

Daylight Report

Avro Hollows, Newton Heath



Revision Control

Project Name: Avro Hollows, Newton Heath

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Calculation Methods

BS EN 17037:2018+A1:2021 Daylight in Buildings

Kitchen target 200 lux. Table NA.1

Daylight factor to approximate to 200 lux at latitude 53.55 is 1.4%. Table NA.5

Guidance (based on the Code for Sustainable Homes) using the method described in Littlefair (1998) as set out in BS 8206-2

Average daylight factor

The average daylight factor is the average indoor illuminance (from daylight) on the working plane within a room, expressed as a percentage of the simultaneous outdoor illuminance on a horizontal plane under an unobstructed CIE 'standard overcast sky'. The average daylight factor can be calculated using the following equation:

$$DF = \frac{MWuT}{A(1-R2)}$$

Where:

W = total glazed area of windows or roof lights

A = total area of all the room surfaces (ceiling, floor, walls and windows) R = area-weighted average reflectance of the room surfaces

M = a correction factor for dirt

T = glass transmission factor

u = angle of visible sky

Guide values for a typical dwelling with light-coloured walls are as follows (for more accurate values, refer to CIBSE Lighting Guide 10):

R = 0.5

M = 1.0 (vertical glazing that can be cleaned easily)

0.8 (sloping glazing)

0.7 (horizontal glazing)

T = 0.7 (double glazing)

0.6 (double glazing with low emissivity coating)

0.6 (triple glazing)

u = 65° (vertical glazing)

Note: It is advised that this default figure for the angle of visible sky is used with caution; the methodology detailed in the angle of visible sky definition must be preferred for more accuracy.

Angle of visible sky

The angle of visible sky u is the angle subtended, in the vertical plane normal to the window, by the visible sky from the centre of the window.

Where:

Hw is the height of the window

Tw is the thickness of the wall

D is the distance from the window to the obstruction

H is the height of the obstruction above the mid-height of the window

u = 90-a-b

tan a = H/D

tan b = Tw/Hw

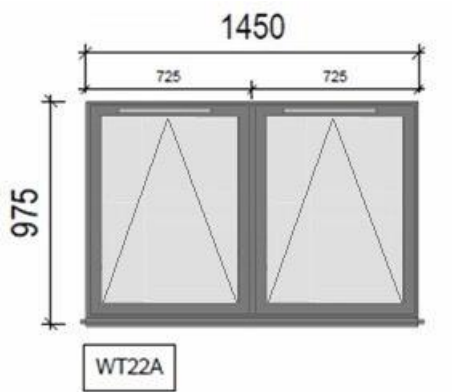
Executive Summary

For this report, we have been tasked with calculating the daylight factor of an existing window and comparing with our option for the proposed retrofit window.

To meet ventilation requirements for the ground floor kitchens of existing 2-storey cottage flats, it is proposed by the design team that ventilation outlets be fitted within solid aluminium infill panels instead of the existing glazed panels. This proposal might reduce the area of glazing that receives daylight, and we have carried out calculations to prove if this is the case or not and compare the impact on daylight factors.

Our calculations indicate that the proposal equals the daylight factor of the existing.

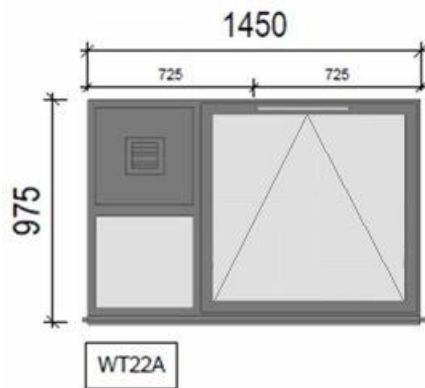
Existing Window



Room Areas		Project Notes/Supporting Information
Ceiling (m2)	7.16	
Floor (m2)	7.16	
Walls (Inc Windows) (m2)	26.83	
Total surface area of room	41.15	
Glazing Info		
Glazed Area (exclude frames & mullions) (m2)	0.88	
Correction factor for dirt (M)	1	
Light Transmittance	0.6	
Average Daylight Factor Calculation		
Formulas		
DF=M.W.u.T/A(1-R ²)		
Total glazed area of windows or room lights	W	0.88
Total area of all the room surfaces (ceiling, floor, walls and windows)	A	41
Area-weighted average reflectance of the room surface*	R	0.5
Correction factor or dirt	M	1
Glass transmittion factor	T	0.6
angle of visible sky	u	65
Results		
Summary of Daylight factor - DF		Target Average Daylight Factor %
Average Daylight Factor Calculation	1.1%	2

Proposed Window

Option



Room Areas		Project Notes/Supporting Information
Ceiling (m2)	7.16	
Floor (m2)	7.16	
Walls (Inc Windows) (m2)	26.83	
Total surface area of room	41.15	
Glazing Info		
Glazed Area (exclude frames & mullions) (m2)	0.86	
Correction factor for dirt (M)	1	
Light Transmittance	0.6	
Average Daylight Factor Calculation		
Formulas		
$DF = M \cdot W \cdot u \cdot T / A(1 - R^2)$		
Total glazed area of windows or room lights	W	0.86
Total area of all the room surfaces (ceiling, floor, walls and windows)	A	41
Area-weighted average reflectance of the room surface*	R	0.5
Correction factor or dirt	M	1
Glass transmittion factor	T	0.6
angle of visible sky	u	65
Results		
Summary of Daylight factor - DF		Target Average Daylight Factor %
Average Daylight Factor Calculation	1.1%	2