

Project name

Project Fury

As designed

Date: Tue Mar 07 20:07:44 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.16

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.16

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

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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	22.9
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	22.9
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	-3.3
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	05000000:Surf[9]
Floor	0.25	0.22	0.22	05000000:Surf[0]
Roof	0.25	0.18	0.18	05000012:Surf[11]
Windows***, roof windows, and rooflights	2.2	1.12	1.36	05000000:Surf[1]
Personnel doors	2.2	1.95	2.2	05000001:Surf[1]
Vehicle access & similar large doors	1.5	1.5	1.5	05000011:Surf[1]
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	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	>0.95

1- VRF Office / MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.3	5.2	0	1	0.85
Standard value	2.5*	2.55	N/A	1.6^	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.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

2- Electric Radiators Natural

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	-	-
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					YES

3- Electric Radiators WC Extract

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	-	-
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					YES

4- Radiant Heating & Extract

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	0	-
Standard value	0.86	N/A	0.55	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

1- VRF Office / MVHR

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	4.3	0.004
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

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

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard	
05.00.01 CSP[0500000B]	-	-	-	-	-	-	-	0.3	-	-	N/A	
06.00.01 Reception [06000004]	-	-	-	-	-	-	-	0.3	-	-	N/A	
05.01.24 Office [05000020]	-	-	-	-	-	-	-	0.3	-	-	N/A	
05.01.28 Tea Point [05000033]	-	-	-	-	-	-	-	0.3	-	-	N/A	
06.01.23 Office [06000015]	-	-	-	-	-	-	-	0.3	-	-	N/A	
06.01.28 Tea Point [06000033]	-	-	-	-	-	-	-	0.3	-	-	N/A	
06.00.11 Unit 7 Warehouse Office [0600000F]	-	-	-	-	-	-	-	0.3	-	-	N/A	
06.00.11 Unit 7 Warehouse Office [0600000F]	-	-	-	-	-	-	-	0.3	-	-	N/A	
06.00.11 Unit 7 Warehouse Office [0600000F]	-	-	-	-	-	-	-	0.3	-	-	N/A	
06.00.11 Unit 7 Warehouse Office [0600000F]	-	-	-	-	-	-	-	0.3	-	-	N/A	

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
Standard value		60	60	22	
05.00.01 CSP[0500000B]		-	146	10	720
05.00.02 Stair 01 [0500000A]		-	92	-	129
05.00.02 Stair 02 [0500000E]		-	111	-	79
05.00.03 Corridor [05000006]		-	93	-	47
05.00.04 Female WC Lobby [05000005]		-	147	-	11
05.00.05 Female WC [05000004]		-	87	-	86
05.00.06 Male WC Lobby [05000002]		-	166	-	8
05.00.07 Male WC [05000003]		-	96	-	62
05.00.09 Acc. WC [05000007]		-	113	-	33
05.00.10 Lift [05000009]		282	-	-	13
05.00.11 Unit 6 Warehouse [05000021]		92	-	-	8879
05.00.11 Unit 6 Warehouse [05000021]		282	-	-	0
05.00.13 Riser [0500000C]		282	-	-	19
05.00.14 Goods Lift [0500000D]		282	-	-	18
05.00.14 Riser [05000008]		282	-	-	5
05.01.00 Store [05000017]		170	-	-	4
05.01.00 Void [0500001E]		282	-	-	0
05.01.14 Riser [0500001C]		282	-	-	5
05.01.16 Corridor [05000011]		-	97	-	25
05.01.17 Cleaners [05000015]		255	-	-	2
05.01.18 Male WC [05000016]		-	84	-	105
05.01.19 Acc. WC [0500001F]		-	103	-	42
05.01.20 Female WC [05000013]		-	144	-	21
05.01.21 Female WC [05000012]		-	76	-	132
05.01.22 Corridor [0500000F]		-	71	-	97
05.01.23 Lift [05000018]		258	-	-	13
05.01.25 Mezzanine [0500001A]		94	-	-	1247
05.01.25 Mezzanine [0500001A]		282	-	-	0
05.01.26 Riser [05000014]		282	-	-	19

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
05.01.26 Riser [05000014]		282	-	-	0
05.01.26 Stair 02 [0500001D]		-	96	-	79
05.01.26 Stair 02 [0500001D]		-	188	-	0
05.01.27 Goods Lift [0500001B]		282	-	-	18
05.01.27 Goods Lift [0500001B]		282	-	-	0
05.02.00 Void [05000019]		282	-	-	0
05.02.29 Stair 01 [05000023]		-	85	-	95
05.02.30 Plant Room [05000024]		115	-	-	232
06.00.01 Reception [06000004]		119	-	-	460
06.00.02 Stair 01 [06000008]		-	92	-	129
06.00.02 Stair 02 [06000002]		-	111	-	79
06.00.03 Corridor [06000009]		-	100	-	42
06.00.04 Female WC Lobby [0600000D]		-	155	-	19
06.00.05 Female WC [0600000E]		-	83	-	97
06.00.06 Male WC Lobby [0600000B]		-	155	-	9
06.00.07 Male WC [0600000C]		-	89	-	75
06.00.09 Acc. WC [06000007]		-	111	-	34
06.00.10 Lift [06000006]		282	-	-	13
06.00.11 Unit 7 Warehouse [0600000F]		106	-	-	131
06.00.13 Riser [06000003]		282	-	-	23
06.00.14 Goods Lift [06000001]		282	-	-	18
06.00.33 Riser [06000005]		282	-	-	6
06.01.00 Female WC Lobby [06000023]		-	148	-	21
06.01.00 Lift [06000018]		258	-	-	13
06.01.00 Store [06000017]		167	-	-	5
06.01.00 Void [06000022]		282	-	-	0
06.01.14 Riser [0600001D]		282	-	-	6
06.01.15 Stair 01 [06000010]		-	67	-	95
06.01.16 Corridor [06000011]		-	104	-	23
06.01.17 Cleaners [06000016]		208	-	-	3
06.01.18 Male WC [06000024]		-	81	-	119
06.01.19 Acc. WC [06000014]		-	96	-	52
06.01.21 Female WC [06000012]		-	75	-	141
06.01.22 Corridor [06000021]		-	72	-	93
06.01.24 Mezzanine [0600001F]		95	-	-	1024
06.01.24 Mezzanine [0600001F]		282	-	-	0
06.01.25 Stair 02 [0600001C]		-	96	-	79
06.01.25 Stair 02 [0600001C]		-	188	-	0
06.01.26 Riser [06000020]		282	-	-	23
06.01.26 Riser [06000020]		282	-	-	0
06.01.27 Goods Lift [0600001B]		282	-	-	18
06.01.27 Goods Lift [0600001B]		282	-	-	0
06.02.00 Void [0600001A]		-	188	-	0

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
06.02.29 Stair 01 [06000025]		-	85	-	95
06.02.30 Plant Room [06000000]		113	-	-	251
05.01.24 Office [05000020]		93	-	-	1373
05.01.28 Tea Point [05000033]		251	-	-	12
06.01.23 Office [06000015]		95	-	-	839
06.01.28 Tea Point [06000033]		253	-	-	11
05.00.08 Shower Room Lobby [05000001]		-	105	-	20
05.00.08 Shower Room 01 [05000035]		-	188	-	4
05.00.08 Shower Room Dry 01 [05000036]		-	159	-	9
05.00.08 Shower Room 02 [05000034]		-	188	-	4
05.00.08 Shower Room Dry 02 [05000045]		-	179	-	7
06.00.08 Shower Lobby [06000034]		-	100	-	24
06.00.08 Shower Room 02 [06000035]		-	188	-	6
06.00.08 Shower Room Dry 02 [06000036]		-	140	-	11
06.00.08 Shower Room Dry 01 [0600000A]		-	158	-	9
06.00.08 Shower Room 01 [06000045]		-	188	-	4
05.01.15 Stair 01 [05000010]		-	65	-	28
05.01.15 Stair 01 [05000037]		-	69	-	67
06.00.11 Unit 7 Warehouse [0600000F]		123	-	-	7569
06.00.11 Unit 7 Warehouse Office [0600000F]		137	-	-	179
06.00.11 Unit 7 Warehouse [0600000F]		129	-	-	134
06.00.11 Unit 7 Warehouse Office [0600000F]		170	-	-	58
06.00.11 Unit 7 Warehouse [0600000F]		208	-	-	44
06.00.11 Unit 7 Warehouse Office [0600000F]		170	-	-	67
06.00.11 Unit 7 Warehouse [0600000F]		143	-	-	50
06.00.11 Unit 7 Warehouse [0600000F]		129	-	-	98
06.00.11 Unit 7 Warehouse Office [0600000F]		142	-	-	131

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?
05.00.01 CSP[0500000B]	NO (-25.7%)	NO
05.01.25 Mezzanine [0500001A]	NO (-8.2%)	NO
05.01.25 Mezzanine [0500001A]	NO (-72.4%)	NO
06.00.01 Reception [06000004]	YES (+81.3%)	NO
06.00.11 Unit 7 Warehouse [0600000F]	NO (-51.8%)	NO
06.01.24 Mezzanine [0600001F]	NO (-10.8%)	NO
06.01.24 Mezzanine [0600001F]	NO (-74.8%)	NO
05.01.24 Office [05000020]	YES (+64%)	NO
05.01.28 Tea Point [05000033]	YES (+127.1%)	NO
06.01.23 Office [06000015]	YES (+63%)	NO
06.01.28 Tea Point [06000033]	YES (+111.3%)	NO
06.00.11 Unit 7 Warehouse [0600000F]	NO (-43.6%)	NO
06.00.11 Unit 7 Warehouse Office [0600000F]	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
06.00.11 Unit 7 Warehouse [0600000F]	NO (-31.6%)	NO
06.00.11 Unit 7 Warehouse Office [0600000F]	N/A	N/A
06.00.11 Unit 7 Warehouse [0600000F]	YES (+40.4%)	NO
06.00.11 Unit 7 Warehouse Office [0600000F]	N/A	N/A
06.00.11 Unit 7 Warehouse [0600000F]	NO (-7.5%)	NO
06.00.11 Unit 7 Warehouse [0600000F]	NO (-14.7%)	NO
06.00.11 Unit 7 Warehouse Office [0600000F]	N/A	N/A

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]	6937.4	6937.4
External area [m ²]	13778.4	13778.4
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	5
Average conductance [W/K]	4194.07	3816.09
Average U-value [W/m ² K]	0.3	0.28
Alpha value* [%]	10.15	10

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

Building Use

% Area	Building Type
1	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
99	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	1.99	2.04
Cooling	2.6	3.04
Auxiliary	2.23	1.55
Lighting	15.7	34.71
Hot water	3.34	4.9
Equipment*	142.48	142.48
TOTAL **	25.86	46.24

* 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	31.02	0
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]	52.28	48.21
Primary energy* [kWh/m ²]	75.57	134.75
Total emissions [kg/m ²]	-3.3	22.9

* 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] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	12.8	530.3	0.9	30.7	20.7	4.1	4.8	4.3	5.2
	Notional	7.1	442.9	0.8	32.5	17.3	2.56	3.79	----	----
[ST] Central heating using water: radiators, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	77.9	0	21.6	0	2.6	1	0	1	0
	Notional	83.5	0	26.9	0	1.3	0.86	0	----	----
[ST] Central heating using water: radiators, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	2.1	0	0.6	0	0.3	1	0	1	0
	Notional	2.3	0	0.7	0	0.2	0.86	0	----	----
[ST] Flued radiant heater, [HS] Unitary radiant heater, [HFT] Natural Gas, [CFT] Electricity										
	Actual	8.1	0	2.7	0	0	0.85	0	0.91	0
	Notional	7	0	2.3	0	0	0.86	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}	Surface where the minimum value occurs*
Wall	0.23	0.25	05000000:Surf[9]
Floor	0.2	0.22	05000000:Surf[0]
Roof	0.15	0.18	05000012:Surf[11]
Windows, roof windows, and rooflights	1.5	1.01	05000012:Surf[1]
Personnel doors	1.5	1.58	05000000:Surf[2]
Vehicle access & similar large doors	1.5	1.5	05000011:Surf[1]
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	5