BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

DRAFT Greville Street Offices

As designed

Date: Fri Dec 17 13:37:08 2021

Administrative information

Building Details

Address: Offices, 20-23 Greville Street, LONDON, EC1N 8SS

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.1"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.1

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Audley Franklin

Telephone number: 07939171969

Address: 20 - 22 Wenlock Road, London, N1 7GU

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	22.7
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	22.7
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	17.1
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.52	0.54	External Wall
Floor	0.25	0.25	0.25	Ground Floor
Roof	0.25	0.25	0.25	Roof
Windows***, roof windows, and rooflights	2.2	1.85	1.86	New Window 2-3 (1)
Personnel doors	2.2	2.18	2.18	Door
Vehicle access & similar large doors	1.5	-	-	No vehicle doors in project
High usage entrance doors	3.5	-	-	No high usage entrance doors in project

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]
$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* There might be more than one surface where the maximum U-value occurs.
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
*** Display windows and similar glazing are excluded from the U-value check.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
$m^3/(h.m^2)$ at 50 Pa	10	13

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Cooling (B1 0 2 Telecoms)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0	4.36	-	-	0.9
Standard value	N/A	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

2- Cooling (00 0 6 Reception)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.43	2.87	-	-	0.9
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- EF-02 (28 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.19	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

4- NV

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.19	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

5- EF-01 (B1 0 8 Bin Store)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.19	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

6- AHU 2 (12 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.55	3.28	-	1.7	0.87
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

7- AHU 1 (B1 0 1 B1C Unit)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.01	4.36	-	-	0.9
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

8- MVHR 4 (8 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.43	2.87	-	-	0.85
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

9- MVHR 3 (7 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.43	2.87	-	1.1	0.85
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

10- MVHR 2 (6 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.43	2.87	-	1.1	0.85
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- New HWS Circuit

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0
Standard value	1	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	**Zone**	**Standard**
B1 0 1 B1C Unit	-	-	-	0.8	-	-	-	0.1	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
B1 0 2 Telecoms	-	-	-	0.8	-	-	-	0.2	-	-	N/A
B1 0 4 Shower	-	-	0.3	-	-	-	-	-	-	-	N/A
B1 0 5 Shower	-	-	0.3	-	-	-	-	-	-	-	N/A
B1 0 6 Accessible WC	-	-	0.3	-	-	-	-	-	-	-	N/A
B1 0 8 Bin Store	-	-	0.5	-	-	-	-	-	-	-	N/A
00 0 6 Reception	-	-	-	0.8	-	-	-	0.2	-	-	N/A
00 0 13 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
00 0 14 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
00 0 15 Accessible WC	-	-	0.3	-	-	-	-	-	-	-	N/A
01 0 9 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
01 0 10 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
01 0 11 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
01 0 12 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
02 0 1 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
02 0 2 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
02 0 3 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
02 0 4 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
02 0 5 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
02 0 6 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
02 0 9 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
02 0 10 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
02 0 11 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
02 0 12 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
03 0 1 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
03 0 2 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
03 0 3 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
03 0 4 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
03 0 5 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
03 0 6 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
03 0 7 B1 Unit	-	-	-	1.1	-	-	-	0.1	-	-	N/A
03 0 10 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
03 0 11 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
03 0 12 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
03 0 13 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
04 0 1 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
04 0 2 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
04 0 3 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
04 0 4 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
04 0 5 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
04 0 6 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
04 0 7 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
04 0 8 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
04 0 11 WC	-	-	0.3	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
04 0 12 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
04 0 13 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
04 0 14 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
05 0 1 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
05 0 2 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
05 0 3 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
05 0 4 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
05 0 5 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
05 0 6 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
05 0 7 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
05 0 10 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
05 0 11 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
05 0 12 Accessible WC	-	-	0.3	-	-	-	-	-	-	-	N/A
06 0 1 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
06 0 2 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
06 0 3 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
06 0 4 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A
06 0 9 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
06 0 10 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
06 0 11 Accessible WC	-	-	0.3	-	-	-	-	-	-	-	N/A
06 0 5 B1 Unit	-	-	-	1.7	-	-	-	0.1	-	-	N/A

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
B1 0 1 B1C Unit	-	-	-	1187
B1 0 2 Telecoms	-	-	-	99
B1 0 4 Shower	-	-	-	28
B1 0 5 Shower	-	-	-	29
B1 0 6 Accessible WC	-	-	-	24
B1 0 7 Bicycle Store	-	-	-	415
B1 0 8 Bin Store	-	-	-	142
B1 0 10 Lift Lobby	-	-	-	85
B1 0 11 Stairs	-	-	-	230
B1 0 12 Stairs Lobby	-	-	-	22
B1 0 13 Circulation	-	-	-	18
00 0 6 Reception	-	-	22	470
00 0 7 Reception Stairs	-	-	-	218
00 0 9 Bicycle/Bin Circulation	-	-	-	106
00 0 10 Substation	-	-	-	147
00 0 12 Entrance	-	-	-	196
00 0 13 WC	-	-	-	15
00 0 14 WC	-	-	-	14

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
00 0 15 Accessible WC	-	-	-	29
00 0 16 WC Circulation	-	-	-	35
01 0 9 WC	-	-	-	15
01 0 10 WC	-	-	-	14
01 0 11 WC	-	-	-	13
01 0 12 WC	-	-	-	15
01 0 13 WC Circulation	-	-	-	35
02 0 1 B1 Unit	-	-	-	635
02 0 2 B1 Unit	-	-	-	573
02 0 3 B1 Unit	-	-	-	794
02 0 4 B1 Unit	-	-	-	789
02 0 5 B1 Unit	-	-	-	384
02 0 6 B1 Unit	-	-	-	618
02 0 9 WC	-	-	-	15
02 0 10 WC	-	-	-	14
02 0 11 WC	-	-	-	13
02 0 12 WC	-	-	-	15
02 0 13 WC Circulation	-	-	-	35
03 0 1 B1 Unit	-	-	-	273
03 0 2 B1 Unit	-	-	-	362
03 0 3 B1 Unit	-	-	-	573
03 0 4 B1 Unit	-	-	-	794
03 0 5 B1 Unit	-	-	-	789
03 0 6 B1 Unit	-	-	-	384
03 0 7 B1 Unit	-	-	-	618
03 0 10 WC	-	-	-	15
03 0 11 WC	-	-	-	14
03 0 12 WC	-	-	-	13
03 0 13 WC	-	-	-	15
03 0 14 WC Circulation	-	-	-	35
04 0 1 B1 Unit	-	-	-	273
04 0 2 B1 Unit	-	-	-	362
04 0 3 B1 Unit	-	-	-	415
04 0 4 B1 Unit	-	-	-	92
04 0 5 B1 Unit	-	-	-	794
04 0 6 B1 Unit	-	-	-	789
04 0 7 B1 Unit	-	-	-	384
04 0 8 B1 Unit	-	-	-	618
04 0 11 WC	-	-	-	15
04 0 12 WC	-	-	-	14
04 0 13 WC	-	-	-	13
04 0 14 WC	-	-	-	15
04 0 15 WC Circulation	-	-	-	35

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
05 0 1 B1 Unit	-	-	-	173
05 0 2 B1 Unit	-	-	-	317
05 0 3 B1 Unit	-	-	-	344
05 0 4 B1 Unit	-	-	-	369
05 0 5 B1 Unit	-	-	-	509
05 0 6 B1 Unit	-	-	-	516
05 0 7 B1 Unit	-	-	-	477
05 0 10 WC	-	-	-	14
05 0 11 WC	-	-	-	15
05 0 12 Accessible WC	-	-	-	23
05 0 13 WC Circulation	-	-	-	34
05 0 14 Store	-	-	-	33
06 0 1 B1 Unit	-	-	-	280
06 0 2 B1 Unit	-	-	-	299
06 0 3 B1 Unit	-	-	-	458
06 0 4 B1 Unit	-	-	-	280
06 0 9 WC	-	-	-	14
06 0 10 WC	-	-	-	15
06 0 11 Accessible WC	-	-	-	23
06 0 12 WC Circulation	-	-	-	34
06 0 5 B1 Unit	-	-	-	145

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
B1 0 1 B1C Unit	N/A	N/A
B1 0 2 Telecoms	N/A	N/A
00 0 6 Reception	NO (-58%)	NO
02 0 1 B1 Unit	NO (-87%)	NO
02 0 2 B1 Unit	NO (-55%)	NO
02 0 3 B1 Unit	NO (-5%)	NO
02 0 4 B1 Unit	NO (-70%)	NO
02 0 5 B1 Unit	NO (-74%)	NO
02 0 6 B1 Unit	NO (-74%)	NO
03 0 1 B1 Unit	NO (-87%)	NO
03 0 2 B1 Unit	NO (-88%)	NO
03 0 3 B1 Unit	NO (-54%)	NO
03 0 4 B1 Unit	NO (-11%)	NO
03 0 5 B1 Unit	NO (-71%)	NO
03 0 6 B1 Unit	NO (-73%)	NO
03 0 7 B1 Unit	NO (-74%)	NO
04 0 1 B1 Unit	NO (-87%)	NO
04 0 2 B1 Unit	NO (-89%)	NO
04 0 3 B1 Unit	NO (-55%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
04 0 4 B1 Unit	NO (-36%)	NO
04 0 5 B1 Unit	NO (-20%)	NO
04 0 6 B1 Unit	NO (-72%)	NO
04 0 7 B1 Unit	NO (-73%)	NO
04 0 8 B1 Unit	NO (-73%)	NO
05 0 1 B1 Unit	NO (-95%)	NO
05 0 2 B1 Unit	NO (-20%)	NO
05 0 3 B1 Unit	NO (-35%)	NO
05 0 4 B1 Unit	NO (-81%)	NO
05 0 5 B1 Unit	NO (-10%)	NO
05 0 6 B1 Unit	NO (-66%)	NO
05 0 7 B1 Unit	NO (-72%)	NO
06 0 1 B1 Unit	NO (-88%)	NO
06 0 2 B1 Unit	NO (-82%)	NO
06 0 3 B1 Unit	NO (-51%)	NO
06 0 4 B1 Unit	NO (-88%)	NO
06 0 5 B1 Unit	NO (-81%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m^2]	2331	2331
External area [m^2]	3325	3325
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	13	3
Average conductance [W/K]	2044	1447
Average U-value [W/m^2K]	0.61	0.44
Alpha value* [%]	14.16	14.16

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
99	**B1 Offices and Workshop businesses**
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger terminals
	Others: Emergency services
1	**Others: Miscellaneous 24hr activities**
	Others: Car Parks 24 hrs
	Others: Stand alone utility block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	3.85	1.64
Cooling	5.6	9.51
Auxiliary	3.77	8.01
Lighting	17.68	21.67
Hot water	5.53	6.35
Equipment*	38.86	38.86
TOTAL**	**36.42**	**47.18**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	3.52	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	117.68	144.83
Primary energy* [kWh/m^2]	111.81	129.2
Total emissions [kg/m^2]	17.1	22.7

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	121.9	202.7	9.9	15.3	10.1	3.43	3.68	3.43	3.68
	Notional	30.5	279.9	3.5	21.6	16.5	2.43	3.6	----	----
[ST] Central heating using air distribution, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	103.5	0	7.2	0	6.6	3.98	0	4.19	0
	Notional	35.1	0	4	0	12.4	2.43	0	----	----
[ST] Other local room heater - unfanned, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	295.8	0	20.6	0	0	3.98	0	4.19	0
	Notional	94.6	0	10.8	0	0	2.43	0	----	----
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	89.6	0	6.3	0	12.7	3.98	0	4.19	0
	Notional	49.1	0	5.6	0	15.1	2.43	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	51.8	69.7	4.1	5.9	5.1	3.55	3.28	3.55	3.28
	Notional	12.4	150.4	1.4	11.6	9.3	2.43	3.6	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	13.1	2.8	0.9	0.2	1.2	4.01	4.36	4.01	4.36
	Notional	2.9	4.3	0.3	0.3	3.6	2.43	3.6	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	27.1	77.3	2.2	7.5	4.9	3.43	2.87	3.43	2.87
	Notional	7	161.2	0.8	12.4	9.2	2.43	3.6	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	27.3	78.7	2.2	7.6	3.4	3.43	2.87	3.43	2.87
	Notional	6.8	164.3	0.8	12.7	9.3	2.43	3.6	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	34	72.2	2.8	7	3.4	3.43	2.87	3.43	2.87
	Notional	8.7	147.1	1	11.4	9.3	2.43	3.6	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.35	External Wall New
Floor	0.2	0.22	Exposed Floor
Roof	0.15	0.25	Roof
Windows, roof windows, and rooflights	1.5	1.82	Rooflight
Personnel doors	1.5	2.18	Door
Vehicle access & similar large doors	1.5	-	No vehicle doors in project
High usage entrance doors	1.5	-	No high usage entrance doors in project

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	13