

Project name

RMC base_green 2021**As designed****Date:** Mon Oct 03 16:11:26 2022

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:** 7.0.16**Interface to calculation engine:** IES Virtual Environment**Interface to calculation engine version:** 7.0.16**BRUKL compliance module version:** v6.1.c.0**Foundation area [m²]:** 658.31The 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	3.04
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	1.75
Target primary energy rate (TPER), kWh/m ² annum	32.36
Building primary energy rate (BPER), kWh/m ² annum	17.51
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	0.15	0.15	B_000000:Surf[2]
Floors	0.18	0.13	0.13	L1000004:Surf[14]
Pitched roofs	0.16	-	-	No Pitched roofs in building
Flat roofs	0.18	0.13	0.13	B_000000:Surf[1]
Windows** and roof windows	1.6	1.2	1.2	BT000005:Surf[4]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	1.68	2.2	RF00000D:Surf[2]
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 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	3

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- LTHW radiators NV

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	-	0.3	-	-
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

2- DX no vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	0	-	-
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

3- LTHW radiators AHU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	-	0.3	-	0.76
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

4- LTHW radiators MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	-	0.3	-	0.89
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

5- Displacement ventilation

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	5	0	1.4	0.76
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					YES
* 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.					

"No HWS in project, or hot water is provided by HVAC system"

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			
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		Zone	Standard
B AHU plant room serving studio theatre	-	-	0.4	-	-	-	-	-	-	-	-	N/A
B AWC	-	-	-	1.4	-	-	-	-	-	-	-	N/A
B Female changing	-	-	-	1.4	-	-	-	-	-	-	-	N/A
B Female showers	-	-	-	1.4	-	-	-	-	-	-	-	N/A
B Female toilets	-	-	-	1.4	-	-	-	-	-	-	-	N/A
B Female WC	-	-	-	1.4	-	-	-	-	-	-	-	N/A
B Green room	-	-	-	0.8	-	-	-	-	-	-	-	N/A
B Male changing	-	-	-	1.4	-	-	-	-	-	-	-	N/A
B Male showers	-	-	-	1.4	-	-	-	-	-	-	-	N/A
B Male toilets	-	-	-	1.4	-	-	-	-	-	-	-	N/A
B Male WC	-	-	-	1.4	-	-	-	-	-	-	-	N/A
B Plant	-	-	0.4	-	-	-	-	-	-	-	-	N/A
B Prop store	-	-	0.4	-	-	-	-	-	-	-	-	N/A
B SpEx store	-	-	0.4	-	-	-	-	-	-	-	-	N/A
B Stage Storage	-	-	0.4	-	-	-	-	-	-	-	-	N/A
B Store 01	-	-	0.4	-	-	-	-	-	-	-	-	N/A
B Store 02	-	-	0.4	-	-	-	-	-	-	-	-	N/A
B Store 03	-	-	0.4	-	-	-	-	-	-	-	-	N/A
B Technician	-	-	-	0.8	-	-	-	-	-	-	-	N/A
B WC	-	-	-	1.4	-	-	-	-	-	-	-	N/A
B Workshop	-	-	-	0.8	-	-	-	-	-	-	-	N/A
L0 AWC	-	-	-	1.4	-	-	-	-	-	-	-	N/A
L0 SpEx Managers Office	-	-	-	0.8	-	-	-	-	-	-	-	N/A
L0 SpEx Office	-	-	-	0.8	-	-	-	-	-	-	-	N/A
L1 AWC	-	-	-	1.4	-	-	-	-	-	-	-	N/A
L1 Drama classroom 01	-	-	-	0.8	-	-	-	-	-	-	-	N/A
L1 Drama classroom 02	-	-	-	0.8	-	-	-	-	-	-	-	N/A
L1 Drama Office	-	-	-	0.8	-	-	-	-	-	-	-	N/A
L1 Female WC	-	-	-	1.4	-	-	-	-	-	-	-	N/A
L1 Male WC	-	-	-	1.4	-	-	-	-	-	-	-	N/A

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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
L1 Staff breakout kitchenette	-	-	-	0.8	-	-	-	-	-	-	N/A
L1 Store	-	-	0.4	-	-	-	-	-	-	-	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	
B AHU plant room serving studio theatre	95	-	-	
B Armoury	95	-	-	
B AV room	95	-	-	
B AWC	95	-	-	
B Circulation	95	-	-	
B Drama Foyer	95	-	-	
B Escape stair west	95	-	-	
B Female changing	95	-	-	
B Female changing circ	95	-	-	
B Female showers	95	-	-	
B Female toilets	95	-	-	
B Female WC	95	-	-	
B Green room	95	-	-	
B Lobby 01	95	-	-	
B Lobby 02	95	-	-	
B Lobby 03	95	-	-	
B Lobby 04	95	-	-	
B Lobby 05	95	-	-	
B Lobby 06	95	-	-	
B Lobby 07	95	-	-	
B Male changing	95	-	-	
B Male changing circ	95	-	-	
B Male showers	95	-	-	
B Male toilets	95	-	-	
B Male WC	95	-	-	
B Plant	95	-	-	
B Prop store	95	-	-	
B SpEx Lobby	95	-	-	
B SpEx store	95	-	-	
B Stage Storage	95	-	-	
B Store 01	95	-	-	
B Store 02	95	-	-	
B Store 03	95	-	-	
B Technician	95	-	-	
B Theatre	95	-	-	
B WC	95	-	-	
B Workshop	95	-	-	

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
L0 AWC		95	-	-
L0 Control room		95	-	-
L0 Drama Foyer		95	-	-
L0 Escape stair west		95	-	-
L0 IT/Patch panel room		95	-	-
L0 Lobby 01		95	-	-
L0 Lobby 02		95	-	-
L0 Lobby 03		95	-	-
L0 SpEx Managers Office		95	-	-
L0 SpEx Office		95	-	-
L1 AWC		95	-	-
L1 Circulation 01		95	-	-
L1 Circulation 02		95	-	-
L1 Drama classroom 01		95	-	-
L1 Drama classroom 02		95	-	-
L1 Drama Office		95	-	-
L1 Escape stair west		95	-	-
L1 Female WC		95	-	-
L1 Lobby		95	-	-
L1 Male WC		95	-	-
L1 Staff breakout kitchenette		95	-	-
L1 Store		95	-	-
L1 Viewing area		95	-	-

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?
B AV room	N/A	N/A
B Green room	NO (-36.7%)	NO
B Technician	NO (-54%)	NO
B Theatre	NO (-82.4%)	NO
B Workshop	N/A	N/A
L0 Control room	N/A	N/A
L0 IT/Patch panel room	N/A	N/A
L0 SpEx Managers Office	NO (-82.9%)	NO
L0 SpEx Office	NO (-68.7%)	NO
L1 Drama classroom 01	NO (-3.3%)	NO
L1 Drama classroom 02	NO (-38.3%)	NO
L1 Drama Office	NO (-81.7%)	NO
L1 Staff breakout kitchenette	NO (-0.5%)	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?	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]	1768.8	1768.8
External area [m ²]	3580.2	3580.2
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	901.32	1000.38
Average U-value [W/m ² K]	0.25	0.28
Alpha value* [%]	25.14	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
16	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
84	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	4.61	5.37
Cooling	0.58	0.37
Auxiliary	2.98	3.42
Lighting	6.25	6.29
Hot water	6.37	6.22
Equipment*	33.07	33.07
TOTAL **	20.79	21.67

* 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	9.25	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>9.25</i>	<i>0</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	63.47	59.94
Primary energy [kWh/m ²]	17.51	32.36
Total emissions [kg/m ²]	1.75	3.04

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	81.4	147.1	6.5	11.7	0	3.5	3.5	3.5	3.5
	Notional	76.8	106.7	7.7	6.4	0	2.78	4.63	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	54.3	0	4.5	0	1.2	3.33	0	3.5	0
	Notional	52.2	0	5.2	0	1.4	2.78	0	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	55.7	0	4.7	0	2.5	3.33	0	3.5	0
	Notional	39.5	0	3.9	0	5.1	2.78	0	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	88.8	0	7.4	0	7.8	3.33	0	3.5	0
	Notional	195.3	0	19.5	0	3.1	2.78	0	----	----
[ST] Chilled ceilings/passive chilled beams & disp. vent., [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	29.3	31.3	2.4	1.9	7.1	3.33	4.5	3.5	5
	Notional	34.8	24.4	3.5	1.5	8.7	2.78	4.63	----	----
[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