

BRUKL Output Document

Compliance with Wales Building Regulations Part L 2014



Llywodraeth Cymru
Welsh Government

Project name

Huws Gray

As designed

Date: Fri Jul 22 11:11:00 2022

Administrative information

Building Details

Address: Information not provided by the user, Huws Gray,
Plot C5, Parc Bryn Cegin, Llandygai, Bangor,
Information not provided by the user

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: iSBEM

Interface to calculation engine version: v5.6.b

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

Certifier details

Name: Mr Nick Weston

Telephone number: 07591 637407

Address: The Old Forge, The Green., Deopham, NR18
9DH

Criterion 1: The calculated BER and BPEC for the building must not exceed the targets

Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	19.8
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	22.2
Building Primary Energy Consumption (BPEC), kWh/m ² .annum	124.63
Target Primary Energy Consumption (TPEC), kWh/m ² .annum	149.3
Do the building's emissions and primary energy consumption exceed the targets?	BER =< TER BPEC =< TPEC

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	0.27	0.32	"Z0/02/Si"
Floor	0.25	0.17	0.17	"Z0/02/f"
Roof	0.25	0.18	0.18	"Z0/02/r"
Windows***, roof windows, and rooflights	2.2	1.6	1.6	"W2"
Personnel doors	2.2	1.6	1.6	"D7, D8"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	1.6	1.6	"D1"

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)]

* 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	5

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	<0.9

1- Heating system

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.96	-	-	-	-
Standard value	0.91*	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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

1- HWS

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	-
Standard value	N/A	N/A

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

General lighting and display lighting	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Zone name				
Standard value	60	60	22	
Z0/01	135	-	-	3423
Z0/02	-	135	50	6555
Z0/03	135	-	-	73
Z0/04	-	135	-	33
Z0/05	-	135	-	40

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?
Z0/01	NO (-11.7%)	NO
Z0/02	NO (-15.6%)	NO
Z0/03	N/A	N/A
Z0/05	N/A	N/A

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

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?	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
Area [m ²]	2044	2044
External area [m ²]	6076	6076
Weather	CAR	CAR
Infiltration [m ³ /hm ² @ 50Pa]	5	5
Average conductance [W/K]	1742.55	1883.16
Average U-value [W/m ² K]	0.29	0.31
Alpha value* [%]	45.69	19.27

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

Building Use

% Area	Building Type
48	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
52	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 Others: Miscellaneous 24hr activities Others: Car Parks 24 hrs Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	33.83	21.92
Cooling	0	0
Auxiliary	1.14	0.57
Lighting	24	38.2
Hot water	5.07	5.34
Equipment*	25.73	25.73
TOTAL**	64.04	66.03

* 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	3.1	6.36
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	356.16	308.53
Primary energy* [kWh/m ²]	124.63	149.3
Total emissions [kg/m ²]	19.8	22.2

* 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] No Heating or Cooling									
Actual	228.5	149.5	0	0	0	0	0	0	0
Notional	223.7	103.8	0	0	0	0	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	219.7	114.7	67.7	0	2.3	0.9	0	0.96	0
Notional	129.2	160.4	43.8	0	1.1	0.82	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
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