

Project name

181217 Alexander House H3

As designed

Date: Mon Dec 17 21:43:20 2018

Administrative information

Building Details

Address: Alexander House, READING, RG1

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.10

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.10

BRUKL compliance check version: v5.4.b.0

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name: Wilson Gray Consulting

Telephone number: 0191 691 6770

Address: Swan Building Prestwick Park, Newcastle upon Tyne, NE20 9SJ

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	52.5
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	52.5
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	41
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 -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.25	0.25	0500002E:Surf[1]
Floor	0.25	0.2	0.2	00000006:Surf[0]
Roof	0.25	0.18	0.18	0500002E:Surf[2]
Windows***, roof windows, and rooflights	2.2	1.6	1.6	0500002E:Surf[0]
Personnel doors	2.2	-	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* 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	4

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	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- 04 H3 VRF HRU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	5.5	4.5	0	0	0.8
Standard value	2.5*	3.2	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.					

2- 02 H3 Electric Panel Heaters Mech Extract

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.23	0	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

3- 05 H3 VRF Comms

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.5	3.5	0	0	-
Standard value	2.5*	3.2	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- 01 H3 Electric Panel Heaters Nat Vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.3	0	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

1- 03 H3 LTHW CHP DHWS

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.95	0.005
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

2- 03 H1 LTHW DHWS

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.95	0.005
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

1- CHECK2-CHP

	CHPQA quality index	CHP electrical efficiency
This building	105	0.31
Standard value	105	0.2

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

[illegible]

[illegible]

[illegible]

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
Circulation		-	95	-	14
Circulation		-	95	-	14
Circulation		-	95	-	38
Circulation		-	95	-	10
Circulation		-	95	-	14
Circulation		-	95	-	50
Circulation		-	95	-	50
Circulation		-	95	-	10
Circulation		-	95	-	38
Circulation		-	95	-	30
Circulation		-	95	-	28
Circulation		-	95	-	38
Circulation		-	95	-	65
Circulation		-	95	-	18
Circulation		-	95	-	28
Circulation		-	95	-	50
Circulation		-	95	-	31
Circulation		-	95	-	10
Circulation		-	95	-	14
Circulation		-	95	-	38
Circulation		-	95	-	16
Circulation		-	95	-	14
Circulation		-	95	-	28
Circulation		-	95	-	38
Circulation		-	95	-	59
Circulation		-	95	-	14
Circulation		-	95	-	64
Circulation		-	95	-	38
Circulation		-	95	-	14
Circulation		-	95	-	57
Circulation		-	95	-	55
Circulation		-	95	-	31
Circulation		-	95	-	45
Circulation		-	95	-	27
Circulation		-	95	-	28
Circulation		-	95	-	42
Circulation		-	95	-	65
Circulation		-	95	-	50
Circulation		-	95	-	38
Circulation		-	95	-	10
Circulation		-	95	-	16
Circulation		-	95	-	38
Circulation		-	95	-	65

[illegible]

Luminous efficacy [lm/W]		
Luminaire	Lamp	Display lamp

[illegible]

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	16
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	16
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	16
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	16
Ensuite Std Room		-	95	-	18
Ensuite Std Room		-	95	-	16
Ensuite Std Room		-	95	-	18
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	16
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	16
Ensuite Std Room		-	95	-	16
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	16
Ensuite Std Room		-	95	-	16
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	18
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	17
Ensuite Std Room		-	95	-	16

[illegible]

Luminous efficacy [lm/W]		
Luminaire	Lamp	Display lamp

Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	16
Ensuite Std Room	-	95	-	16
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	16
Ensuite Std Room	-	95	-	16
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	16
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	16
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	19
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	18
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	16
Ensuite Std Room	-	95	-	17
Ensuite Std Room	-	95	-	18
Ensuite Std Room Dis	-	95	-	24
Ensuite Std Room Dis	-	95	-	24

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Ensuite Std Room Dis	-	95	-	24
Ensuite Std Room Dis	-	95	-	24
Ensuite Std Room Dis	-	95	-	24
Ensuite Studio	-	95	-	17
Ensuite Studio	-	95	-	16
Ensuite Studio	-	95	-	16
Ensuite Studio	-	95	-	16
Ensuite Studio	-	95	-	17
Ensuite Studio	-	95	-	16
Ensuite Studio	-	95	-	17
Ensuite Studio	-	95	-	16
Ensuite Studio	-	95	-	17
Ensuite Studio	-	95	-	16
Ensuite Studio	-	95	-	17
Ensuite Studio	-	95	-	16
Ensuite Studio	-	95	-	17
Ensuite Studio	-	95	-	17
Ensuite Studio	-	95	-	18
Ensuite Studio	-	95	-	17
Ensuite Studio	-	95	-	16
Ensuite Studio	-	95	-	17
Ensuite Studio	-	95	-	17
Ensuite Studio	-	95	-	18
Ensuite Studio	-	95	-	20
Ensuite Studio	-	95	-	18
Ensuite Studio	-	95	-	17
Ensuite Studio (DA)	-	95	-	16
Ensuite Studio (DA)	-	95	-	23
Ensuite Studio (DA)	-	95	-	19
Ensuite Studio (DA)	-	95	-	18
Games Room	-	95	-	42
Gym	-	95	-	94
IT Hub	95	-	-	20
Kitchen	-	95	-	71
Kitchen	-	95	-	68
Kitchen	-	95	-	64
Kitchen	-	95	-	68
Kitchen	-	95	-	64
Kitchen	-	95	-	68
Kitchen	-	95	-	68
Kitchen	-	95	-	68
Kitchen	-	95	-	68
Kitchen	-	95	-	68
Kitchen	-	95	-	64
Kitchen	-	95	-	64
Kitchen	-	95	-	68
Kitchen	-	95	-	68
Kitchen	-	95	-	64
Kitchen	-	95	-	68

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
Kitchen		-	95	-	68
Kitchen		-	95	-	68
Kitchen		-	95	-	68
Kitchen		-	95	-	71
Kitchen		-	95	-	64
Kitchen		-	95	-	68
Laundry		-	95	-	95
Lounge Quiet		95	-	-	111
Lounge TV		-	95	-	198
Meeting Bookable Space		95	-	-	196
Meeting Room		95	-	-	120
Office		95	-	-	143
Plant		95	-	-	165
Plant		95	-	-	435
Plant Room		95	-	-	247
Post Room		95	-	-	72
Reception		-	95	50	41
Stairs		-	95	-	37
Stairs		-	95	-	31
Stairs		-	95	-	39
Stairs		-	95	-	31
Stairs		-	95	-	37
Stairs		-	95	-	39
Stairs		-	95	-	31
Stairs		-	95	-	37
Stairs		-	95	-	31
Stairs		-	95	-	28
Stairs		-	95	-	34
Stairs		-	95	-	31
Stairs		-	95	-	37
Stairs		-	95	-	37
Stairs		-	95	-	37
Std Room		-	95	-	20
Std Room		-	95	-	20
Std Room		-	95	-	20
Std Room		-	95	-	20
Std Room		-	95	-	19
Std Room		-	95	-	20
Std Room		-	95	-	22
Std Room		-	95	-	20
Std Room		-	95	-	20
Std Room		-	95	-	20
Std Room		-	95	-	20

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	19
Std Room	-	95	-	19
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	21
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	21
Std Room	-	95	-	18
Std Room	-	95	-	20
Std Room	-	95	-	19
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	21
Std Room	-	95	-	20
Std Room	-	95	-	18
Std Room	-	95	-	19
Std Room	-	95	-	20
Std Room	-	95	-	19
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	21
Std Room	-	95	-	20
Std Room	-	95	-	19
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	21
Std Room	-	95	-	22
Std Room	-	95	-	22
Std Room	-	95	-	21
Std Room	-	95	-	22
Std Room	-	95	-	22

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Std Room	-	95	-	21
Std Room	-	95	-	21
Std Room	-	95	-	21
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	20
Std Room	-	95	-	21
Std Room Dis	-	95	-	27
Std Room Dis	-	95	-	27
Std Room Dis	-	95	-	27
Std Room Dis	-	95	-	27
Std Room Dis	-	95	-	27
Std Room Dis	-	95	-	27
Store	95	-	-	5
Store	95	-	-	5
Store	95	-	-	18
Store	95	-	-	5
Store	95	-	-	5
Store	95	-	-	5
Store	95	-	-	5
Store Bikes	95	-	-	36
Store Bins	95	-	-	65
Store Cleaner	95	-	-	9
Studio	-	95	-	33
Studio	-	95	-	25
Studio	-	95	-	29
Studio	-	95	-	25
Studio	-	95	-	34
Studio	-	95	-	27
Studio	-	95	-	31
Studio	-	95	-	29
Studio	-	95	-	29
Studio	-	95	-	29
Studio	-	95	-	34
Studio	-	95	-	29
Studio	-	95	-	25
Studio	-	95	-	25

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Studio	-	95	-	26
Studio	-	95	-	25
Studio	-	95	-	29
Studio (DA)	-	95	-	34
Studio (DA)	-	95	-	35
Studio (DA)	-	95	-	35
Studio (DA)	-	95	-	35
Studio to do	-	95	-	36
Studio to do	-	95	-	36
Study Room	95	-	-	137
WC DA	-	95	-	38

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?
Cinema Room	N/A	N/A
Games Room	N/A	N/A
Gym	N/A	N/A
IT Hub	N/A	N/A
Kitchen	NO (-70.6%)	NO
Kitchen	NO (-63.2%)	NO
Kitchen	NO (-55.7%)	NO
Kitchen	NO (-79.1%)	NO
Kitchen	NO (-51.5%)	NO
Kitchen	NO (-74.3%)	NO
Kitchen	NO (-64%)	NO
Kitchen	NO (-65.2%)	NO
Kitchen	NO (-83.8%)	NO
Kitchen	NO (-54%)	NO
Kitchen	NO (-53.3%)	NO
Kitchen	NO (-84.9%)	NO
Kitchen	NO (-66%)	NO
Kitchen	NO (-81.3%)	NO
Kitchen	NO (-52.2%)	NO
Kitchen	NO (-80.6%)	NO
Kitchen	NO (-78%)	NO
Kitchen	NO (-77.2%)	NO
Kitchen	NO (-70.4%)	NO
Kitchen	NO (-73.7%)	NO
Kitchen	NO (-56.2%)	NO
Kitchen	NO (-81.6%)	NO
Lounge Quiet	NO (-33.2%)	NO
Lounge TV	N/A	N/A
Meeting Bookable Space	NO (-29.8%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Meeting Room	NO (-79.1%)	NO
Office	NO (-76.7%)	NO
Post Room	N/A	N/A
Reception	NO (-60.4%)	NO
Std Room	NO (-64.1%)	NO
Std Room	NO (-63%)	NO
Std Room	NO (-63%)	NO
Std Room	NO (-64%)	NO
Std Room	NO (-69.8%)	NO
Std Room	NO (-78.8%)	NO
Std Room	NO (-78.2%)	NO
Std Room	NO (-67.7%)	NO
Std Room	NO (-68.4%)	NO
Std Room	NO (-83.2%)	NO
Std Room	NO (-68.8%)	NO
Std Room	NO (-78.1%)	NO
Std Room	NO (-91.5%)	NO
Std Room	NO (-76%)	NO
Std Room	NO (-61%)	NO
Std Room	NO (-80.8%)	NO
Std Room	NO (-72.6%)	NO
Std Room	NO (-72.5%)	NO
Std Room	NO (-88.5%)	NO
Std Room	NO (-72.5%)	NO
Std Room	NO (-73.6%)	NO
Std Room	NO (-69.8%)	NO
Std Room	NO (-72.1%)	NO
Std Room	NO (-67.7%)	NO
Std Room	NO (-69.2%)	NO
Std Room	NO (-88.4%)	NO
Std Room	NO (-77.2%)	NO
Std Room	NO (-93.3%)	NO
Std Room	NO (-87.3%)	NO
Std Room	NO (-66.8%)	NO
Std Room	NO (-69.7%)	NO
Std Room	NO (-70%)	NO
Std Room	NO (-69.4%)	NO
Std Room	NO (-78.9%)	NO
Std Room	NO (-77.5%)	NO
Std Room	NO (-71.9%)	NO
Std Room	NO (-70.5%)	NO
Std Room	NO (-74.7%)	NO
Std Room	NO (-72.6%)	NO
Std Room	NO (-75.4%)	NO
Std Room	NO (-73.5%)	NO
Std Room	NO (-73.2%)	NO
Std Room	NO (-87.5%)	NO
Std Room	NO (-59.9%)	NO
Std Room	NO (-68.1%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Std Room	NO (-68.3%)	NO
Std Room	NO (-69.4%)	NO
Std Room	NO (-73.5%)	NO
Std Room	NO (-73.4%)	NO
Std Room	NO (-81.4%)	NO
Std Room	NO (-62%)	NO
Std Room	NO (-87.6%)	NO
Std Room	NO (-77.3%)	NO
Std Room	NO (-92%)	NO
Std Room	NO (-68.7%)	NO
Std Room	NO (-64.2%)	NO
Std Room	NO (-82.8%)	NO
Std Room	NO (-63%)	NO
Std Room	NO (-89%)	NO
Std Room	NO (-76.4%)	NO
Std Room	NO (-70.7%)	NO
Std Room	NO (-71.5%)	NO
Std Room	NO (-71.1%)	NO
Std Room	NO (-79.4%)	NO
Std Room	NO (-78.5%)	NO
Std Room	NO (-75%)	NO
Std Room	NO (-73.6%)	NO
Std Room	NO (-77.8%)	NO
Std Room	NO (-63.5%)	NO
Std Room	NO (-76.4%)	NO
Std Room	NO (-74.3%)	NO
Std Room	NO (-88.7%)	NO
Std Room	NO (-60.4%)	NO
Std Room	NO (-67.6%)	NO
Std Room	NO (-78.9%)	NO
Std Room	NO (-71.9%)	NO
Std Room	NO (-72.1%)	NO
Std Room	NO (-75%)	NO
Std Room	NO (-74.6%)	NO
Std Room	NO (-92.9%)	NO
Std Room	NO (-78.5%)	NO
Std Room	NO (-61.9%)	NO
Std Room	NO (-90%)	NO
Std Room	NO (-80.1%)	NO
Std Room	NO (-75.2%)	NO
Std Room	NO (-75.9%)	NO
Std Room	NO (-74.8%)	NO
Std Room	NO (-60.9%)	NO
Std Room	NO (-83.2%)	NO
Std Room	NO (-79.2%)	NO
Std Room	NO (-71.1%)	NO
Std Room	NO (-78.3%)	NO
Std Room	NO (-83.4%)	NO
Std Room	NO (-66.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Std Room	NO (-62%)	NO
Std Room	NO (-69.4%)	NO
Std Room	NO (-76.6%)	NO
Std Room	NO (-76.4%)	NO
Std Room	NO (-78.8%)	NO
Std Room	NO (-68.3%)	NO
Std Room	NO (-85.2%)	NO
Std Room	NO (-81.8%)	NO
Std Room	NO (-68%)	NO
Std Room	NO (-91.3%)	NO
Std Room	NO (-82.4%)	NO
Std Room	NO (-94.1%)	NO
Std Room	NO (-86.7%)	NO
Std Room	NO (-75.1%)	NO
Std Room	NO (-77.9%)	NO
Std Room	NO (-67.3%)	NO
Std Room	NO (-66.1%)	NO
Std Room	NO (-65.9%)	NO
Std Room	NO (-67.8%)	NO
Std Room	NO (-73.1%)	NO
Std Room	NO (-72.5%)	NO
Std Room	NO (-89.1%)	NO
Std Room	NO (-71.5%)	NO
Std Room	NO (-71%)	NO
Std Room	NO (-79.6%)	NO
Std Room	NO (-77.2%)	NO
Std Room	NO (-60.4%)	NO
Std Room	NO (-87.9%)	NO
Std Room	NO (-69.3%)	NO
Std Room	NO (-65%)	NO
Std Room	NO (-76.2%)	NO
Std Room	NO (-63.1%)	NO
Std Room	NO (-65.9%)	NO
Std Room	NO (-70.8%)	NO
Std Room	NO (-75.8%)	NO
Std Room	NO (-76.5%)	NO
Std Room	NO (-72.4%)	NO
Std Room	NO (-63%)	NO
Std Room	NO (-70.4%)	NO
Std Room	NO (-69.5%)	NO
Std Room	NO (-75.9%)	NO
Std Room	NO (-73.4%)	NO
Std Room	NO (-78.2%)	NO
Std Room	NO (-59%)	NO
Std Room	NO (-75.1%)	NO
Std Room	NO (-76.4%)	NO
Std Room	NO (-78.7%)	NO
Std Room	NO (-77.3%)	NO
Std Room	NO (-79.5%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Std Room	NO (-77.8%)	NO
Std Room	NO (-66.7%)	NO
Std Room	NO (-87.5%)	NO
Std Room	NO (-68.5%)	NO
Std Room	NO (-63.8%)	NO
Std Room	NO (-65.2%)	NO
Std Room	NO (-79.8%)	NO
Std Room	NO (-64.8%)	NO
Std Room	NO (-73.2%)	NO
Std Room	NO (-75.5%)	NO
Std Room Dis	NO (-60.2%)	NO
Std Room Dis	NO (-64.4%)	NO
Std Room Dis	NO (-71.3%)	NO
Std Room Dis	NO (-67.4%)	NO
Std Room Dis	NO (-70.5%)	NO
Std Room Dis	NO (-57.9%)	NO
Studio	NO (-83.3%)	NO
Studio	NO (-75.8%)	NO
Studio	NO (-74.9%)	NO
Studio	NO (-76.4%)	NO
Studio	NO (-79.1%)	NO
Studio	NO (-79.4%)	NO
Studio	NO (-77.8%)	NO
Studio	NO (-70.5%)	NO
Studio	NO (-73.4%)	NO
Studio	NO (-65.9%)	NO
Studio	NO (-82.2%)	NO
Studio	NO (-72.2%)	NO
Studio	NO (-72.6%)	NO
Studio	NO (-76.5%)	NO
Studio	NO (-68%)	NO
Studio	NO (-74.7%)	NO
Studio	NO (-74.4%)	NO
Studio (DA)	NO (-69.9%)	NO
Studio (DA)	NO (-81%)	NO
Studio (DA)	NO (-78.5%)	NO
Studio (DA)	NO (-77%)	NO
Studio to do	NO (-67.9%)	NO
Studio to do	NO (-71.4%)	NO
Study Room	NO (-24.7%)	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]	4886.2	4886.2
External area [m ²]	4624.7	4624.7
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	4	3
Average conductance [W/K]	2626	2520.49
Average U-value [W/m ² K]	0.57	0.55
Alpha value* [%]	10.03	10

* 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
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

100 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
Others: Miscellaneous 24hr activities
Others: Car Parks 24 hrs
Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	43.27	57.63
Cooling	0.21	0.29
Auxiliary	4.4	7.15
Lighting	7.53	11.76
Hot water	157.84	112.98
Equipment*	40.43	40.43
TOTAL **	172.44	189.8

* 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/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	40.81	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	159.94	182.7
Primary energy* [kWh/m ²]	233.38	259.09
Total emissions [kg/m ²]	41	52.5

* 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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
Actual	194	0	53.9	0	0	1	0	1	0	
Notional	0	0	0	0	0	0	0	----	----	
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
Actual	262.6	0	73	0	11.5	1	0	1	0	
Notional	121.9	0	39.3	0	0	0.86	0	----	----	
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	27.2	18.9	1.4	1.2	9.3	5.39	4.48	5.5	6	
Notional	429.9	0	138.5	0	21.9	0.86	0	----	----	
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	0	1238.6	0	102.3	0	4.41	3.36	4.5	4.5	
Notional	13	30.2	1.4	2.9	5.6	2.56	2.84	----	----	
[ST] No Heating or Cooling										
Actual	0	0	0	0	0	0	0	0	0	
Notional	0	1105.5	0	81	0	2.56	3.79	----	----	

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-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.25	0500002E:Surf[1]
Floor	0.2	0.2	00000006:Surf[0]
Roof	0.15	0.18	0500002E:Surf[2]
Windows, roof windows, and rooflights	1.5	1.6	00000001:Surf[1]
Personnel doors	1.5	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
U _{i-Typ} = Typical individual element U-values [W/(m²K)]		U _{i-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	4