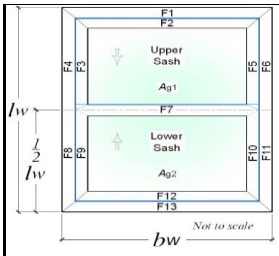


**Sample Style:**

**Vertical Sliding Sash**

*Blue line illustrates opening light length (air leakage)*

Report Number:

Report Date: 30/10/2019

Project Details: Softwood VS with spiral balances. Chromatech Ultra F & Argon, 0.03 Emissivity Glass

**THIS SPREADSHEET IS THE PROPERTY OF THE BFRC AND CAN ONLY BE USED IN CONJUNCTION WITH A BFRC LICENCE APPLICATION**

**Input Values:**
Yellow input, green intermediary, blue finals — X' DP is no.of decimal place to enter

| *Parameter* | *Symbol* | | *Units* |
|---|---|---|---|
| Total window height ***0DP*** | $l_w$ | 1480 | mm |
| Total window width ***0DP*** | $b_w$ | 1230 | mm |

Frame offset: No

Nominal 4mm etc to ***0DP***, others ***1DP***

| **Glazing dimensions and properties:** | | | |
|---|---|---|---|
| Thickness of pane 1, $d_{p1}$ | | **4.0** | mm |
| Glazing fill thickness 1/2, $d_{gf1}$ | | **16.0** | mm |
| Gas fill (1/2) | | **Argon 90%** | |
| Thickness of pane 2, $d_{p2}$ | | **4.0** | mm |
| Complete next 3 cells for TG IGU | | | |
| Glazing fill thickness 2/2, $d_{gf2}$ | | | mm |
| Gas fill (2/3) | | | |
| Thickness of pane 3, $d_{p3}$ | | | mm |
| Glazing Trans. - ***3DP*** | $U_g$ | **1.124** | W/(m²·K) |
| *g* -value - ***2DP*** | $g_\perp$ | **0.64** | |

Thermal transmittance of window from hot box test

$U_w$ **- 2DP** W/(m²·K)

| **Window Dimensions:** | | | Area, A | |
|---|---|---|---|---|
| | Length, l | Width, b | No gasket | With gasket |
| Section | m | m | m² | m² |
| Upper glazing | 0.6235 | 1.0440 | 0.6509 | 0.6476 |
| Lower glazing | 0.5745 | 1.0420 | 0.5986 | 0.5954 |
| Total of glazing | | | 1.2496 | 1.2430 |
| Frame | m | m | m² | m² |
| F1 | 1.2300 | 0.0550 | 0.0646 | 0.0646 |
| F2 | 1.1200 | 0.0390 | 0.0422 | 0.0432 |
| F3 | 0.6850 | 0.0380 | 0.0249 | 0.0255 |
| F4 | 0.7400 | 0.0550 | 0.0392 | 0.0392 |
| F5 | 0.6850 | 0.0380 | 0.0249 | 0.0255 |
| F6 | 0.7400 | 0.0550 | 0.0392 | 0.0392 |
| F7 | 1.1200 | 0.0450 | 0.0487 | 0.0508 |
| F8 | 0.7400 | 0.0550 | 0.0388 | 0.0388 |
| F9 | 0.6710 | 0.0390 | 0.0243 | 0.0249 |
| F10 | 0.6710 | 0.0390 | 0.0243 | 0.0249 |
| F11 | 0.7400 | 0.0550 | 0.0388 | 0.0388 |
| F12 | 1.1200 | 0.0740 | 0.0800 | 0.0810 |
| F13 | 1.2300 | 0.0690 | 0.0811 | 0.0811 |
| Total Frame | | | 0.5708 | 0.5774 |
| Total Window, Aw | | | 1.8204 | 1.8204 |
| Percentage upper glass area | | | 35.76% | 35.57% |
| Percentage lower glass area | | | 32.88% | 32.71% |
| Percentage glass area (total) | | | 68.64% | 68.28% |

| **Solar Factor, *g* - value:** | glazing area $A_g$ (m²) | 1.3124 |
|---|---|---|
| | $F_w$ | 0.9 |
| | $g_w$ | 0.42 |

| $U_{window}$ | No bars; or attached bars | 1.41 | W/(m²·K) |
|---|---|---|---|
| | Single cross bar in IGU | 1.5 | |
| | Multiple cross bar in IGU | 1.6 | |
| | Glazing bar (Georgian bar) | 1.8 | |

| **BFRC Rating** kWh/(m²·yr) | **Label index** | **EWER Rating Scale** | **Window Rating** |
|---|---|---|---|
| ≥10 | N/A | A+ | N/A |
| 0 to <10 | | A | |
| -10 to <0 | | B | |
| -20 to <-10 | | C | |
| -30 to <-20 | | D | |
| -50 to <-30 | | E | |
| -70 to <-50 | | F | |

| **Frame dimensions (All frame values to 0dp, gaskets to 1DP)** | | Frame height, $b_f$ (mm) Internal | External | Gasket protrusion (mm) | With gasket (mm) | Total |
|---|---|---|---|---|---|---|
| F1 fixed top rail | | 55 | 55 | n/a | 55.0 | 95.0 |
| F2 moving top rail | | 39 | 39 | **1.0** | 40.0 | |
| F3 top (LH) jamb (moving sash) | | 38 | 38 | **1.0** | 39.0 | 94.0 |
| F4 top (LH) jamb (fixed frame) | | 55 | 55 | n/a | 55.0 | |
| F5 top (RH) jamb (moving sash) | | 38 | 38 | 1.0 | 39.0 | 94.0 |
| F6 top (RH) jamb (fixed frame) | | 55 | 55 | n/a | 55.0 | |
| F7 mid rail | (upper) | 45 | | **1.0** | 47.0 | 47.0 |
| | (lower) | | | **1.0** | | |
| F8 bottom (LH) jamb (fixed frame) | | 55 | 55 | n/a | 55.0 | 95.0 |
| F9 bottom (LH) jamb (moving sash) | | 39 | 39 | **1.0** | 40.0 | |
| F10 bottom (RH) jamb (moving sash) | | 39 | 39 | 1.0 | 40.0 | 95.0 |
| F11 bottom (RH) jamb (fixed frame) | | 55 | 55 | n/a | 55.0 | |
| F12 bottom moving rail | | 74 | | **1.0** | 75.0 | 144.0 |
| F13 bottom fixed rail | | 69 | | n/a | 69.0 | |
| | | | Total gasket area | 0.00656 | m² | |

Where a *Uw* value from hot box testing is available, no $L_f{}^{2D}$ or $L_\psi{}^{2D}$ values need to be entered

| **Frame conductance:** | All *L* values to ***4DP***. All b values to ***0DP*** | | | | |
|---|---|---|---|---|---|
| | W/(m·K) | $b_p$ (mm) | | W/(m·K) | $b_g$ (mm) |
| F1+F2 top rail | **0.3528** | **200** | | **0.3917** | 200 |
| F3+F4 top (LH) jamb | **0.3535** | 200 | | **0.3923** | 200 |
| F5+F6 top (RH) jamb | 0.3535 | 200 | | 0.3923 | 200 |
| F7 mid rail | **0.6097** | 400 | | **0.6874** | 400 |
| F8+F9 bottom (LH) jamb | **0.3573** | 200 | | **0.3966** | 200 |
| F10+F11 bottom (RH) jamb | 0.3573 | 200 | | 0.3966 | 200 |
| F12+F13 bottom rail | **0.4357** | 200 | | **0.4752** | 200 |

$L_f{}^{2D}$ $L_\psi{}^{2D}$

| **Frame:** Section | Frame width, $b_f$ | Frame U-value, $U_f$ | Frame areas, $A_f$ | Frame heat flow, HU | Linear trans, Ψ | Linear length, $l_g$ | Junction heat flow, Hψ |
|---|---|---|---|---|---|---|---|
| | m | W/(m²·K) | m² | W/K | W/(m·K) | m | W/K |
| F1+F2 top rail | 0.0940 | 1.2668 | 0.1068 | 0.1353 | 0.0478 | 1.0440 | 0.0499 |
| F3+F4 top left jamb | 0.0930 | 1.2879 | 0.0640 | 0.0825 | 0.0477 | 0.6235 | 0.0298 |
| F5+F6 top right jamb | 0.0930 | 1.2879 | 0.0640 | 0.0825 | 0.0477 | 0.6235 | 0.0298 |
| F7 mid rail | 0.0450 | 3.1612 | 0.0487 | 0.1538 | 0.0955 | 1.0430 | 0.0997 |
| F8+F9 btm left jamb | 0.0940 | 1.3147 | 0.0631 | 0.0829 | 0.0482 | 0.5745 | 0.0277 |
| F10+F11 btm right jamb | 0.0940 | 1.3147 | 0.0631 | 0.0829 | 0.0482 | 0.5745 | 0.0277 |
| F12+F13 bottom rail | 0.1430 | 1.4124 | 0.1611 | 0.2275 | 0.0484 | 1.0420 | 0.0505 |
| | | Totals | 0.5708 | 0.8475 | | Total | 0.3150 |

**Air Leakage loss:**
Air leakage at 50 Pa per hour & per unit length of opening light (BS 6375-1) - ***2DP*** — m³/(m·h)

| Opening light length, $l_{opening}$ | 6.2320 | m | Total air leakage | 0.000 | m³/h |
|---|---|---|---|---|---|
| $L_{50}$ | 0.00 | m³/(m²·h) | Heat loss = 0.0165 $L_{50}$ | 0.00 | W/(m²·K) |

Other parameters needed for calculation, taken from simulations:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $\lambda_p$ = | 0.035 | W/(m·K) | $R_{se}$ = | 0.04 | m².K /W | $d_p = d_g$ = | 0.024 | m |
| $R_p$ = | 0.6857 | m².K /W | $R_{tot}$ = | 0.8557 | m².K/ W | $R_{se}$ = | 0.13 | m².K /W |
| | | | | | | $U_p$ = | 1.1686 | W/(m²·K) |

| **BFRC Rating =** | |
|---|---|
| **218.6*g* $_{window}$ - 68.5 x ($U_{window}$ + Effective $L_{50}$) =** | **N/A** |
| **Climate zone is:** | **UK** |

| **Thermal transmittance, W/(m²·K)** | $U_{window}$ | **1.4** |
|---|---|---|
| **Solar factor** | $g_{window}$ | **0.42** |
| **Window air leakage heat loss, W/(m²·K)** | $L_{factor}$ | **N/A** |

British Fenestration Rating Council

**BFRC Certified**

**Simulator Name:**