

BRUKL Output Document

Compliance with Wales Building Regulations Part L 2022



Llywodraeth Cymru
Welsh Government

Project name

Blaendulais Childcare Unit

As designed

Date: Thu May 11 16:09:25 2023

Administrative information

Building Details

Address: Blaendulais Childcare Unit, Neath Port Talbot,

Certifier details

Name: Darren Baker

Telephone number: 0845 094 1593

Address: Melin Consultants, The Beacon, Dafen Business Park, Llanelli, SA14 8LQ

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.20

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

The 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	16.21
Building CO ₂ emission rate (BER), kgCO ₂ /m ² :annum	8.09
Target primary energy rate (TPER), kWh _{PE} /m ² :annum	91.46
Building primary energy rate (BPER), kWh _{PE} /m ² :annum	85.03
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	0.22	0.22	GF000001_W0
Floors	0.22	0.18	0.18	GF000001_F
Pitched roofs	0.2	-	-	No heat loss pitched roofs
Flat roofs	0.2	0.14	0.14	GF000001_C
Windows**	1.6	1.4	1.4	GF000006_W0_O1
Roof windows	1.8	-	-	No external roof windows
Rooflights***	2.2	-	-	No external rooflights
Personnel doors	1.8	1.8	1.8	GF000001_W0_O0
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors
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)] * Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for roof windows. ** Automatic U-value check by the tool does not apply to glazed doors whose limiting standard is similar to that for personnel doors. Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position. 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	5

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	<0.9

1- Air Conditioning

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	5	-	-	-
Standard value	2.5*	5	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.					

2- LST Electric Radiators

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
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- SYST0000-DHW

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

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
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 balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
Kitchen/Prep Area	0.3	-	-	-	-	-	-	-	-	-	-	N/A
Childrens Toilets	0.3	-	-	-	-	-	-	-	-	-	-	N/A
Staff & Accessible WC	0.3	-	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Entrance Lobby	100	-	-

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
Kitchen/Prep Area		100	-	-
Main Childcare Area		100	-	-
Office		100	-	-
Plant Room		100	-	-
Store Room		100	-	-
Childrens Toilets		100	-	-
Staff & Accessible WC		100	-	-

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?
Entrance Lobby	N/A	N/A
Kitchen/Prep Area	NO (-81.7%)	NO
Main Childcare Area	YES (+18.5%)	NO
Office	NO (-68.5%)	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?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	123.6	123.6
External area [m ²]	458.1	458.1
Weather	CAR	CAR
Infiltration [m ³ /hm ² @ 50Pa]	5	5
Average conductance [W/K]	142.23	197.06
Average U-value [W/m ² K]	0.31	0.43
Alpha value* [%]	33.97	16.94

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

Building Use

% Area Building Type

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
 Residential Spaces
 Non-residential Institutions: Community/Day Centre
 Non-residential Institutions: Libraries, Museums, and Galleries

100 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	31.82	72.54
Cooling	4.81	5.47
Auxiliary	0.14	0.18
Lighting	5.13	5.75
Hot water	13.19	13.19
Equipment*	20.28	20.28
TOTAL **	55.09	97.13

* 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	17.84
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>17.84</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	294.09	330.92
Primary energy [kWh _{PE} /m ²]	85.03	91.46
Total emissions [kg/m ²]	8.09	16.21

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] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	209.7	73.1	15.6	5.7	0	3.73	3.55	4	5
	Notional	208.8	102.9	67.4	6.5	0	0.86	4.4	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	338.7	15	117.6	0	0.7	0.8	0	1	0
	Notional	308.2	124.4	99.5	0	0.9	0.86	0	----	----

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}	First surface with maximum value
Walls	0.2	0.22	GF000001_W0
Floors	0.2	0.18	GF000001_F
Roofs	0.15	0.14	GF000001_C
Windows and roof windows	1.5	1.4	GF000006_W0_O1
Personnel doors	1.5	1.8	GF000001_W0_O0
Vehicle access & similar large doors	1.5	-	No external vehicle access doors
High usage entrance doors	1.5	-	No external high usage entrance doors
U _{i-Typ} = Typical individual element U-values [W/(m²K)]			U _{i-Min} = Minimum individual element U-values [W/(m²K)]

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