

Project name

WCS (Refurb Be Lean)

As designed

Date: Thu Apr 27 11:50:17 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.19

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.19

BRUKL compliance module version: v6.1.e.0

Foundation area [m²]: 258.8The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	4.17
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	3.93
Target primary energy rate (TPER), kWh _{PE} /m ² annum	45.55
Building primary energy rate (BPER), kWh _{PE} /m ² annum	42.33
Do the building's emission and primary energy rates exceed the targets?	BER =< TER BPER =< TPER

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

Fabric element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.38	1.5	GF000014:Surf[2]
Floors	0.18	0.25	0.25	BS000000:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.12	0.12	BS000000:Surf[2]
Windows** and roof windows	1.6	1.28	1.5	GF000014:Surf[3]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors [^]	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

U_{a-Limit} = Limiting area-weighted average U-values [W/(m²K)]
U_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]
U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]

* 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. *** Values for rooflights refer to the horizontal position.
[^] For fire doors, limiting U-value is 1.8 W/m²K
NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	25

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	>0.95

1- Mini VRF (Unit 10-12 MS)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.64	6.66	0	1.1	0.9
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

2- Residential Circulation (heat pump)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.64	-	0.2	-	-
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					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

3- Mini VRF (NOS)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.64	6.57	0	1.1	0.9
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

1- DHW

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

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting Zone name	General luminaire	Display light source	
	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
Standard value	95	80	0.3
BASEMENT RETAIL FLEXIBLE CLASS E	110	80	1.5
BASEMENT RETAIL FLEXIBLE CLASS E	110	80	1.5
BASEMENT RETAIL FLEXIBLE CLASS E	110	80	1.5
GF RESIDENTIAL CIRCULATION	110	-	-
GF RESIDENTIAL CIRCULATION	110	-	-
GF RESIDENTIAL CIRCULATION	110	-	-
GF RESIDENTIAL CIRCULATION	110	-	-
GF RETAIL FLEXIBLE CLASS E	110	80	1.5

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
GF RETAIL FLEXIBLE CLASS E		110	80	1.5
GF RETAIL FLEXIBLE CLASS E		110	80	1.5
GF RETAIL FLEXIBLE CLASS E		110	80	1.5
GF SHARED CYCLE STORE		140	-	-
GF RETAIL FLEXIBLE CLASS E		110	80	1.5

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
BASEMENT RETAIL FLEXIBLE CLASS E	NO (-99.8%)	NO
BASEMENT RETAIL FLEXIBLE CLASS E	N/A	N/A
BASEMENT RETAIL FLEXIBLE CLASS E	N/A	N/A
GF RETAIL FLEXIBLE CLASS E	YES (+60.7%)	NO
GF RETAIL FLEXIBLE CLASS E	YES (+18.8%)	NO
GF RETAIL FLEXIBLE CLASS E	YES (+28.6%)	NO
GF RETAIL FLEXIBLE CLASS E	YES (+35.3%)	NO
GF RETAIL FLEXIBLE CLASS E	YES (+85.6%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	539.9	539.9
External area [m ²]	703.5	703.5
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	25	3
Average conductance [W/K]	264.56	193.05
Average U-value [W/m ² K]	0.38	0.27
Alpha value* [%]	26.1	10

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

Building Use

% Area	Building Type
91	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
9	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	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	6.97	1.55
Cooling	2.77	2.72
Auxiliary	4.71	7.28
Lighting	12.61	17.98
Hot water	1.47	1.4
Equipment*	18.76	18.76
TOTAL**	28.53	30.93

* 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	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>0</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	106.22	60.79
Primary energy [kWh _{PE} /m ²]	42.33	45.55
Total emissions [kg/m ²]	3.93	4.17

HVAC Systems Performance

System Type	Heat dem MJ/m ²	Cool dem MJ/m ²	Heat con kWh/m ²	Cool con kWh/m ²	Aux con kWh/m ²	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	78.4	38.4	8.7	2.4	5.2	2.49	4.42	2.64	6.66
Notional	16	54.9	1.6	3.3	8.3	2.78	4.63	----	----
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	44.3	78.2	4.9	5	5.2	2.49	4.36	2.64	6.57
Notional	15.1	46.2	1.5	2.8	8.2	2.78	4.63	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	37.6	0	4.4	0	2.6	2.36	0	2.64	0
Notional	20.5	0	2	0	1.5	2.78	0	----	----
[ST] No Heating or Cooling									
Actual	0	0	0	0	0	0	0	0	0
Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m ²]	= Heating energy demand
Cool dem [MJ/m ²]	= Cooling energy demand
Heat con [kWh/m ²]	= Heating energy consumption
Cool con [kWh/m ²]	= Cooling energy consumption
Aux con [kWh/m ²]	= 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