the central pane U-value of the glazing, indicating its U-value to be 1.0 W/m²K. The make-up of the glazing is given below. (Note that the U-value quoted on the datasheet has not been independently verified during this work.) The glass has been included in the models and an equivalent thermal conductivity assigned to the glazing void between the panes to meet that declared U-value.

Glazing 1	Planiclear 3mm PVB standard 0.76mm Planiclear 4mm Cool-lite SKN 176
Cavity 1	Argon 90% 16mm
Glazing 2	Planiclear 4mm T

3. Assessment results

The centre pane U-value of the glazed unit was taken from the manufacturers datasheet. This was represented in the models as 1x 4mm and 1x 8mm glass panes with a cavity void assigned between the panes, with an equivalent thermal conductivity to achieve the declared overall glazed U-value of 1.0 W/m²K. (Trisco has the function of calculating U-values through a designated plane through the model.)

3.1 Frame U-values

U-values of the door frame profile sections are given in Table 2. These have been determined from thermal models in accordance with BS EN ISO 10077-2, where the glazing is replaced in the model with an insulated panel of a set thermal conductivity (0.035 W/mK) and is therefore independent of any effects of the glazing/ connection. These U-values are applied to the respective frame areas.

Table 2: Frame U-values

	Calculated frame U-values W/m²K
Head	2.68
Threshold	2.68
Jamb 1	2.80
Jamb 2	2.62
Central sections	2.21

3.2 Frame/ glazing connection ψ -values

Additional heat loss associated with the glazing edge/ frame connections are reported as ψ -values in Table 3. These are applied to the 'visible perimeter' of the glazing within the frame. Additionally, a further ψ -value has been determined representing the linear connection/ joint where the seals meet in the central frame sections.

Table 3: Glazing edge/ frame connection ψ -values

	Calculated frame/ glazing edge ψ-values W/mK
Head	0.015
Threshold	0.015
Jamb 1	0.015
Jamb 2	0.015
Central sections	0.016
Joint in central sections	0.223

Note that the ψ -value quoted for the central sections represents the glazing connections on either side of the frame.

3.3 Overall door U-values

Areas and lengths for application of the above values to a door of overall dimensions 2.500m x 2.725m are given in Table 4. Areas of corners have been assigned to the jambs. The area above the central frame sections have been assigned to the head. Overall door U-values are reported in Table 5.

Modelling diagrams are included in Annexe B.

Table 4: Glazing and frame areas and visible perimeter/ length of glazing/ frame connections

	Visible area (for U-values) m²	Visible perimeter/ length (for ψ-values) m
Head	0.242	2.280
Threshold	0.242	2.280
Jamb 1	0.300	2.513
Jamb 2	0.289	2.513
Central sections	0.613	10.052
Joint in central sections	-	5.026
Centre pane glazing	5.076	-

Table 5: Overall door U-values (for door size 2.500m x 2.725m)

Total heat loss from U-values W/K	Total heat loss from ψ-values W/K	Total door area m²	Overall door U-value W/m²K
9.32	1.42	6.81	1.58