



Glazing dimensions and properties			
<b>All to 3DP</b>			
Thickness of pane 1	0.004	m	
Pane1/2 distance	0.02		
Thickness of pane 2	0.004		
Pane2/3 distance			
Thickness of pane 3			
Thermal transmittance of glazing-2DP	$U_g$ 1.19	W/(m <sup>2</sup> ·K)	
Glazing solar factor, g-value-2DP	$g$ 0.71		
Window air leakage at 50 Pa per hour and per unit length of opening light (BS 6375-1)-2DP	0.06	m <sup>3</sup> /(m·h)	
	To nearest 0.05	0.05	m <sup>3</sup> /(m·h)
Window air leakage at 50 Pa per hour and per unit area (for GGF window)-2DP			m <sup>3</sup> /(h·m <sup>2</sup> )
	To nearest 0.05		m <sup>3</sup> /(h·m <sup>2</sup> )

Window Dimensions:			
Section	Length (m)	Width (m)	Area (m <sup>2</sup> )
Fixed light	1.3720	0.5170	0.7093
Opening light	1.2800	0.4170	0.5338
Total glazing, $A_g$			1.2431
Frame			
F2	0.6150	0.0540	0.0306
F3	0.6150	0.0540	0.0306
F1	1.4800	0.0540	0.0770
F4	0.6150	0.0540	0.0306
F5	0.5170	0.0460	0.0215
F7	0.6150	0.0540	0.0306
F6	0.5170	0.0460	0.0215
F8	1.3720	0.0460	0.0610
F9	1.4800	0.0540	0.0770
F10	1.3720	0.0540	0.0716
F11	1.4800	0.0880	0.1255
Total Frame			0.5773
Total Window, $A_w$			1.820400

Visible glass area ( $A_g$ )	1.22150
Percentage glass area	67.10%

Solar Factor, g-value:	
$F_w$	0.9
$g_w$	0.43

BFRC Rating kWh/(m <sup>2</sup> ·yr)	EWER Rating Scale
= 0	A
-10 to <0	B
-20 to <-10	C
-30 to <-20	D
-50 to <-30	E
-70 to <-50	F
<-70	G

**Project details**

Design 5 Uni  
1.19 Centre Pane (G Glass = .71) Swisspacer  
Yellow input, green intermediary, blue finals  
X' DP is no. of decimal points to enter

**Input Values:**

Parameter Symbol Units

All F values to nearest 0.0005

Total window height 2DP(3DP?)	$l_w$	1.48	m
Total window width 2DP(3DP?)	$b_w$	1.23	m
F1 fixed jamb (b <sub>f</sub> )		0.054	m
F2 fixed head (b <sub>f</sub> )		0.054	m
F3 fixed sill (b <sub>f</sub> )		0.054	m
F4 fixed (b <sub>f</sub> )		0.054	m
F5 moving (b <sub>f</sub> )		0.046	m
F7 fixed (b <sub>f</sub> )		0.054	m
F6 moving (b <sub>f</sub> )		0.046	m
F8 moving (b <sub>f</sub> )		0.046	m
F9 fixed (b <sub>f</sub> )		0.054	m
F10 moving (b <sub>f</sub> )		0.054	m
F11 fixed (b <sub>f</sub> )		0.088	m
Mullion		0.088	m
Gaskets or beading protrusion 3DP		0.003	m

b <sub>p</sub> (m)			
F1 fixed frame conduction	$L_f^{2D}$	0.2756	0.190
F2 fixed head conduction		0.2756	0.190
F3 fixed sill conduction		0.2756	0.190
F4+F5 sash head conduction		0.3447	0.190
F6+F7 sash sill conduction		0.3447	0.190
F8+F9 sash jamb conduction		0.3447	0.190
F10+F11 mullion conduction		0.5904	0.380

All L values to 4DP. All b values to nearest 0.001			
F1 fixed frame conduction	$L_f^{2D}$	0.3281	0.190
F2 fixed head conduction		0.3281	0.190
F3 fixed sill conduction		0.3281	0.190
F4+F5 sash head conduction		0.3986	0.190
F6+F7 sash sill conduction		0.3986	0.190
F8+F9 sash jamb conduction		0.3986	0.190
F10+F11 mullion conduction		0.6980	0.380

Where a  $U_w$  value from hot box testing is available, no  $L_f^{2D}$  or  $L_f^{2D}$

values need to be entered

Thermal transmittance of window from hot box testing-2DP	$U_w$		W/(m <sup>2</sup> ·K)
	To nearest 0.05		

**Frame:** Data from EN.673.  $U_g$  and  $e$  to 2DP.  $K_{eff}$  to 4DP. All d to nearest 0.0001m

Section	$b_f$ (m)	$U_f$ W/(m <sup>2</sup> ·K)	Frame areas		Heat flow W/K	$U_g$ W/(m <sup>2</sup> ·K)	Heat flow W/K
			m <sup>2</sup>	W/(m <sup>2</sup> ·K)			
F1 fixed frame	0.054	1.4764	0.0770	0.1137	0.0220	1.372	0.0302
F2 fixed head	0.054	1.4764	0.0306	0.0451	0.0220	0.517	0.0114
F3 fixed sill	0.054	1.4764	0.0306	0.0451	0.0220	0.517	0.0114
F4+F5 sash head	0.1	1.4882	0.0520	0.0775	0.0240	0.417	0.0100
F6+F7 sash sill	0.1	1.4882	0.0520	0.0775	0.0240	0.417	0.0100
F8+F9 sash jamb	0.1	1.4882	0.1380	0.2054	0.0240	1.28	0.0307
F10+F11 mullion	0.142	1.3989	0.1971	0.2757	0.0470	1.326	0.0623
<b>Totals</b>			<b>0.5773</b>	<b>0.8399</b>		<b>Total</b>	<b>0.1660</b>

$U_w = 1.37$  W/(m<sup>2</sup>·K)

Other parameters needed for calculation, taken from simulations:

$I_p = 0.035$ W/(m·K)	Panel thickness, $d_p = d_g = 0.028$ m
$R_{se} = 0.04$ m <sup>2</sup> ·K/W	$R_p = 0.8000$ m <sup>2</sup> ·K/W
$R_{ext} = 0.9700$ m <sup>2</sup> ·K/W	$R_{si} = 0.13$ m <sup>2</sup> ·K/W
	$U_p = 1.0309$ W/(m <sup>2</sup> ·K)

Air Leakage Loss:	
Total air leakage=	0.19 m <sup>3</sup> /h
$L_{50} =$	0.10 m <sup>3</sup> /(m <sup>2</sup> ·h)
Heat loss =	0.0165 $L_{50}$
	0.00 W/(m <sup>2</sup> ·K)

Opening light length(internal) 3.778m

BFRC Rating = 218.6g window - 68.5 x ( $U_{window}$  + Effective  $L_{50}$ ) = 0.15

Window Rating	<b>A</b>
Labelling index, kWh/(m <sup>2</sup> ·yr)	<b>0</b>
Thermal transmittance, W/(m <sup>2</sup> ·K)	$U_{window}$ <b>1.4</b>
Solar factor	$g_{window}$ <b>0.43</b>
Window air leakage heat loss, W/(m <sup>2</sup> ·K)	$L_{factor}$ <b>0.00</b>

