

## Project name

**Retail**

As designed

Date: Wed Jun 13 11:16:41 2018

## Administrative information

## Building Details

Address: ,

## Certification tool

Calculation engine: TAS

Calculation engine version: "v9.4.3"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.4.3

BRUKL compliance check version: v5.4.b.0

## Owner Details

Name:

Telephone number:

Address: , ,

## Certifier details

Name: Scott Hedges

Telephone number: 01932753739

Address: 51 Staines Road West, Sunbury-on-Thames,  
TW16 7AHCriterion 1: The calculated CO<sub>2</sub> emission rate for the building must not exceed the target

|                                                                                                    |                     |
|----------------------------------------------------------------------------------------------------|---------------------|
| CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum | 39                  |
| Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum               | 39                  |
| Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum             | 37.4                |
| 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 <sub>a</sub> -Limit | U <sub>a</sub> -Calc | U <sub>i</sub> -Calc | Surface where the maximum value occurs* |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|----------------------|-----------------------------------------|
| Wall**                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.35                  | 0.14                 | 0.14                 | External Wall                           |
| Floor                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.25                  | 0.2                  | 0.2                  | Ground Floor                            |
| Roof                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.25                  | 0.12                 | 0.12                 | Roof                                    |
| Windows***, roof windows, and rooflights                                                                                                                                                                                                                                                                                                                                                                                                     | 2.2                   | 1.5                  | 1.5                  | Morrisons Glazing                       |
| Personnel doors                                                                                                                                                                                                                                                                                                                                                                                                                              | 2.2                   | 2.18                 | 2.18                 | Morrisons Rear Door                     |
| Vehicle access & similar large doors                                                                                                                                                                                                                                                                                                                                                                                                         | 1.5                   | 1.49                 | 1.49                 | Morrisons V. Door                       |
| High usage entrance doors                                                                                                                                                                                                                                                                                                                                                                                                                    | 3.5                   | -                    | -                    | No high usage entrance doors in project |
| U <sub>a</sub> -Limit = Limiting area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>a</sub> -Calc = Calculated area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>i</sub> -Calc = Calculated maximum individual element U-values [W/(m <sup>2</sup> K)]                                                                                                                                                            |                       |                      |                      |                                         |
| * There might be more than one surface where the maximum U-value occurs.<br>** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.<br>*** Display windows and similar glazing are excluded from the U-value check.<br>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 <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa | 10                        | 2             |

## 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- A12 Warehouse/Store

|                                                                                           | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|-------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------|---------------|
| This system                                                                               | 0.91               | -                  | -                  | -             | -             |
| 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           |

### 2- A12 Shop (3 Zones)

|                                                                                                                                                                                                                                                   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------|---------------|
| This system                                                                                                                                                                                                                                       | 4                  | 5                  | -                  | 1.6           | 0.7           |
| Standard value                                                                                                                                                                                                                                    | 0.91*              | 2.6                | N/A                | 1.6^          | 0.65          |
| 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. |                    |                    |                    |               |               |
| ^ 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.                                                               |                    |                    |                    |               |               |

### 1- DHW

|                                                                                                             | Water heating efficiency | Storage loss factor [kWh/litre per day] |
|-------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------|
| This building                                                                                               | 1                        | 0                                       |
| Standard value                                                                                              | 0.9*                     | N/A                                     |
| * Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73. |                          |                                         |

"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] |
|---------------------------------------|----------------|--------------------------|------|--------------|----------------------|
| Zone name                             |                | Luminaire                | Lamp | Display lamp |                      |
|                                       | Standard value | 60                       | 60   | 22           |                      |
| A12 Warehouse/Store 1                 |                | 100                      | -    | -            | 266                  |
| A12 Shop 1                            |                | -                        | 100  | 22           | 2256                 |
| A12 Shop 2                            |                | -                        | 100  | 22           | 7795                 |
| A12 Warehouse/Store 2                 |                | 100                      | -    | -            | 93                   |
| A12 Warehouse/Store 3                 |                | 100                      | -    | -            | 66                   |
| A12 Circulation 1                     |                | -                        | 100  | -            | 93                   |

## 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? |
|-------------------|--------------------------------|-----------------------|
| A12 Shop 1        | YES (+54%)                     | NO                    |
| A12 Shop 2        | NO (-84%)                      | NO                    |
| A12 Circulation 1 | YES (+113%)                    | NO                    |

## 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 <sup>2</sup> ]                                | 1569   | 1569     |
| External area [m <sup>2</sup> ]                       | 3099   | 3099     |
| Weather                                               | LON    | LON      |
| Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa] | 2      | 6        |
| Average conductance [W/K]                             | 795    | 871      |
| Average U-value [W/m <sup>2</sup> K]                  | 0.26   | 0.28     |
| Alpha value* [%]                                      | 5.65   | 5.65     |

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

## Building Use

| % Area | Building Type                                                      |
|--------|--------------------------------------------------------------------|
| 100    | <b>A1/A2 Retail/Financial and Professional services</b>            |
|        | 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                         |
|        | 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/m<sup>2</sup>]

|                 | Actual      | Notional     |
|-----------------|-------------|--------------|
| Heating         | 5.36        | 8.62         |
| Cooling         | 28.81       | 30.87        |
| Auxiliary       | 5.28        | 3.07         |
| Lighting        | 36.3        | 38.49        |
| Hot water       | 1.16        | 1.34         |
| Equipment*      | 157.12      | 157.12       |
| <b>TOTAL **</b> | <b>76.9</b> | <b>82.38</b> |

\* 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/m<sup>2</sup>]

|                       | Actual | Notional |
|-----------------------|--------|----------|
| Photovoltaic systems  | 0      | 0        |
| Wind turbines         | 0      | 0        |
| CHP generators        | 0      | 0        |
| Solar thermal systems | 0      | 0        |

## Energy & CO<sub>2</sub> Emissions Summary

|                                               | Actual | Notional |
|-----------------------------------------------|--------|----------|
| Heating + cooling demand [MJ/m <sup>2</sup> ] | 565.81 | 448.92   |
| Primary energy* [kWh/m <sup>2</sup> ]         | 220.89 | 229.09   |
| Total emissions [kg/m <sup>2</sup> ]          | 37.4   | 39       |

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

| HVAC Systems Performance                                                                    |                   |                   |                    |                    |                   |               |               |                  |                  |      |
|---------------------------------------------------------------------------------------------|-------------------|-------------------|--------------------|--------------------|-------------------|---------------|---------------|------------------|------------------|------|
| System Type                                                                                 | Heat dem<br>MJ/m2 | Cool dem<br>MJ/m2 | Heat con<br>kWh/m2 | Cool con<br>kWh/m2 | Aux con<br>kWh/m2 | Heat<br>SSEFF | Cool<br>SSEER | Heat gen<br>SEFF | Cool gen<br>SEER |      |
| [ST] Multiburner radiant heaters, [HS] Radiant heater, [HFT] Natural Gas, [CFT] Electricity |                   |                   |                    |                    |                   |               |               |                  |                  |      |
|                                                                                             | Actual            | 69.7              | 0                  | 21.3               | 0                 | 0             | 0.91          | 0                | 0.91             | 0    |
|                                                                                             | Notional          | 101               | 0                  | 34.3               | 0                 | 0             | 0.82          | 0                | ----             | ---- |
| [ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Electricity, [CFT] Electricity    |                   |                   |                    |                    |                   |               |               |                  |                  |      |
|                                                                                             | Actual            | 2.4               | 737.2              | 0.2                | 41                | 7.5           | 4             | 5                | 4                | 5    |
|                                                                                             | Notional          | 2.1               | 568.6              | 0.2                | 43.9              | 4.4           | 2.43          | 3.6              | ----             | ---- |

### 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 <sub>i-Typ</sub> | U <sub>i-Min</sub>                                                 | Surface where the minimum value occurs* |
|--------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------|-----------------------------------------|
| Wall                                                                     | 0.23               | 0.14                                                               | External Wall                           |
| Floor                                                                    | 0.2                | 0.2                                                                | Ground Floor                            |
| Roof                                                                     | 0.15               | 0.12                                                               | Roof                                    |
| Windows, roof windows, and rooflights                                    | 1.5                | 1.5                                                                | Morrisons Glazing                       |
| Personnel doors                                                          | 1.5                | 2.18                                                               | Morrisons Rear Door                     |
| Vehicle access & similar large doors                                     | 1.5                | 1.49                                                               | Morrisons V. Door                       |
| High usage entrance doors                                                | 1.5                | -                                                                  | No high usage entrance doors in project |
| U <sub>i-Typ</sub> = Typical individual element U-values [W/(m²K)]       |                    | U <sub>i-Min</sub> = 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             | 2             |