

BRUKL Output Document

Compliance with Wales Building Regulations Part L 2022



Llywodraeth Cymru
Welsh Government

Project name

PLOT C1 LLANTARNAM INDUSTRIAL PARK

As designed

Date: Wed Jul 03 14:51:36 2024

Administrative information

Building Details

Address: PLOT C1 LLANTARNAM INDUSTRIAL PARK,
CWMBRAN, TORFAEN, NP44 3SE

Certifier details

Name: COUCH PERRY & WILKES

Telephone number: 0121 709 6600

Address: INTERFACE 100, ARLESTON WAY, SOLIHULL,
B90 4LH

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.26

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.26

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	1.4
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	0.8
Target primary energy rate (TPER), kWh _{pE} /m ² annum	8.86
Building primary energy rate (BPER), kWh _{pE} /m ² annum	6.88
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	FF000005:Surf[1]
Floors	0.22	0.22	0.22	WR000002:Surf[1]
Pitched roofs	0.2	-	-	No pitched roofs in building
Flat roofs	0.2	0.18	0.18	FF000005:Surf[0]
Windows**	1.6	1.6	1.6	FF000005:Surf[2]
Roof windows	1.8	-	-	No roof windows or curtain walls in building
Rooflights***	2.2	2.1	2.1	L0000007:Surf[3]
Personnel doors	1.8	1.6	1.6	L0000007:Surf[8]
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_i-Calc = Calculated maximum individual element U-values [W/(m²K)]

U_a-Calc = Calculated area-weighted average 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 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- VRF HEATING AND COOLING WITH HRU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3	5	0	2	0.75
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- ELECTRIC HEATERS AND MECH EXTRACT

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	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- ELECTRIC POU DOMESTIC HOT WATER HEATER

	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	ID of system type	SFP [W/(l/s)]									HR efficiency	
		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		
L01: DIS WC		-	-	0.5	-	-	-	-	-	-	-	N/A
L01: Clean Store		-	-	0.5	-	-	-	-	-	-	-	N/A
L00: WC		-	-	0.5	-	-	-	-	-	-	-	N/A
L00: Shower		-	-	0.5	-	-	-	-	-	-	-	N/A
L00: DIS WC		-	-	0.5	-	-	-	-	-	-	-	N/A
L01: WC		-	-	0.5	-	-	-	-	-	-	-	N/A
L01: WC		-	-	0.5	-	-	-	-	-	-	-	N/A

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		
L01: WC		-	-	0.5	-	-	-	-	-	-	-	N/A
L01: WC		-	-	0.5	-	-	-	-	-	-	-	N/A
L01: Male WC		-	-	0.5	-	-	-	-	-	-	-	N/A
L01: Female WC		-	-	0.5	-	-	-	-	-	-	-	N/A
L00: WC		-	-	0.5	-	-	-	-	-	-	-	N/A
L00: Clean Store		-	-	0.5	-	-	-	-	-	-	-	N/A

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
L01: Stair		100	-	-
L01: Poss. TEA		100	-	-
L01: Stair (Main)		100	-	-
L01: DIS WC		100	-	-
L01: Clean Store		100	-	-
L00: Stair		100	-	-
L00: WC		100	-	-
L00: Shower		100	-	-
L00: Stair (Main)		100	-	-
L00: DIS WC		100	-	-
L01: WC		100	-	-
L01: WC		100	-	-
L01: WC		100	-	-
L01: WC		100	-	-
L01: Male WC		100	-	-
L01: Female WC		100	-	-
L00: WC		100	-	-
L00: Clean Store		100	-	-
L00: Storage Space		100	-	-
L01: Open Office		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?
L01: Poss. TEA	N/A	N/A
L00: Storage Space	YES (+95.3%)	NO
L01: Open Office	NO (-5.8%)	YES

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?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	5058.4	5058.4
External area [m ²]	13571.6	13571.6
Weather	CAR	CAR
Infiltration [m ³ /hm ² @ 50Pa]	5	5
Average conductance [W/K]	4486.11	4207.22
Average U-value [W/m ² K]	0.33	0.31
Alpha value* [%]	25.44	10

* 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

100 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
 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	2.77	4.06
Cooling	0.3	0.35
Auxiliary	0.77	1.45
Lighting	9.72	11.04
Hot water	8.09	7.69
Equipment*	30.64	30.64
TOTAL**	21.65	24.58

* 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	17.87	17.75
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>17.87</i>	<i>17.75</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	24.43	19.04
Primary energy [kWh _{PE} /m ²]	6.88	8.86
Total emissions [kg/m ²]	0.82	1.38

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] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	175.7	68.7	16.3	3.8	8.3	3	5	3	5
Notional	107.8	74.9	33.1	4.5	16.9	0.91	4.63	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	484.6	0	134.6	0	10.9	1	0	1	0
Notional	431.5	0	132.4	0	12.4	0.91	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/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	FF000005:Surf[1]
Floors	0.2	0.22	WR000002:Surf[1]
Roofs	0.15	-	
Windows and roof windows	1.5	-	
Personnel doors	1.5	1.6	L0000007:Surf[8]
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/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	5