

Project name

Sugden Hall

As designed

Date: Thu Jul 07 11:38:05 2022

Administrative information

Building Details

Address: Station Road, Teddington, London, TW11 9AA

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.13

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

Certifier details

Name: CD International

Telephone number:

Address: 159 St. James's Road, London, SE1 5BP

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 | 33.3 |
| Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum | 33.3 |
| Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum | 30.1 |
| 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 | 0.11 | 0.12 | "GF000002_W0" |
| Floor | 0.25 | 0.17 | 0.21 | "WC000001_F" |
| Roof | 0.25 | 0.13 | 0.14 | "GF000002_C" |
| Windows***, roof windows, and rooflights | 2.2 | 1.95 | 1.95 | "GF000002_W4_O0" |
| Personnel doors | 2.2 | - | - | "No external personnel doors" |
| Vehicle access & similar large doors | 1.5 | - | - | "No external vehicle access doors" |
| High usage entrance doors | 3.5 | - | - | "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)] | | | | |
| * 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- 5. MVHR & Electric Panel Heater (Copy)

| | 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 |

2- 1. Heat Pump - Cassettes

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|--------------------|--------------------|--------------------|---------------|---------------|
| This system | 3.14 | 3.5 | - | - | - |
| Standard value | 2.5* | 2.6 | 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. For types <=12 kW output, refer to EN 14825 for limiting standards. | | | | | |

1- SYST0003-DHW

| | Water heating efficiency | Storage loss factor [kWh/litre per day] |
|-----------------------|--------------------------|---|
| This building | 1 | 0.012 |
| Standard value | 1 | N/A |

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 | |
|-----------------------|---------------|-----|-----|-----|-----|-----|-----|-----|---|------|---------------|--|
| | A | B | C | D | E | F | G | H | I | Zone | Standard | |
| Standard value | 0.3 | 1.1 | 0.5 | 1.9 | 1.6 | 0.5 | 1.1 | 0.5 | 1 | | | |
| WC | - | - | 0.3 | - | - | - | - | - | - | - | N/A | |
| DIS WC | - | - | 0.4 | - | - | - | - | - | - | - | N/A | |
| Kitchen | - | - | - | - | - | - | - | - | 1 | - | N/A | |

General lighting and display lighting

| Zone name | Luminous efficacy [lm/W] | | | General lighting [W] |
|-----------------------------|--------------------------|------|--------------|----------------------|
| | Luminaire | Lamp | Display lamp | |
| Standard value | 60 | 60 | 22 | |
| Stairway | - | 200 | - | 15 |
| Waiting Room/Entrance Lobby | - | 200 | - | 34 |

| General lighting and display lighting | | Luminous efficacy [lm/W] | | | |
|---------------------------------------|-----------------------|--------------------------|------|--------------|----------------------|
| Zone name | | Luminaire | Lamp | Display lamp | General lighting [W] |
| | Standard value | 60 | 60 | 22 | |
| WC | | - | 95 | - | 21 |
| Waiting Room/Entrance Lobby | | - | 200 | - | 17 |
| DIS WC | | - | 200 | - | 23 |
| UG Store | | 95 | - | - | 146 |
| Consultation Room 4 | | 100 | - | - | 242 |
| Consultation Room 2 | | 100 | - | - | 115 |
| Consultation Room 1 | | 100 | - | - | 95 |
| Consultation Room 3 | | 100 | - | - | 115 |
| Kitchen | | 95 | - | - | 74 |

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? |
|---------------------|--------------------------------|-----------------------|
| UG Store | N/A | N/A |
| Consultation Room 4 | NO (-76.1%) | YES |
| Consultation Room 2 | NO (-69.3%) | YES |
| Consultation Room 1 | NO (-70.5%) | YES |
| Consultation Room 3 | NO (-69.3%) | YES |
| Kitchen | NO (-84.2%) | YES |

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? | YES |
| Is evidence of such assessment available as a separate submission? | NO |
| Are any such measures included in the proposed design? | YES |

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

| | Actual | Notional |
|---|--------|----------|
| Area [m ²] | 117.4 | 117.4 |
| External area [m ²] | 394 | 394 |
| Weather | LON | LON |
| Infiltration [m ³ /hm ² @ 50Pa] | 5 | 5 |
| Average conductance [W/K] | 103.3 | 185.07 |
| Average U-value [W/m ² K] | 0.26 | 0.47 |
| Alpha value* [%] | 35.58 | 23.7 |

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

Building Use

% Area Building Type

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
 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

100 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 | 29.36 | 45.15 |
| Cooling | 4.6 | 7.04 |
| Auxiliary | 3.66 | 2.49 |
| Lighting | 15.92 | 21.55 |
| Hot water | 4.42 | 3.1 |
| Equipment* | 29.94 | 29.94 |
| TOTAL** | 57.95 | 79.33 |

* 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 | 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] | 240.33 | 364 |
| Primary energy* [kWh/m ²] | 177.92 | 168.25 |
| Total emissions [kg/m ²] | 30.1 | 33.3 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance

| System Type | Heat dem MJ/m ² | Cool dem MJ/m ² | Heat con kWh/m ² | Cool con kWh/m ² | Aux con kWh/m ² | Heat SSEFF | Cool SSEER | Heat gen SEFF | Cool gen SEER |
|--|-------------------------------|-------------------------------|--------------------------------|--------------------------------|-------------------------------|---------------|---------------|------------------|------------------|
| [ST] Other local room heater - fanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity | | | | | | | | | |
| Actual | 160.6 | 69.9 | 55.8 | 0 | 2.4 | 0.8 | 0 | 1 | 0 |
| Notional | 260 | 189.1 | 88.2 | 0 | 2.2 | 0.82 | 0 | ---- | ---- |
| [ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity | | | | | | | | | |
| Actual | 146.6 | 99.7 | 13.2 | 7.4 | 4.4 | 3.08 | 3.74 | 3.14 | 5 |
| Notional | 165 | 147 | 18.9 | 11.3 | 2.7 | 2.43 | 3.6 | ---- | ---- |

Key to terms

| | |
|--------------------------------|---|
| Heat dem [MJ/m ²] | = Heating energy demand |
| Cool dem [MJ/m ²] | = Cooling energy demand |
| Heat con [kWh/m ²] | = Heating energy consumption |
| Cool con [kWh/m ²] | = Cooling energy consumption |
| Aux con [kWh/m ²] | = 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 | 0.1 | "GS000000_W-1" |
| Floor | 0.2 | 0.15 | "GF000005_F" |
| Roof | 0.15 | 0.11 | "GS000000_C" |
| Windows, roof windows, and rooflights | 1.5 | 1.95 | "GF000002_W4_O0" |
| Personnel doors | 1.5 | - | "No external personnel doors" |
| 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/(m ² K)] | | U _{i-Min} = Minimum individual element U-values [W/(m ² K)] | |
| * There might be more than one surface where the minimum U-value occurs. | | | |

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